CEREAL VARIETIES

IN GREAT BRITAIN

BY

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FOREWORD

DURING and since World War II cereals have been in the foreground of British agriculture; scientists, farmers and seedsmen have joined the drive to obtain a greater production of grain to feed the people and livestock of the British Isles.

From time to time farmers, seedsmen, students, in fact all people connected with cereals, have desired information of a general nature regarding the principal varieties of wheat, barley and oats in cultivation throughout the country. The aim of this work is an endeavour to give this desired information on the types grown. It is principally based on five years' observations and trials on the majority of the varieties mentioned, together with data collected from the farming community; some recent introductions have been included with the aid of the breeders' descriptions.

These observations and trials were carried out on the borders of Worcestershire and Staffordshire, practically in the centre of England. The land on which they were grown is of a light sandy nature in an average state of fertility, and is situated approximately 500 ft. above sea level.

It must be remembered by the reader that these observations and general remarks are those of one man in one part of the country, and, consequently, some criticism may arise from time to time from observers in other conditions. The illustrations are from photographs of original material which was taken to represent an average specimen.

To distinguish the many varieties of cereals is a difficult undertaking and it always appears necessary to have some experience in this field. It is hoped, however, that this illustrated description will be useful to those with and without experience, to farmers, seedsmen, maltsters, and to all whose interests are centred around the many varieties of cereals and their uses.

Quite naturally much helpful information on these varieties was collected from many quarters. I would therefore like to tender my appreciation to the professional and commercial people who have provided assistance, in particular to E. T. Jones, M.Sc., Welsh Plant Breeding Station, E. G. Thompson, M.A., Dr. F. Earnshaw, A. F. Kelly, B.Sc., National Institute of Agricultural Botany, W. Robb, N.D.A., F.R.S.E., Corstorphine; also to the North of Scotland College of Agriculture, Aberdeen, the Albert Agricultural College, Dublin, and to Messrs. Gartons Ltd., Warrington, Messrs. C. W. Marsters Ltd., King's Lynn, Messrs. McGill & Smith Ltd., Ayr, Messrs. Carters Ltd., London, Messrs. Bees Ltd., Liverpool, Messrs. Elsoms Ltd., Spalding, Messrs. Dunns Ltd., Salisbury, Messrs. Miln & Co., Chester, Messrs. Hasler & Co., Dunmow, and Twyford Mill Ltd., Banbury.

Finally I would like to express my gratitude to Messrs. Edward Webb & Sons Ltd., Stourbridge, for all the facilities granted which enabled me to carry out this work on their plant-breeding station.

R. A. P.

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INTRODUCTION

THE cultivation of wheat has been carried on from the remotest times; no one country in the world has overlooked its assets, but many countries have failed to establish the types of true bread wheat that we know in Great Britain.

Temperature and rainfall limit the crop to certain parts of the earth, but the plantbreeders have made great strides in breeding suitable varieties not only for many countries but for the different conditions that exist within one country. Emphasis on varieties for different conditions must be noted, as this is most important to the grower of wheat.

All types mentioned and illustrated in this section are to be found growing in the British Isles, some in large acreage, others in small. They are all commonly known as our true bread wheats, and belong to the species *Triticum vulgare*. There is, however, one exception to this, that of Rampton Rivet, which belongs to the species *Triticum turgidum*.

It has been laid down that the characters of cultivated plants vary in response to environment; with this in mind some of the lesser points discussed in the description of the varieties can be treated somewhat broadly by the reader.

Being purely a general description of the varieties of wheat it is essential that seedsmen, corn merchants, farmers, students, and all those interested in this crop should examine for themselves the different features and characters of the varieties. There will be found, however, under the heading "Principal Characters" all the more important botanical features which will aid the reader to differentiate between varieties of similar general appearance.

In the classification of the various types by many botanical and genetical features much work has been done by the staff of the National Institute of Agricultural Botany, Cambridge. In this work it has not been considered necessary to deal too scientifically with the characters examined. Many students of cereals, technical seedsmen, crop inspectors, and others are familiar with all the terms used in this guide.

ORIGIN OF THE VARIETY

The origin of a variety is all important to plant-breeders, students, seedsmen, and many others. Under this heading wherever possible will be found the parentage of the variety and the name of the breeder or introducer. In some cases a date is given which denotes the year of introduction into commerce. The origin of some of the older types is rather obscure, and some contradictions may be found.

Records of origin have been collected from the breeders or the introducer of the variety from many parts of the world, and these have been taken to represent as correct data as it is possible to discover.

GENERAL DESCRIPTION

Firstly, this general description has been compiled from the breeders' reports, trials, observations and the behaviour of field crops with many farmers throughout

the British Isles. To keep this work within the limits of a quick guide to the varieties one must omit a considerable amount of scientific detail. In principle the general description was laid down over five years of observations on light land.

A few enlargements must be made under this heading, and firstly it will be noted that remarks are made on trueness for autumn sowing and also winter hardiness. Much data has been collected by the writer on these two points, and both are quite important to wheat-growers. Experiments have been carried out to obtain information on the effect of date of sowing on crop yield.

There are many wheats which are popular to-day that can be sown as early as the end of September and as late as the end of February with only a small decrease in yield as the sowing date becomes later; on the other hand we have wheats which if not sown in the autumn by the end of November are not remunerative to the farmer or grower. (See further under "Selection of Variety.")

Winter hardiness is important, especially in some districts where it is essential to sow early, thus enabling the plants to establish themselves and cover the ground. Wheats differ to some extent in their ability to survive through the winter; some are more winter hardy than others. The true autumn wheats are all winter hardy, but the stage of growth at which severe winter conditions are encountered can have a big effect on the ability of the plants to survive. Severe conditions when the plant is just emerging through the soil can have grave effects.

In general, winter conditions in Great Britain are not so severe as those found in Scandinavia and parts of the Continent, where the wheat crop must be sown by very early October, but in Eastern England, where the principal grain belts are found, hard frosts are not uncommon.

Some of the spring wheats have certain winter hardy characters, but it is not normal farming practice to risk these types as an autumn or winter sown crop.

Covering of the ground in the winter and early tillering are characters which must be observed. The usual prostrate habit of growth of the varieties which cover well is usually followed by early spring tillering, giving them a vigorous and healthy appearance. High tillering is not always a pointer to the yield of the variety, as some varieties of wheat (principally of Continental origin) with a semi-prostrate habit of growth and low tillering in the spring are our best yielding wheats to-day.

Earliness of ripening is all important to many growers; it is essential for the grower to have his harvest spread over a limited period by the time of ripening of his grain crops. To give a date when the variety should be mature is practically impossible, as this depends on many factors, but it can be assumed that where an early ripening variety is mentioned it is four to six days ahead of those in the average class; similarly, where a late-ripening variety is noted, it can be taken that this matures four to six days later than those in the average group or class.

Length and strength of straw can only be described as short and stiff, average, tall or rather weak. This feature has probably been studied more than any other character in the wheat crop during the past few years; the introduction of the combined harvester, together with the battle against early lodging, has brought this character to the front. Fuller discussion on the length and strength of the straw will be found under "Selection of Variety."

Resistance to disease is somewhat more of a breeder's problem than a farmer's problem, except in some districts where certain diseases are known to be troublesome, but plant-breeders are making great headway in their efforts to produce diseaseresisting types. Many of the troublesome diseases of the past have now been arrested by the introduction of seed dressings applied prior to sowing. These dressings do not control the rusts, for which there is no known cure or treatment, neither do they control loose smut, a disease which, although troublesome and infectious, always appears to take more of the crop than it does in reality. Some varieties of wheat, both spring and autumn types, are more susceptible to loose smut, rusts and mildew than others; these will be noted under the variety in question.

Resistance to shattering when dead ripe has been seen in many of our wheats; it has been observed that some more readily shed their seed, but the general conclusions are that shattering is not a serious problem among the popular wheats in Great Britain to-day.

Sprouting in the ear has given concern during wet harvests, and it is interesting to note the varieties which resist or are slower to germinate in the ear when subjected to wet or showery weather. Research and observations have been made by many specialists on the wheat plant, and it has been found that the white-grained wheats are more susceptible to sprouting than those with red grains. Some non-conclusive work has also suggested that the harder wheats are more susceptible than the poorer-class soft wheats, except where the ear is very dense or compact, but no correlation has been established between hardness and sprouting in the ear.

Finally a word about yields. Comparative figures of yields are valueless unless a full account of the trials are described, which is considered unnecessary in a work of this description. Results of trials giving the yield of various varieties are found in reports from the National Institute of Agricultural Botany, Cambridge.

Yields are influenced by the type of land, fertility of the soil, previous cropping, fertiliser applied, rainfall and climatic conditions, together with lesser factors.

SELECTION OF VARIETY

The need for the farmer, the merchant, and in particular the seedsman and his salesmen, to be very familiar with the varieties of wheat in commerce cannot be overestimated, and it is often inadequate knowledge of the suitability of the variety for certain conditions which results in poor returns and poor quality grain. There are several factors to consider before selecting a variety to grow, and these factors must be discussed one by one.

Class of Soil and Fertility

Much has been done and is still being done, by carefully conducted trials throughout the country to find the varieties, or the best varieties, for the many soil types that exist in the British Isles.

Varieties with good qualities have been condemned on a farm because the farmer or his advisers have had insufficient knowledge of the soil and its state of fertility. With a good knowledge of these factors the condemned varieties would never have been grown, but more suitable types would have been suggested.

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It is quite possible to see on one side of the hedge a good crop and on the other side only a fair or even poor crop of the same variety. Both crops may have been sown on the same day and given the same treatment throughout, but the difference in the past rotations and the level of fertility between the two fields has shown its mark.

The essentials, therefore, are a full knowledge of past rotations, past fertiliser programme, present fertiliser programme, a thought for the future crop, together with a sound knowledge of the class of soil; with this firmly in mind attention may be drawn to the suitability of varieties for the land and the fertility present.

Climatic Conditions

Consideration of the soil and its level of fertility should be coupled with the climatic conditions, namely the rainfall, temperatures, aspect and altitudes.

With knowledge of these conditions one can then begin to study varieties further. Different conditions exist in many parts of the country and these conditions are of equal importance as consideration of the soil. Take, for example, the Eastern Counties of England; here a more Continental climate is usually encountered than is known in the West or North, and it is in this part of the country where a large wheat acreage is found.

The soils in this area vary considerably, ranging f om the black fen earths to the light sandy types which in some districts are considered most infertile. Acid conditions are also found here, except where the chalk lies close to the surface and where good liming programmes have been carried out; yet in this part of the country wheats generally do better than in many other localities. It would seem that soil characteristics are modified by the climatic conditions : the usually sharper winter, the earlier spring which in turn promotes earlier spring growth, the somewhat higher spring rainfall, and usually less humid summer atmosphere which is so essential to perfect maturation.

It is not enough to suggest that this is a wheat area and matters should be left to them, as conditions obtain in many other parts of the kingdom for the growing of excellent crops of wheat. There is no need to define the meaning of " an excellent crop of wheat," but many use that expression and too few stop to consider the variety. Firstly consider the soil, the fertility, the climatic conditions and then the variety, then judge the excellence of the crop.

The wheat yields in the United Kingdom are now on the increase compared with pre-war years, but there remains room for considerable improvement to equal those of some parts of Europe. Going back twenty years or more, Denmark and Holland had better yield averages than this country due to the small acreage grown and then on the most suitable and selected land; they also found that artificial fertilisers used at the correct time greatly improved the yield of wheat. This statement needs qualification, for in Great Britain more work has been done on the wheat plant and its fertilisers than is found in many European countries, but in some of these countries more work has been done on the selection of the variety to suit the soil and conditions than has been conducted in Great Britain in the past. It is understood that substantial grants of money were made by the Governments to the plant-breeders and experimental stations to conduct this work, finally to benefit the farmers and the agricultural status of the country. Much work is being done in the British Isles to-day, and more team work is being shown by the farmer, seedsman and scientist, who, working together with information and trials, can, and will, increase the yields of wheat throughout the

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country. The farmer himself is the man to choose his variety, but can he do this alone, especially with the introduction of so many new varieties in recent years? He can, of course, by trialling them himself, but this is not possible for the average farmer in these days, hence the necessity for a number of conducted trialling stations throughout the country. Some of these are run by seedsmen who endeavour to assist the farmers by offering the varieties which have been proved most suitable for the districts concerned. By a suitable variety we mean a variety that will give its maximum yield of good grain under the conditions that exist on the farm or in the district.

A heavy soil in a good state of fertility in the Eastern half of England will usually grow good crops of wheat belonging to the French group, plus others with short, stiff straw; this type of soil in the West and North-West may not produce such satisfying results. In one case the soil, fertility and climatic conditions are suitable, in the other case the soil and fertility are suitable, but the climatic conditions may be unfavourable. Where climatic conditions make districts late, such as in parts of Scotland and the

Where climatic conditions make districts fate, such as in parts of controls is an early maturing North-West of England, the first consideration for the wheat soils is an early maturing variety, the question is, are the early maturing types of wheat suitable for these districts? The answer is "yes" and "no"; very good crops of the early maturing wheats have been noted in Scotland, but in most cases only when the climatic conditions have been ideal, and this may be only three years in ten. In these parts it is usual to see the later maturing Scandinavian types of wheat doing very well.

When the soil, fertility and climate appear suitable for the wheat plant in general, why is there this difference? Perhaps we do not consider that varieties are bred and produced under certain climatic conditions, and that the parents were also subjected to these conditions; it is therefore permissible to say that the variety is somewhat indigenous to the climatic conditions under which it has been raised for a number of years and therefore is expected to give its best returns under these conditions, providing the state of the soil is satisfactory?

Many of the short-strawed high-yielding varieties in commerce to-day are of French and Belgian origin, where usually in summer the climatic conditions are less humid than are to be found in the British Isles. These varieties need a high level of fertility to supply the nutrients to the plant, enabling it to fulfil its growth period quickly and normally; they also need a soil containing a high proportion of colloidal matter, which apart from retaining the plant foods has a high moisture-holding capacity. Such varieties do not need a high rainfall in late spring or summer, neither do they need a humid climate; these factors suppress natural maturation to a considerable degree. When suppressed maturation takes place under these conditions, mildew and other diseases sometimes take hold, resulting in poor immature grains which depress the yields.

It is true to say that the wheat farmers predominate in the Eastern side of the British Isles and the dairy farmer is well established in the Western half, but with developments in agriculture during the past few years, together with more ley farming

and knowledge of artificial fertilisers, wheat has become a crop which is seen on most farms. The plant-breeders and seedsmen have made great efforts to place at the disposal of the farmer varieties to suit almost all conditions.

The Dutch breeders have bred varieties which have become popular in England; these varieties were bred to withstand fertile conditions, wet and sometimes flooded conditions in winter and early spring. It is these wheats that often find their place in the more Central and Western districts of England. In Scandinavia, on the other hand, the breeders have concentrated on the production of varieties which will stand hard winter conditions and a more humid climate; although these varieties are somewhat later in maturing than many, they often do better in the Northern districts.

On light sandy soils, in only an average state of fertility, one often observes good crops of the taller and weaker-strawed wheats where wheat of the heavy-land type may not be remunerative to the farmer. Soils of a light nature in a high state of fertility and the medium soils are seen to carry fine crops of varieties in the intermediate group, of which there are many. These will be noted in the varieties described. On these soils some of the very light land types may be seen lodged. For the heavy fertile soils one must turn to the short, stiff-strawed varieties which resist lodging much better than varieties suited to above-mentioned groups.

Many examples could be given of the influence of various factors and different conditions, but from the general description of the varieties it should be possible to select one suitable for various soils and conditions.

Methods of Harvesting

Do we cut and bind by hand, do we use the binder, or do we use the combined harvester? Science and mechanisation have advanced at such a pace in recent years that we may now disregard the hand-work of the past and consider varieties of wheat suitable for machines to handle. In the British Isles to-day few wheats are ever seen which cannot be harvested by the binder or binding machine, and yet years ago varieties would have been noted which could not have been tied by the binder. Developments in plant-breeding have also advanced and have provided varieties for machines to handle. In brief this development has been in the selection and breeding of shorterstrawed types. It is true to say that all the varieties of wheat in general use can be cut by the binder.

Lodging can of course prevent mechanical harvesting, but this is chiefly caused by the selection of an unsuitable variety or treatment of the crop with fertilisers in excess of requirements.

In more recent years when labour shortage has been felt the need to speed harvesting has stimulated the agricultural engineers' activities, resulting in the production of the combined harvester. A different picture has been presented to the farmer and more so to the plant-breeder. The farmer on one hand, especially the grain-producer, immediately considers his harvesting costs in time and labour, therefore takes up a combined harvester which can be delivered in a short time; on the other hand the plant-breeder now has to turn his attentions to the breeding of varieties that are suitable for harvesting in this manner. It is true to say that many varieties can be harvested by combined methods in a normal season providing they are all standing

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when fully mature, but some have been bred which are more suitable, and these are principally the short-strawed types with a high resistance to lodging, and a high resistance to shattering when dead ripe. Several of these varieties are Continental-bred, but there are many British good quality wheats which fall into this class. The combined harvester can often pick up off the ground lodged crops which could not be bound into sheaves, but the trouble with lodged crops for combining is that a large percentage of damp grain is often encountered which is a liability for combined threshing. Standing crops therefore are important to ensure dry grain, which is more easily threshed and stored.

Harvesting methods must be considered with a full understanding of the variety, especially where a large acreage of grain is grown on one farm, thus enabling the farmer to spread his harvest economically. Considering the shorter-strawed types does not mean that the taller varieties will be extinct in a few years' time, as straw is still a necessity to the farmer, especially the man who feeds cattle in yards and one who conducts a large potato business, by whom some consideration is given to straw and straw quality.

Use to be Made of the Grain

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Yield and more yield of saleable grain is always a foremost consideration, but attention must be paid to the use to be made of it. Is it to be sold to the miller for bread flour, to the biscuit maker, or to the provender miller for animal and poultryfeeding stuffs? These three classes command different values in f s. d., and much consideration must be given to this question from the farm economy point of view. If milling for bread flour is decided upon one must choose varieties which are, firstly, suited to the particular soil, fertility and climatic conditions, plus some consideration for the method of harvesting to be employed; acquaintance must then be made with the quality of the wheat for that purpose. The same consideration must be made when the desired grain is to be sold for biscuit making or for feeding stuffs. Many farmers are of course farming under conditions which will not produce a good milling wheat. Considerations such as the availability of the markets for the various qualities of grain may be made in certain districts of Great Britain.

Probably our best baking wheats will only be produced under certain conditions, so it is not uncommon to see a farmer growing a poorer-quality variety which for economic reasons is more suitable for his farming practice. If we consider the short, stiff-strawed wheats of which a few are of good baking quality we shall also find that many are inferior as baking wheats, in fact some are only feeding-stuffs quality, which would normally command a lower price, but where the harvest combine is employed the saving in time and labour, plus a good yield of grain, will often more than compensate the farmer when price differences are considered.

Use to be made of the grain must be considered not as a separate factor but closely associated with all other factors in conjunction with the type of farming that is being conducted. Quite naturally a dairy farmer has to consider the needs of his stock, likewise a pig farmer, and a poultry farmer.

With a general knowledge of the varieties in circulation, in particular those that are proved suitable by trials, there are to be found wheats to suit most farmers' special

requirements, but it can be stated that plant-breeders all over Europe are endeavouring to breed varieties to meet such special conditions as are not yet provided for.

Spring Wheats

Advances in the breeding of wheat for spring sowing have been noticeable during the past few years. This has put them into a large acreage, and they are becoming more popular. It may be true to say that when yields are compared with the autumnsown varieties the latter, or a large number of them, are more remunerative, but it is sometimes an advantage to sow a spring wheat.

In the very much smaller range of varieties in this group there are to be found suitable types for many areas, soils and fertilities, and special types of farming. The range of varieties although small includes many with good baking quality, together with early and late maturing types.

Apart from the necessity for spring wheats in some rotations it is often proved more remunerative to sow a spring wheat in place of the autumn variety when the sowing date becomes very late. The best returns from autumn-sown wheats are always when sowing takes place in October or early November. Conditions of the land in a very wet autumn often make the sowing of wheat difficult, especially where the soil is of a heavy nature. This does not apply to all parts of the country, but in certain parts, particularly in the Midlands and West of England, delay in sowing autumn wheat has been considerable, and better returns have been obtained by planting a spring variety as early as possible in the year. Where at one time only a few of these types existed there are now several very promising wheats, many of which are of Scandinavian origin.

In all cases it is necessary to have a sound knowledge of the Class of Soil, its State of Fertility, the Climatic Conditions, Methods of Harvesting, Use to be Made of the Grain, together with the type of farming practised. Before choosing a variety out of the number on offer, be sure that its characters are sufficiently known to be suitable for the specific conditions.

PRINCIPAL CHARACTERS

Botanical details of the characters will not be fully entered into as the attention of the reader may be drawn to a botanical text-book for full description of the botanical terms applied. Many students of cereals, seedsmen, crop inspectors, millers and others have taken courses in the identification of cereals and are quite familiar with the characters which are studied as an aid to distinguishing the variety.

It will be necessary however to mention the features in some detail as a guide to the reader who is not familiar with these characters, and also the farmer who is keen to know if his crop is true to name.

Young Plant

In the young stage most of our autumn wheats have a prostrate habit of growth, they grow away in the autumn then cover the ground, taking on a flat prostrate appearance which continues until spring growth begins. Spring wheats usually take the opposite habit, and remain erect throughout their growth.

A few autumn wheats are semi-erect, for example Bersee, Vilmorin 27 and Jubilegem; it has been observed that these wheats do quite well when sown as late as February. Non-conclusive observations point to the habit of growth being an indication of suitability for late sowing.

WHEAT

Examination of the Ear

Ears of wheat from the same variety can vary to a large extent in size within a crop and considerable variations in size of ear can be found within a variety grown under different conditions, but the essential characters to note never vary under normal conditions; they are, namely, colour of the chaff, presence of awn development, shape and density.

The chaff colour, red or white is easily distinguished when the ear is mature, except where one is presented with a badly weathered specimen. There are one or two wheats that are a very pale red or pink, but they are not now in commerce in this country. A tinted chaff such as is found in Holdfast would be put into the whitechaffed group. The presence of bearded wheats grown in England is not common, only two will be mentioned, Rampton Rivet and the spring variety April Bearded. Smooth or rough chaff is usually observed as smooth chaff, as few wheats have hairs covering the outer chaff or glume.

Shape of the car is somewhat linked with the density, but it is noted that some varieties of the same density taper towards the apex, while on the other hand we have a square uniform car such as is seen in Square Head II.

Density of the ear is an important character, the closer and more compact the spikelets are found on the rachis the more deuse the ear is found to be. Varieties described will be put into four groups, although the three main groups, Lax, Medium and Dense is usually sufficient.

Examples under the four groups are as follows:

Lax Meteor, Diamond, April Bearded

Lax-Medium Jubilegem, Little Joss, Desprez 80, Progress

Medium Holdfast, Standard Red, Redman, Scandia, Staring

Dense Wilhelmina, White Wonder, Million III, Crown

There are one or two varieties that can be identified by their ear characters alone, but by examination of the straw one can often be more certain, and place the variety into its group. Before dissection of the ear examine the straw.

Thickness of the Straw Walls

The most important character of the straw is seen in the transverse or cross section, certainly the most important for diagnostic purposes. Cut the straw about 4-6 in.

below the ear and note the thickness or thinness of the straw wall. Wheats in the French group are usually found to have thickened walls, sometimes an almost solid or filled cavity is noted; whereas practically all of the English, Scandinavian and Dutch varieties have a thin wall. Measurement of the thickness of the straw wall has been made in many varieties, and it has been observed that the harder, more steely or better-class bread wheats have a thinner wall than our wheats in the biscuit class. Wheats which are very poor in quality for baking, and sometimes described as chicken wheats, fall in the French group, and have thick straw walls. The theory that the poorer the quality of the wheat the thicker the straw wall should not be accepted without reserve until more research has been undertaken. Rampton Rivet, which has an almost solid straw, is known to be of very poor baking quality.

It has been suggested that there are three groups, thin, medium and thick, but it is only necessary to consider two groups, the thin and thick walls.

Examples in the thin-walled group are Holdfast, Steadfast, Atle, Juliana and Scandia. In the thick-walled group are Vilmorin 27, Bersée, Jubilegem. Always examine more than one specimen wherever possible.

Examination of the Glume

An ear of wheat consists of a number of spikelets, each attached at the base to the rachis. On examination of a complete spikelet it will be found to consist of four or more flowers, when mature each floret carrying a grain between the lemma or flowering glume and the pale. At the base of the spikelet, and below the lower two flowers, are found the two non-flowering glumes which are removed for examination.

These glumes (chaff) are not constant in their characters throughout the ear, but when taken from the centre of the ear will be found to be fairly consistent. All glume characters have been found to show a variation within the variety and more so when considering different stocks of any one variety. It is far from necessary to describe in detail all glume characters, some are important, others mean little, and many are not appreciated by the average inspector of cereals.

The principal consideration of the glume is its size and shape; it may be considered as a long and narrow glume, short broad glume, or simply small, and large. It may also be a flat or rounded glume having a boat-shaped appearance. The Keel is to be considered, the prominent ridge on the outside surface; this ridge may be found prominent over the entire length, whereas in other varieties only a short keel is observed, being very marked towards the apex, forming a very distinct beak or point. The *Beak* when examined will be found to be short, long, straight, curved, humped, sharp or blunt.

The Shoulder of the glume, which runs from the beak inwards towards the inner edge, has been found to vary within a variety to a considerable extent, nevertheless it must be examined. It will be found to be broad, narrow, square, slightly sloping, sloping, rounded or acute when slightly rising. A combination of these features is often found, i.e. broad, slightly sloping shoulder, or square and narrow shoulder, etc. The size, shape, keel and beak, also shoulder variations, will be seen in the photograph of the glumes on page 23.

WHEAT

Two lesser characters may be considered during the examination of the glume; the first is the presence or development of hairs usually found on the inside. These are termed the "internal hairs" and are commonly observed in the upper third; they may be placed into three groups. Group 1 are where hairs are present in the apex or on the inside of the keel. Group 2 hairs will be found from the apex running along to the edge of the shoulder. Group 3 hairs will be found extending lower down the glume.



Imprint or Water-mark

Observations here have never been conclusive; this marking is found on the inside of the glume at the base and takes the form of a dark mark, which is patterned to resemble a water-mark. This marking, which often extends to the centre, is not always constant within the variety. It is found to be either pronounced, large, small or hardly visible.

The Straw

Apart from the examination of the straw walls, the length, stiffness and colour are descriptive points worthy of note. Wheats vary considerably in straw length, the short more stiff-strawed types such as Vilmorin 27, and Jubilegem, are not comparable with such wheats as Little Joss, Steadfast and April Bearded, whose straw is usually longer and weaker in nature. The colour of the straw may be a useful guide, but little use in the absence of the ear. Little Joss, for example, has a bright straw turning red in the upper third when mature. Some of this colouring may also be observed in Steadfast. Fylgia is noted to have a deep-coloured straw, in this case the straw in the upper half turns to a deep red-brown when mature.

The rachis of the ear has been examined, but only on a few occasions has the writer observed any notable differences, and these are not to be included in this edition as more work must be done in this respect.

The Grain

Examination of the grain, apart from colour differences, does not serve a useful

purpose in many varieties. When examination for colour is made it is most important to obtain a fresh sample owing to the possibility of colour changes or fading, the latter being due to long storage. It is true to say that some grain is large, some small and some long, short or plump, but the size of grain varies from year to year; this may appear to alter the shape.

The above concludes the principal characters used in the identification of the variety, but other observations in the field are often useful. It is not uncommon in some varieties to note taller plants appearing here and there. One may at a glance consider these as rogues or an infection from another variety; this may not be the case, as on examination these taller plants may be found to be genetical rogues or sports. Certain varieties are more susceptible to this sporting; in the case of Yeoman it is noted occasionally that a tall lax narrow ear appears, where in the variety Atle a bearded genetical rogue is sometimes encountered. Again, in Little Joss and Squareheads Master a white-chaffed genetical rogue is occasionally seen. This is unavoidable and is not the seedsman's liability, although care should be taken to eliminate these plants if the crop is to be used for seed purposes.

GLUMES Key to Plate on opposite page

1. VILMORIN 27 2. JUBILEGEM 3. DESPREZ 80 4. BENOIST 40 BERSÉE 5. 6. COTE D'OR 7. PICARDIE 8. VILMORIN 29 9. RED MARVEL 10. A.1 11. JULIANA 12. STARING 13. WILHELMINA 14. VICTOR 15. WILMA 16. MILLION III 17. ESSEX PEARL 18. WHITE WONDER 19. SCANDIA 20. SCANDIA III 21. CROWN 22. SWEDISH IRON 23. STEEL

24. IRON III 25. PILOT 26. DEFIANT 27. QUOTA 28. MILLER 29. HOLDFAST 30. WARDEN 31. YEOMAN 32. METEOR 33. ATLE 34. EXTRA KOLBEN II 35. DIAMOND II 36. FYLGIA 37. PROGRESS 38. APRIL BEARDED 39. RAMPTON RIVET 40. LITTLE JOSS 41. STEADFAST 42. STANDARD RED 43. SQUAREHEADS MASTER 13/4 SQUAREHEAD II 45. IRONRED

46. MIRACLE 47. GENEROSITY 48. REDMAN 49. KARN II 50. BRONS 51. YGA 52. PETIT QUIN QUIN 53. FRANC NORD 54. NORD DESPREZ 55. HYBRID 46 56. N.59 57. ALBA 58. RECOVERY 59. MARSHALL 60. ALS 61. GARTONS 60 62. OVERLOED 63. RENOWN 64. WEIBULLS STANDARD 65. FENLAND WONDER 66. EROICA 67. ECLIPSE

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GLUMES

WHEAT

Origin Introduced by Messrs. C. W. Marsters, of King's Lynn, in 1921. It was derived from a selection of Vilmorins Blé-des-Allies.

General Best sown in early spring for good yields. Tillering is poor and it ripens rather late. The straw is about average in length, and resistance to lodging is fair. Resistance to disease, like most French wheats, is not high, and it is rather susceptible to Loose Smut and Yellow Rust. Shattering is not often seen, but it is not a good combine wheat, although better than Atle. Ears of A.1 are lax-medium density of average size. A white-chaffed, white-grained wheat which is soft and of poor quality. It is suited to soils in no more than average fertility, better in early ripening districts. Resistance to sprouting is quite good. Yields are fair for a spring wheat when sown early. A little grown in some parts of England to-day.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth. Leaf medium size, flaggy, good colour.

Tillering Poor 0-2 weak.

- **Ear** White-chaffed, average length, lax or laxmedium in density, tapering both views; points of lemma slightly incurved, rather long, up to 2 cms. at top.
- Glume Short and rather broad, more flat. Shoulder straight or slightly inclined, medium to broad. Beak slightly curved, humped, short to medium, blunt. Keel prominent along whole glume. Internal hairs group 3. Imprint large but not clearly defined.
- Grain Average-large, white, clean, a little rough, soft, rather poor quality.
- Straw About average (av. 47 in.), pale colour, a little coarse. Thick walls.
- 1,000 Grain Wt. 51.2 grams.



WHEAT VARIETIES

NOTE.—1. Illustrations of wheat varieties are all natural size. 2. 1,000 grain weights are based on averages.

WHEAT

A.I

Origin Introduced by Messrs. C. W. Marsters, of King's Lynn, in 1921. It was derived from a selection of Vilmorins Blé-des-Allies.

General Best sown in early spring for good yields. Tillering is poor and it ripens rather late. The straw is about average in length, and resistance to lodging is fair. Resistance to disease, like most French wheats, is not high, and it is rather susceptible to Loose Smut and Yellow Rust. Shattering is not often seen, but it is not a good combine wheat, although better than Atle. Ears of A.1 are lax-medium density of average size. A white-chaffed, white-grained wheat which is soft and of poor quality. It is suited to soils in no more than average fertility, better in early ripening districts. Resistance to sprouting is quite good. Yields are fair for a spring wheat when sown early. A little grown in some parts of England to-day.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth. Leaf medium size, flaggy, good colour.

Tillering Poor 0-2 weak.

- **Ear** White-chaffed, average length, lax or laxmedium in density, tapering both views; points of lemma slightly incurved, rather long, up to 2 cms. at top.
- Glume Short and rather broad, more flat. Shoulder straight or slightly inclined, medium to broad. Beak slightly curved, humped, short to medium, blunt. Keel prominent along whole glume.Internal hairs group 3. Imprint large but not clearly defined.
- Grain Average-large, white, clean, a little rough, soft, rather poor quality.
- Straw About average (av. 47 in.), pale colour, a little coarse. Thick walls.

1,000 Grain Wt. 51.2 grams.



WHEAT VARIETIES

Note.—1. Illustrations of wheat varieties are all natural size. 2. 1,000 grain weights are based on averages.

ALBA

Origin Bred at the Plant Breeding Station, Wageningen, Holland, from a cross between Tresor and Jacob Cats.

General Being a new wheat in England its general behaviour is not yet known, but in trials it has proved a promising variety. It should be sown early for best returns. Alba winters well and grows strongly in spring, the tillering being low-average; it ripens early, about six to seven days earlier than Juliana and Wilhelmina. The straw is short and stiff, resistance to lodging being high. Resistance to disease and sprouting in the ear appears quite good over a three-year observation. The ear is large and of medium density, white-chaffed with white grain which is plump, large and uniform, but only poor biscuit quality. Yields from Alba are said to be quite high, and in trials it has given 10 per cent. more grain than Juliana and 5 per cent. more than Staring. Suitable soils are those of a medium heavy nature in average to high fertility. Doing well in Holland this wheat may replace Juliana and Wilhelmina to a large extent. Can be successfully combined.



PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth. Leaf long, medium width, inclined to flag. Some waxy bloom present.

Tillering Low-average 0-2 occasional weak.

- Ear White chaff, usually clean, more square or very slightly tapering both views, medium density; points of lemma more straight.
- Glume Average size, rounded in centre, tapering towards top, soft. Shoulder narrow to medium, square. Beak short to medium, very slightly humped only, sharp. Keel prominent along whole glume. Internal hairs group 2-3. Imprint average size, not always clear.
- Grain White, rounded, plump, uniform, clean, rather soft. Longer than Juliana.
- Straw Short-average (av. 44 in.), stiff, a little coarse, pale colour. Thick walls.

1,000 Grain Wt. 55.4 grams.

WHEAT

ALS

Origin Introduced in 1934. It is a selection made by Herr Lawaetz on the Island of Als, Denmark, from an old Danish land variety, Alsen Wheat.

General An autumn wheat and very winter hardy; tillering fairly well in the spring it ripens rather late, later than the average for wheats in the same class. The straw is average or longer, but is reasonably strong and resists lodging favourably if not grown on too rich soils. Resistance to disease is not high, a head or two of Loose Smut is often noted and frequently Rusts are observed. The ears are somewhat of the Squarehead type, white, clean-chaffed, with large brownish-red grain of poor quality. It is suited to soils in no more than average fertility or lodging will take place. Ability to harvest by combined methods is rather poor. Yields from Als are said to be quite good in some parts, but it is not considered to be in the high-yielding class. Its resistance to sprouting in the ear during a wet season is very high. Very little grown in England to-day, but common in Scotland.

PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth.

Tillering Fair only 0-2 some weak.

- Ear White chaff, clean, medium to dense, smallaverage size, very slight or no tapering both sides; points of lemma short and incurved, 0.5 cm. at top of ear.
- Glume Rather small, rounded. Shoulder narrow to medium, almost square but often slightly doping with rounded ends. Beak medium size, usually straight, rather blunt. Keel prominent in upper half of glume. Internal hairs group 2. Imprint large, grey colour.
- Grain Red, fairly large, uniform, quite plump, rough and a little coarse, quality rather poor.
- susceptible to Rust, fairly strong, fine quality when clean. Thin-walled.

1,000 Grain Wt. 54.4 grams.



APRIL BEARDED

Origin An old British variety, selected by Sir John Sinclair, but true origin is unknown.

General A true spring wheat and can be sown late, in fact sowing in April is advised. Tillering is usually high but few mature. It ripens average-late in some districts, average in others. The straw is long and weak and lodging is common if in too fertile conditions. Resistance to disease, shattering and sprouting is high, but April Bearded would not be suitable for combined methods of harvesting. The ear is red-chaffed, long, lax and tapering, bearing barbed awns. Quality of the grain, which is red and small, is good bread baking. Yields can be quite good when grown well, but is not considered a high-yielding spring wheat; it is a variety for very late sowing, this being the most important feature of April Bearded. Suitable soils are those in a lighter class and in no more than average fertility. Is grown in small acreage to-day but is still being sold in England and occasionally in Scotland.



PRINCIPAL CHARACTERS

Young Plant Erect habit of growth, narrow leaf, long , and flaggy, pale colour.

Tillering High 0-4 many weak.

- Ear Dark red chaff, long and lax, slightly tapering both sides; points of lemma extending into long awns which are spread open and barbed.
- Glume Long and very narrow, flat. Shoulder narrow, square or rising slowly. Beak very long, straight and sharply pointed. Keel very prominent along whole glume. Internal hairs group 3. Imprint appears in centre of glume. Large.
- Grain Small-average, dark red, hard, long, smooth, even, good baking quality.
- Straw Long and weak (av. 55 in.), very bright colour, fine quality, resistance to lodging low. Thin walls.

1,000 Grain Wt. 43.2 grams.

WHEAT

ATLE

Origin Bred and introduced by Messrs. Weibulls, Landskrona, Sweden, in 1936. It was derived from a cross between Extra Kolben and Saxo.

General Atle is best sown fairly early in spring, sowing in April will usually result in inferior yields. It tillers well and ripens early, but later than Diamond and Fylgia. The straw is about average in length, resisting lodging favourably; resistance to shattering, sprouting in the ear and disease is reasonably good, but sometimes a little Black Rust and Mildew are noted. The chaff is white with red grain which is small, uniform and very hard, being of excellent bread-baking quality. Ears of Atle are long, medium density and slightly tapering. Most suitable soils are those of a medium to heavy nature in high fertility; it will not do well on poor light land. Yields from Atle can be expected to be very good as it will outyield most spring varieties by as much as 10 per cent. Grown in many parts of England to-day and is sometimes sown in the autumn, but is one of the best spring wheats in cultivation. It may be sown at a slightly lower seed rate by weight per acre than is normal owing to its small grain.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth. Leaf rather narrow, fairly erect, good colour, waxy bloom in evidence.

Tillering Average 0-2 plus occasional weak.

- Ear White chaff, medium density, average long, slight tapering on face view only; prominent points of lemma near top of ear, up to 2 cms.
- Glume Average size, rather flat, tapering. Shoulder narrow to medium, slightly sloping, rounded at end. Beak rather short, straight, sharply pointed. Keel prominent along whole glume, more prominent at top and base. Internal hairs group 2. Imprint usually small and pale.
- Grain Small, dark red, hard, uniform, bright and clean, good quality.
- Straw Short-average (av. 43 in.), strong and stiff, bright colour. Thin walls.

1,000 Grain Wt. 40 grams.



BENOIST 40

Origin Selection from Wilson, which in turn was a selection from Hatif Inversable. Introduced by M. Camile Benoist, France, in 1926-8. First grown in England about 1934.

General This wheat should be sown by the end of November for best returns at a seed rate slightly above average owing to its large grain. It is quite winter hardy but will not stand severe frosts over a long period without showing ill effects. Tillering in spring is only fair at best. It ripens early, a day or two later than Vilmorin 27. The straw is stiff, short and coarse, resistance to lodging being very high; ears are large, square, of medium density with a white chaff which is not always clean. The grain is red, large, plump and inclined to be rough; its quality is poor. Resistance to disease is not high and Rusts are commonly noted; it may be less susceptible to Loose Smut than Vilmorin 27. Soils best suited to Benoist 40 are those of a medium to heavy nature in high fertility where it will yield very well indeed. Vilmorin 27 and Jubilegem have been found to just outyield this wheat in trials. It does not shatter or sprout in the ear easily at harvest, and is quite a good wheat to harvest by combined methods. Sometimes known as Hybrid 40, and is grown in small acreage principally in the Eastern Counties of England.



PRINCIPAL CHARACTERS

Young Plant Semi-erect habit of growth. Leaf medium-broad, sometimes a little flaggy.

Tillering Low 0-2 strong tillers.

- Ear White chaff, usually dirty, lax-medium density; points of lemma slightly incurved, more spreading and up to 2 cms. at top of ear. Ear large and square, no tapering both sides, held erect.
- Glume Large, broad, tapering towards top, rounded. Shoulder narrow, usually square or slightly sloping. Beak medium-long, straight or slight hump tapering to blunt point. Keel usually well defined along whole glume. Internal hairs group 2. Imprint large, pale colour.
- Grain Very large, red, rough, coarse grain, plump, irregular, poor quality.
- Straw Short and stiff (av. 40 in.), rather coarse, pale colour; resistance to lodging high. Thickwalled.

1,000 Grain Wt. 69.2 grams.

WHEAT

BERSÉE

Origin First marketed in France, being introduced by M. Blondeau, Bersée. It was derived from a cross between Hybrid des Allies and Vilmorin 23, and was grown in England about 1935, being introduced by Mr. G. Elsom, Spalding.

General Best crops and highest yields are obtained when sown in the autumn, but this wheat is remunerative when sown as late as February. It stands a normal winter well, but not too severe conditions over a long period. The growth is more semi-prostrate, so covering the ground is not seen so completely as in most other varieties. Tillering is about average in spring and it ripens very early. The straw is short in length, resistance to lodging being quite good; it is a fair wheat to harvest by combined methods, but resistance to shattering is not high and it is inferior in this respect to Jubilegem, Holdfast and many others. Resistance to Loose Smut and Rust is not high but better than Vilmorin 27. Mildew is also noted on Bersée in some seasons. The chaff is white or dirty-white; ears are average-long, medium to lax in density, they are well filled with red grain of large size but of poor quality. It is suited to a wide range of soils in high fertility except those of a very light nature. Yields are very high, being one of the best yielding wheats grown in England to-day. Very popular in all wheat growing areas, in particular parts of Lincolnshire and Cambridgeshire.

PRINCIPAL CHARACTERS

Young Plant More erect habit of growth. Leaf medium erect, pale colour.

Tillering Low-average 0-2 some weak.

- Ear White chaff, lax-medium density, slightly tapering, rather long, spikelets spreading, rachis stiff but weaker than Vilmorin 27.
- Glume Average-large in size, slightly rounded. Shoulder narrow to medium width, slightly rounded. Beak medium size, straight, small hump sometimes present. Keel well ridged upper and lower part of glume. Internal hairs group 1. Imprint large and dark-coloured.
- Grain Quite large, pale red, rough, and coarse, plump, irregular in shape, poor quality.
- Straw Short and stiff (av. 41 in.), dull yellow colour, rather coarse. Thick-walled.
- 1.000 Grain Wt. 55.3 grams.



BRONS

Origin Bred by Messrs. Weibulls, Landskrona, Sweden, from a cross between Aurora and Extra Kolben II. It was introduced by Messrs. Edward Webb & Sons Ltd., Stourbridge, in 1950.

General Brons must be sown by mid-March for best returns; it is not suitable for sowing as late as Fylgia. The tillering is moderate but it grows strongly and ripens earlyaverage with a stiff straw slightly shorter than average. Ears of Brons are medium in size and of medium density, it has pale red chaff with small red grain of good baking quality. Resistance to lodging, sprouting in the ear, Rusts, Mildew and shattering appears high, but an occasional ear of Loose Smut may be observed. It is rather more susceptible to Bunt or Stinking Smut than many varieties, so all seed should be carefully dressed. Suitable soils are those of a medium to heavy nature in a high state of fertility on which Brons will give good yields. Harvests well by combined methods. A new spring wheat which has shown promise in recent trials.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth. Very narrow leaf, held fairly erect.

Tillering Moderate 0-2.

- Ear Red or pale red chaff, lax-medium density, average length, tapers sharply on both views; points of lemma rather long, straight or slightly incurved, up to 1.5 cms. at top.
- Glume Small, narrow, flat, hard. Shoulder medium, square or very slightly rising at end. Beak medium straight, fairly sharp. Keel very prominent at top but prominent along whole glume. Internal hairs group 1. Imprint average size, but not always clear.

Grain Small, red, hard, uniform, fair baking quality.

Straw Thin, strong and bright (av. 41 in.). Thin walls.

1,000 Grain Wt. 42.2 grams.

WHEAT

COTE D'OR

Origin An introduction from the Station d'Amélioration de Dijon, France, in 1937.

General This wheat is best sown in the autumn but can be sown in February with fair returns. It tillers only moderately in spring but ripens early. The straw is short to medium and quite stiff with a fair resistance to lodging. Rust, Smut and Mildew are commonly observed, but sprouting in the ear is unknown during a wet harvest. The chaff is pinkish in colour and the grain is a pale red, large and rather coarse, of poor milling quality. Suitable soils are those of a medium to heavy nature in a good state of fertility, on which it gives a fair yield of grain, but inferior to most wheats in this class, especially to Vilmorin 27, Jubilegem and Bersée. Not popular and is only found growing in odd parts of the country to-day.

PRINCIPAL CHARACTERS

Young Plant More erect habit of growth. Leaf short, held erect, good colour.

Tillering Low-average 0-2 many weak.

- Ear Pink chaff, sometimes dirty, lax-medium density, average size tapering slowly both sides; points of lemma short and straight, longer at top of ear, up to 1.5 cms., slightly incurved.
- Glume Average size, rather long. Shoulder mediumbroad, square. Beak medium size, straight, rather blunt. Keel prominent along whole glume. Internal hairs group 1. Imprint small, pale (irregular).
- Grain Large, red or pale, rough and coarse, rather long, poor quality.
- Straw Short-average (av. 42 in.), bright colour, rather coarse, resistance to lodging high. Thick walls.

1,000 Grain Wt. 59 grams.



CROWN

Origin Introduced and bred by the Plant Breeding Institute, Svalof, from a cross between Sun and Iron. Grown in England about 1930.

General A true autumn wheat and should be sown early for best results. Tillering is average in spring. Crown ripens about the same time as Standard Red, with straw short to medium, resisting lodging favourably. The ear is square, fairly dense, whitechaffed with red grain of average size but poor milling quality. Resistance to disease is fair only, and sprouting in the ear is common. Suitable soils are those of a medium to heavy nature in a good state of fertility, especially in the more Northern districts. Yields are about average, and Crown would not be classed a high-yielding wheat when compared with the more recent Scandinavian variety Scandia III. A little grown in some parts of the country and also Scotland; is not universally popular.

PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth. Leaf 'medium, fairly erect, mid-green colour.

Tillering Average 0-3, some weak, not maturing.

- Ear White-chaffed, clean, medium-dense, ear very square with practically no tapering both sides, points of lemma incurved, short.
- Glume Average size, tapering, broad at base. Shoulder narrow, slowly sloping to rounded end. Beak medium size, slightly humped, blunt. Keel prominent upper half only. Internal hairs group 2. Imprint large up to two-thirds of glume.
- Grain Red, quite large and plump, a little coarse, poor quality, soft.
- Straw Average length (44 in.), clcan, rather pale, resistance to lodging fair. Thin-walled.

1,000 Grain Wt. 54.5 grams.

WHEAT

DEFIANT

Origin Introduced by Messrs. C. W. Marsters Ltd., King's Lynn. It was derived from a cross between Squarehead II and Browick.

General Best yields are obtained when sown in October. It is very winter hardy and covers the ground well; tillering is good in early spring and it ripens early to average. The straw is short and stiff with a high resistance to lodging; resistance to disease is not high and Yellow Rust is often noted. A white clean-chaffed wheat with red grain which is regular and large in size. Ears of Defiant are of medium density, being of average length and square. The grain is of biscuit quality only. It is suited to the more fertile wheat soils, where it is classed as a high-yielding wheat. Susceptibility to sprouting may be noted in some seasons, but this is not common. Shattering is found to be common and this makes Defiant a poor wheat to harvest by combined methods; it is best cut a little early and stooked up longer owing to this bad feature. Not very popular but is still being grown in some places, principally in Eastern England.

PRINCIPAL CHARACTERS

Young Plant Very prostrate habit of growth. Leaf may be broad, a little flaggy, good colour.

Tillering 0-2 strong.

- **Ear** White chaff, clean, medium density, average to large ear, very slight tapering on both sides, spikelets loose; points of lemma straight or slightly incurved at top of ear, where they extend to approximately 0.75 cms.
- Glume Average to large, slightly tapering, soft. Shoulder medium to broad, slightly sloping. Beak short-medium, straight and blunt. Keel prominent only in upper third. Internal hairs group 1-2. Imprint large and pale.
- Grain Large, red, fairly coarse, plump, rather irregular, fair quality.

Straw Short (av. 43 in.), good colour, clean. Thin walls.

1,000 Grain Wt. 59.4 grams.



DESPREZ 80

Origin Introduced by M. F. Desprez, France, about 1937 and derived from a cross between Vilmorin 23 and a selection Inst. Agric. Agronomique.

General Best returns are obtained when autumn sown, but Desprez 80 can be sown with good results as late as February. It winters well unless too severe over long periods, but does not cover the ground during winter. Tillering to maturity is only light and it ripens very early on a very short, stiff straw with a high resistance to lodging. Resistance to shattering is fair but not as high as Jubilegem or Vilmorin 27; however it is considered a very good wheat to harvest by combined methods. Disease-resistance, like many of the French wheats, is not good, and Desprez 80 is very susceptible to Yellow Rust; Loose Smut is also prominent. The chaff which is white often has a dirty appearance due to Mildew, which is quite common on this wheat. Ears are lax in density, they are rather long and slightly tapering. The grain is red, very large but not attractive, being rather coarse and of poor quality. It is suited to soils in a high state of fertility, in particular the heavy wheat lands. Under these conditions it gives excellent yields, being well up in the group of high-yielding wheats. Resistance to sprouting during a wet harvest is very high. Grown in the British Isles in a few places, but is being replaced by Jubilegem and other cleaner French wheats of more recent years.

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PRINCIPAL CHARACTERS

Young Plant Semi-erect habit of growth. Leaf small . but a little flaggy, pale colour.

Tillering Average, but many weak and not maturing.

- Ear White chaff, rather dull, lax, average length, narrow, slight tapering both sides; points of lemma straight or slightly incurved extending to 1.5 cm. at top.
- Glume Large, long and tapering. Shoulder narrow, square, sometimes rising a little. Beak medium to long, straight or very slightly humped, medium sharp point. Keel more prominent in upper half. Internal hairs group 1-2. Imprint large.
- Grain Very large, red, rough and coarse, irregular, soft, poor quality.
- Straw Very short and stiff (av. 37 in.), pale colour, rather coarse. Thick-walled.

1,000 Grain Wt. 64.4 grams.

WHEAT

DIAMOND II

Origin Introduced by the General Swedish Seed Co. Ltd., Svalof, about 1939 and bred at Svalof from a cross between Extra Kolben II and Diamond.

General Should be sown by the end of March. Tillers freely but ripens early, the straw being average to long and moderately stiff. Its resistance to lodging is only fair. The ears of Diamond II are lax and long, with red chaff and red grain of good quality, suitable for baking. Resistance to common disease is only fair. It does not sprout quickly in the ear during a wet harvest but resistance to shattering is not good. Would not be classed as a wheat to harvest by combined methods. Most suitable soils are those in average fertility, but should not be sown on very heavy wet types of soil. Yields fair only when compared with Atle, Meteor or Fylgia. Grown in small quantities in the British Isles and will be found more in the North.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth. Leaf narrow, fairly long, flaggy appearance.

Tillering High 0-4, but many weak and not maturing.

- Ear Pale red chaff, long, lax, and tapering sharply both sides. Points of lemma straight or slightly incurved.
- Glume Long and narrow, rather flat. Shoulder medium or narrow, square or slightly sloping. Beak short or medium, straight and blunt. Keel well defined along whole glume. Internal hairs group 1.
- Grain Small to average size, deep red, hard, clean, long, good quality.
- About average (48 in.) or long, fine, bright colour, rather weak. Thin walls.

1.000 Grain Wt. 44.8 grams.



ECLIPSE

Origin Introduced by Messrs. C. W. Marsters Ltd., King's Lynn, in 1946. It was derived from a cross between Little Joss and Yeoman.

General Sow by mid-November for best returns. Eclipse grows strongly in early spring, tillering well. It is very winter hardy and ripens about four to five days earlier than Yeoman. It has a medium-length straw, quite 6 in. shorter than Little Joss, of good quality and is capable of standing well on good wheat lands. Its resistance to disease is fair, but has shown a susceptibility to Black Rust in certain seasons. The ear is long and lax with a clean red chaff containing red grain of average size and quite good quality. It is a highly productive wheat on many classes of land. Its yield is higher than Little Joss when grown on the lighter and poorer soils. Recently it has been grown on the well-bodied and highly fertile wheat lands, where its resistance to lodging is markedly high and its yields have been exceptionally good. Does not shatter easily at harvest and sprouting in the ear was not seen during the wet harvest of 1946. A new wheat which should be popular in some districts in the near future.

PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth. Dark green · leaf, rather narrow, long, a little flaggy.

Tillering High 0-2 maturing.

- Ear Red chaff, clean and bright, lax, long, tapering very slowly both sides; points of lemma slightly incurved, prominent at top of ear, 2 cms. long.
- Glume Average size oblong glume. Shoulder narrow-medium, square or slightly sloping. Beak medium size, straight and pointed sharply. Keel prominent along whole glume. Internal hairs group 1. Imprint not well-defined.
- Grain Red, fairly long, average to large size, quite hard and of reasonable quality.
- Straw Average (av. 47 in.), bright, clean colour, often with pinkish colouring present, good quality. Thin-walled.

1,000 Grain Wt. 50.7 grams.

WHEAT

EROICA

Origin Bred by Messrs. Weibulls, Landskrona, Sweden, from a cross between (Bankuter 178 \times Standard) \times Aring. Introduced by Messrs. Edward Webb & Sons Ltd., Stourbridge, in 1949.

General Must be sown in carly autumn for best returns. It is very winter hardy and covers well; tillering freely in spring it ripens about average or a day or two earlier than most Scandinavian types. The straw is short and stiff, resistance to lodging being high; resistance to disease is quite good, but a little Yellow Rust has been observed. The ear is white-chaffed, clean, of medium size and density with red grain of average size, plump and uniform. Quality of the grain is said to be quite good and much better than Scandia or Scandia III for milling. Suitable soils are those which are favourable to Scandia, namely the more heavy and fertile conditions. On these soils Eroica has given an 8 per cent. higher yield than Scandia and can be placed in the high-yielding group of wheats. It does not shatter and no sprouting in the ear has been observed during a wet harvest. Would be suitable to harvest by combined methods. A new wheat which may replace Scandia and Scandia III to a large extent.

PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth. Leaf narrow and rather short, held erect.

Tillering High 0-3, some weak.

- Ear White chaff, medium density, but more dense than Scandia III, very slow tapering both views; points of lemma incurved.
- Glume Rather small, bright and clean, hard. Shoulder narrow, sloping. Beak short-medium, sharper than Scandia, straight or very slight hump. Internal hairs group 1-2. Imprint average size.
- Grain Red, plump, uniform, clean, fairly hard, of fair quality, small-average size.
- Straw Short and stiff (av. 42 in.), clean, pale colour. Thin walls.

1,000 Grain Wt. 48.8 grams.



ESSEX PEARL

Origin Introduced by Messrs. Hasler & Co., Dunmow, Essex. It was bred from a cross between Yeoman II and Hatif Inversable.

General Sow early in autumn for best yields. It tillers well in early spring, ripening early. The straw is short-medium but has a high resistance to lodging and can usually be satisfactorily harvested by combined methods. Ears of Essex Pearl are short to medium in length, dense and square; the chaff is white and usually clean. The grain is white, uniform, quite plump and of good biscuit quality. Resistance to disease is reasonable, but some Rusts have been observed and an occasional ear of Loose Smut. Some sprouting in the ear has been noted during a wet harvest. Suitable soils are those in a good state of fertility and of medium to heavy nature. On these soils Essex Pearl is said to give good yields of grain. A wheat of more recent years, which is grown in several parts of England to-day but not in large acreage.

PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth when young, later leaf broad, inclined to flag, dark green colour.

Tillering Average to high o-3.

- Ear White-chaffed, clean, dense, small-average in size, ear more square, no tapering; points of lemma usually straight or only slightly incurved, short at top of ear, usually no more than 0.5 cm.
- Glume Average-large size, rounded, tapering. Shoulder sloping, narrow to medium, often, rounded at end. Beak short to medium, straight or slightly humped, very blunt. Keel prominent upper third, plain along remainder of glume. Internal hairs group 2. Imprint large, grey-colour.
- Grain White, of average size, clean, regular, plump, biscuit quality only.
- Straw Average length (av. 48 in.), pale colour, clean but little coarse. Slightly thickened walls.

1,000 Grain Wt. 48.9 grams.

WHEAT

EXTRA KOLBEN II

Origin Bred at Svalof and introduced by the General Swedish Seed Co. Ltd. It was derived from a cross between Varparl and Kolben wheat.

General Should be sown by mid-March for best results. Extra Kolben II ripens early, its straw being average to long with a fair resistance to lodging. Ears are narrow and lax with white chaff and red grain which is of good baking quality. It is resistant to the common diseases, also to shattering and does not sprout quickly in the ear during a wet harvest. Suited to soils in average fertility, but has been out-yielded by Atle. Would not be termed a combine wheat. Grown in several parts of England to-day as it is suited to a wide range of conditions, but is only in small acreage.

PRINCIPAL CHARACTERS

Young Plant Appears more semi-erect, later leaf long, held more erect.

Tillering Average 0-3, but many not maturing.

- Ear White-chaffed, average length, lax, tapering sharply on both sides; points of lemma rather long, more straight, extending to 2 cms. at top.
- Glume Average length but narrow, flat. Shoulder narrow-medium, square or slightly inclined. Beak medium size, straight and slightly pointed. Keel well-defined along whole glume. Internal hairs group 1. Imprint not clearly defined.
- Grain Small, red, clean even grain, plump and short, good baking quality.
- Straw Average-long (49 in.), rather fine, good bright colour and quality, low resistance to lodging. Thin walls.

1,000 Grain Wt. 41.0 grams.



FENLAND WONDER

Origin A single plant selection by Messrs. Carter's Tested Seeds Ltd., in 1922.

General A wheat that should be sown in the autumn, by the end of November, for best returns. It stands the winter well, with fair tillering, making normal growth in the spring. Time of ripening is about average. The straw is about medium, being stiff with fair resistance to lodging. Ears of Fenland Wonder are white to golden-chaffed according to weather conditions, they are medium in length and medium in density, with white grain of good quality. Resistance to disease is quite high, also to shattering when ripe, a little sprouting has been noted during a wet harvest. Yields are satisfactory when grown well, but they are not up to the standard of the early French Hybrid Wheats. The best soils for Fenland Wonder are the medium types in good state of fertility. It can be harvested by combined methods, although on extra-strong land it may grow too tall. Grown in several parts of England and Scotland to-day.

PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth. Leaf medium, a little flaggy, good colour.

Tillering Good 0-2, strong.

- Ear White chaff, average size, square or very slight tapering both views, medium density; points of lemma incurved, short.
- Glume Average size, slightly rounded in centre, soft. Shoulder medium sloping, not rounded. Beak short, blunt, slight hump. Keel usually plain along whole glume. Internal hairs group I. Imprint not clearly defined.
- Grain White, average size, rather long, clean and uniform, soft.
- Straw About average length (av. 47 in.), bright, clean, fairly strong and whippy. Thin walls but thicker than many in this class.

1,000 Grain Wt. 47.6 grams.

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WHEAT

FRANC NORD

Origin Raised in France by M. Blondeau from a cross between Yga and Vilmorin 23. Introduced by Messrs. G. Elsom Ltd., Spalding.

General A new French wheat introduction which should be sown in the autumn for best returns, but February sowings may be made with fair results. It is winter hardy and tillers moderately for French wheats. Franc Nord ripens very early with short, stiff straw which is highly resistant to lodging. Resistance to disease is quite good, but a little Yellow Rust has been observed. The ears are long and large, lax, with white chaff and large long red grain of fair quality. It does not shatter or quickly sprout in the ear during a wet harvest and is a suitable wheat to harvest by combined methods. Soils most suitable are those of a medium to heavy nature and in a good state of fertility on which yields can be very high.

PRINCIPAL CHARACTERS

Young Plant More semi-prostrate habit of growth, Leaf medium, inclined to flag. Good colour, little waxy bloom present.

Tillering Moderate.

- Ear White chaff, usually clean, rather lax, large, long and only slightly tapering; points of lemma long, up to 2.5 cms. at apex.
- Glume Very large, long tapering glume, soft. Shoulder narrow, sloping. Beak long, curved, sharp, humped. Keel prominent at top, plain along remainder. Internal hairs group 1. Imprint large.
- Grain Large, rather long red grain, irregular and a little coarse, fairly hard but of fair quality only.
- Straw Short, stiff, strong (av. 41 in.). Thick walls.

1,000 Grain Wt. 62.8 grams.



FYLGIA

Origin Introduced by the General Swedish Seed Co. Ltd. and bred at Svalof from a cross between Aurora and Extra Kolben.

General This wheat can be sown from February to the middle of April and give good results, although it does better when sown early. The tillering is rather poor. It ripens early, the straw being about average in length on light land and a deep colour when ripe, especially in the upper third; resistance to lodging is fair except when grown on too fertile soils. It does not shatter, but nevertheless is not considered a good combine wheat. Resistance to disease is not high, it being rather susceptible to Loose Smut, and some Yellow Rust is often noted. A red chaff which often becomes a dark red-brown when mature, the chaff is always clean. The grain is red, average size, uniform, clean but poor quality. Ears of Fylgia are inclined to be long, they are medium in density and taper slowly. It is suited to soils in no more than average fertility and does well on the lighter types. Many market growers drill Fylgia after their winter and early spring green crop is removed and get good returns. Yields are not as high as Atle but quite satisfactory for a spring wheat. Resistance to sprouting in the ear is high. Known and grown in many parts of the country; does well in late districts.



PRINCIPAL CHARACTERS

Young Plant Erect habit of growth. Leaf medium, flaggy, good colour.

Tillering Poor to average 0-2, some weak.

- Ear Dark red chaff, lax-medium density, average to long ear, tapering on both sides; points of lemma 1 cm. long at top of ear; spikelet rather compact.
- Glume Average length but narrow, flat. Shoulder medium width, square, sometimes corner slightly rounded. Beak rather short, straight and sharply pointed. Keel prominent along whole glume. Internal hairs group 2. Imprint usually quite small, clear.
- Grain Red, average size, uniform shape, soft, poor quality.
- Straw Average on light land (av. 46 in.), clean, bright, upper third purple-red colour when mature. Thin walls.

1,000 Grain Wt. 51.4 grams.

WHEAT

GENEROSITY

Origin Selection made by Messrs. Carter's Tested Seeds Ltd., London, in the year 1929.

General Truly an autumn wheat and should be sown by the end of November for remunerative yields. It is very winter hardy and grows strongly in spring. Ripening about average Generosity has a straw which is inclined to be long with only a fair resistance to lodging under certain soil conditions and husbandry. The ears are redchaffed, square average to large in size, and of medium density with white grain of good size which is of good white biscuit quality. Resistance to Smut and Rust is good and also to shattering when dead ripe; sprouting in the ear has not been noted to a large extent during a very wet harvest. Most suitable soils are those of a medium nature in average fertility where it will give satisfactory yields, equal to Steadfast, which it closely resembles. Its ability to harvest by combined methods is always best determined on the field at harvest time, but Generosity would not normally be classed as a combine wheat. Grown in many parts of England to-day.

PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth. Leaf medium to long, a little flaggy, good colour.

Tillering Average 0-2 maturing.

- Ear Deep red chaff, clean and bright, medium density, ear very slowly tapering on both sides, average size; points of lemma inconsistent but usually more incurved, up to 1 cm. at top.
- Glume Average width but rather long or oblong glume. Shoulder medium to broad, square, sometimes slightly rounded at end. Beak shortmedium, usually straight or very small hump, blunt. Keel prominent upper half, plain remainder. Internal hairs group 1. Imprint large.
- Grain White, fairly large, very plump, clean, rounded, regular in shape, biscuit quality.
- Straw Rather long (av. 51 in.), good quality, bright colour, clean. Thin-walled.

1,000 Grain Wt. 55.9 grams.



HOLDFAST

Origin Bred at Plant Breeding Institute, Cambridge. Holdfast was introduced in 1935 by the N.I.A.B. It was derived from a cross between Yeoman and White Fife.

General This wheat is a true autumn wheat, and a greatly reduced yield can be expected if sown later than the end of November. It is very winter hardy, covering the ground well. Tillering freely in spring Holdfast ripens early, the straw being short and stiff with a high resistance to lodging, it is a good wheat to harvest by combined methods. It does not readily shatter and its resistance to the more common diseases is very high. Generally known as a white chaff, but is sometimes termed a pink chaff, as it is decidedly off-white when compared with other white chaffs; the chaff is clean and is rarely infected with Mildew. Ears of Holdfast are slightly tapering, medium size and density, they are filled with white grain which is small, clean, hard and of excellent bread-baking quality. It is suited to the better-class wheat lands or good land in high fertility; under these conditions it returns high yields, falling well into the high-yielding group. Holdfast is grown extensively throughout England to-day with a little in Scotland and is considered a first-class wheat. It has one disappointing feature, it sprouts in the ear during a wet harvest very quickly.



PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth. Leaf narrow, held erect, good colour.

Tillering Average to high 0-3.

- Ear White or pinkish chaff, medium density, only slight tapering both sides, rachis stiff, average length.
- Glume Average size both length and width. Shoulder medium to broad, square. Beak rather short, straight, no hump, pointed. Keel not prominent but is plain along whole glume. Internal hairs group 1. Imprint medium size, not always clearly defined.
- Grain Small, white, regular, clean, hard, plump, good quality.
- **Straw** Short and stiff (av. 40 in.), bright colour with often a little pinkish colouring. Very thin walls.

1,000 Grain Wt. 44.8 grams.

WHEAT

HYBRID 46

Origin Introduced by C. W. Marsters Ltd., King's Lynn, in 1946. It was derived from a cross between Benoist 40 and two other hybrids.

General One of the autumn wheats which can be sown a little later than the majority, but like most of the wheats in this class best returns are always obtained when sown early. It is winter hardy and covers quite well, tillering in the spring being only fair. Maturity is early, being about 4 days later than Vilmorin 27; the straw is very short and stiff with a high resistance to lodging. It is considered an ideal combine wheat. Ears are large, medium density and white-chaffed, the chaff being a little dull or dirty-coloured. Quality of the grain, which is red, coarse and large is poor for milling. Resistance to disease is not high and it is rather susceptible to Loose Smut. So far trials and observations on this new variety indicate it to be adaptable to many soil types, but is particularly suitable for very highly fertile conditions, and under all conditions it has recorded very high yields of grain. Shattering has not been observed, and sprouting in the ear has not been reported by the breeders during a wet harvest. Grown chiefly in the Eastern Counties of England at present, but may be more widely known in the near future.

PRINCIPAL CHARACTERS

Young Plant Semi-erect habit of growth. Leaf broad, a little flaggy, bluish-green colour.

Tillering Low-average 0-2.

- Ear White chaff, rather dirty, lax-medium density, ear average to large in size, usually held erect, more square, no tapering on both sides; points of lemma slightly incurved, 1.5 cms. at top of ear.
- Glume Large, broad, tapering, rounded in centre. Shoulder medium width. Square or slightly rising at end. Beak medium size, straight, slightly twisted out, tapering to sharp point. Keel prominent along glume. Internal hairs group 1. Imprint medium size, dark.
- Grain Large, red, coarse, plump, irregular, poor quality.
- Straw Short and stiff (av. 36 in.), pale colour, rather coarse. Thick-walled.

1,000 Grain Wt. 56.7 grams.



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CEREAL VARIETIES IN GREAT BRITAIN

IRON III

Origin Bred at Svalof and introduced by the General Swedish Seed Co. Ltd. It was derived from a cross between Kotte and Grenadier. First marketed in 1923.

General Like the old Swedish Iron in many ways or characters Iron III is essentially a wheat for autumn sowing. Its winter hardy characters are excellent. Tillering fair in spring it ripens about average, the straw being also about average length and reasonably stiff; resistance to lodging is fair under correct conditions. It would not be classed as a wheat for harvesting by combined methods, although shattering does not often take place. Resistance to disease is good, very little Rust or other common diseases being noted. The chaff is a clean white and the ears are of medium density and size. Iron III has a pale red or pink grain of good size but poor quality. It is suited to a wide range of soils in medium fertility and is superior in yield to the original Swedish Iron, Crown and Steel, but should not be placed into the high-yielding group. There is a little Iron III grown to-day, chiefly in the North, where climatic conditions suit the Swedish wheats. It does not sprout quickly during a wet harvest. Sometimes called Panzer III and is a parent of Jubilegem.

PRINCIPAL CHARACTERS

Young Plant Very prostrate habit of growth. Leaf medium, inclined to flag, pale colour.

Tillering Low-average 0-2.

Ear White chaff, clean, medium density, very slow tapering on both sides, average size; points of lemma small and slightly incurved, 0.5 cm. at top.

Glume About average size, slightly rounded. Shoulder medium sloping, often rounded at end. Beak medium, usually straight and blunt. Keel prominent along whole glume. Internal hairs group 1. Imprint large, broad and pale.

Grain Average-large, dull red colour, regular but a little rough or coarse, poor quality.

Straw About average length (45 in.), good quality, clean and bright. Thin walls.

1,000 Grain Wt. 56.0 grams.

WHEAT

IRONRED

Origin Introduced by Messrs. Edward Webb & Sons Ltd., Stourbridge, in 1938. It was derived from a cross between Swedish Iron and Standard Red.

General Best sown in early autumn, but can be a little later than is normal for autumn wheats. It is very winter hardy and tillers quite well in early spring; the time of ripening is about the same as for Standard Red, average for autumn-sown wheats. The straw of Ironred is slightly longer than Standard Red but shorter than Steadfast; its resistance to lodging is fair only. Resistance to Loose Smut and other common diseases is very high; it does not shatter easily, but would not be classed as a good wheat for combined harvesting. It is a red clean-chaffed wheat with ears of medium density, rather square and of good size. The grain is clean, red and uniform, of biscuit quality only. Most suitable soils are those of a lighter type in a fair state of fertility which may be under a wide range of climatic conditions. Sprouting in the ear has not been observed during a wet or damp harvest. In trials it has given slightly better yields of grain than Standard Red, Little Joss and Steadfast. Grown in many parts, principally in England.

PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth. Leaf medium, held fairly erect. Good colour.

Tillering Average 0-2, occasional weak.

- Ear Red chaff, medium density, rather square, tapering only slight face view, average to large size; points of lemma incurved, up to 1.5 cms. at top.
- Glume Average size, slightly rounded. Shoulder narrow to medium, usually sloping a little, occasionally rounded at end. Beak shortmedium, humped, blunt. Keel usually prominent, but sometimes less defined in centre of glume. Internal hairs group 3. Imprint very large up to $\frac{3}{4}$ in.
- Grain Red, quite large, plump and rounded, regular, soft, biscuit quality.
- Straw Average to long (av. 49 in.), good quality, clean bright colour. Thin-walled.

1,000 Grain Wt. 52.0 grams.

JUBILEGEM

Origin Bred at the Plant Breeding Institute, Gembloux, Belgium, from a cross between Vilmorin 23 and Panzer III. Name given by the breeders is Jubilé, and it was introduced under this name in 1936. It was introduced by the N.I.A.B. as Jubilegem in 1940.

General For highest yields it is best sown in early autumn, but can be sown with good results much later than many varieties. It stands the winter well, covers the ground better than many French types and tillers strongly but not freely in the spring. A very early ripening variety but a day or two later than Bersée and Vilmorin 27. The straw is very short and stiff, resistance to lodging being excellent; one of the best wheats to combine as it does not shatter quickly on becoming dead ripe. Resistance to disease is not high but yields are rarely affected by Rusts or Loose Smut but are sometimes lowered by Mildew, to which it is rather susceptible in the moister districts. The chaff is white or a dirty-white (Mildew) with ears that are fairly long, tapering and more lax. The grain is red, of average size, often irregular and slightly rough, of poor quality. It is suited to the medium and heavy soils in a high state of fertility; when grown well on these soils it will be found to be one of the highest yielding wheats in cultivation to-day. Yields of 80 bushels are not uncommon. Sprouting in the ear during a wet harvest is not recorded. Grown in considerable acreage in the wheat districts of the Eastern Counties of England and many other parts.

PRINCIPAL CHARACTERS

Young Plant Semi-erect habit of growth. Leaf average, fairly erect, mid-green colour.

Tillering Low-average 0-2.

Ear White chaff, tapers very slightly both sides, lax or lax-medium density, stiff rachis.

Glume Average-long but broad at base, tapering quickly, rounded. Shoulder narrow to medium, square or slightly rising at end. Beak fairly long and pointed, usually straight. Keel prominent along whole glume. Internal hairs group I. Imprint large.

Grain Large but smaller than Vilmorin 27. Red, rough, coarse, irregular, soft and poor quality.

Straw Short, stiff (av. 37 in.), rather coarse, dirty colour. Thick-walled.

1,000 Grain Wt. 54.4 grams.

WHEAT

JULIANA

Origin Bred at the Plant Breeding Institute, Wageningen, Holland. It was derived from a cross between Wilhelmina and Essex Smooth Chaff. First introduced in 1934.

General In many ways this wheat resembles Wilhelmina, it is best sown in early autumn although it can be sown a little later than Wilhelmina. Covering the ground well during the winter Juliana is winter hardy, tillering well in spring. It ripens about average but is usually a day or two earlier than Wilhelmina; the straw is short-average and its resistance to lodging is quite good, it can be successfully combined. Resistance to shattering is high, also to Rust and Mildew, but some Loose Smut is often seen in crops of Juliana. A white clean-chaffed wheat with ears of a square type, medium to dense and smaller than those of Wilhelmina. The grain is white, clean and of average size, best uses are for white biscuit making. It is suited to soils which are a little better than those recommended for Wilhelmina, namely soils in medium to high fertility, and is specially suitable for land which lies wet and cold during the winter. In recent trials it has given slightly better yields than Wilhelmina, but it would not be classed a very high-yielding wheat. Sprouting in the ear during a wet harvest is rather common. Grown in many parts of England, popular in the more Western districts, but is being replaced slowly by Staring and Alba.

PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth. Leaf broad, held erect.

Tillering High but 0-2 maturing only.

- Ear White chaff, clean, dense, short-average in length, sometimes widening towards top but usually uniform on both sides.
- Glume Average length, rather broad, and rounded. Shoulder medium to narrow, sloping, sometimes rounded. Beak medium size, blunt, straight or slightly humped. Keel prominent along whole glume. Internal hairs group 2. Imprint very large, pale colour.
- Grain White, plump, average size, clean, smooth, good white biscuit quality.
- Straw About average length (46 in.), pale colour, good quality, fairly stiff. Thin-walled.

1,000 Grain Wt. 46.8 grams.



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KARN II

Origin Bred by Messrs. Weibulls, Landskrona, Sweden, from a double cross between (Marquis \times Hatif Inversable) \times Extra Kolben \times Dutch Land Variety. It was introduced by Messrs. Edward Webb & Sons Ltd., Stourbridge, in 1950.

General Like most spring wheats it should be sown early to obtain best results. It tillers moderately and grows strongly, ripening early-average with straw about average length which is quite stiff and strong, the resistance to lodging being quite high. Resistance to disease is fair—an ear or two of Loose Smut has been observed in some seasons; resistance to shattering and sprouting in the ear is excellent. The ear is white-chaffed, medium density and of average size, with red grain which is small, hard and of fair quality. Soils best suited to Karn II are those of a light to medium nature in a high state of fertility. In trials on light land Karn II has given good yields of grain and has out-yielded all other light-land types. Like Brons, Karn II is a new spring-wheat introduction which may become popular among the few varieties for spring sowing.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth. Leaf medium size, dark green, little waxy.

Tillering Moderate 0-2 occasional weak.

- Ear White chaff, medium density, average size, slowly tapering both views; points of lemma not consistent, long, extending up to 2 cms. at apex.
- Glume Small-medium size, rather flat. Shoulder medium square, sometimes bevelled at end. Beak medium size, straight, fairly sharp. Keel very prominent along whole glume. Internal hairs group 1. Imprint not clearly defined.
- Grain Small, uniform, red, plump, medium texture, fair quality.
- Straw Short-average (43 in.), pale colour, stiff. Slightly thickened walls.

1,000 Grain Wt. 41.4 grams.

WHEAT

LITTLE JOSS

Origin An introduction from the Plant Breeding Institute, Cambridge, in 1908, and bred by Sir Rowland Biffen from a cross between Squareheads Master and Ghirka variety.

General Little Joss is best sown in the autumn, but this wheat can be sown as late as February, and under some conditions gives a fair crop. It is winter hardy and covers the ground well during this period; tillering is medium in spring. Time of ripening is about average, the straw is long and weak and the resistance to lodging is poor. Although it does not shatter it would not be considered a suitable wheat to harvest by combined methods. It is highly resistant to Rusts but rather susceptible to Loose Smut. A red clean-chaffed wheat with rather long lax ears; the grain is red, clean, average size and of biscuit quality. Best suited to soils which are of the lighter type or where the fertility is low; Little Joss is sometimes termed the poor-land farmer's wheat. It can give quite good yields but is not considered to be in the high-yielding class. Yields from Little Joss vary considerably from season to season as in many cases they are dependent on the crop all standing; in some cases on a little better land than is advised, yields have been recorded as high as 35 cwts. per acre in one season, in another season it may have lodged badly. Resistance to sprouting in the ear is high, and Little Joss is known and grown throughout England, only a little being found in Scotland.

PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth. Leaf narrow, pale colour, flaggy.

Tillering Average 0-2 maturing only.

- Ear Red chaff, clean and bright, lax-medium density, long, and tapering both sides, spikelets spreading; small points on lemma.
- Glume Rather long and narrow, flat. Shoulder narrow, slowly sloping. Beak short to medium, usually humped, blunt. Keel very prominent at top, less towards base. Internal hairs group 2. Imprint very large.
- Grain Average-large, red, clean, somewhat longer than normal, slightly humped.
- Straw Long and fine (av. 56 in.), bright colour with some reddening towards top, weak. Thinwalled.

1,000 Grain Wt. 48.5 grams.



MARSHALL or LOVINK

Origin Bred in Holland by Dr. Mansholt from a cross between Carsten and Juliana. It was introduced into England by Twyford Mill Ltd., Banbury.

General A true autumn wheat as it will not give a crop if sown after the turn of the year. It tillers freely in spring and ripens about the same time as Juliana. The straw is short to medium, and quite stiff with a high resistance to lodging; resistance to disease, shattering and sprouting seems fair, although an occasional ear of Loose Smut has been observed and a little Yellow Rust. Ears are white-chaffed, about average size, dense and more club-headed; the grain is white, clean and uniform, similar in appearance to Juliana. Its quality is no more than biscuit. Suitable soils are those in a high state of fertility where it will yield favourably and stand better than many of the white-grained wheats grown to-day. Should harvest satisfactorily by combined methods. A new wheat introduction.



PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth. Leaf medium, held erect.

Tillering High 0-3 some weak.

- Ear Short-average, dense, more club-headed, white chaff; points of lemma usually more straight.
- Glume Medium size, rounded, soft. Shoulder medium width, slightly sloping. Beak medium size, straight or slight hump, sharp. Keel usually plain along whole glume but more pronounced at top. Internal hairs group 1-2. Imprint large, not always clear.

Grain White, plump, clean, uniform, biscuit quality.

Straw Short-average (av. 44 in.), white, bright, clean, reasonably stiff.

1,000 Grain Wt. 46 grams.

WHEAT

METEOR

Origin Introduced by Messrs. Gartons Ltd., of Warrington, 1941. It was derived from a cross between April Bearded and Yeoman.

General Should be sown by mid-March; Meteor ripens fairly early, the straw is rather long but quite coarse, although it will quickly lodge if sown on too fertile soils. It does not shatter but is not considered a wheat to harvest by combined methods. Resistance to the common diseases is high. The ears are a good size, square, long and lax to medium in density. A white chaff with red grain which is of good quality. It is suited to the light-medium soils in no more than an average state of fertility. Yields are very satisfactory for a spring wheat. Resistance to sprouting in the ear during a wet harvest is only fair. Grown in many parts of England but not as popular as Atle or Fylgia. Meteor will fill many gaps, is a useful variety, and is becoming more popular.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth. Leaf narrow, long, a little flaggy, good colour, much bloom in evidence.

Tillering High 0-3, some weak.

- Ear White chaff, clean, lax to medium, ear rather long and uniform, no tapering ; prominent points of lemma at top, usually 1-2 cms. long.
- Glume Average length but narrow, slight taper, fairly flat. Shoulder narrow, square but often rising slightly. Beak short to average, straight and pointed. Keel prominent along whole glume. Internal hairs group 1-2. Imprint small-average, pale.
- Grain Small-medium size, uniform, red, bright, may be long, good quality.
- Straw Rather long (av. 54 in.), fine or thin but coarse, rather weak, good colour. Very thin walls.

1,000 Grain Wt. 44.2 grams.

MILLER

Origin Bred and introduced by Messrs. Edward Webb & Sons Ltd., of Stourbridge. Miller was derived from a cross between Yeoman and Wilhelmina.

General Truly a wheat for autumn sowing, and would not be considered suitable for sowing after the turn of the year; it is winter hardy and covers the ground well. Tillering is high in spring. It ripens early-average, the straw being short-average, stiff with a fair resistance to lodging, but slightly weaker than Holdfast. A suitable wheat for combined harvesting and does not shatter when dead ripe. The resistance to Loose Smut and Rust is high. Colour of the chaff is white and clean, the ears being medium in size, square and of medium density; they are well filled with white grain which is of average size, uniform, clean, hard and of very good baking quality. It is suited to the medium-class soils in a high state of fertility on which it will give good yields, almost two tons per acre have been reported on several occasions. Not unlike Holdfast in many of its features except that Miller does not sprout so freely in the ear during a wet or damp harvest. A wheat found in several parts of England and in some districts of Scotland.

PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth. Leaf rather narrow, fairly erect.

Tillering High 0-3, some weak.

- Ear White chaff, clean and bright, average size, very slight tapering on both sides, spikelets small and compact, medium density; points of lemma small and straight.
- Glume Small-average size, may be slightly narrow. Shoulder medium-broad, very slowly sloping. Beak short, straight and blunt. Keel not very prominent but plain down whole glume. Internal hairs group 2. Imprint small-average, greyish.
- Grain White, average size, clean, uniform, rounded, hard, good quality.
- Straw Short-average (av. 44 in.), pale colour, clean, good quality. Thin walls.

1,000 Grain Wt. 48.5 grams.

WHEAT

MILLION III

Origin Bred at the Plant Breeding Station, Wageningen, Holland. It was derived from a cross between Wilhelmina and William I.

General Best sown in early autumn as Million III will not give a crop if sown after the turn of the year. It winters well and tillers freely in spring. Time of ripening is average-late for autumn-sown wheats. The straw is medium in length but fairly stout. It resists lodging to a large extent under normal conditions. There is a slight tendency to shatter and should not be classed as a good combine wheat. Resistance to the common diseases is fair only as some Yellow Rust has been observed in most seasons. The ear is dense, square, short-average in length, and in many ways resembles Wilhelmina. A clean white-chaffed wheat with white grain which is uniform, medium size, and of poor biscuit quality. Best suited to fertile conditions on soils in the medium class where its yields are close to Juliana, but slightly inferior. Like other Dutch wheats it is suitable for sowing on land which lies wet for long periods during the winter. It is rather susceptible to sprouting during a wet harvest. Very little grown, and, like Juliana and Wilhelmina, is being replaced by Staring and Alba. No use in Scotland.

PRINCIPAL CHARACTERS

Young Plant More semi-prostrate habit of growth. Leaf long, broad, flaggy, pale colour.

Tillering High 0-3.

- Ear White-chaffed, clean, very dense, compact, usually square, short to average in length, no tapering; points of lemma straight or slightly incurved, approximately 1 cm. at top.
- Glume Rather long, tapering, slightly rounded in centre. Shoulder medium, slowly sloping, may be rounded at very end. Beak medium, straight and blunt. Keel not prominent but can be seen along whole glume. Internal hairs group I. Imprint average to large.
- Grain White, average size, uniform, plump, slightly rough, poor quality.
- Straw Average (av. 44 in.), white or pale, fair quality, resistance to lodging fair-good. Slightly thickened walls.

1,000 Grain Wt. 52.3 grams.



MIRACLE

Origin A single plant selection from a hybrid by Messrs. Carter's Tested Seeds Ltd., London, in 1927.

General Should always be sown in autumn for best returns. It grows strongly in spring after standing a hard winter, the tillering is quite fair. Time of ripening is about average, same as Standard Red or Steadfast; the straw is inclined to be long and resistance to lodging is not high if grown on too strong land. The ear is red-chaffed, medium in size and density, slightly tapering. Quality of the grain which is white is not high but is of fair size and attractive. Resistance to diseases, shattering and sprouting in the ear is quite good, a little Yellow Rust and Mildew being noted in some seasons. Suitable soils are those of a light to medium nature in average fertility on which it will give satisfactory yields, slightly higher than Little Joss and about the same as Standard Red or Steadfast. It would not be put into the group of high-grain yielders, and would not be classed as an ideal wheat to harvest by combined methods. Known to be grown in many parts of England to-day.

PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth. Leaf rather long, inclined to flag, good colour.

Tillering Average 0-2 maturing.

- Ear Red chaff, clean, medium density, average to long, slow tapering on both sides; points of lemma incurved, very small, at top 0.5 cm. maximum.
- Glume Average width, rather long, tapering. Shoulder narrow to medium, square or slightly sloping. Beak usually straight but sometimes small hump present, medium size and blunt. Keel prominent at top only, remainder plain and thin. Internal hairs group 2-3. Imprint very large.
- Grain White, average-long in size, uniform, slightly rounded, clean. Soft.
- Straw Rather long (av. 53 in.), good bright colour, good quality. Thin walls.

1,000 Grain Wt. 52.3 grams.

WHEAT

Origin Selected by Messrs. David Miln & Co. Ltd., Chester, from a collection of mutant types in their plant breeding station.

General Best yields are obtained when sown in early autumn, but this wheat can be sown a little later than many varieties. The tillering is low to moderate and it ripens early, about the same time as Jubilegem and Bersée. Its straw is short to medium but whippy and strong, the resistance to lodging being quite high. Resistance to disease and shattering is good, and no sprouting in the ear has been observed during a wet harvest. The ear is white-chaffed, long and lax with red grain, regular in shape, large in size and of fair quality. Suitable soils are those of a more medium nature in a high state of fertility, but it will do well on a range of soil conditions. When grown well N.59 gives high yields of grain and would be placed in the high-yielding group. A new wheat being grown in increasing acreage to-day.

PRINCIPAL CHARACTERS

Young Plant More erect habit of growth. Leaf medium, good colour, considerable waxy bloom present.

Tillering Low-moderate 0-2.

- Ear White-chaffed, clean, rather long, tapering towards apex, lax; points of lemma sharply incurved.
- Glume Medium size, soft. Shoulder medium to broad, square or very slightly sloping. Beak very short, blunt and straight. Keel plain along whole glume. Internal hairs group 2. Imprint medium size, not always clear.

Grain Red, large, regular shape, long, fair quality.

Straw Short to medium (av. 47 in.), usually bright colour, thin and whippy but strong. Thick walls.

1,000 Grain Wt. 56 grams.





NORD DESPREZ

Origin Bred at the plant-breeding station of M. Desprez in France from a cross between Hybrid du Joncquios and Vilmorin 23. Introduced by Messrs. Elsoms Ltd., Spalding.

General Should be sown in the autumn by the end of November for best returns as this wheat is winter hardy and grows strongly in spring. The tillering is moderate and it ripens very early on very short, stiff straw with a high resistance to lodging. Resistance to disease is not high but better than Vilmorin 27 and some others in the same class. Ears of Nord Desprez are long and large with white chaff and large red grain which is rather coarse and of poor quality. It does not shatter quickly and no sprouting has been noted during a wet harvest season; most suitable for harvesting by combined methods. Suitable soils are those of a medium to heavy nature in a high state of fertility on which Nord Desprez will yield exceptionally well, being one of the highest-yielding wheats in the country to-day. A new wheat introduction, but should become popular.



PRINCIPAL CHARACTERS

Young Plant Prostrate habit usually. Leaf medium, good colour, inclined to flag, much waxy bloom present.

Tillering Moderate.

- Ear Large, long, more square, white chaff, laxmedium density, points of lemma incurved, small.
- Glume Average to large, slightly rounded in centre. Shoulder narrow, square. Beak short, blunt and humped. Keel prominent along whole glume. Internal hairs group 2. Imprint very large.
- Grain Large, red, rather coarse, poor quality, elongated.
- Straw Short, stiff, rather coarse (av. 39 in.). Thick walls.

1,000 Grain Wt. 64.2 grams.

WHEAT

OVERLOED

Origin A selection from Robusta, which is a Dutch wheat, the parentage being Million $I \times Iduna$.

General Like most Dutch wheats it should be sown early for best returns. It is very winter hardy and grows strongly in early spring; tillering is rather poor. Time of ripening is average-late for autumn wheats, the straw is about average, fairly stiff and coarse. Resistance to lodging is quite good, and common diseases are not noted to be a troublesome feature. The ear is large, of square type and medium-dense in density. It is white-chaffed with large white grain of poor quality, the grain is usually much larger than that of Wilhelmina. Suitable soils are those of a medium-heavy nature and in good fertility. Yields are not more than average, lower than Juliana; the ear population per acre or square yard of these types of wheat is below that of many varieties and this factor governs yields to a large extent. Does not shatter at harvest but is rather susceptible to sprouting during a wet season. Grown in small acreage in some parts of England, more in Central and Western Counties.

PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth. Leaf medium, a little flaggy, good colour.

Tillering Rather low 0-2, many weak.

- Ear White chaff, clean, medium to dense, average length, slow tapering on face view; points of lemma straight or slightly incurved, inconsistent.
- Glume Average size, slightly tapering, rounded in centre. Shoulder rather narrow, sloping and rounded. Beak short to medium in size, straight or slightly humped, blunt. Keel plain along whole glume. Internal hairs group 3. Imprint usually large, pale.

Grain Rather large, white, slightly coarse, soft.

Straw Average (av. 45 in.), rather coarse, pale colour. Thin walls.

1,000 Grain Wt. 57.0 grams.



PETIT QUIN QUIN

Origin Bred by M. Blondeau in France from the crosses Vilmorin $23 \times$ Agricultural Institute \times Providence. Introduced by Messrs. Elsoms Ltd., Spalding.

General A new French wheat introduction which can be sown later than many varieties, but highest yields are obtained when autumn-sown. It is one of the early maturing wheats with strong stiff straw and can be successfully harvested by combined methods; its resistance to shattering is very high. Resistance to disease is fair, but some Yellow Rust has been observed and an occasional ear of Loose Smut. The ears are average to long, more lax in density, white-chaffed with rather long, red, soft grain. Suitable soils are those in a high state of fertility and of a more heavy nature, on which it gives high yields of grain falling well into the high-yielding group of wheats.



PRINCIPAL CHARACTERS

Young Plant . More semi-prostrate habit of growth. Leaf medium, good colour, much waxy bloom present.

Tillering Low-average.

- Ear Average long, lax medium, tapering both views, white chaff, points of lemma usually straight, up to 3.0 cms.
- Glume Average size, more oblong. Shoulder medium, square or slightly acute. Beak shortmedium, tapering, slightly humped. Keel plain at apex, less clear lower glume. Internal hairs group 1. Imprint average size, not always clear.
- Grain Very large, long, red, coarse grain, poor quality, irregular.

Straw Short, stiff, coarse (av. 40 in.). Thick walls.

1,000 Grain Wt. $64 \cdot 6$ grams.

WHEAT

PICARDIE

Origin Raised in France by M. Desprez from a cross between The Allies and Agricultural Institute. Introduced by Messrs. Elsoms Ltd., Spalding.

General This wheat can sometimes be termed a dual-purpose wheat as it will give good returns if sown as late as March. It is quite winter hardy, and best returns are obtained when sown in the autumn. Tillering is moderate and ripening is early, the straw being short to average but strong and stiff with a high resistance to lodging. Resistance to disease is better than is found in most French wheats, and Rusts are seldom seen. Ears of Picardie are of good size, rather lax in density. They are whitechaffed with white bold grain which is of rather poor quality for milling. Suitable soils are those in the medium to heavy class and in a high state of fertility, on which it will give very high yields of grain; over 80 bushels per acre are commonly recorded. Not universally popular but is grown in some parts of England, principally in the Midlands.

PRINCIPAL CHARACTERS

Young Plant Semi-erect habit of growth. Leaf rather narrow, pale green, some waxy bloom present.

Tillering Low-average.

- Ear White chaff, sometimes dirty, lax, very slightly tapering only both views; points of lemma incurved, usually short.
- Glume Average size, slightly rounded in centre. Shoulder narrow - medium square. Beak medium straight. Keel prominent along whole glume. Internal hairs group 2. Imprint pale, average size.
- Grain Large white plump grain, fairly regular, soft and poor quality.
- Straw Short-medium, stiff, fairly fine (av. 45 in.). Very thick walls.

1,000 Grain Wt. 64.9 grams.



PILOT

Origin Introduced by Messrs. Gartons Ltd., of Warrington, in 1945. It was derived from a cross between Little Tich and Swedish Iron.

General Sow early in the autumn for best results. Wintering well and covering quickly this wheat grows vigorously in spring, tillering freely. It ripens average to late, a day or so earlier than Swedish Iron and Scandia. The straw is average in length, quite strong, with fair resistance to lodging unless grown on too heavy fertile land. Ears of Pilot are large, long, square type and of medium density. Quality of the grain which is red is fair-good, the grain being uniform, clean and of good size. Resistance to disease is fair only, some Yellow Rust has been noted but little Mildew and no Loose Smut. Suitable soils are those of a medium to heavy nature in an average state of fertility, in particular where climatic conditions are suitable for the Scandinavian types. Under these conditions it gives a very good yield of grain higher than Swedish Iron and Iron III, and has equalled Scandia in trials. It does not shatter at harvest and sprouting in the ear during a wet harvest is not troublesome. Being grown in increasing acreage in the suitable parts of England, also in Scotland.

PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth. Leaf medium-long, a little flaggy, good colour.

Tillering Average-high, 0-2 strong.

- Ear White chaff, clean, medium density, ear average to large, slowly tapering on both sides, points of lemma incurved, up to 1 cm. at top.
- Glume About average width and length, slowly tapering from slightly rounded centre. Shoulder medium, square or slightly sloping, sometimes a little rounded at end. Beak medium to long, straight, rather blunt. Keel plain along whole glume. Internal hairs group 1. Imprint average size, pale.
- Grain Usually average-large, red, plump, a little coarse, soft.
- Straw About average (av. 45 in.), good clean quality, pale colour. Thin walls.

1,000 Grain Wt. 50 grams.

WHEAT

PROGRESS

Origin Bred at Svalof and introduced by the General Swedish Seed Co. Ltd. in 1940. It was derived from a double cross between Extra Kolben \times (Svalof Kolben \times Braun Schlaustalter).

General Best sown at the end of February or early March. It tillers well but ripens late, the straw being average to long; resistance to lodging is fair, slightly better than Fylgia, and far superior to Red Marvel. The ears are rather long, tapering and of medium density. A red chaff with red grain, rather small in size and of fair quality for baking. It is resistant to Loose Smut but some Black and Yellow Rust has been noted, although only to a small extent. Most suitable soils are those of a medium nature in no more than average fertility. Resistance to shattering is high, but sprouting in the ear is obvious during a wet harvest. Would not be easy to harvest by combined methods. Progress is a new spring wheat and in yield trials on light land it has been superior to Fylgia and Meteor. Grown in Ireland in large acreage, but appears a little late in ripening for the British farmer unless grown in the South-Eastern Counties or up on the Cotswolds.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth. Leaf rather long, a little flaggy, deep colour.

Tillering High 0-3, some weak.

- Ear Deep red chaff, lax-medium density, average to long ear, slow tapering both sides, points of lemma small incurved, longer and straight towards top.
- Giume Small, narrow, only slight tapering. Shoulder narrow and square. Beak short to average, straight, fairly sharp point. Keel prominent along whole glume. Internal hairs group 2. Imprint not clearly defined.
- Grain Small, red, clean and bright, uniform, medium texture, good quality.
- Straw Average (av. 46 in.), good clean quality, bright, strong, thin walls.

1,000 Grain Wt. 43.2 grams.

F



QUOTA

Origin Selection made by Messrs. Carter's Tested Seeds Ltd., London, in 1926.

General A wheat for autumn sowing only, it is very winter hardy and grows normally in spring; tillering is not very high, but tillers are strong. Time of ripening is average to late, the straw being medium-long but fairly strong; resistance to lodging is not high if grown on strong land. The ear is white-chaffed, medium density, square type and of good size; the chaff is clean. Quality of the grain, which is red, round, and plump, is rather poor and also a little coarse. Resistance to disease is fair only, some Rusts and Mildew being noted. Soils best suited to Quota are those in high fertility if of light type and in no more than average fertility if medium to heavy. Yields are said to be satisfactory when grown well, but it is not to be put into the same yielding class as Vilmorin 27 for example. Would not be classed as a good wheat to harvest by combined methods, although it does not shatter easily, and sprouting in the ear during a wet harvest is not often troublesome. Grown in many parts of England.

PRINCIPAL CHARACTERS

Young Plant. Very prostrate habit of growth, leaf inclined to flag, average size, good colour.

Tillering Average 0-2, strong.

- **Ear** White chaff, clean, medium density, average to large size, very slight tapering if any on both sides; points of lemma straight or slightly incurved at top, where they are up to 1 cm.
- Glume Average size, rounded in centre, tapering slightly. Shoulder medium sloping, slightly rounded at end. Beak medium, slightly humped or straight, rather blunt. Keel usually prominent along whole glume. Internal hairs group 1. Imprint long and narrow.
- Grain Red, plump, rounded, rather coarse, average size, soft.
- Straw Average to long (av. 50 in.), good clean colour. Thin walls.

1,000 Grain Wt. 51 .2 grams.

WHEAT

RAMPTON RIVET

Origin Introduced by the National Institute of Agricultural Botany, Cambridge, in 1939. It is a selection from Cone Wheat.

General Little grown to-day, this wheat should be sown early in the autumn at a slightly higher seed rate than is normal for best returns. It is very winter hardy but appears to grow weakly at first in spring. Time of ripening is late, two weeks or more behind the early ripening varieties. The straw is long and the resistance to lodging is not high although it will stand up under a number of conditions. Ears are bearded with a bluish-grey chaff, large in size and square. The grain is more pink in colour, plump and large. Resistance to the common diseases is high. Best soils are those of a medium heavy type in low fertility, especially the heavy, wet low-fertility clays. Yields from Rampton Rivet are very high, one of the highest recorded. It does not shatter at harvest, but sprouting in the ear is common during a wet harvest season. Is most unsuitable for harvesting by combined methods. Found growing in some parts of England but only in very small patches.

PRINCIPAL CHARACTERS

Young Plant Semi-erect habit of growth. Leaves narrow, flaggy, pale colour.

Tillering High 0-3, some weak.

- Ear Chaff hairy, a dirty-grey colour, medium density, ear slightly tapering both sides, or more square, rough awns or points of lemma, sharply barbed. Ear large, curves when mature.
- Glume Very small narrow glume, hairy on outer surface. Shoulder narrow, sloping, sometimes rounded at end. Beak average to long, straight and pointed. Keel very prominent along whole glume. Internal hairs group 3. Imprint large.
- Grain Pale red or pink, average size, smooth, humped, quite even, poor quality, soft.
- Straw Long, tough (av. 55 in.). Almost solid or very thick walls.

1,000 Grain Wt. 51.4 grams.



RECOVERY or CARSTEN DIKKOP V

Origin Bred at Carsten from a cross between Dikkop and Griewener 104. Introduced into England about 1947 by Twyford Mill Ltd., Banbury, Oxon.

General One of the autumn wheats which must be sown early to obtain best yields. Tillering is high in spring and it ripens about average, the straw being short to medium and quite stiff. Resistance to lodging, shattering and disease appears good. Ears of Recovery are short to medium and rather dense; they are white-chaffed with red grain of uniform size. Quality of the grain is quite fair. Soils suited to this wheat are those of a medium to heavy nature in high fertility. Like most of the Dutch types it is suited to wet conditions during winter and is very winter hardy. Yields are quite good when grown well. Harvesting by combined methods can easily be achieved, and no sprouting in the ear has been observed during a wet harvest. A new wheat introduction.

PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth. Leaf medium, dark colour.

Tillering High 0-3, some weak.

- Ear Short-medium, white chaff, dense, sometimes appearing club-headed; points of lemma more straight, up to 1.5 cms. at apex.
- Glume Rather small, rounded, soft. Shoulder medium square. Beak short, straight or very slight hump, sharp. Keel prominent at top, less defined along remainder. Internal hairs group 1. Imprint large, usually dark colour.
- Grain Red, small-average, fairly hard, uniform and clean.
- Straw Short-average (av. 44 in.), white, clean, stiff. Thin walls.

1,000 Grain Wt. 44.0 grams.

WHEAT

REDMAN

Origin Introduced by Messrs. Gartons Ltd., of Warrington, in 1934, and was derived from a cross between Yeoman and Squareheads Master.

General This wheat should be sown in early autumn and not later or reduced yields can be expected. It is very hardy and covers the ground well during the winter. Tillering freely in early spring it ripens about average for the autumn-sown wheats. The straw is short to average, resistance to lodging being high but in the same class is inferior to Holdfast as a combine wheat. Resistance to shattering and disease is good. Ears of Redman are red-chaffed, clean, medium in density and size. The grain is red, average size, uniform and of good baking quality. It is suited to soils in the heavier class which are in a medium to high state of fertility, where it will give good yields of good-quality grain. Sprouting does not take place quickly during a wet harvest but it is rather more susceptible than many varieties. Grown in many parts of England to-day.

PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth. Leaves fairly broad and held erect, good colour.

Tillering High 0-3.

- Ear Red chaff, clean, medium density, average size, almost square form, no tapering or slight face view only, points of lemma up to I cm. long, usually straight.
- Glume Small-average size, little or no tapering. Shoulder medium to broad, square or very slightly sloping only. Beak very short, straight and blunt. Keel not very prominent but plain along whole glume. Internal hairs group 1. Imprint small-average, clear.
- Grain Average size, red, uniform, hard, good quality.
- Straw Short to average (av. 41 in.), good bright colour. Thin walls.

1,000 Grain Wt. 51 · 1 grams.



RED MARVEL or JAPHET

Origin A selection made by Messrs. Vilmorin of Paris, from the French land variety "Noe." First grown in France in 1892, coming into England about 1900.

General This wheat may be sown a little later than some varieties, but should be sown by the end of March. It is a true spring type and ripens average to late; the straw is long and rather weak, resistance to lodging being poor to fair. Ears of Red Marvel are rather long and lax, similar to Vilmorin 27 in shape. The chaff is white or dirtywhite with red grain, which is large or very large and of poor quality. It is suited to soils of a light to medium nature in no more than average fertility. Shattering is not often noticed, but this wheat would be difficult to harvest by combined methods. Resistance to sprouting during a wet harvest is good, but resistance to disease is poor. Yields are fair only, several of the more recent spring wheats have taken much of the Red Marvel acreage to-day. Owing to its large grain a slightly higher seed rate should be sown by weight.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth. Leaf mediumlong, inclined to flag, good colour, waxy bloom present.

Tillering Rather poor.

- **Ear** White chaff, rather dirty colour, ear averagelong, lax to medium density, slowly tapering both sides, points of lemma curved sharply inwards, more straight at top, up to 1 cm. long.
- Glume Large, broad, rounded in centre. Square medium shoulder slightly rounded at end. Beak medium size, distinctly humped, rather blunt. Keel very well defined along whole glume. Internal hairs group 3. Imprint large.
- Straw Average-long (av. 51 in.), pale colour, rather dirty. Thick walls.
- Grain Large, plump, red, rough, irregular, poor quality, rather humped.

1,000 Grain Wt. 59.4 grams.

WHEAT

RENOWN

Origin Introduced by Messrs. Gartons Ltd., Warrington, in 1926. Derived from a cross between Squareheads Master and Swedish Squarehead.

General Should be sown by the end of November. It is very winter hardy. Slow growing early in year, Renown tillers freely in spring with dark green leaf. Ripening about average, its straw being quite strong but not short, resistance to lodging is only fair and should not be sown on heavy land in good fertility. Ears are dark red-chaffed, average to large in size and of medium density. The grain is red, round and plump, and is always clean; the quality being rather poor biscuit. It is not susceptible to disease to any troublesome extent and its resisting powers to shattering during cutting and carting are good. Sprouting in the ear during a wet harvest has not been observed. Suitable soils are those of a medium nature in no more than average fertility. Yields are good, higher than Squareheads Master in many places. Not to be classed a combine wheat.

PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth. Leaf medium to broad.

Tillering Medium 0-2 maturing.

- Ear Red chaff, medium density, average size, slow tapering both sides, points of lemma pronounced, incurved.
- Glume Rather long, tapering, rounded in centre. Shoulder narrow-medium square or slightly sloping. Beak medium size, blunt with small hump. Keel prominent at top, plain along whole glume. Internal hairs group 2. Imprint usually large.
- Grain Average size, red, round, plump, biscuit quality.
- Straw Average-long (av. 50 in.) good bright colour. Thin walls.

1,000 Grain Wt. 49.8 grams.


72 CEREAL VARIETIES IN GREAT BRITAIN

SCANDIA

Origin Bred at Svalof, Sweden, and introduced by the General Swedish Seed Co. Ltd. in 1935. It was derived from a cross between Crown and a line Fylgia.

General Truly an autumn wheat Scandia does not do well if sown after the turn of the year. It is very winter hardy and covers the ground well. Tillering is free in spring but it ripens rather late. The straw may be a little shorter than average in length and its resistance to lodging is quite high. It can be successfully combined and it does not easily shatter. Resistance to disease is fair but some Yellow and Black Rust is often noted. A white clean-chaffed wheat, the ears being average in size, medium density and somewhat square in shape. The grain is red and uniform, of good size; the quality is poor for baking in this country. It is suited to soils which are in the heavy class and in good heart; yields when grown well can be quite high, and it would be classed as a high-yielding wheat. It has a high resistance to sprouting in the ear during a wet harvest. Probably the most popular Scandinavian wheat in this country to-day, but it is not grown in great acreages anywhere; it does well in the more Northern districts and Southern Scotland, but is now being replaced by Scandia III and also to some extent by Eroica, which is a new and promising Scandinavian variety.

PRINCIPAL CHARACTERS

Young Plant Very prostrate habit, leaf held fairly erect later in growth, good colour.

Tillering High 0-2, maturing strong.

- Ear White chaff, clean, medium density, average size, ear more square, practically no tapering or may be slight on face view; points of lemma small, straight or slightly incurved.
- Glume Average size, rounded, tapering sharply. Shoulder medium width, sloping. Beak shortmedium, straight or slight hump, blunt. Keel prominent at top, plain along remainder. Internal hairs group 1. Imprint average size.
- Grain Average to large, plump, red, rounded, poor baking quality, soft.
- Straw About average (av. 45 in.), pale colour, little coarse. Thin walls.

1,000 Grain Wt. 52.5 grams.

WHEAT

SCANDIA III

Origin A Svalof bread wheat and marketed by the General Swedish Seed Co. Ltd. It is a line selection from Scandia 0013.

General Being very similar to Scandia this wheat is again a true autumn wheat and no use for sowing late or early in the year. It is very winter hardy, one of the qualities the Swedish breeders have to consider. The tillering is high in spring and it ripens a day or two earlier than Scandia; its straw length is about average and quite stiff, resisting lodging very favourably. It can be successfully combined as shattering is not often noted. Resistance to Loose Smut is high but much Black Rust has been observed in some recent trials of this wheat. The chaff and grain are as Scandia, the grain quality being rather poor. Suitable soils are those under Scandia where it will give a higher yield than the latter by as much as 10 per cent. An improved Scandia type, but it is liable to throw a pink-chaffed genetical rogue occasionally. Does well in some Northern districts where climatic conditions are more favourable to Scandinavian wheats. One of the wheats in the high-yielding class.

PRINCIPAL CHARACTERS

Young Plant Very prostrate when young, later leaf held fairly erect. Leaf medium size, good colour.

Tillering High 0-3, some weak.

- Ear White chaff, clean, medium density, average size, slight or no tapering, ear more square, held erect, points of lemma small, more incurved.
- Glume About average size but more narrow than Scandia. Shoulder narrow, square or very slightly sloping. Beak short, straight and blunt. Keel prominent along whole glume. Internal hairs group 1. Imprint small-average, grey.
- Grain Average to large, red or dull colour, plump, rounded, soft.
- Straw Average length (av. 45 in.), pale colour, slightly coarse. Thin walls.

1,000 Grain Wt. 52.2 grams.



SQUAREHEAD II

Origin Introduced by Messrs. C. W. Marsters Ltd., King's Lynn, in 1927. It was derived from a cross between Squareheads Master and Yeoman.

General Most remunerative yields from this wheat are obtained when sown in early autumn, but it can be sown a little later than many varieties, and some fair yields have been reported when sown in February, although this is inadvisable. It is very winter hardy, grows away well in spring and tillers freely. Time of ripening is early-average, a little earlier than Standard Red or Squareheads Master. The straw is shorter than Squareheads Master and fairly strong, resistance to lodging being fair. Ears are dark red-chaffed, medium density, average size and of a square type; the grain is red, uniform, clean, of fair size and good biscuit quality. Resistance to disease is quite fair although a little Yellow Rust and a few heads of Loose Smut have been noted in some seasons. Suitable soils are those of a medium nature in average fertility, but it does very well under a wide range of soil types and conditions. Yields are very favourable when grown well, equal to and slightly above the yields of Squareheads Master. Shattering and sprouting in the ear at harvest time is never troublesome; it will combine well in some seasons, but is not classed as a good combine wheat. Grown in many parts of the British Isles and is a very popular variety.

PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth. Leaf broad, inclined to be flaggy, deep colour.

Tillering High 0-3, some weak.

- Ear Red chaff, clean and bright, medium density, square ear, no tapering or slight on face view, points of lemma straight up to 1.5 cm. at top of ear.
- Glume Average to large, slightly rounded lower third. Shoulder medium to broad, square or slightly sloping. Beak may be longer than average, slightly humped, blunt. Keel not prominent but runs evenly down whole glume. Internal hairs group 1. Imprint usually large.
- Grain Average size, plump, red, uniform, fair quality, medium texture.
- Straw Average length (av. 48 in.), bright colour, clean. Thin walls.

1,000 Grain Wt. 49.0 grams.

WHEAT

SQUAREHEADS MASTER 13/4

Origin Introduced by the National Institute of Agricultural Botany, Cambridge, in 1940. It is a selection from Squareheads Master.

General This wheat is very similar to the old Squareheads Master and is suited to the same class of land. It resembles the old variety in its botanical features, characters and habits except that the straw and chaff are very bright in colour. Resistance to lodging may be slightly higher and it ripens three to four days earlier than Squareheads Master or Standard Red. Being grown in larger acreage to-day and may be replacing the old type to some extent.

PRINCIPAL CHARACTERS

Young Plant More prostrate habit of growth. Leaf medium in size, inclined to flag a little.

Tillering Average-high 0-3, some weak.

- Ear Red chaff, clean and bright, medium size and density, slight tapering only both sides; points of lemma small up to 1 cm. at top, incurved or straight.
- Glume Rather long and slightly narrow. Shoulder narrow to medium width, sloping, occasionally rounded at the end. Beak average size, usually humped, blunt. Keel prominent at top and base, less defined in centre of glume. Internal hairs group 2. Imprint usually very large, pale.
- Grain Average size, plump, red, uniform or regular, rather soft.
- Straw Average to long (av. 50 in.), very bright, more yellow colour. Thin walls.

1,000 Grain Wt. 49.8 grams.



STEADFAST

Origin Introduced in 1941 by the National Institute of Agricultural Botany, Cambridge, and bred at the Plant Breeding Institute from a cross between Little Joss and Victor.

General Should be sown early in autumn for best yields but may be sown later than many varieties. It winters well and tillers fairly freely in the spring. Ripening about average its straw is inclined to be rather long, but is shorter than Little Joss; resistance to lodging is not high, especially where fertility is too good. The ears are medium in density, average to long, and are clean red-chaffed with white grain which is uniform, of good size and good white biscuit quality. It has shown strong resistance to Rust and other common diseases. Best returns are obtained by growing Steadfast on the light to medium soils in average fertility. Yields can be expected to be satisfactory for a light-land wheat. Sprouting in the ear is not often troublesome in wet times, but its resistance is not high; not a good wheat to harvest by combined methods, the straw being usually too long. Well known in many parts of the British Isles.

PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth. Leaf rather broad and flaggy, good colour.

Tillering Medium 0-2, occasionally weak.

- Ear Red chaff, medium density, large-average size, tapering, spikelets rather spreading, points of lemma very small, incurved.
- Glume Average width, rather long, tapering, flat. Shoulder narrow or medium, square or slightly tapering. Beak medium size, humped or almost straight, blunt. Keel prominently ridged upper half. Internal hairs group 2. Imprint very large.
- Grain White, average size, plump, smooth and uniform, rather soft, clean.
- **Straw** Rather long (av. 54 in.), good clean quality, bright colour, occasionally some red colouring present at top. Thin walls.

1,000 Grain Wt. 52.6 grams.

WHEAT

STANDARD RED or SQUAREHEADS MASTER

Origin Selected by Messrs. Edward Webb & Sons Ltd., Stourbridge, from an old English wheat named and Standard Red. It is also known as Squareheads Master.

General This old wheat is probably the best known of all varieties. It does best when sown early, but can be sown much later than many varieties and still give good returns. Winter hardy characters are high and it covers the ground well; tillering fair in spring it ripens average, the straw being slightly above average in length but fairly strong. Although not considered a combine wheat it will harvest by this method quite satisfactorily; it does not shatter quickly. A red chaff with red grain, the grain being poor biscuit quality only. Ears are medium in size, medium density and rather square. Resistance to disease is very high. It is suited to a wide range of soils and conditions but does well on medium soils in average fertility or light land in a high state of fertility. Yields are quite good but inferior to many of the more recent wheats; however it fills many gaps and is a most reliable cropper, one which most farmers know quite well. There are several types of this wheat marketed and it is advisable to obtain seed from a reliable seedsman. Grown throughout the British Isles.

PRINCIPAL CHARACTERS

Young Plant Prostrate habit, or nearly so. Leaf medium to broad, inclined to flag, mid-green colour.

Tillering Average 0-2, occasionally weak.

- Ear Red chaff, medium density, average size, very slight tapering only on both sides, held erect, points of lemma usually short, incurved or straight.
- Glume Rather long and somewhat narrow. Shoulder narrow to medium sloping with occasional rounded ends. Beak average size, usually slightly humped, blunt. Keel prominent at top and base. Internal hairs group 2. Imprint very large and pale.
- Grain Average size, plump and red, rounded, uniform, rather soft.
- Straw Average to long (av. 50 in.), good bright colour and quality. Thin walls.

1,000 Grain Wt. 48.8 grams.



WHEAT

CEREAL VARIETIES IN GREAT BRITAIN

STARING

Origin Introduced by the Central Bureau, Rotterdam, Holland, in 1941. It was bred from a cross between Vilmorin 23 and Juliana at the Plant Breeding Station, Wageningen.

General This wheat is better sown in early autumn, but unlike Wilhelmina and Juliana it can be sown later with some success. It is winter hardy and covers the ground fairly well, but the plants are more semi-prostrate than prostrate. Tillering is good in early spring and it ripens four days earlier than Juliana; the straw is on an average 2-4 in. shorter than Juliana and the resistance to lodging is quite high. Can be harvested by combined methods quite easily. Resistance to Loose Smut is said to be very good, but it is rather susceptible to the Rusts and Mildew. The chaff is white and fairly clean, ears being of medium size and density of a square type. It has white uniform grain of similar quality to that of Juliana. Best suited to soils in the medium to heavy class and in average to high fertility. Under these conditions Staring can give high yields, 5 per cent. or more above the expected yield of Juliana or Wilhelmina. Resistance to sprouting in the ear is good, and like most Dutch wheats it will stand wet conditions over a long period. First grown in commerce in England in 1947 and with Alba should slowly replace Juliana and Wilhelmina.



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PRINCIPAL CHARACTERS

Young Plant Prostrate or semi-prostrate habit when young, later leaf medium, held erect, good colour, some bloom present.

Tillering Average 0-2.

- Ear White chaff, ear more square both views, medium density held erect, points of lemma straight or incurved.
- Glume Average size but tapering, soft. Shoulder medium sloping, square at end. Beak mediumlong, rather blunt, very slight hump. Keel prominent along whole glume. Internal hairs group 2. Imprint usually large, dark colour.
- Grain White, average size, rounded, usually regular and clean, soft, fair quality for biscuits only.
- Straw Short-average (av. 43 in.), pale coloured, a little dirty and coarse, stiff. Slightly thickened walls.

1,000 Grain Wt. 50 grams.

STEEL

Origin Introduced by the General Swedish Seed Co. Ltd., Svalof, Sweden. It was derived from a cross between Sun I and Iron II.

General A true wheat for autumn sowing only; it is very winter hardy, covers and tillers well, ripening about average. The straw is rather long but quite strong, resistance to lodging being fair only. Resistance to the more common diseases is high and it does not shatter easily. Not a wheat to harvest by combine. A white chaff, red grain of poorish quality, the ears being large in size. It is suited to soils in no more than average fertility in the more medium class; good returns from Steel have been recorded in the more Northern districts, where climatic conditions are more suitable for the Scandinavian wheats. The yields are fair only and would not be termed a high-yielding wheat in England. Does not sprout in the ear very quickly. Very little grown in the British Isles to-day.

PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth. Leaf medium, fairly erect, good colour.

Tillering Average 0-2, occasional weak.

- Ear White chaff, clean, medium density, average to large, very slow tapering on both sides, points of lemma straight or very slightly incurved, up to 1 cm. at top.
- Glume About average size, but may be broader and flat, tapering quickly. Shoulder medium, square or slightly sloping, sometimes a little rounded at end. Beak short-medium, straight and blunt. Keel not very prominent but plainly seen along whole glume. Internal hairs group 3. Imprint average size, brownish.
- Grain Average-large, rounded, plump, red, soft, poor quality.
- Straw Average-long (av. 48 in.), pale colour, clean, rather coarse. Thin walls.

1,000 Grain Wt. 54.5 grams.



SWEDISH IRON

Origin An old Swedish wheat from the Plant Breeding Station, Svalof, Sweden.

General Must be sown in early autumn only to give a good crop. It is very winter hardy, as are all Swedish wheats, and it covers the ground well during winter. Tillering is only fair in spring and it ripens about average. The straw is inclined to be a little long, resistance to lodging being only fair. Resistance to disease is very high. The chaff is white, clean and soft; ears are medium in size and density with red grain of medium size but rather poor quality. It is suited to soils in average fertility of a medium nature as it will lodge if grown too well; shattering is not often noted, but its ability to combine well is rather poor. In more recent years it has been replaced by Iron III and more suitable Scandinavian wheats. May be found in odd places in England to-day, more in the North than elsewhere.

PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth. Leaf medium, inclined to flag, pale colour.

Tillering Low-average 0-2, some weak.

- **Ear** White chaff, clean, medium density, very slowly tapering on both sides, average size; points of lemma incurved or straight, 0.5 cm. at top.
- Glume Average size, slightly rounded. Shoulder medium sloping, often rounded at end. Beak medium, usually straight and blunt. Keel prominent along whole glume. Internal hairs group 1. Imprint large, broad and pale.
- Grain Average-large, dull red colour, uniform, clean, a little coarse, rather poor quality.
- Straw About average (47 in. av.), good quality, clean, bright colour. Thin walls.

1,000 Grain Wt. 56.0 grams.

WHEAT

SIXTY or GARTONS SIXTY

Origin Introduced by Messrs. Gartons Ltd., Warrington, in 1932. It was derived from a cross between Victory and Squareheads Master.

General Should not be sown later than October-November for good returns. It grows strongly in spring after standing a hard winter. Time of ripening is about the same as Squareheads Master, the straw being average in length and quite stiff; resistance to lodging is high unless grown on too fertile soils. The ear is white-chaffed, medium to dense. Quality of the grain which is red is poor for milling, but it is clean, uniform and of good size. This wheat does well on the medium class of soils in average to high fertility where it will give good yields of grain. Resistance to disease and shattering is good, but sprouting in the ear can be expected if a very wet time comes at harvest. Would not be classed a good wheat for harvesting by combined methods. Grown in many parts of England to-day but not in a large acreage.

PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth when young. Leaf medium, inclined to flag, good colour.

Tillering Average 0-2.

- Ear White chaff, clean, medium density, slight tapering both sides, average size ear, points of lemma sharply incurved 1 cm. at top.
- Glume Average size, slowly tapering, rounded in centre. Shoulder medium square or very slowly sloping. Beak medium, straight and tapering to sharp point. Keel prominent along whole glume. Internal hairs group 2. Imprint average size, pale.
- Grain Red, rather coarse, average-long, good size, soft.
- Straw About average (av. 44 in.), quite stiff, good colour, clean. Thin walls.

1,000 Grain Wt. 55 grams.

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VICTOR

Origin Introduced by Messrs. Gartons Ltd., of Warrington, in 1908. It was derived from the crosses (Squarehead \times Red King) \times Talavera.

General A wheat for sowing in early autumn giving poor results if sown late; it is winter hardy and covers very well. Tillering is high in spring and it ripens early-average in some parts of the country, average in others. The straw is medium in length, resistance to lodging being quite fair. Victor strongly resembles Wilhelmina in all its characters. Resistance to shattering is good, but it is rather susceptible to Rusts and Loose Smut; similar to Wilhelmina in shape, size and density. The grain is a good white, average size and uniform; best uses are for white biscuit making. Suited to soils of a medium nature in average to high fertility, but it may not stand up to wet conditions over a long period as well as Wilhelmina. Its resistance to sprouting during a wet harvest is only fair. Yields practically the same as Wilhelmina. Suits districts where high rainfall is common in spring, but is grown in many parts of England, not in a large acreage to-day.

PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth. Leaf medium-broad, not flaggy, good colour.

Tillering High but few maturing.

- **Ear** White chaff, clean, medium dense to dense, no tapering, ear almost square or slight widening at top in side view, held erect, stiff rachis.
- **Glume** Large, tapering, rounded. Shoulder narrow to medium, slightly sloping, square at end. Beak medium or large, slightly humped, curved, blunt tip. Keel prominently ridged near top but remainder distinct. Internal hairs group 3. Imprint very large, $\frac{3}{4}$ of glume.

Grain White, plump, average size, uniform soft, but good biscuit quality.

Straw About average length (av. 47 in.), pale colour, clean, fairly stout. Thin walls.

1,000 Grain Wt. 49.8 grams.

WHEAT

VILMORIN 27

Origin One of the introductions from the plant-breeding station of Messrs. Vilmorin, Paris, about 1934. It was derived from the following parentage (Dattel \times Japhet) \times Parsee.

General Like Bersee this wheat can be sown even as late as early February and give fair yields, but is better sown in the autumn for maximum returns. It stands an average winter well, but does not cover the ground like some varieties. The tillering is only fair, but maturing tillers are strong and erect; it ripens very early. Vilmorin 27 has straw which is short and stiff, being shorter than Bersee but an inch or two taller than Jubilegem. Resistance to lodging is excellent and harvesting by combined methods is easily achieved; shattering is not troublesome. Disease resistance is not high, it is very susceptible to Loose Smut, more so than any other variety, but is better than Desprez 80 for Rusts, although Yellow Rust is often noted. The chaff is white or dirty-white; ears are rather long, slightly tapering and more lax in density. It has a red grain of large size; like Jubilegem it is inclined to be rough and coarse, the quality is poor. Suitable soils are those in a high state of fertility and of a medium to heavy nature, on which it gives an excellent yield of grain, 80 bushels per acre are common figures reported. It does not sprout in the ear during a wet harvest. A wellknown wheat in the wheat belts of England.

PRINCIPAL CHARACTERS

Young Plant Semi-erect habit of growth. Leaf medium, a little flaggy, good colour with waxy bloom.

Tillering Low-average 0-2, some weak.

- Ear White chaff, lax-medium density, slightly tapering, rather long, spikelets spreading, supernumerary spikelet often present, stiff rachis.
- Glume Large, broad, long, rounded lower third. Shoulder narrow square, or slightly rounded. Beak medium length, rounded at tip, usually humped. Keel prominent, well ridged. Internal hairs group 1. Imprint large, usually dark.
- Grain Red, very large, rough or coarse, plump, humped slightly, soft and poor quality.
- Straw Short and stiff (av. 38 in.), dirty white colour, coarse. Thick walls.

1,000 Grain Wt. 65.8 grams.



VILMORIN 29

Origin Introduced by Messrs. Vilmorin, Paris. It was derived from a cross between Blé des Allies and Vilmorin 23.

General This wheat is sometimes known as a dual-purpose wheat as it can be sown from October until early March; it is not very winter hardy, although it will stand hard frosts. Some very good crops of Vilmorin 29 have been February-sown, which seems to be the best time for sowing this wheat; the seed rate should be slightly higher than normal. Tillering is only fair in spring. It ripens about average when sown in February, a few days later than Vilmorin 27; the straw is stiff, fairly short with a high resistance to lodging, but below that of Vilmorin 27, harvesting by combined methods is easily achieved. The ear is of average size and of medium density, it is white-chaffed with large red grain which is soft and of poor quality. Resistance to disease is superior to Vilmorin 27, being less susceptible to Loose Smut, but Rusts are noted. No shattering or sprouting in the ear has been recorded at harvest time. Suitable soils are those of a medium nature and in average to high fertility. Yields are quite high, but below those of Vilmorin 27, Jubilegem and Bersee. Grown in many parts of England in an everdecreasing acreage.



PRINCIPAL CHARACTERS

Young Plant More semi-erect habit of growth. Leaf medium, a little flaggy, good colour, some bloom present.

Tillering Average 0-2, some weak.

- Ear White chaff, medium density, average size, tapering both sides, points of lemma small incurved, 1-1.5 cms. at top of ear.
- Glume Average length, a little narrow. Shoulder average width, square with rounded ends. Beak short-medium humped, rather sharp point. Keel prominent along whole glume. Internal hairs group 1-2. Imprint usually small.

Grain Red, large, rather coarse, soft, poor quality.

Straw About average, quite stiff, coarse, dirty colour (av. 44 in.). Thick walls.

1,000 Grain Wt. 54.5 grams.

WHEAT

WARDEN

Origin Bred and introduced by Messrs. Gartons Ltd., Warrington, in 1938. It was derived from a cross between Benefactress and Yeoman.

General Warden is best sown in early autumn as yields decline if sown late. It winters well and covers well. Tillering strongly in spring, it ripens about average for autumn wheats; the straw is short-medium, stiff and its resistance to lodging is quite high. Resistance to disease is fair, but in some seasons a little Yellow Rust is noted. The ears are white-chaffed, average size, medium density, rather square with white grain of medium size, clean and uniform; it is of good bread-baking quality. Suitable soils are of the medium to heavy class in average to high fertility, but it does a little better on the lighter soils than most other good bread wheats. One of the wheats which may be put into the high-yielding group. It is liable to sprout rather quickly during a wet harvest. Grown in many localities, principally in England.

PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth. Leaf many and narrow, inclined to flag, good colour.

Tillering High 0-3, some weak.

- Ear White chaff, clean, medium density, tapers slightly face view, square side view, somewhat thickening towards top, ear erect, average length, points of lemma straight.
- Glume Long and narrow, flat. Shoulder square or slightly sloping, medium size. Beak distinctly short, blunt, straight. Keel prominent at top only, remainder slightly ridged. Internal hairs group 2. Imprint large, pale brown.
- Grain White, average size, uniform, may be long and pointed, good milling quality.
- Straw Average (av. 44 in.), white, clean, good quality, stout. Thin walls.

1,000 Grain Wt. 51.4 grams.



WEIBULLS STANDARD

Origin Introduced and bred by Messrs. Weibulls, Landskrona, Sweden, in 1921 from a cross between Tystofte Petty Wheat and Iduna Wheat.

General A wheat for autumn-sowing, but it may be sown a little later than many varieties. Being very winter hardy it covers the ground well, tillering freely in the spring. Ripening about average, its straw is about the same as Standard Red; resistance to lodging being fair. Disease resistance appears quite high in the variety and resistance to sprouting in the ear and shattering is also good. A white clean-chaffed wheat with bright red grain, the ears being of similar shape and density to those of Standard Red. Quality of the grain is not high and is no more than poor biscuit. It is suitable to a wide range of soils and conditions, but should not be sown in soils which are too high in fertility. Yields about the same as Standard Red or Squareheads Master. Very little grown in the British Isles to-day.

WHEAT

WHITE WONDER

Origin Introduced by Messrs. Edward Webb & Sons Ltd., Stourbridge. It is a selection from a German wheat.

General A wheat for early autumn sowing only. It is winter hardy and covers the ground well. Tillering is rather high in spring and it ripens average to late. The straw is short and stiff, resistance to lodging being very good; it also has fair resistance to the more common diseases. Ears of White Wonder are short, broad and dense to very dense; they are white-chaffed with white grain which is fairly large, and of good biscuit quality. It is suitable for sowing on the heavy types of land in an average to high state of fertility where it will give good yields of grain; in trials it has been superior to Juliana and Wilhelmina by as much as 10 per cent. It is rather susceptible to sprouting in the ear, probably due to its dense compact ear character. A most suitable wheat for harvesting by combined methods. Very little of this wheat grown in England to-day.

PRINCIPAL CHARACTERS

Young Plant. Prostrate habit of growth, leaf medium, many, inclined to flag, deep colour.

Tillering Average-high o-3, some weak.

- Ear White chaff, clean, medium size and density, slow tapering both views, points of lemma incurved.
- Glume Medium size, soft. Shoulder narrow to medium, sloping. Beak medium size, blunt, usually straight. Keel prominent along whole glume. Internal hairs group 2. Imprint usually large, not always clear.
- Grain Average size, plump, red, uniform and clean, soft. Similar to Standard Red.
- **Straw** Average-long (av. 51 in.), bright yellow colour, rather soft. Thin walls.

1,000 Grain Wt. 49.8 grams.

PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth. Leaf medium-broad, held erect, good colour.

Tillering High 0-3, but many not maturing.

- Ear White chaff, dense ear, small or short, square, sometimes widening into almost a club head, points of lemma small, slightly incurved, rachis stiff, ear held very erect.
- Glume Average length, rather narrow. Shoulder very inconsistent but commonly narrowmedium, sloping. Beak short, straight or very slightly humped, blunt. Keel not prominent but plain along whole glume. Internal hairs group 2-3. Imprint about average.
- Grain Good white, large, clean, uniform, plump, rather rounded, soft but good biscuit quality.
- Straw Short and stiff (av. 40 in.), pale colour, clean but coarse. Very slightly thickened walls.

1,000 Grain Wt. 54.7 grams.



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WILHELMINA

Origin Introduced by the Plant Breeding Institute, Wageningen, Holland, and was bred by Professor Brokema from a cross between Spyk and Red Squarehead. First marketed in Holland in 1901.

General Wilhelmina should be sown in early autumn, it does not give a crop if sown early in the year; it is winter hardy and covers the ground well. The tillering in early spring is normal and it ripens about average for autumn-sown wheats. Straw length is average to long, but resists lodging quite well unless grown on too strong land; would not be termed a good combine wheat. Resistance to shattering is good, to Mildew only fair, but Yellow Rust is often observed. A white-chaffed wheat with ears of large size, medium to dense and rather square. The grain is white, clean and uniform, suitable for white biscuits. It is suited to soils of a medium nature in average to high fertility and especially where the land lies wet over long periods during winter; under these conditions the yields are satisfactory to the farmer. Resistance to sprouting during a wet harvest is rather poor. It is grown in a larger acreage in the more central and Western districts of England than elsewhere. Slowly being replaced by Staring and Alba.

PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth. Leaf rather broad, not flaggy, good colour.

Tillering Average high 0-3, many weak.

- Ear White chaff, clean, medium dense to dense, little or no tapering face view, side view increased width and density towards top, ear held erect.
- Glume Large, tapering, rounded. Shoulder narrowmedium, slightly sloping, square at end. Beak medium or longer, slightly humped, curved at tip. Keel prominently ridged near top, remainder very flat. Internal hairs group 3. Imprint very large.
- Grain White, clean, smooth, average size, uniform, soft but good biscuit quality.
- Straw About average (av. 47 in.), or may be slightly long, pale yellow colour. Thin walls.

1,000 Grain Wt. 49.9 grams.

WHEAT

WILMA

Origin Introduced by Messrs. Gartons Ltd., of Warrington, in 1936. Wilma is a selection from Wilhelmina.

General A true wheat for autumn-sowing, does not do well if sown late or in early year; it is winter hardy and covers the ground fairly well. Tillering is about average and it ripens the same time as Wilhelmina. In general it resembles Wilhelmina in all its characters; it has ears and grain of the same type and is suited to similar soils and conditions. Harvesting by combined methods is not difficult, but these Dutch wheats are in no way comparable to Holdfast or Vilmorin 27 for example. Rather susceptible to Mildew and Yellow Rust and should not be top-dressed too heavily with nitrogen in the spring. Grown in England, in particular where Wilhelmina is known.

PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth. Leaf rather broad but not flaggy, good colour.

Tillering Average-high 0-3, but few weak.

- Ear White chaff, clean, medium dense to dense, short-average, more square, no tapering, ear held erect, stiff.
- Glume Large, tapering, rounded. Shoulder medium, sloping, square at end. Beak average or longer, slightly humped, blunt. Keel prominent along upper half of glume. Internal hairs group 3. Imprint very large and clear.
- Grain Good, white, average size, smooth and clean, soft but good biscuit quality.
- Straw Average (av. 46 in.), pale colour, clean quality, stout. Thin walls.

1,000 Grain Wt. 50.8 grams.



YEOMAN

Origin Bred by Sir Rowland Biffen at the Plant Breeding Institute, Cambridge, from a cross between Browick and Red Fife.

General Yeoman is a true autumn wheat and does not do well if sown late or in early year. It is very winter hardy and covers the ground fairly well; the tillering is good in early spring and it ripens early-average. The straw is about average in length but quite strong, resistance to lodging is high. It will harvest by combined methods quite well although not as good as Holdfast and some others; it does not shatter quickly when dead ripe. Resistance to Rust and Mildew is high, the white chaff is usually very clean; in more recent years Yeoman has been rather susceptible to Loose Smut, but never as badly as Vilmorin 27. Ears are slightly tapering, medium in size and density, they are well filled with red grain which is of average size, clean, hard, of excellent bread-baking quality. Most suitable soils are those of a medium to heavy nature and in high fertility where it will yield very well. Its resistance to sprouting in the ear is not high but much better than Holdfast. Yeoman is probably our oldest yet best bread wheat grown in England to-day; Holdfast may be slightly superior in yields for this class of wheat, but yields of 80 bushels per acre of Yeoman have been recorded. It is one of the wheats that will stand top-dressing with nitrogen in the spring with a marked yield increase.



PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth. Leaf, many, medium, inclined to flag, dark green colour.

Tillering High 0-3, strong.

- Ear White chaff, clean, medium density, tapering on face view only, average to long.
- Glume Long and narrow, practically oblong. Shoulder medium width, square or very slightly sloping. Beak medium length, straight, tapering to sharp point, no hump. Keel not complete, prominent in upper half only. Internal hairs group 1. Imprint long and narrow, pale.
- Grain Dark red, average size but longer than normal, hard, uniform, good baking quality.
- Straw About average (av. 46 in.), fairly stiff, bright colour, clean. Very thin walls.

1,000 Grain Wt. 49.8 grams.

WHEAT

YGA

Origin Raised at the plant-breeding station of M. Blondeau, France, from a cross between Vilmorin 27 and Red Fife. It was introduced in England by Messrs. Elsoms Ltd., Spalding.

General This wheat, like many in the same class, can be sown from October until late February with fair returns, but autumn-sowing is always advised. It is quite winter hardy, tillers fairly well and ripens early, the straw being short to medium, but stiff and strong with a high resistance to lodging. Resistance to disease is fair, much better than many French wheats. Ears of Yga are long and rather lax, whitechaffed with large red grain which is of quite good quality for these wheats. Shattering and sprouting in the ear has not been observed and Yga should combine well. Suitable soils are those of a medium to heavy nature in high fertility, but it is more adaptable than many in its class. Yields when grown well are high and it would be placed well up in the high-yielding class. A new wheat introduction which may become popular.

PRINCIPAL CHARACTERS

Young Plant Semi-prostrate habit of growth. Leaf good colour, inclined to flag, some waxy bloom present.

Tillering Low-average.

- Ear Long, lax or lax-medium in density. White chaff, very slightly tapering both views; points of lemma incurved straight at apex extending to 3.5 cms.
- Glume Average-long soft glume. Shoulder medium square. Beak medium, fairly sharp, curved or humped. Keel prominent along whole glume. Internal hairs group 2. Imprint irregular, not always clear.
- Grain Long, large, red grain, regular, fair quality, hard.
- Straw Short, stiff, coarse (av. 40 in.). Very thick walls.

1,000 Grain Wt. 66.0 grams.



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CEREAL VARIETIES IN GREAT BRITAIN

SECTION II

OATS

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OATS

INTRODUCTION

DEVELOPMENTS in the genus Avena, to which all our cultivated oats belong, have been very considerable during the past century. The growing of oats as a crop for animal food can be traced back many centuries, and it probably came to England from the continent of Europe. In the not so distant past the oat was principally grown for feeding to stock, and this is mainly the case to-day, as the straw of oats is usually readily consumed by farm animals, but in more recent years with the improvement made by plant-breeders on the grain quality the oat takes a place as food for human consumption.

Unlike the wheat plant, which in some form is found in most countries, oats are limited to the cooler and more humid parts of the world. The common varieties of European oats are known as *Avena sativa*, and all varieties mentioned belong to this group, with the exception of one or two Welsh hill-land types, which belong to the *strigosa* and *brevis* groups.

Growing or sowing certain types in the winter has increased in England recently, and it is now possible to say that we have winter oats and spring oats. These two types will not be separated but will be dealt with under the above heading. The varieties described on succeeding pages are all to be found growing in the British Isles, but some in a very small acreage. Unlike wheat it is a more difficult task to identify the varieties of oats growing to-day, dissection and notebooks are less important than the experienced eye of man. Many farmers get to know their varieties not by the threshing returns only but by observing them throughout the growing period.

The general description of oats is a guide to the variety to people responsible for their cultivation. Much is to be gained by studying this cereal in all stages of growth, and work of this nature by the Svalof Plant Breeding Station, Sweden, and by the Welsh Plant Breeding Station, Aberystwyth, has been most valuable, resulting in the production of many popular types which are grown in a large acreage throughout the British Isles.

ORIGIN OF THE VARIETY

As mentioned under this heading in Section I the origin of the variety, together with the parentage and, wherever possible, the year of introduction, is as accurate as it is possible to obtain. In the case of oats it may be even more important to study the origin of the variety than in wheats and barleys.

GENERAL DESCRIPTION

The general remarks concerning the varieties of oats are compiled from breeders' reports, trials and observations, but much more information has been obtained from experienced farmers on the behaviour and yields of many oats than was obtained for wheats. Trials and observations were made mainly on light land in average fertility in Midland England, together with trials on good medium loam in South Berwickshire.

Enlarging under the heading it is all important to note the best time for sowing. Some varieties are best suited to early sowing, such as Marvellous, which is much better

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when sown in February or early March. Yields and maturity can be greatly affected if oats in this class are sown late in spring. Winter oats also show reduced returns if sown late in autumn. On the other hand varieties in the class of Orion III can be sown from early March until early April with no appreciable diminution in the yield of corn. Tillering in oats is not so important as in wheats and barleys, but higher tillering is an advantage where attack by wire-worm is possible.

Time of ripening is important; growers of cereals for sale or for home consumption cannot have wheats, barleys and oats maturing at the same time, so they must consider the time of maturity of the varieties suited to their land, thus enabling them to stagger their harvest and cope with all at the correct time. In the North, and of course in Scotland, earliness of ripening is an advantage in all cereals, but in the South of England this does not appear so necessary.

Length of straw can only be described as short, medium or long as straw length in oats can be governed by many farming practices. It can be expected, for example, that Victory oats may be seen very tall and perhaps lodge when grown after a ley which has been well-grazed, while on the other hand they may be 12 in. shorter and stand well under less fertile conditions. To-day the farmer has a wide choice of varieties from which to select, and it will be learned that there are short, stiff-strawed types for better soils and the more medium to long-strawed types which do better on less fertile lands. The shape of panicle, spikelets and grain will be enlarged upon under "Principal Characters." Husk content or percentage is important and one of the factors that govern the sale of oats to the miller. Husk contents are given as low, medium and high, no actual figures can be set for any one variety except where varieties are compared under the same conditions on the same soil. (See average figures under "Principal Character.") Where, for example, a husk content is written as being low it means that on the average the husk falls below 25 per cent., a medium husk 25-28 per cent., and a high husk content 28 per cent. and upwards.

Yields are again not stated in figures as this is impossible owing to many factors governing the yields of cereals; where in one season of favourable conditions an oat will give a pleasing return, in other seasons, under different conditions, it will be rejected from the farmers' books; therefore yields are given as low, average or high, and this can be accepted as correct when comparisons are made under similar treatment.

Suitable soils for the variety, or suitability of the variety to certain soils and conditions, governs yields more than any other factor. In the groups of cultivated oats in the British Isles will be found varieties suitable for most soils and climates, the most important factors to consider when selecting an oat for cultivation.

Resistance to disease in oats is coming under the study of the plant-breeders, and advances have been made in the breeding of mildew, eelworm and, to some extent, frit fly-resisting types. Under "General Description" will also be noted the more popular districts for the varieties mentioned, and this may serve as a guide to the suitability of the variety to other parts of the Kingdom.

SELECTION OF VARIETY

The growing of a good crop of oats on the farm to-day is equal in importance to that of wheat. With the present-day limitations of imported feeding stuffs there is a greater importance attaching to the oat as a crop for home consumption. In the selection of a variety careful consideration is called for.

OATS

Developments in the breeding of oats during the past twenty years have exceeded all other cereals in this country, and there have also been valuable contributions from the well-known plant-breeding stations in Sweden and Denmark. Principally, the developments have been in increased yields and earliness of ripening, plus the breeding and selection of types for a larger range of conditions than those which are naturally suited to the oat crop.

Lodging in oats has always been a problem, but one which has been treated carefully by the plant-breeder owing to the absolute necessity for oat straw on the farm for the maintenance of stock. In more recent years, with the advancement of mechanisation in agriculture, harvesting methods have been greatly improved and the combined harvester is now being used in some cases to harvest the oat crop, although not as freely as in the case of wheat and barley. The straw of oats is usually of a softer nature than that of wheat, and lodging is a more common occurrence on the better soils; this, coupled with the risk of shattering that sometimes takes place in oats when dead ripe, plus the value of the straw for feeding to stock is against the combined method of harvesting on a large scale at present.

Plant-breeders are concentrating on these problems closely and rapidly, with the result that shorter and stiffer-strawed varieties are being produced while still retaining a high feeding value and good yields. An example of this work is the oat S.172 for autumn-sowing and the new oat Milford (S.225) for spring-sowing, both introduced by the Welsh Plant Breeding Station, Aberystwyth. These oats are suitable for the richer soils where normally no oats could have been grown before with reasonable safety from lodging. Again much work has been done on the production of varieties to suit the drier areas where oats are usually a poor crop, and we also see evidence of progress made in the attempt to produce the perfect miller in the new varieties.

In general the selection of a variety must be considered in a similar manner to wheat, but again some enlargement on the factors is necessary.

Class of Soil and Fertility

Consideration of the class of soil and its state of fertility is of first importance, and unsuccessful oat crops are seen where this has been disregarded. Victory, an old oat, was grown twenty years ago on the better soils in a highly fertile conditon ; this is not the case in most places to-day, because with the introduction of several shorter and stifferstrawed varieties mentioned in this guide we have oats that withstand the more fertile conditions. It is true to say that oats need fertile conditions, but let it be fully emphasised that they also need moisture and a suitable climate.

Climatic Conditions

Oats, unlike wheat, are best suited to the more moist and temperate regions, whereas wheat is suited to the drier and more sunny districts, which it needs to promote perfect maturity. This cereal calls on soil moisture for a longer period than wheat and usually does better when sown after a ley; it also favours a slower-ripening climate, a climate which is more humid than found in the wheat belts of England, hence the demand for a Scotch-grown oat.

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In Scotland, or parts of Scotland, the soil and climate are ideally suited to this crop, resulting in a plump grain of good quality in a normal year. Excellent crops can be seen elsewhere, of course, especially with the introduction of some new varieties bred for variable conditions. There are varieties which do better in districts of high rainfall and a later-maturing climate, but here earliness of ripening is to be preferred, which enables the crop to be harvested in reasonable condition.

Development in the production of oats for winter sowing has been most marked in recent years, and we have in addition to S.172 the winter oats S.147, S.81 and Picton, which are some of the best oat introductions, helping to spread the sowing periods and harvest, while still retaining good-quality grain and straw characters. In the winter group we also have Black Winter, Unique and the old Grey Winter, the latter becoming less important, and superseded by S.147 and Picton to a large extent. While the old Grey Winter may still be the best quality oat for feeding and by far the more winter hardy, its long weak straw is a great disadvantage.

Consideration of climatic conditions in the North and in Scotland must not be overlooked, as in these parts one can expect a much higher rainfall, especially in the west of the area. In these areas one finds the old Potato oat and members of its group. These oats have throughout a large number of years become indigenous to these parts and although they are continually being replaced by the new oats, many of which have Potato parentage, there is still a large acreage planted with them. Usually these oats are hardy, tiller freely and produce more straw than grain, which are the characters essential for oats to withstand high rainfall in temperate regions.

Methods of Harvesting

In general most oats are harvested by the binder, few being harvested by combined methods. The use of the combined harvester will no doubt increase as more varieties come along which are suited to this form of harvesting. Under the general description of varieties mentioned it will be noted that many are said to resist shattering at harvesttime, this was taken into account when the oats were ready to cut by the binder only.

Oats, unlike wheat and barley, are favoured by slow-maturing conditions, one of the reasons why in some parts of the British Isles they are cut with almost a green appearance about them; and quoting the old Scottish expression, "leave them three Sundays then pick them up."

The Use to be Made of the Grain

Methods of harvesting the oat crop are not so important a consideration as the use to be made of the grain. In oats we have to consider the value of the straw, as on most farms this is always retained for home consumption. Where a farmer's cropping programme includes a large acreage of oats which is more than he needs for home use, his main object would normally be oats for sale, which puts his requirements into the group of grain-bearers. On another type of farm where no sale of oats takes place the more intermediate type of oats are often found. Still further we have the strawproducing group, with Potato as its oldest member.

If oats are grown for sale, especially for milling, the selected variety should firstly be suitable for soil, fertility and climate; it should be proved for high yields under these conditions, producing a good plump grain with a thin husk. A good milling oat OATS

unfortunately often falls into the straw-producing group, as the straw-bearers usually produce a thin husk and return a higher percentage of meal per bushel, but it is meal per acre that is to be considered, so therefore we may forget the straw-producer for many parts of the Kingdom. Many oats fall into the grain-producing group, and some of these have also good feeding-quality straw.

Taking the country over all, grain production is the chief consideration, but one must not by-pass the straw-producers as many of these give only a narrow margin between straw and grain. Usually it is found that these varieties, apart from yielding slightly more straw, produce straw finer in nature, less coarse, more palatable to stock and give a higher feeding value weight for weight than the grain-producers. On many dairy farms special importance is attached to the production of fodder.

Varieties in the class under consideration are found to be more hardy and reliable in many cases than that of the pure grain-producer; under adverse conditions these types can be expected to give a good account of themselves such as in the cooler wetter parts and high exposed situations. Many of these varieties are liable to lodge and create harvest difficulties; so it is clear that every factor must be taken into account before selecting a variety to grow.

The type of farming practised has naturally a large bearing on the selection of a variety; the dairy farmer's needs may be quite different from that of the stock farmer with his beef programme, or where the speciality is pigs and poultry. With careful consideration of the factors mentioned the selection of a suitable variety can be made from the many types of oats in cultivation throughout the Kingdom.

PRINCIPAL CHARACTERS

As with wheat, some enlargement of the characters used in the identification of the variety must be made. Under this heading it will be noted that observations have been made before ear-emergence, in fact from quite a young stage one can begin to observe the characters.

Habit of Growth

Usually in oats the habit is an erect type of growth with the exception of most winter oats and varieties of the Potato type; here the habit will often be noticed as being of a semi-erect type.

Middle Growth

Examination at this stage is always best performed after normal growth has commenced but before the panicle emerges. The leaf and sheath bear the characters to be observed in the form of hairs along the margins of the leaf or on the sheath. Leaf colour and flaggy appearance cannot be stated with any accuracy as these are dependent on cultural factors, but it must be emphasised that some varieties are noted for their deep green colour and flaggy appearance. Leaf width and length are other points which have no great significance.

Tillering

This can be noted, and is usually found to be somewhat low in most erect types of

oats, while more tillering will be found in the winter types and the straw-producing oats of the Potato group.

Panicle

Shape and size of the panicle is most important; here it is essential in the first instance to compare varieties visually. So many varieties of oats are similar in shape that only by careful comparisons by eye can one see and fix the features that determine the variety. Some varieties are easily put into their groups by obvious panicle shape such as those with unilateral panicles. The word unilateral is often replaced in the field by tartarian or one-sided; oats of this type bear the branches on one side of the rachis. Examples in this group are Black Tartarian, Black Supreme, and, to some extent, Marvellous, although some people will class this type of panicle as semi-unilateral.

In the more common group the panicle shape is equilateral, these bear the branches around the rachis in a uniform manner; examples are Victory, Star and Eagle.

The branches and rachis are examined for their stiffness and length, these features usually govern the size of the panicle, giving it either a close compact appearance or a spreading and more lax, open form.

Spikelet

Examination of the spikelet will soon disclose two grains or three grains, this is fairly constant within the variety, but the three-grained variety is perhaps less constant than varieties which bear a two-grained spikelet. Size of the spikelet is an important point for observation, together with the size of the glume, as in some varieties it will be noted that the spikelet is quite small and compact with small glumes, where in others a large or long spikelet is noted with long glumes. Size of the spikelet has no bearing on the yield of the variety. The glumes of oats are less reliable in their characters than the glumes of wheat, and no enlargement of this subject will be made in this edition.

Grain

Many distinguishing features are obtained from the grain; here we have mainly two groups, the black oats and the white oats. In the white oat group we often find the colour varying considerably from almost a pure white to a bright yellow; this is a help in isolating the variety. In some circles it may be stated that there are three groups, black, white and yellow; this is true to some extent as considerable variations are found in the density of the colour. There may be one or two oats that are always a bright yellow, but in many cases where several samples of the same variety are examined from different parts of the Kingdom it will be noted that the colour may vary from a good white to almost a bright yellow. Size of the grain is, of course, dependent on many factors outside the variety, but shape of grain is constant and should be carefully noted. Some varieties have short broad grain while in others a long and narrow form can be found. On plates 1 and 2 the size and shape of the grain can be compared. The specimen grains were taken from panicles grown under the same treatment on light land and serve as a general guide; it must however be realised that the size of the grain may take a different form if samples are obtained from plants grown on a heavy and more fertile soil. The size of the grain is seldom an indication of the yield of the variety except perhaps where one observes the Welsh hill-land oats, which are usually poor

OATS

grain-bearers. Similarly where a large oat is noted it must not always be assumed that the kernel percentage is high. Careful examination, aided by a lens, will reveal the presence or absence of fine hairs on the base of the grain, and a similar examination should be made on the rachilla. These hairs when found will usually be seen to spread outwards from the base on either side, there may be few or many, and either long or short; these hairs are fragile, therefore one cannot expect to observe this character on machine-threshed or cleaned oats. Grain taken from the spikelet in the field, from the stack or hand-threshed specimens only will be suitable for this purpose. The husk is also important, husk percentage can rise and fall according to seasons and fertility, but many oats are known to be low in husk content while others have a high percentage.

Finally the presence or absence of "awns" is a great help in the grouping of varieties. Where awns are observed they may be found to be short or long, straight, or bent at about half the length to form a knee, they may also be twisted at the base and either black or pale-coloured. Climate or soil fertility has no effect on the awn characters.

Straw

Length and strength of the straw of oats varies considerably within the range of varieties, it is also dependent on the soil, fertility and climate. Figures giving length of straw are omitted as these would be confusing to the reader, but it does follow that where one reads a long fine straw or a short stiff straw they will find that feature in the field under any normal farming conditions. The nodes of the straw may be examined for the presence of hairs immediately above or below, the presence or absence of these hairs forms a link in the chain of identification characters. This examination is best performed in the field before cutting, or, better still, while quite green. Nodes may be found to be glabrous (no hairs) or hairs may be found above, below, or at both points.

Several more characters used in the identification of oats are being investigated to-day, but these may never be principal characters, and therefore no mention will be made in this edition.



PLATE I

	Key to Plate I
11.	NEW MINOR
12.	ORION III
13.	EXTRA BELL
14.	BORRIS OPUS
15.	ABUNDANCE
16.	ONWARD
17.	SPITFIRE
18.	SUPERB

1. VICTORY 2. VICTORY II

5. GOLDEN RAIN 6. GOLDEN RAIN II

7. BAMBU 8. AYR COMMANDO

3. STAR

4. EAGLE

9. SUN I 10. SUN II

14.	
13.	EXTRA BELL
14.	BORRIS OPUS
15.	ABUNDANCE
1Ğ.	ONWARD
17.	SPITFIRE
18.	SUPERB
19.	YIELDER
20.	MARVELLOUS

23. RESISTANCE 24. ROYAL SCOT 25. AYR BOUNTY 26. EARLY MILLER 27. HARVESTER III 28. STORMONT IRIS 29. GLASNEVIN SUCCESS 30. GLASNEVIN ARDRI

21. RELIANCE 22. ASCOT

Note.-All grown under the same conditions and treatment on light land in average fertility.

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PLATE II

Key to Plate II

1. RICHLAND IOWA 2. BLACK SUPREME 3. BLACK TARTARIAN 4. RADNOR SPRIG 4. RADIOR 5. 5. S.220 6. S.84 7. MILFORD 8. S.175 9. S.171 10. S.79

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11. S.75	
12. S.81	
13. S.147	
14. S.172	
15. PIĆTON	
16. GREY WINTER	
17. S.S. EARLY GREY	
18. UNIOUE	
10. BLACK WINTER	
20 BOUNTIFUL	
20. 000111102	

21. AYR ALLY 22. POTATO 23. AYR LINE OATS 24. POTATO ARDEE 24. TO THE FIGURE
25. R.30
26. CASTLETON
27. QUALITY
28. HAMILTON 29. GORDON 30. SANDY

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OATS

ABUNDANCE

Origin Introduced by Messrs. Gartons Ltd., Warrington, in 1898. It was derived from a cross between White August and White Swedish.

General An old oat for spring sowing but still popular. It grows strongly in early spring and ripens fairly early, a day or so later than Yielder. The straw is long and fairly weak, the resistance to lodging being rather poor, especially on the better soils. Shape of the panicle is open, uniform and of medium size. The spikelets are numerous two-grained, very rarely does three occur. A white grain, rather large with low husk content makes it a good oat for milling while the straw is very palatable to stock and therefore a good feeder. Soils should be below average in fertility to avoid lodging, but a wide range of soils are suitable for the growing of Abundance. It does not break very casily when dead ripe and does not shatter quickly. Yields from Abundance vary considerably, but where grown well can be very satisfactory. Known and grown throughout the British Isles but not in large acreage.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Medium-size erect leaf, sheath glabrous, a few hairs are found on leaf margins near base. Deep green colour. Leaf medium width, a little flaggy.

Tillering Rather poor.

OAT VARIETIES

Note.-Illustrations of oat varieties are all one-third of natural size.

Panicle Medium equilateral, stiff rachis, slightly waved, branches stiff, slightly pendulous when ripe.

Spikelet Medium size, usually two-grained. Glumes fairly long, well-defined markings or veins.

- Grain Fairly long, broad, and flat on inner surface, very few hairs on base of grain. Rachilla usually glabrous. Grain yellowish-white colour. Lowaverage husk.
- Straw Long, rather weak, good colour. Nodes glabrous or very occasional hair above and below.

Awn Present in fair numbers. Strong, black. 1,000 Grain Wt. 44.8 grams Average Husk Content 25.8 per cent. ∫ figures.

ASCOT

Origin Introduced by Messrs. Edward Webb & Sons Ltd., Stourbridge. It is a selection from Record.

General This oat should be sown as early as possible for best returns. It grows strongly, tillering moderately and ripens about average or the same as Victory. The straw is average in length but stiff and strong, the resistance to lodging being quite high for this type of oat. The panicle is open, uniform and somewhat larger than Victory; a fair number of spikelets are to be found on the branches, some having three grains. Quality of the grain is good, it is white, large and plump with a husk content a little higher than Star or Victory. A good selling oat with milling qualities, best suited to soils in average fertility and of medium nature on which it will give high yields of grain. Falling into the grain-producing group its straw is not considered the best for feeding, but it is quite palatable. A good oat to follow leys, it does not shatter easily at harvest and resistance to disease is quite high. Grown in many parts of Britain.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Leaf long, flaggy appearance, margins hairy lower half, sheath glabrous. Good colour.

Tillering 0-2, third weak.

Panicle Open uniform, average size, rachis stiff, branches rather weak, little pendulous when ripe.

Spikelet Numerous, large, two-grained, occasionally three. Glumes have raised markings.

Grain Good white, large, fairly plump, average to high husk. Base of grain few hairs. Rachilla glabrous.

Straw Average length, stiff, bright colour, good quality. Nodes glabrous above and below.

Awn Occasional then pale, weak.

1,000 Grain Wt. $46 \cdot 8$ gramsAverageHusk Content $29 \cdot 4$ per cent.figures.

OATS

AYR ALLY

Origin Introduced by Messrs. McGill & Smith Ltd., Ayr, in 1946. It was derived from a cross between Star and R.30 Potato.

General Sow during March for best yields. Growth is slow at first but it tillers well and strongly later in spring. It ripens a little later than average, the straw being of medium length. Resistance to lodging is good, being the most resistant of all the Potato types. The panicle and grain are similar to that of Potato, and it is an excellent thin-skinned milling oat, although rather small. Suitable for soils in average fertility in the North of England and in Scotland. Yields are high for the Potato types. Does not shatter at harvest. Appears an improved form of Potato and should replace many of the old types in cultivation to-day. Falls into the straw-producing group but yields well for its class.

PRINCIPAL CHARACTERS

Young Plant More semi-erect habit of growth.

Middle Growth Leaf a little flaggy, sheath glabrous or occasional hair, leaf margins hairy lower half.

Tillering 0-3, strong.

Panicle Medium open, equilateral, rachis stiff, branches pendulous.

Spikelet Small, usually two-grained.

Grain Small-medium, white rather thin husk. Base of grain hairy. Rachilla glabrous.

Straw Medium, fairly fine, good quality, white. Nodes glabrous above and below.

Awn Occasional only and then weak, pale colour.

1,000 Grain Wt. 31 · 6 grams Average Husk Content 24 · 2 per cent. ∫ figures.



AYR BOUNTY

Origin Introduced by Messrs. McGill & Smith Ltd., Ayr, in 1937. It was derived from a cross between Yielder and Pure Line Potato.

General Can be sown a little later than average. It ripens early with straw of average length but quite strong, resisting lodging well. The panicle is medium-open, fairly large, bearing two-grained spikelets. Quality of the grain which is white, medium in size, with high husk content, is quite good. Suitable for soils in average to high fertility but not heavy lands. It does well in the North, also in wet districts where excellent crops are found. Resistance to disease and shattering is high. A good oat for home consumption. Ayr Bounty is grown to a large extent in the North of England and in Scotland, very little being found in the South.



PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Leaf rather broad, hairs on margins, sheath few hairs, leaf held fairly erect.

Tillering Average 0-2, strong.

Panicle Medium open, equilateral, spikelets numerous. Rachis stiff, straight branches, stiff, more erect.

Spikelet Average size, usually two-grained. Glumes broad, pale coloured.

Grain White, broad at base, tapering sharply. Grain average-large. Base of grain many long hairs. Rachilla glabrous. Rather high husk content.

Straw Average length, resistance to lodging high. Straw quality is good, bright coloured. Nodes glabrous above, odd hair below.

Awn Many, pale and straight.

I,000 Grain Wt.44 gramsAverageHusk Content30 · 4 per cent. ∫ figures.

OATS

AYR COMMANDO

Origin Marketed by Messrs. McGill & Smith Ltd., Ayr. This oat was derived from the crosses Bambu \times (Crown \times Victory).

General For general remarks concerning the features of this oat, its suitability and type, one may read under Bambu which it strongly resembles. The straw is average in length, reasonably stiff but the grain may be a little better quality for milling than Bambu. It yields very well and ripens early-average, giving good results in Scotland, where it is popular. Disease-resistance is strong, but dressing the seed is always advisable. Straw quality is good for feeding. Suitable for late districts with high rainfall.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Leaf held erect, margins and sheath glabrous.

Tillering 0-2, strong.

Panicle Equilateral or semi-unilateral, rather dense, average size, curved rachis, stiff branches.

Spikelet Numerous, usually two-grained, occasional three. Glumes short and broad, pale markings.

Grain Good white-bright, average husk, good quality. Base of grain occasional hair. Rachilla glabrous.

Straw Average length, fairly strong, bright. Nodes glabrous above and below.

Awn Numerous, usually straight, pale coloured.

I,000 Grain Wt.40 gramsAverageHusk Content $26 \cdot 8$ per cent. \int figures.



AYR LINE OATS

Origin Introduced by Messrs. McGill & Smith Ltd., Ayr, in 1946, from a cross between R.30 Potato and Monarch.

General Similar to Potato Oats but with a little shorter straw and better yield. Most suitable type for the farmer who favours Potato Oats but whose land is a little too good for the old variety. General remarks same as for Potato.

PRINCIPAL CHARACTERS

Young Plant More semi-erect growth, pale colour.

Middle Growth A little flaggy leaf, broader than old Potato oat. Leaf margins long hairs lower half.

Tillering 0-2, strong.

- Panicle Medium-large, open, spikelets numerous, stiff erect rachis, branches sometimes slightly pendulous.
- **Spikelet** Small, one and two-grained only, glumes thin, short and broad, white or pale coloured.
- Grain Good, white, medium-size, plump. Base of grain few long hairs. Rachilla glabrous.
- Straw Average length, good fine nature, a little weak. Nodes glabrous above, odd hair below.
- Awn Very occasional weak and undeveloped.

1,000 Grain Wt. $37 \cdot 6$ gramsAverageHusk Content $25 \cdot 4$ per cent.figures.

OATS

BAMBU

Origin Bred by Messrs. W. Weibull, Landskrona, Sweden, from a cross between two hybrid lines (Victory \times Abundance) \times (Victory \times Great Mogul). Introduced by Messrs. Edward Webb & Sons Ltd., Stourbridge. 1948.

General A new oat for spring sowing, up to early April. It grows strongly, tillers well and ripens early, 4-5 days earlier than Star. The straw is about average but quite stiff, and the resistance to lodging is good. The panicle is generally open, medium size, but some may be more one-sided in shape; it carries a large number of spikelets, usually two-grained, but occasionally three-grained, are found. Quality of the grain, which is white, is good, the size average to large, and the husk content is about average. It is suited to soils in average fertility ranging from light to heavy and its behaviour is very constant. Yields of grain and straw are high, the straw being of good feeding quality. It does not shatter easily when dead ripe and dry. Grown in Scotland and England; is suitable for late and also wet districts.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Short, erect, leaf held erect, margins and sheath glabrous, good colour.

Tillering 0-2, strong.

- Panicle Equilateral or semi-unilateral, average size, rather dense; rachis stiff, curved at apex, branches stiff.
- Spikelet Numerous, usually two-grained, three grains found at top of panicle. Glumes short and broad, bright coloured, faint markings.
- Grain White, average size with average husk, good quality. Base of grains one or two hairs. Rachilla glabrous.
- Straw Average, strong, bright yellow or pink colour, stands well.
- Awn Numerous, usually straight, pale colour.
- 1,000 Grain Wt.40.7 gramsAverageHusk Content27 per cent. \int figures.



III

BLACK TARTARIAN

Origin Reported to have originated from South-East Europe during the seventeenth century.

General Best sown not later than March as this variety is susceptible to Frit Fly attack probably more than any other spring oat. Leaf Spot is also common. In early growth it appears weak, tillering low, but it soon becomes vigorous with dark-green leaves. It ripens late and its straw is long and somewhat weak, resistance to lodging on the better soils is poor. The panicle is one-sided (unilateral), it is dense, the spikelets being very close and usually only two-grained. The grain is long and thin with an average to high husk content. Colour of the grain varies from a grey-brown, deep brown-black to black. Value of the grain is not high and only moderate yields can be expected on soils which should be only low in their state of fertility. The straw is reasonably good for feeding stock. If left until dead ripe and dry some breaking may be noted at the base of the panicle. Grown in many parts of the country but not to a large extent. Orion III may soon replace this oat in many places.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Leaf fairly broad, not long, sheath and leaf margins glabrous. Dark green colour.

Tillering Poor.

- **Panicle** One-sided (unilateral), rachis stiff and erect. Branches stiff, erect and close to rachis. False node is frequently present.
- **Spikelet** Medium size, usually two-grained, glumes deep colour, diverging on ripening.
- Grain Rather long, tapering, not broad. Dark brown—good black. Base of grain a few short hairs. Rachilla glabrous or occasional hair.
- Straw Long, rather coarse, stiff until ripe, then becomes somewhat brittle and breaks or is inclined to lodge.
- Awn Many medium length, twisted towards base, common black.

1,000 Grain Wt. 33.9 grams Average Husk Content 28 per cent. ∫ figures.

OATS

BLACK WINTER

Origin May have been imported many years ago, but its origin is unknown.

General Best sown in the autumn this oat is more winter hardy than Bountiful, although it is often found to suffer badly if the winter is long and severe. It ripens early, the straw being rather long but not coarse. Resistance to lodging is poor but better than Grey Winter. The panicle is large and very open with two-grained spikelets which bear grain of a good black colour of average size, with a low to average husk content. It is of good quality and Black Winter resists common diseases to a large extent. Soils in low fertility or light land in medium fertility are strong enough for this oat. Yields are fair, but this oat has been outclassed in recent years by S.147 and Picton. It does not shatter easily but is generally not a combine oat. Sometimes sown on hill lands, this oat is not grown in any great acreage to-day. Needs a slightly higher seed rate per acre than Grey Winter.

PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth.

Middle Growth Leaves long, dark green, leaf margins hairy all along, leaf more erect.

Tillering Good 0-4, many weak.

- Panicle Large, open equilateral, rachis waved, branches pendulous.
- Spikelet Usually two-grained, long dark glumes prominently marked.
- Grain Rather long, good black. Base of grain long hairs. Rachilla prominent and hairy.
- Straw Tall, weak, fairly fine, bright colour. Nodes glabrous or few above.
- Awn Present in large numbers, long, twisted below knee which is bold.

1,000 Grain Wt. 44.5 grams Average Husk Content 25 per cent. ∫ figures.



BORRIS OPUS

Origin A selection from Borris Stand oats which was in turn selected from Grey Heath oats. Raised at the Borris Station in Denmark. Introduced by Twyford Mill Ltd., Banbury, Oxon.

General Sow early in spring for best returns. It grows strongly, tillers well and ripens about the same time as Eagle. The straw is fairly short and quite stiff for oats with a high resistance to lodging. Panicles of Borris Opus are medium, open and bear numerous spikelets. The grain is white, rather long, with an average husk content. Suitable soils are those in a high state of fertility in the light to medium class where this oat will yield quite well, equal to Eagle. It has not been observed to shatter at harvest-time and the straw appears soft, of good quality for feeding stock. A new oat introduction.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Leaf held erect, medium length and width, good colour. Leaf margins, odd hair only.

Tillering Moderate to high for oats.

Panicle Equilateral, average size, open, branches may be slightly pendulous when dead ripe.

Spikelet Numerous, usually two-grained, occasionally three. Glumes pale, well marked.

- Grain White, long, rather narrow. Base of grain occasional long hair. Rachilla glabrous. Average husk content.
- Straw Very bright yellow colour, strong. Nodes few hairs above and below.

Awn Absent.

I,000 Grain Wt.39.8 gramsAverageHusk Content27.1 per cent. ∫ figures.

OATS

BOUNTIFUL

Origin Introduced by Messrs. Gartons Ltd., of Warrington, in 1908, and was derived from the following crosses:

 \times

(Grey Winter \times Abundance) Black Winter

 \times (Goldfinder \times Black Tartarian)

General Bountiful can be sown up to February with success. It is not a true winter oat and suffers from the effects of a hard winter. It grows vigorously in spring and ripens a little late for winter-sown oats. The straw is long and coarse the leaves broad; resistance to lodging is not high. The panicle is very open and very large, branches and spikelets hanging downwards or drooping. The grain is of average size but it has a rather thick husk. It is suited to soils of a light nature, a little better than for Grey Winter; sheltered positions are better for this oat. Resistance to Leaf Spot is not good. The yield is fair, but other winter oats of more recent years are replacing this oat. Does not shatter easily but would not harvest by combined methods. The straw is coarse and not palatable to stock. Little grown to-day.

PRINCIPAL CHARACTERS

Young Plant Semi-erect habit of growth.

Middle Growth Leaves long, very broad, few hairs on the margin near base, sheath glabrous or occasional.

Tillering Very poor.

Panicle Very large, equilateral, long branches, pendulous when mature.

Spikelet Usually two-grained, long glumes well marked.

Grain Short, average size. Base of grain long hairs. Rachilla prominent, glabrous. Grain brownishblack in colour, glossy.

Straw Long and coarse, nodes usually glabrous.

Awn Common black, present in numbers, fairly long and twisted below knee.

1,000 Grain Wt. 44.8 grams Average Husk Content 30.2 per cent. ∫ figures.

CASTLETON

Origin A selection from Potato Oat made by Mr. Runcieman, King Edwards, Aberdeenshire.

General This oat closely resembles Potato. It gives a slightly higher yield in some parts, and the grain is a little larger and longer. Grown in the North of England and Scotland. General remarks as under Potato.

PRINCIPAL CHARACTERS

Young Plant More semi-erect.

Middle Growth Leaf margins and sheath hairy lower plant, a little flaggy.

Tillering Good o-3, strong.

Panicle Large, very open, long equilateral, stiff rachis, branches slightly pendulous when mature.

Spikelet Usually two-grained, short glumes, which are pale with thin markings.

- Grain White, of average size, being longer than Potato. Base of grain short hairs. Rachilla glabrous.
- Straw Medium-long, fine, of good quality, resists lodging better than Potato. Nodes glabrous above, few below.

Awn Short, few and undeveloped, pale colour.

1,000 Grain Wt.37 gramsAverageHusk Content28 · 2 per cent. ∫ figures.

OATS

EAGLE

Origin Introduced by the General Swedish Seed Co. Ltd. in 1931. It was bred at Svalof from a cross between Victory and Von Lochows Yellow.

General Best results are obtained when sown by mid-March. It is a strong oat in early spring, ripening a day or two later than Victory and Star. Its straw is below average in length for oats, stiff, strong, and the resistance to lodging is high; it is one of the strongest-strawed spring oats in general cultivation to-day, the exceptions being Milford and Sun II. Eagle is sometimes harvested by combined methods. The panicle is open, smaller than Victory and Star; the spikelets are numerous, several with three grains. A white oat, small to average in size with a low husk content; the grain and straw are both much brighter than Victory and Star. It is considered one of the best oats for feeding or home consumption, the straw being of high feeding value. Suitable soils are those in a high state of cultivation and fertility; is suitable for the heavy types. Under these conditions it gives excellent yields, and in trials has outyielded its parents. It appears to resist Frit Fly attack better than most well-known spring oats. Most suitable for sowing with Camton barley in a dredge corn mixture. Is known and grown throughout the British Isles.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Leaf narrow, held erect, margins and sheath glabrous, purple base.

Tillering 0-2, but some weak.

- Panicle Equilateral medium-small, more compact than Star. Rachis very stiff, branches stiff.
- **Spikelet** Numerous, rather small, two-grained and three-grained. Glumes bright, faintly marked.
- Grain White oat class, but sometimes more yellow, rather small, narrow. Base of grain and rachilla glabrous. Thin husk.
- **Straw** Short-average length, strong and stiff, bright colour. Nodes few hairs above, very occasional below.

Awn Absent.

1,000 Grain Wt. 39.8 grams Average Husk Content 24.8 per cent. figures.



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EARLY MILLER

Origin Bred and introduced by the Plant Breeding Station, Corstorphine, Edinburgh, in 1934. It was derived from a cross between Potato and Record.

General This oat can be sown somewhat later in spring than many of the oats for the North. It grows strongly and tillers well; maturing early. The straw is inclined to be long but stands reasonably well, resisting lodging unless grown on too strong land. Its panicle is medium-open, bearing numerous spikelets, some of which are three-grained. Quality of the grain is good milling; it is of average size, very white, with a low to average husk content. Most suitable soils are those of the light-medium type in average-high fertility; better suited to the North or late districts where rainfall is high in late spring and early summer. The straw is of good feeding quality, and disease-resistance is fair. Shattering at harvest may occur if not cut rather sharp. Grown in large acreage in Scotland and parts of North England. An increased seed-rate is advisable.

PRINCIPAL CHARACTERS

Young Plant More erect habit but sometimes appears semi-erect.

Middle Growth Leaf rather broad, not long, but has flaggy appearance. Leaf margins hairy, long at base, sheath hairy at base of plant only.

Tillering High, but 0-2 maturing only.

Panicle Equilateral, average size, rachis straight and stiff, branches weak, pendulous when ripe.

Spikelet Numerous, usually two-grained, but few bear three. Glumes pale, small.

Grain Good, white, short and plump. Base of grain very short hairs. Rachilla long, glabrous. Thin to average husk. Good quality.

Straw Bright, good quality, average to long; rather brittle when ripe. Nodes glabrous.

Awn Absent.

I,000 Grain Wt.42.6 gramsAverageHusk Content26.6 per cent.figures.

OATS

EXTRA BELL

Origin Bred at the Plant Breeding Station, Svalof, Sweden, from a cross between Victory and Bell III.

General Best returns are obtained when sown by the end of March. It ripens earlyaverage, the straw being long with low resistance to lodging. The panicle is rather large, equilateral and open, with branches a little weak; spikelets are numerous and two-grained, the grain being a brown-black colour, average size, with a thin husk; the quality is good. Most suitable soils are those in low to average fertility and of a light nature, preferably in late districts with high rainfall. The yield is only fair for grain but good for straw which is of good quality. Very little Extra Bell is grown to-day, practically none in England and very little in Scotland. Many of the more recent oats have replaced this variety.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Leaf rather long and flaggy, margins and sheath glabrous or odd hair, deep purple base. Good colour.

Tillering 0-2 weak.

Panicle Equilateral, large, open, stiff rachis, branches a little weak.

Spikelet Numerous two-grained, long pale glume, white with faint markings.

Grain Brown-black, average size, thin to average husk. Base of grain very hairy. Rachilla glabrous.

Straw Long and weak, bright colour, good quality. Nodes occasional hair above, glabrous below.

Awn Few only and then pale, weak and short.

1,000 Grain Wt. 46·I grams Average Husk Content 25 per cent. figures.

GLASNEVIN ARDRI

Origin Introduced by the Plant Breeding Station, University College, Dublin. It was derived from a cross between Glasnevin Sonas and Victory II.

General Best sown as early as possible in spring for good returns. It ripens about average after growing strongly and tillering very freely. The straw is medium and quite stiff, resistance to lodging being good. An equilateral rather close panicle, bearing numerous spikelets with white grains of average size and husk content. It is suited to a wide range of soils and conditions, but the very heavy fertile soils should be avoided. Yields are very good, one of the highest-yielding oats in Ireland to-day. Resistance to the common disease is high, but dressing the seed before sowing is advisable. Quality of the straw is good, the straw yield is low. Grown in many parts of Ireland.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth,

Middle Growth Leaf held very erect, narrow, margins and sheath glabrous.

Tillering 0-3 strong.

Panicle Equilateral, rather close, rachis fairly stiff, branches very stiff.

Spikelet Very numerous, small two-grained. Glumes short, bright colour. Well marked.

Grain Good white, medium size, average husk. Base of grain and rachilla glabrous.

Straw Average in length, reasonably strong, bright colour, fair quality. Nodes occasional hair above, few below.

Awn Present but not common, short, weak and pale.

I,000 Grain Wt.43.4 gramsAverageHusk Content27.0 per cent.figures.

OATS

GLASNEVIN SUCCESS

Origin Introduced by the Plant Breeding Department, University College, Dublin. This oat was raised from a cross between Victory and Record.

General May be sown a little later than average, it grows strongly in spring and tillers freely. Ripening early, a week earlier than Victory, it has fairly short and stiff straw, resistance to lodging being high. An open medium panicle with grain of good white colour, large and plump, with average to high husk content. It is suited to a wide range of soils and conditions, but does better on the richer soils in late districts owing to its early ripening character. The yields are good under the above conditions, but may be slightly inferior to Glasnevin Sonas. It is rather susceptible to Leaf Spot and should not be sown unless the seed has been dressed. Grown in many parts of Ireland where it is popular to-day as a grain-bearer.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Leaf erect, dark colour, rather narrow, leaf margins and sheath glabrous or occasional hair at base.

Tillering 0-3, some weak.

Panicle Equilateral, average size, stiff rachis, branches usually erect.

Spikelet Numerous two to three-grained. Glumes long, narrow and very pointed, pale markings.

Grain Good white colour, average-long, rather narrow. Base of grain few hairs. Rachilla stiff, glabrous. Average-high husk content.

Straw Short and stiff, bright colour, fair quality for feeding. Nodes many hairs above, few below.

Awn Absent.

I,000 Grain Wt. 43.5 grams Average **Husk Content** 28.8 per cent. figures.

GOLDEN RAIN

Origin Marketed by the General Swedish Seed Co. Ltd. and raised at Svalof from a selection made from Milton.

General Best sown in spring not later than the end of March, but can be sown a little later than many other spring oats. It grows well and strong, ripening early. The straw is average to long, soft and of a bright colour. Resistance to lodging is fair unless grown too well. Crops have been seen almost laid after heavy rain, but have stood up again when dry. An open panicle of medium size, the grain being of average size, bright, almost yellow colour, with an average husk. It is best suited to soils in no more than average fertility and does well in wet districts and the better hill lands. It yields well but inferior to Victory, Ascot and Star. Golden Rain does not shatter or break at neck when dead ripe and dry. More of a feeding oat than a selling oat as the straw is of very good quality. Known and grown in many parts of the British Isles. Does very well in some parts of Scotland.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Leaves medium size and length, margins and leaf sheath glabrous.

Tillering Medium.

Panicle Small-medium, equilateral, rachis stiff and straight, branches stiff, usually straight when ripe, not very pendulous, but spikelets turn downwards.

Spikelet Numerous, rather small, usually twograined, but occasionally three. Glumes clean, bright colour, markings not prominent.

- Grain Average-small, short, bright yellow colour. Base of grain and rachilla are glabrous. Medium husk.
- Straw Average-long, soft, bright colour, good quality. Nodes, few hairs below, hairy above.

Awn Very few present, then short and dark in colour.

I,000 Grain Wt.37 gramsAverageHusk Content26.3 per cent.figures.

OATS

GOLDEN RAIN II

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Origin Introduced by the General Swedish Seed Co. Ltd. It was bred at the Plant Breeding Station, Svalof, from a cross between Victory and Golden Rain.

General This oat is very similar to the old Golden Rain. It ripens about the same, is of a bright colour and about the same straw length. It differs in yield which is slightly higher than the old type, also the grain may be more plump but with a slightly thicker husk. The straw is slightly stiffer and Golden Rain II can be grown on somewhat heavier and more fertile soils. May be sown in place of Golden Rain in some places. Not as widely known as the old variety but is grown in many parts of the country.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

- Middle Growth Leaves medium, margins and sheath glabrous.
- Panicle Small-medium equilateral, rachis stiff and straight, branches upright, stiff, more close than Golden Rain.
- Spikelet Numerous small-medium, two to threegrained.
- Grain Average size, short and plump, bright yellow colour. Base of grain and rachilla glabrous. Medium husk.
- Straw Average-long, soft, good colour, little stiffer than Golden Rain 1. Few hairs above and below the nodes.

Awn Occasional only, then weak dark colour.

1,000 Grain Wt.40 gramsAverageHusk Content27.2 per cent.figures.

GORDON

Origin Selection from Scots Berlie made by Mr. Runcieman, King Edwards, Aberdeenshire.

General Very similar remarks in general as those under Potato oat. Gordon is a fine straw producer, the grain being rather more narrow and longer than most Potato types. Resistance to lodging is not high. Yields are average for this class of oat. Suitable for Northern districts where high rainfall conditions are encountered.

PRINCIPAL CHARACTERS

Young Plant Semi-erect to erect habit.

Middle Growth Leaf pale green, broad, long and flaggy. Leaf margins and sheath hairy, purple-based.

Tillering High, 0-4, several weak.

- **Panicle** Large, long, equilateral, stiffrachis, branches stiff, spikelets numerous.
- Spikelet Small one and two-grained. Glumes deeper coloured, thin and broad.
- Grain Good white, fairly plump but usually longer than other similar types. Base of grain long hairs. Rachilla glabrous.
- Straw Long, tough, inclined to lodge when ripe, brighter colour than Potato. Nodes glabrous or occasional hair.
- Awn Very occasional, pale, undeveloped awn.

1,000 Grain Wt.39 gramsAverageHusk Content28 per cent.figures.

OATS

GREY WINTER

Origin Believed to have come from the Continent of Europe, but its origin is unknown.

General A true winter oat and is best sown in early autumn. It is very winter hardy and stands severe conditions probably better than any other variety of winter oats. Ripening early with long fine straw, its resistance to lodging is poor. The panicle is large and open with two-grained spikelets bearing long grey grain which have a very low husk content. Grey Winter is one of the best feeding oats, the straw is very palatable to stock and of excellent quality. Resistance to disease is good but it may shatter slightly at harvest. Suitable soils are those in a low state of fertility, preferably light land. Yields are fair only and in this respect has been replaced to a considerable extent by S.147 and Picton. This oat will not harvest by combined methods. It is well known over the British Isles but is being grown in smaller acreage every year. Very resistant to Stem Eel-worm attack.

PRINCIPAL CHARACTERS

Young Plant Almost prostrate habit of growth.

Middle Growth Leaf long and narrow, leaf margins hairy, lower sheath hairy, rather pale green.

Tillering High, 0-6, many weak.

Panicle Large open, equilateral, rachis straight, branches long and fine, pendulous when mature.

Spikelet Two-grained, long, with long glumes which are thin and not well marked.

- Grain Long and pointed. Base of grain hairy. Rachilla long, bearing short hairs. Colour is a good grey. Very thin husk.
- Straw Long, fine, weak, good quality and bright. Nodes glabrous.

Awn Few, grey, twisted, medium length.

1,000 Grain Wt. 39 grams Average Husk Content 21.2 per cent. figures.



HAMILTON

Origin Selection from a Potato type made by Hamilton of Steppes.

General Remarks are those for Potato oat in general. This variety is very hardy and may be sown early in the North of Scotland. It gives fair yields of high quality grain and straw. May be found growing in Northern Ireland and parts of Wales, but chiefly in Scotland. An old variety.

PRINCIPAL CHARACTERS

Young Plant More semi-erect habit.

Middle Growth Leaf broad, long, appears flaggy, leaf margins hairy lower half. Pale green colour.

Tillering Good, 0-4.

Panicle Rather large, equilateral, stiff rachis, branches stout, spikelets small, numerous.

Spikelet Small, one and two-grained. Glumes thin, short, pale coloured.

Grain Clean, white, short and plump. Base of grain hairy. Rachilla glabrous. Fairly thin husk.

Straw Average length, fine and rather weak. Nodes glabrous above, few below.

Awn Occasional weak.

1,000 Grain Wt. 34.6 grams Average Husk Content 25 per cent. figures.

OATS

HARVESTER III

Origin A pure line selection made by Messrs. Carters Ltd., London, S.W.20, in 1925.

General Should be sown by the end of March. It ripens early, the straw being long, resistance to lodging is rather poor but the straw is of good quality for feeding. The panicle is more unilateral or one-sided, similar to Marvellous, bearing numerous spikelets two and three-grained; a white grain which is large and plump with a rather high husk content. Yields are said to be very good when grown well under ideal conditions. Soils should be on the light side in no more than average fertility. Appears susceptible to Leaf Spot, so all seed should be dressed; care should be taken at harvest-time if hot and dry as a little shattering may occur. Does well in the South of England. Would suggest a higher seed rate by weight per acre as the grain is extra large.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Leaf held erect, margins few hairs, sheath glabrous. Good colour.

Tillering 0-2 strong.

- **Panicle** Unilateral, lower branches spreading a little, rachis curved, branches stiff and close.
- **Spikelet** Numerous, large two to three-grained, glumes long tapering, pale markings.
- Grain Good white, large, rather thick husk. Base of grain one or two short hairs. Rachilla stout, short, glabrous.
- Straw Rather long, good quality and colour. Nodes, many hairs above, glabrous below.

Awn Numerous, long, twisted, black-based.

1,000 Grain Wt. 55.0 grams Average Husk Content 30.8 per cent. figures.



127

MALDWYN (S.221)

Origin Introduced by the Welsh Plant Breeding Station, Aberystwyth. It was derived from a cross between Victory and Radnor Sprig.

General A new oat introduction not yet universally known. It should be sown early in spring for best returns, growing strongly with fair tillering it ripens quite early, with straw which is short and much stronger than Victory. The resistance to lodging is quite good and also resistance to disease is high. Panicles of this oat are of average size, open and uniform and bearing a good number of spikelets which are two-grained. The grain of Maldwyn is a good white, small to average in size with a thin husk. Suitable soils are those of medium nature in average fertility, where this oat will stand better than its parents and give a higher yield of grain than Victory, which is of equal quality. The straw is soft and of good feeding texture.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Leaf rather long, narrow, a little flaggy. Margins bear very occasional hair.

Tillering Average.

- Panicle Equilateral, small to average in size. Branches rather weak and pendulous when ripe.
- **Spikelet** Numerous, two-grained, glumes thin and narrow, well marked.
- Grain White small-average, thin husk. Base of grain few very short hairs. Rachilla long with very few short hairs.
- Straw Average length, thin and whippy, good quality. Nodes glabrous.

Awn Absent or very occasional weak awn.

I,000 Grain Wt. $39 \cdot 8$ gramsAverageHusk Content $25 \cdot 4$ per cent.figures.

OATS

MARVELLOUS

Origin Introduced by Messrs. Gartons Ltd., Warrington, in 1921. It was derived from the following parentage:

Avena Fatua (Ŵild Oat) × Grey Winter × Avena Fatua × Goldfinder (White Grain) (Grey Grain)

General For best returns this oat should be sown in February, but not ever later than the middle of March. It grows strongly in early spring and ripens early. The straw is rather long and strong but somewhat coarse; its resistance to lodging is fair. When dead ripe the straw is inclined to be brittle, with a tendency to break in the upper third. A rather one-sided panicle or semi-unilateral type of medium size; spikelets are numerous, many bearing three grains. The grain is white, large, of moderate quality, with thick husk and high husk content. It is suited to the lighter soils in a highly fertile state where it will yield very satisfactorily. The straw is not considered a good feeder. Marvellous will stand a mild winter but it is best sown in February. If sown much later it appears to be rather more susceptible to Frit Fly attack. Being a large oat a slightly higher seed rate per acre is advisable. Grown throughout England but little in Scotland.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Leaves fairly long and broad, few hairs at base of leaf.

- **Panicle** Somewhat unilateral but often very irregular, rachis quite stiff but curved.
- Spikelet Large, medium length, two to threegrained. Glumes large plain markings.
- Grain Long and broad. Base of grain very few short hairs. Rachilla glabrous. White grain, thick husk.
- **Straw** Long, strong, somewhat coarse and brittle when ripe, good colour. Hairy above and below the nodes.

Awn Numerous.

1,000 Grain Wt. $45 \cdot 6$ gramsAverageHusk Content $32 \cdot 8$ per cent.figures.

129

MILFORD (S.225)

Origin Introduced by the Welsh Plant Breeding Station, Aberystwyth, in 1948. Formerly called S.225 it was derived from a cross between Victory and S.172.

General This oat should be sown as early as possible, but it ripens about the same time as Star. The straw is short and strong, probably the strongest-strawed spring oat in cultivation to-day. Resistance to lodging is very high and it is recommended for soils which are in a high state of fertility and of a medium-heavy nature. In low-rainfall areas it does better on heavy clay land. The panicle is medium-open, bearing spikelets usually two-grained, but occasionally three grains are found. A white grain which is of average size, with a low husk content and of good quality. Yields very well on suitable soils and does not shatter at harvest. The straw is quite palatable to stock. Bred for a specific purpose, to meet the farmers' need for spring-sown oats on highly fertile land. Would easily harvest by combined methods. A new oat which should soon be very popular.

PRINCIPAL CHARACTERS

Young Plant Erect, sometimes appears semi-erect.

Middle Growth Leaf medium, good colour, appears flaggy on very fertile land. Leaf margins, few hairs lower third, sheath glabrous.

Tillering Average, 0-2, weak.

- Panicle Equilateral, close or more compact, rachis stiff, branches stiff.
- **Spikelet** Usually two-grained, occasional three, glumes long, broad at base, pale colour, faintly marked.
- Grain Medium size, white, fairly plump. Base of grain occasional short hair. Rachilla occasional short hair. Low husk content.
- Straw Short and strong, inclined to be coarse. Nodes usually glabrous.

Awn Very few and then weak, pale and undeveloped.

1,000 Grain Wt. 38.4 grams Average Husk Content 24.7 per cent. figures.

OATS

NEW MINOR

Origin An introduction from the Abed Plant Breeding Station, Denmark. This oat was derived from a cross between French Black Oat and Abed Silver.

General A new oat introduction to this country for spring sowing it should be sown as early in March as possible, but may be sown later with satisfactory returns. It tillers moderately and ripens early, a week earlier than Victory and two or three days earlier than Marvellous. The straw is short and stiff, one of the shortest strawed spring oats, with a high resistance to lodging. New Minor has an equilateral panicle rather close, bearing spikelets which are three-grained over most of the panicle. The grain is white, short and plump with a rather high husk which makes its quality doubtful. Resistance to shattering at harvest is second to none and one may say it is a hard thresher to its advantage; common diseases are also highly resisted, but seed-dressing is always advisable. Suitable soils are those of a medium to heavy nature in a high state of fertility on which it gives very high yields. In recent trials it has given a 20 per cent. higher yield than Star, which is considerable. It is rated high in the grainproducing group with a low straw yield, which is quite good and palatable to stock. New Minor may be very popular for strong land in future in both England and Scotland.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Leaf medium, margins hairy, sheath hairy at base, dark green colour.

Tillering 0-2 strong.

- **Panicle** Equilateral, uniform, rather close, rachis stiff and straight, branches stiff, more erect.
- **Spikelet** Numerous three-grained, glumes small, bright golden colour, raised markings, open, exposing grain.
- Grain White or more golden, short, plump and having a rather thick husk. Base of grain several fine hairs. Rachilla appears glabrous.
- Straw Short, stiff and strong, bright colour, fair quality. Nodes glabrous above and below or sometimes occasional hair.
- Awn Numerous, average length, black and twisted at base, pale at apex.

1,000 Grain Wt. 46.6 grams Average Husk Content 30.6 per cent. figures.



ONWARD

Origin Introduced by Messrs. Gartons Ltd., of Warrington, in 1935. It was derived from a cross between Marvellous and Superb.

General A popular oat for spring sowing throughout the British Isles. It ripens early, the straw being about average in length but quite stiff, and resistance to lodging is reasonably high; there is a tendency for the straw to become brittle when ripe and may break down. The panicle is more unilateral or one-sided and fairly dense. Spikelets are numerous two to three-grained, with grain a good white colour, very plump, of average to good quality but with a rather thick husk; straw quality is not very good. Best soils are those in average to high fertility over a wide range of types. Yields from Onward are frequently very high, one of the best of the grain producers. Shattering does not often take place if harvested correctly. Does well in Scotland and many parts of England, where it is considered one of the best oats for sale.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Leaf erect, average width, leaf margins hairy, sheath few hairs, good colour.

Tillering 0-2, occasional weak third.

- **Panicle** More unilateral but sometimes spreading at base; rachis stout, curved, branches a little pendulous when ripe.
- Spikelet Large, usually two to three-grained, glumes large and broad, well marked.
- Grain Good white, fairly large and plump. Base of grain glabrous. Rachilla glabrous or few hairs. Rather thick husk.
- Straw Short-average, fairly stout, but brittle when ripe. Nodes glabrous above, glabrous or occasional below.

Awn Not common, then only pale, short and weak.

1,000 Grain Wt.48.3 gramsAverageHusk Content29.2 per cent.figures.

OATS

ORION III

Origin Marketed by the General Swedish Seed Co. Ltd., and bred at the Plant Breeding Station, Svalof. It was derived from a cross between Orion II and Golden Rain. Introduced by Messrs. Edward Webb & Sons Ltd., Stourbridge, in 1948.

General Best returns are obtained when sown in March, but this oat can be sown much later with good results. It grows well in spring having a deep green colour; tillering is moderate. Ripening very early, Orion III has a good straw of average length which is fine yet strong, and resists lodging well. The panicle is medium in size, open and uniform; spikelets are usually two-grained but some three-grained are found at the top of the panicle. The grain is a good black, rather long and thin with a low to average husk content. It is suited to a wide range of soils in low to average fertility and does well on light land. Yields when grown well can be high, and it has out-yielded all other black oats in trials on light land in average fertility. Quality of the straw for fodder is very good, being of a soft nature. It appears to resist Frit Fly attack when sown late, better than many oats, and resistance to common diseases is high. A new oat in England but may be popular with dairymen and stock farmers in late-ripening districts.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Leaf short, narrow, held erect, good colour. Leaf and sheath glabrous or occasional hair. Purple at base of plant.

Tillering 0-2 strong.

- Panicle Equilateral, average size, rachis stiff, branches stiff but not erect.
- **Spikelet** Numerous two to three-grained. Glumes broad at base, tapering quickly, well marked.
- Grain Good black, average size or rather narrow. Base of grain short fine hairs. Rachilla long, glabrous or occasional hair. Thin to average husk.
- Straw Average length, strong yet fine, good quality, bright colour. Nodes glabrous above and below.
- Awn Absent, or very occasional weak.

1,000 Grain Wt.40 gramsAverageHusk Content25.2 per cent.figures.



PICTON

Origin Introduced by the National Institute of Agricultural Botany, Cambridge, and bred at the Plant Breeding Institute from a cross between Grey Winter and Argentine.

General Best sown in early autumn this oat is very winter hardy. Tillering well in spring it ripens early, as S.147, which in many of its characters it strongly resembles. The straw is rather long but strong, resistance to lodging being good for oats. The panicle is large and open with two or three-grained spikelets bearing white grain of good size, with low husk content. Occasionally there may be a little greyish colour present on the grain, the straw is a little brighter in colour than S.147. Resistance to common disease is quite good and it does not shatter quickly at harvest. This variety is not suitable for harvesting by combined methods. Like S.147 it is suited to a wide range of soils and conditions, but soils in no more than average fertility are best to avoid lodging. Yields are very good, being about the same as S.147, but in recent trials S.147 has slightly out-yielded Picton. This oat, together with S.147 and S.172, will meet the majority of farmers' needs for winter sowing, with the exception of those farming very poor land or hill lands. An excellent feeding oat becoming very popular in England.

PRINCIPAL CHARACTERS

Young Plant Semi-prostrate habit of growth.

Middle Growth Leaf long, medium width, margins hairy lower third, sheath hairy, but few.

Tillering Good, 0-3, strong.

- **Panicle** Large, open equilateral, straight rachis, branches stiff, only slightly pendulous when mature.
- Spikelet Medium size, glumes long, deep golden colour, veins or markings plain. Two to three-grained.
- Grain Rather long, medium width, colour yellowishwhite. Base of grain glabrous. Rachilla hairy.

Straw Long, strong, fine, of good quality. A few hairs below nodes, glabrous above.

Awn Quite common, well developed, black and twisted.

1,000 Grain Wt.41 gramsAverageHusk Content24.8 per cent.figures.

POTATO

Origin Traditionally believed to have been found by a farm labourer in his potato patch at Eskdale, Cumberland, in 1788.

General An old oat belonging to the straw-producers and best sown in March for good returns. In early growth it is more prostrate than others, tillering freely it ripens late. The straw is of average length and fine in nature but weak, the resistance to lodging being rather poor. It has a large very open panicle, the spikelets being less numerous than in general and bearing one or two grains only. The grain is very white, short but plump, and has a thin husk. The quality of this grain is good. It is best suited to soils in a cool climate with high rainfall and in low-medium fertility. Yields are fair but inferior to many of the more recent spring oats. Potato oat is hardy and healthy, resistance to disease being quite good. At one time a very popular oat in Scotland, where it is grown in a larger acreage than in England to-day. The popularity of this oat was probably due to its high total yield (grain and straw). The straw is excellent for feeding. Inclined to shatter slightly at harvest.

PRINCIPAL CHARACTERS

Young Plant More semi-prostrate habit.

Middle Growth Leaf fairly broad, long and drooping. Leaf sheath and margins are hairy. Mid-green colour.

Tillering Rather high. 0-4.

Panicle Rather large, spreading, equilateral, stiff rachis, erect, branches are quite stiff, spikelets numerous.

Spikelet Small, one and two-grained. Glumes thin, short and broad enclosing grain throughout growth, pale coloured with little marking.

Grain Good white, short but very plump. Base of grain many long hairs. Rachilla glabrous, husk low.

Straw Average length, fine, rather weak. Nodes glabrous above, odd hair below.

Awn Numerous.

I,000 Grain Wt. $35 \cdot 8$ gramsAverageHusk Content $25 \cdot 8$ per cent.figures.



136 CEREAL VARIETIES IN GREAT BRITAIN

POTATO ARDEE

Origin A selection from the old Potato variety made by the Plant Breeding Station, University College, Dublin.

General Remarks as for Potato oat, with the exception of a slightly stronger straw and little better yield in certain parts. It ripens a day or two earlier than the old Potato oat and is certainly a superior selection. Grown in Ireland.

PRINCIPAL CHARACTERS

Young Plant More semi-erect habit of growth.

Middle Growth Leaf held fairly erect but a little flaggy, margins hairy, lower sheath very hairy.

Tillering High, 0-4, several weak.

Panicle Equilateral, large open, rachis very stiff, branches stiff.

Spikelet Small, one and two-grained. Glumes white, small, faintly marked.

Grain Good white, small, plump. Base of grain many long hairs. Rachilla glabrous.

Straw Average-long, good quality, rather weak. Nodes glabrous above, occasional hair below.

Awn Many, average length, twisted, usually pale.

I,000 Grain Wt. 38.5 grams Average Husk Content 29.2 per cent. figures.

OATS

QUALITY

Origin A selection from Potato made by Mr. Runcieman, of King Edwards, Aberdeenshire.

General For general remarks on type, suitability, etc., see under Potato oat. Quality is again a Potato type oat bearing very much the same characters as those found in this large group. Sometimes known as Castleton Quality. The panicle is more dense than Potato and the grain appears more plump but with a somewhat thicker husk. This oat is not widely grown but is found in parts of Scotland and Northern England.

PRINCIPAL CHARACTERS

Young Plant More semi-erect habit.

Middle Growth Leaf broad, long and flaggy appearance. Leaf margins and sheath hairy lower half. Purple-based.

Tillering High, 0-3, several weak.

Panicle Large, open, equilateral, spikelets numerous, rachis stiff, branches stiff and more upright.

Spikelet Small, one or two-grained, glumes small, more open than usual, thin glumes.

Grain Small, plump, white but deeper coloured than most types. Base of grain odd long hair. Rachilla glabrous.

Straw Average length, good quality, resists lodging a little better than most Potato types. Nodes glabrous above and below.

Awn Very few pale undeveloped.

1,000 Grain Wt.37 gramsAverageHusk Content30.8 per cent.figures.

R.30 POTATO

Origin Selection from Castleton Potato made by Mr. Runcieman, of King Edwards, Aberdeenshire.

General Remarks in general are those under Potato. This selection is said to have a little stiffer straw of excellent feeding value. A high-quality grain with average husk content. Does well in wet districts. It is grown chiefly in parts of Scotland. The old Potato oat is said to be a better milling oat than R.30.

PRINCIPAL CHARACTERS

Young Plant Semi-erect habit of growth.

Middle Growth Leaf fairly broad, pale green, flaggy appearance. Leaf margins and sheath have long hairs lower half only.

Tillering High, 0-3, plus several weak.

- Panicle Large equilateral, but shorter than old Potato, stiff rachis, branches more pendulous, spikelets numerous.
- **Spikelet** Small, one and two-grained, glumes short, pale coloured, faint markings.
- Grain Short, plump, white, fair quality. Base of grain few long hairs. Rachilla glabrous. Husk content about average.
- Straw Medium length, white, rather weak, fine nature, poorer quality than Sandy. Nodes glabrous or odd hair below.

Awn Few awns, rather short and twisted.

I,000 Grain Wt.34.9 gramsAverageHusk Content27 per cent.figures.

OATS

RADNORSHIRE SPRIG

Origin An old Land Variety or a selection from such.

General A variety which can be sown early or late spring and still be quite remunerative. It is sometimes sown for silage, cutting green after the very high tillering has taken place. Ripening early, Radnorshire Sprig has a whippy straw, which although quite thin stands well on the poorer to medium land in average fertility, to which it is best suited. Resistance to lodging is not normally high, but resistance to disease and shattering is good. The panicle is medium open, equilateral with branches that droop when mature, it bears a number of spikelets which are two-grained, the grain being a brown-black colour, long and thin, with an average husk content. Yields are not high, about the same proportion of grain and straw, but this oat has its place on the hilly poorer types of land in parts of Wales.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Leaf narrow, rather pale, flaggy, margins few hairs lower third, purple base.

Tillering Very high, many weak.

Panicle Medium open, equilateral, rachis weak, branches weak and pendulous when mature.

Spikelet Long, thin, two-grained, glumes very pale colour, faint grey markings.

- Grain Brown-black, long thin, about average husk, very pointed. Base of grain many hairs. Rachilla long and hairy.
- Straw Rather long, thin and whippy, bright colour, good quality. Nodes glabrous.
- Awn Absent or very occasional, then pale and slightly twisted.

1,000 Grain Wt.	36·4 grams	Average
Husk Content	27 per cent.	figures.

140 CEREAL VARIETIES IN GREAT BRITAIN

RELIANCE

Origin Introduced by Messrs. C. W. Marsters Ltd., King's Lynn, in 1938. It was derived from the cross (Marvellous \times Supreme) \times Grey Winter.

General In favourable parts this oat can be sown early and not later than mid-March for best returns. It grows quickly and strongly, tillering well. The straw is shorter than many popular oats and is quite stiff with a high resistance to lodging; it may be somewhat brittle when dead ripe. Ripening rather early, Reliance has an open equilateral panicle of average size bearing numerous spikelets which are usually twograined, the grain being of a good white colour, short, plump, average husk content and of very good milling quality. It falls into the grain-producing class and yields are high on soils of a medium to heavy nature in a reasonable state of fertility, to which this oat is best suited. The straw is considered of good fodder type. Grown in parts of England and Scotland.

PRINCIPAL CHARACTERS

Young Plant Semi-erect habit of growth.

Middle Growth Leaf held erect but a little flaggy at apex, margins hairy (short), sheath few short hairs.

Tillering 0-3 strong.

- **Panicle** Equilateral, average-large, open and uniform, rachis stiff but twisted, branches little pendulous when mature.
- **Spikelet** Two-grained. Glumes small, bright coloured, broad at base.
- **Grain** Good white, short, plump, good quality, average husk. Base of grain and rachilla glabrous.
- **Straw** Short, stiff, bright, fair quality. Nodes glabrous above and below.

Awn Absent.

1,000 Grain Wt.49 gramsAverageHusk Content26.6 per cent.figures.

OATS

RESISTANCE

Origin Introduced by the National Institute of Agricultural Botany, Cambridge. It was derived from a cross between Grey Winter and Argentine.

General Should be sown as early as possible; best results are obtained when sown in February or very early March. It grows strongly and tillers freely, ripening rather late. The straw is short-average, fine, strong and resists lodging favourably. The panicle is open, medium in size, bearing grain of a good white colour, good quality, small-average in size, with an average husk. This oat is suitable for a wide range of soils and conditions, but should not be grown on too fertile land. It does well in early ripening districts, where it is considered a very good oat for feeding to stock, the straw being very palatable. Resistance to disease appears quite high, although dressed seed is advisable. Grown in some parts of England, but little in Scotland.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Leaf held fairly erect, margins hairy lower third, sheath glabrous.

Tillering 0-3, some weak.

- Panicle Medium open, rachis a little weak, sometimes curved, lower branches weak.
- **Spikelet** Not as numerous as many other spring oats, two-grained. Glumes medium size, tapering quickly, well marked.
- Grain Good white, medium size, slender. Base of grain many hairs. Rachilla stout and hairy.
- Straw Short-average, fine, good quality, bright. Nodes many hairs above and below.
- Awn Several but not common, twisted, rather short, dark at base.

1,000 Grain Wt.	40·9 grams	Average
Husk Content	27 per cent.	figures.



RICHLAND IOWA (105)

Origin A selection made from Kherson by the Iowa State College, U.S.A.

General This oat can be sown later than average in the spring but should be sown in March for best yields. It ripens very early, the earliest yellow oat in the country, ripening two to three weeks earlier than the majority of spring-sown oats. The panicle is small and open, with grain which is rather small with average husk and straw-coloured. The straw is shorter than average, but its resistance to lodging is not high. Soils should not be too strong, and the most suitable types are light-medium in no more than average fertility. Yields are fair but not high, the chief advantage of this oat is the early ripening character. Grown in the South of England in small acreage, but is new to this country, being introduced by Messrs. Dunns Ltd., Salisbury.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Leaf narrow, flaggy at top. Margins and sheath glabrous.

Tillering Good, 0-4, some weak.

Panicle Small open, equilateral, rachis slightly curved, branches weak, pendulous.

Spikelet Not numerous, small two and threegrained, narrow glume, yellow colour.

Grain Small, narrow, yellow. Base of grain two or three hairs. Rachilla glabrous.

Straw Short, fine, of medium quality.

Awn Absent.

I,000 Grain Wt. $36 \cdot 4$ gramsAverageHusk Content $26 \cdot 6$ per cent.figures.

OATS

ROYAL SCOT

Origin Introduced by Messrs. Gartons Ltd., Warrington, in 1940, and derived from a cross between Victory and Record.

General Should be sown not later than the end of March for best returns. It grows strongly in spring with strong tillers, and ripens early with straw rather long but reasonably strong. Resistance to lodging is fair unless grown on too fertile soil. The panicle is large, open, bearing many spikelets, usually two-grained, but occasionally three are found. A white grain of good quality and large size. The husk content is rather high. Resistance to Leaf Spot is not strong, but it appears to be less susceptible to attack by Frit Fly if sown late. Most suitable soils are those of a medium nature in average fertility; it has done well in the North of England and Scotland. Yields of grain and straw are usually high, the straw being very palatable to stock. No shattering has been noted when cut or carried in a very dry period. Grown in several parts of England and Scotland to-day in a decreasing acreage.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Leaf rather long and broad, a little flaggy; margins long hairs, sheath glabrous or odd hair, very pale base.

Tillering 0-2 strong, others weak.

Panicle Large, open equilateral, stiff rachis, weak branches, pendulous when ripe.

Spikelet Numerous but spread, usually two-grained. Glumes long, narrow, bright colour.

- Grain Very good white, large, long, high husk. Base of grain very few hairs. Rachilla long, weak.
- Straw Average-long, bright colour, good quality, a little weak. Nodes glabrous above and below.

Awn Absent.

1,000 Grain Wt.	52 grams	Average
Husk Content	31 per cent.	figures.

143
S.75 CEIRCH LLEWD

Origin A pure line selection of *Avena strigosa* made by the Welsh Plant Breeding Station, Aberystwyth. Introduced in 1934.

General Remarks in general are similar to those of S.171. The grain of this oat is pale grey colour and somewhat longer; gives better fodder yields. Resistance to Smut is excellent. Welsh uplands only for this oat. S.75 is frequently sown for fodder only, it is high tillering, grows quickly and can often be cut green twice in one season. It is difficult to sow by drill owing to presence of large coarse awn. Tillering is very high with much leaf, therefore useful for silage.



PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Leaf small, narrow and many of them, good colour. Margins glabrous, sheath hairy. Purple base.

Tillering Very high, o-6 strong.

Panicle Open, more unilateral, rachis waved and branches pendulous.

Spikelet Many, long, narrow with long narrow bright glume. Two and three-grained.

Grain Long, thin, pale, grey grain. Base of grain glabrous or few short hairs. Rachilla very hairy.

Straw Long and fine, weak, not good quality. Nodes glabrous.

Awn Numerous, large, twisted and bent, very strong and coarse. Present on all grains.

I,000 Grain Wt. 17.5 grams Average **Husk Content** 30 per cent. figures.

OATS

S.79 CEIRCH-DU-BACH

Origin Introduced by the Welsh Plant Breeding Station, Aberystwyth, in 1931. It is a pure line selection from the old variety Ceirch-du-bach.

General A Welsh spring oat for soils below average fertility and also hill lands. Found practically nowhere else except in Wales. The grain is black, short, plump and rather small. The straw is long and fine, but less liable to lodge than the old variety. Tillering well in early growth, a lower seed rate is required than is normal. Used chiefly as a feeding oat by Welsh farmers. Yields are not good and should not be expected to exceed 15 cwts. per acre, although in some places it has threshed almost 20 cwts. per acre.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Small, narrow leaf, a little flaggy at apex. Leaf margins and sheath glabrous or odd hair, deep purple base.

Tillering Very high, 0-5 strong.

Panicle Medium to large, very open equilateral, rachis straight, branches may be a little pendulous when mature.

Spikelet Fair numbers, small with small short glume, glume pale with pale markings. Oneand two-grained.

Grain Small and narrow, deep brown-black. Base of grain many long hairs. Rachilla glabrous.

Straw Average length, fairly strong, fine, rather long. Nodes glabrous above and below.

Awn Absent.

1,000 Grain Wt.	26 grams	Averag
Husk Content	25 per cent.	figures.

OATS

147

S.84

Origin Introduced by the Welsh Plant Breeding Station, Aberystwyth, in 1938. It was derived from a cross between Victory and Red Algerian.

General Should be sown as early as possible in spring and not later than the end of March. A slightly higher seed rate is advisable. It tillers well in spring, which is an advantage where an attack by Wireworm is in evidence. S.84 ripens late, one of the latest of the spring oats, but its straw is somewhat shorter than average and the resistance to lodging is very good. The panicle is open and rather close or dense, spikelets are found bearing two grains, which are considered white, plump, but often rather a dirty colour. Husk content is average to high. The quality of this oat is inferior to that of Star, Ascot, Victory and many others; its straw is fairly palatable to stock. It is suited to soils in medium and highly fertile conditions where it will give very good yields. This is an oat to meet special needs, that of the farmer who requires an oat which will stand very fertile conditions in a normally early ripening district. S.84 is too late for the Scottish farmer. Grown in parts of England; more common in the South-Eastern Counties.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Leaf good colour, medium size, held fairly erect. Margins, odd hair at base. Pale based plant.

Tillering High, 0-2 maturing.

Panicle More equilateral, but may be slightly one-sided. Fairly close, rachis and branches stiff.

Spikelet Numerous, two-grained only, glumes broad, bright colour, well marked.

Grain Medium in size, plump, white. Base of grain few short hairs. Rachilla glabrous. Medium husk

Straw Average-short, strong, resists lodging, usually clean and good colour. Nodes have many hairs above and few below.

Awn Absent or very occasional weak one.

1,000 Grain Wt.40.8 gramsAverageHusk Content28 per cent.figures.

S.81

Origin First introduced in 1931 by the Welsh Plant Breeding Station, Aberystwyth, it was derived from a cross between Grey Winter and Kyko.

General A true winter oat and should be sown in the autumn, being very winter hardy and tillering out fairly well in spring. It ripens about average, the straw being somewhat long but probably a little shorter than S.147. It is more resistant to lodging than the latter. The panicle is open, of medium size, with a grain of average size, average husk content, white and of reasonable quality. Resistance to disease is good, but this oat is more resistant to Stem Eel-worm attack than other winter varieties, with the exception of Grey Winter, and is recommended for soils where Eel-worm is in evidence. Soils in medium fertility and of the medium-heavy type are best for S.81. In yield trials it has given 8-14 per cent. more grain than Grey Winter, but is inferior to S.147. It does not shatter but is not considered a combine oat. Very little grown except in areas where Eel-worm is active.

PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth.

Middle Growth Strong, leaf long, medium width, mid-green colour, margins of leaf hairy.

Tillering High.

Panicle Medium, equilateral, rachis stiff, branches more erect.

Spikelet Medium size, rather close, glumes are well marked. Usually two-grained, three occasionally.

Grain Medium size, white. Base of grain few hairs. Rachilla glabrous.

Straw Fairly long, strong, fine and good quality, bright colour. Glabrous above and below the nodes.

Awn Few awns which are black and twisted.

J,000 Grain Wt. $36 \cdot 5$ gramsAverageHusk Content26 per cent.figures.



S.147

Origin Placed on the market in 1938 by the Welsh Plant Breeding Station, Aberystwyth. It was derived from a cross between Grey Winter and Marvellous.

General Best sown in the autumn as it will give inferior yields if sown early in the year. It is very winter hardy and is second to Grey Winter in this respect. Tillering is good and it ripens early. The straw is rather long but strong, and it resists lodging as well as, or better than, all winter oats with the exception of S.172. An open panicle, large and uniform, with grain of a good size and colour, a low husk content makes this oat a good quality feeder, especially as the straw is very palatable to stock. Resistance to the common diseases is quite good, but it is not resistant to Stem Eel-worm attack. Suitable soils are those which are well-drained and are in average fertility. Good crops are to be found on light land and heavy land. S.147 is one of the best oat introductions in recent years. Yields are very good and in trials it has out-yielded S.172, Picton, S.81, Grey Winter, Black Winter and Bountiful. It does not shatter easily but is not considered suitable for the combined harvester. Grown all over the British Isles to-day, and probably the most popular of all winter oats.

PRINCIPAL CHARACTERS

Young Plant More prostrate habit of growth.

Middle Growth Leaf medium width, long, margins of leaf hairy (long hairs). Sheath hairy at base only.

Tillering Good, 0-4 weak.

- Panicle Medium-large, equilateral, long branches, rachis stiff.
- **Spikelet** Medium size, glumes long, veins plain, good bright colour, two to three-grained.
- Grain Medium to long, average width, good colour, white grain. Base of grain, short hairs. Rachilla glabrous or odd hair.
- Straw Rather long, fairly fine, good quality for feeding. Nodes glabrous above and below.
- Awn Few present, pale colour, twisted.

I,000 Grain Wt.41.5 gramsAverageHusk Content23.8 per cent.figures.

OATS

S.171. CEIRCH LLWYD CWTA

Origin Introduced by the Welsh Plant Breeding Station, Aberystwyth, in 1936. This oat is an improved form of the hill-land oats commonly called Brown Oats, Ceirch Llwyd or Ceirch Teify. Derived from a cross between Ceirch Llwyd and Avena brevis.

General For sowing in spring in parts of Wales. It is a fodder oat, often being cut before mature. It tillers well and can produce dense growth; should not be sown as thick as is usual or so deep for best returns. S.171 ripens rather late with long weak straw, resistance to lodging being very poor. The panicle is open and spikelets few. Grain is very small, dark grey colour, but of good quality. Very resistant to Mildew and Smut. It produces an abundance of straw of good quality, but its average yield expectations are no more than 10 to 15 cwts. per acre of grain with a thin-average husk content. Does well on the poor upland soils of Wales.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Leaf pale colour, very narrow, flaggy at apex. Bright purple base. Leaf margins and sheath glabrous.

Tillering Very high, 0-7.

- Panicle Open, medium size, equilateral, rachis slightly waved, branches weak.
- Spikelet Not numerous, small, usually two-grained. Glumes small, narrow, yellow colour, faintly marked.
- Grain Deep, grey colour, small, narrow. Base of grain glabrous. Rachilla glabrous.
- Straw Long, fine nature, weak, clean, fair quality for feeding. Nodes glabrous.
- Awn Numerous short, pale and bent. Present on both grains of the spikelet.

I,000 Grain Wt.19·4 gramsAverageHusk Content22 per cent.figures.

S.172

Origin Introduced in 1939 by the Welsh Plant Breeding Station. This oat was derived from a cross between two white-grained selections from the hybrids (Grey Winter \times Kyko) \times (Grey Winter \times Bountiful).

General A true winter oat and must be sown in the autumn. It is very winter hardy, but a little inferior in this respect to S.147. Tillering is high and it ripens early, the straw is very short and stiff, resisting lodging 100 per cent. on some soils. This oat was bred to be grown on the fertile heavy or fen lands where normally oats could not be expected to stand. The panicle is small, open and very dense with rather small grain having an average husk content. Feeding quality of the straw is not good, being a little coarse and unpalatable. Suitable soils are those in a highly fertile state, where it will give good yields about equal to S.147. The straw on rich heavy land will grow to well over 5 ft. and stand strongly, while on the lighter soils will be seen 24 in. high. Resistance to disease is fair, but unless carefully dressed seed is used much Leaf Spot will be noted in some seasons. Grown in many parts of England to-day.

PRINCIPAL CHARACTERS

Young Plant Prostrate habit of growth.

Middle Growth Medium in leaf size, leaf margins hairy, long at base. Flaggy at top of plant.

Tillering Strong, 0-4, some immature later.

Panicle Small, dense, equilateral, rachis and branches stiff.

Spikelet Small, usually two-grained, short glume.

Grain Small, medium width, white. Base of grain glabrous or occasional long hair. Rachilla glabrous or few short hairs.

Straw Short, stiff, coarse, dull colour. Nodes glabrous above and below.

Awn Many, short, weak, undeveloped.

1,000 Grain Wt.34 gramsAverageHusk Content $25 \cdot 8$ per cent.figures.

OATS

S.175

Origin Marketed by the Welsh Plant Breeding Station, Aberystwyth, in 1938 and produced from a cross between Victory and Black Bell III.

General This variety can be sown a little later than average in the spring. It ripens slightly later than many of the spring oats and a few days later than Radnorshire Sprig, but earlier than Black Tartarian. The panicle is unilateral (one-sided), fairly dense, but more open than Black Tartarian. Spikelets are numerous and only two-grained. A white grain of fair size, long, with an average husk content. The straw is very long, probably the longest of any known variety, and its resistance to lodging is fair for its long straw. Most suitable soils are the poorer ones, and it does well on dry, stony land; land in average fertility would be too strong, and lodging would occur. Yields are poor, comparable with Radnorshire Sprig. A straw-producing oat only, it has been seen to grow over 7 ft. tall; the feeding value of the straw is quite good. In some parts it is called the paper-making oat because of the long, clean straw. Grown in some parts of Wales, practically never in England or Scotland. It tillers poorly and a higher seed rate should be applied.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Deep green narrow leaf, flaggy at apex. Leaf margins and sheath glabrous. Purple base.

Tillering Rather low, 0-2 weak.

Panicle Unilateral but not close, rachis slightly curved, branches a little pendulous when mature.

Spikelet Numerous, two-grained, glumes long and well marked.

Grain White or yellowish-white, long and pointed. Base of grain long hairs. Rachilla glabrous. Average husk content.

Straw Long straw, clean and bright, 72 in. on light land. Nodes glabrous above and below.

Awn Numerous, pale, slightly twisted, undeveloped.

1,000 Grain Wt.42 gramsAverageHusk Content26.5 per cent.figures.



S.220

Origin Introduced in 1945 by the Welsh Plant Breeding Station, Aberystwyth. It was derived from a cross between Victory and Radnorshire Sprig.

General This oat is principally used for sowing on the Welsh hill lands in spring. It is a hardy good tillering oat, ripening about average. The straw is rather long and liable to lodge if the soil is too strong, but it is stouter than Radnorshire Sprig. Panicle is open and lax with two-grained spikelets. The grain is black, small, long and pointed with an average husk content. It is better suited to the poor types of land where the fertility is low. Yields are inferior to most of the common spring oats, 15-25 cwts. per acre can be expected. S.220 is a good substitute for Black Tartarian, giving a higher yield of grain. This variety was bred for a specific purpose and is one of the best for sowing on hill lands. Little grown in England, but will be found in Wales on an increasing scale.



PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Leaf medium in size. Margins and sheath glabrous. Good colour, flaggy at apex.

Tillering High, 0-4 strong.

Panicle Medium size, open equilateral, rachis slightly curved, branches weak and pendulous when mature.

Spikelet Fair numbers, two-grained only, small and thin. Long glume, pale colour, well marked.

Grain Black, long and pointed, not large. Base of grain many short hairs. Rachilla glabrous.

Straw Average length, fairly fine, reasonably strong. Nodes glabrous above and below.

Awn Few undeveloped, pale colour.

I,000 Grain Wt.38 gramsAverageHusk Content27 per cent.figures.

OATS

SANDY

Origin Selected on the farm of Mr. Pirie in Aberdeenshire by his shepherd, Sandy Thompson, in 1824.

General Sown in the North in the spring. It tillers freely in early growth, ripening about average in English trials with straw also average in length but rather weak and liable to lodge under fertile conditions. The panicle is open, large, larger than Potato. Spikelets are numerous, usually two-grained. Quality of the grain is excellent for milling and the grain is white-yellowish-white, rather small in size with thin husk. Sandy is best suited to soils in low-average fertility if light, and low fertility if of medium nature. An oat for poor land, mainly grown in the North of Scotland, but to-day only in small quantities. The straw is very palatable to stock. Shattering at harvest has not been noticed.

PRINCIPAL CHARACTERS

Young Plant Semi-erect habit of growth.

Middle Growth Leaf medium width, good green colour, a little flaggy appearance. Leaf margins glabrous, or occasional hair.

Tillering High, 0-4, one or two weak.

Panicle Large spreading, equilateral, straight stiff rachis, branches may be slightly pendulous when ripe. Spikelets numerous.

Spikelet Small, one or two-grained, glumes narrow, bright coloured, well marked.

Grain Yellowish-white, long and thin, good quality, thin husk. Base of grain odd long hair. Rachilla glabrous.

Straw Long, thin, rather weak, good feeding quality. Nodes usually glabrous.

Awn Absent or occasional weak one.

I,000 Grain Wt.	33 grams	Average
Husk Content	23 per cent.	figures.

SPITFIRE

Origin Introduced by Messrs. Gartons Ltd., of Warrington, in 1945. It was derived from a cross between Victory and Supreme.

General A more recent oat for spring sowing; it grows strongly, tillering fair only but ripening rather early, four to five days earlier than Victory. The straw is shorter than average, stiff but a little brittle when dead ripe, nevertheless it resists lodging very well. Shape of the panicle is open, but slightly one-sided and somewhat close compared with Victory. The quality is good despite its high husk content; it is white, large, plump and broad. Suitable soils are those of a medium nature in average to high fertility, on which it gives good yields. In recent trials it has out-yielded its parents. Straw quality is not particularly good for feeding. Does not shatter easily, but care should be taken at harvest-time. One of the oats that may harvest by combined methods and may prove useful for this machine to handle. Grown in Scotland and in many parts of the British Isles in small acreage at present.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Leaf a little flaggy, rather long, margins few short hairs lower third, sheath glabrous, purple-based.

Tillering 0-2, some weak.

- Panicle Medium open, more equilateral but sometimes semi-unilateral, rather close, rachis fairly stiff, branches stiff.
- **Spikelet** Numerous, two-grained. Glumes rather short, well marked.
- Grain White, but more golden than normal, short, plump, broad, rather thick husk. Base of grain and rachilla glabrous.
- **Straw** Short-average, stiff, a little brittle when ripe. Nodes glabrous above and below.
- Awn Not numerous, then only pale, weak, with slight twist.

I,000 Grain Wt. $46 \cdot 6$ gramsAverageHusk Content30 per cent.figures.

OATS

STAR

Origin Introduced by the General Swedish Seed Co. Ltd., it was bred at the Plant Breeding Station, Svalof, Sweden, from a cross between Victory and Crown.

General One of the most popular oats for spring sowing in cultivation to-day. It should be sown not later than the end of March in England for best returns. Growing strongly, Star ripens about average for spring-sown oats, but a day or so later than Victory. The straw is fairly long but reasonably strong and its resistance to lodging is fair under normal conditions; better than Victory. It has an open panicle of medium size, uniform and bearing a good number of spikelets, many being three-grained. The grain is a good white, medium size, with an average husk. It sells well to the miller, but in many circles it is considered a dual-purpose oat as it is a good feeder. Most suitable soils are those of a medium nature in an average state of fertility. Under these conditions it will give good yields of good quality grain. Star falls into the grainproducing group with good quality palatable feeding straw. It appears to have good disease resistance. Known and grown all over the British Isles, being popular in Scotland.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

- Middle Growth Leaf medium size, held erect; margins and sheath glabrous. Good colour.
- Tillering 0-2, occasional weak.
- Panicle Equilateral, medium size, rachis stiff, branches stiff.
- Spikelet Numerous, small, compact. Two and three-grained. Glumes slender and well marked.
- Grain Good white, medium size. Base of grain glabrous or very occasional hair. Rachilla stout, glabrous. Average husk.
- **Straw** Average-long, fair resistance to lodging, bright colour at top, good quality. Nodes many hairs above, few below.
- Awn Occasional only, and then very small and weak.

1,000 Grain Wt. 42.6 grams Average Husk Content 27 per cent. Ifigures.



STIFF STRAWED EARLY GREY WINTER

Origin Introduced by Messrs. Gartons Ltd., Warrington, in 1946. Derived from a cross between Unique and Black Winter.

General A new Winter Grey for sowing in the autumn only. It is very winter hardy and tillers well in early spring. Time of ripening is early, a day or so earlier than the old Grey Winter. The panicle shape is similar to the old Grey and the grain is a good grey colour with very thin husk. Its straw is somewhat shorter and stiffer than the old variety and is best suited to land in a little better state than that for Grey Winter. Yields are about the same as Grey Winter, but on some land its returns are better than the latter. In general it is of the same quality and would suit the farmer who favours Grey Winter but whose land is a little better.

PRINCIPAL CHARACTERS

Young Plant More prostrate habit of growth.

Middle Growth Leaf long, narrow, margins hairy, lower sheath hairy, pale colour. Sometimes a little flaggy.

Tillering High 0-6, many weak.

Panicle Equilateral, large open, rachis straight, branches long, pendulous when mature.

Spikelet Spread or scattered, two-grained. Glumes long narrow, pale markings.

Grain Good grey colour, long-pointed. Base of grain hairy (long hairs). Rachilla occasional short hair. Thin husk.

Straw Long, fine, excellent quality, bright colour. Nodes glabrous above and below.

Awn Very occasional and then pale and weak.

1,000 Grain Wt. 39.6 grams Average Husk Content 22 per cent. figures.

OATS

STORMONT IRIS

Origin Introduced by the Plant Breeding Station, Stormont, Northern Ireland. It was derived from a cross between Victory and Black Potato.

General An oat for early spring sowing in Ireland. It appears to tiller freely, grow strongly and ripens average to late with straw about average length for oats and reasonably stiff. Resistance to disease and shattering is high. The panicle is equilateral, bearing numerous spikelets which are two-grained. Colour of the grain is a good white and it is short, very plump with average husk content; the quality of both grain and straw is good. It appears to favour wet districts and soils which are of the light to medium type in average to high fertility. Yields are said to be good, but Stormont Iris would be placed in the straw-producer group as yields of straw are up to 20 per cent. more than grain. Reported to be popular in Ireland only.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Leaf medium size, good colour, margins hairy lower third. Purple base. Leaf held erect.

Tillering Good o-3, but many weak.

Panicle Medium open, equilateral, branches quite stiff, rachis stiff.

Spikelet Numerous, two-grained, short. Glume short, broad at base, pale with faint markings.

Grain White, short, plump, average husk content. Base of grain occasional hair. Rachilla bears occasional hair.

Straw About average length for oats, good bright colour, good quality, soft. Nodes glabrous above and below.

Awn Absent.

1,000 Grain Wt. 40.4 grams Average **Husk Content** 25.2 per cent. figures.



SUN I

Origin Marketed by the General Swedish Seed Co. Ltd., and bred at Svalof from a cross between Victory and Eagle.

General In general this oat resembles Victory. It ripens about the same time but has a rather more close panicle structure; the grain is similar to that of Victory. It differs in the straw, Sun I being slightly more stiff and therefore suitable for sowing on heavy or more fertile land than Victory. The soil should not be too high in its state of fertility. It resists shattering very well when dead ripe and dry. Yields are about the same as Victory when grown in trials. The best samples of Sun I oats are grown in Scotland, where it is better known than in England. This oat is being grown in smaller acreage as Sun II is proving the better oat in recent trials. It is a good feeding oat with yields of grain and straw almost equal. Sometimes known as Steel Oats.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Leaf held very erect, margins and sheath glabrous.

Tillering 0-3, two usually weak.

Panicle Medium open, more compact than Victory, rachis stiff, branches stiff.

Spikelet Numerous, small, usually two-grained with occasional three. Glumes narrow, faintly marked.

- Grain Good white, medium size, good quality, average husk. Base of grain and rachilla glabrous.
- Straw Average length, fairly stiff, good quality and bright. Nodes many hairs above and below.

Awn Absent.

I,000 Grain Wt.43.5 gramsAverageHusk Content27.2 per cent.figures.

OATS

SUN II

Origin Introduced by the General Swedish Seed Co. Ltd., and bred at the Plant Breeding Station, Svalof, from a cross between Star and Eagle.

General Best sown in March as early as possible as it grows strongly with moderate tillering. Ripening earlier than Eagle and a day or two earlier than Star, it stands well, with a high resistance to lodging. The straw is of good quality, about the same length as Eagle. An open medium-sized panicle with numerous spikelets two to three-grained. Quality of the grain is very good, having a low-average husk content; it is a good white colour of average size, larger than Eagle. Falling well into the grain-producing group, it is a good milling oat with straw of excellent feeding value. Suitable soils are those in average to high fertility, does well on heavy soils or where Eagle is grown. Yields are said to be very high, and in recent trials it has easily out-yielded its parents. Appears to resist Leaf Spot and also shattering at harvest when dead ripe. In Southern Sweden and Denmark this oat has replaced many older varieties. Grown in Scotland and England on a small scale at present as it is a new introduction, but should become popular in the near future.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Leaf rather narrow, held very erect, margins and sheath glabrous.

Tillering 0-2, fairly strong.

Panicle Equilateral, medium size, more compact than Star, stiff rachis and branches.

Spikelet Numerous, small, usually two-grained, but three-grained found towards top of panicle. Glumes small, very tapering, well marked.

Grain Good white, medium size, good quality, low to average husk. Base of grain sometimes bears odd hair. Rachilla glabrous.

Straw Short to average, strong but good quality, bright. Nodes few hairs above, odd below.

Awn Very occasional, small and weak.

I,000 Grain Wt. 41 · 4 grams Average **Husk Content** 25 · 8 per cent. figures.



SUPERB

Origin Introduced by Messrs. Gartons Ltd., Warrington, it was derived from a cross between Supreme and Waverley. First marketed in 1923.

General Best returns are obtained when sown by mid-March. Growth in the early stages is vigorous and tillering is fair, the leaf is dark green in colour. It ripens early-average and its straw is shortish and strong, resistance to lodging is high. The panicle is unilateral or one-sided and fairly close; it bears many spikelets which are two-grained. A white oat, the grain being short, plump, heavy and uniform with a rather high husk content. Resistance to Leaf Spot is fair, but dressed seed is advisable. Suitable soils are those in average to high fertility for light or medium land, and low to average fertility for the more heavy land. Yields are high, this oat falling into the grain-producer group. The straw is a little coarse and not considered too palatable to stock; it is a little brittle and should be cut sharp to avoid breaking down when dead ripe. Grown in many parts of the British Isles to-day but not as popular as Supreme.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Leaf held erect, margins and sheath hairy (short hairs). Very purple base. Deep colour.

Tillering 0-2 strong.

- **Panicle** Unilateral, medium size, rather close, rachis curved, branches fairly stiff. False node often present.
- Spikelet Numerous, medium size, two-grained. Glumes rather short and broad, raised markings.
- Grain Good white, short, plump, broad, fair quality only. Base of grain glabrous. Rachilla strong, glabrous. Rather thick husk.
- Straw Short-average, strong, inclined to be brittle. Nodes glabrous above and below. False node often present.
- Awn Several present but only pale, weak and slightly twisted at base.

1,000 Grain Wt.46 ⋅ 1 gramsAverageHusk Content30 ⋅ 4 per cent.figures.

OATS

SUPREME (BLACK)

Origin Introduced by Messrs. Gartons Ltd., Warrington, in 1915, it was derived from a cross between Bountiful and Abundance.

General Best sown early in spring. It grows well but with a weaker appearance than many other varieties; this appearance has no detrimental effect. Supreme ripens early or very early. The straw is medium or average in length, but in many places it is shorter than average, it is stiff and resists lodging well, but may be a little brittle when dead ripe, causing some breakage at the base of the panicle. The panicle is one-sided (unilateral) and close. Spikelets are numerous and some are three-grained. The grain is short, plump and black in colour with rather a high husk content. Suitable soils are those in average to high fertility or the better-class oat soils. Of the black oats Supreme needs the best land. Yields can be very high when grown under ideal conditions. Rather susceptible to Frit Fly attack and Leaf Spot. Grown in many parts of the country, also in Scotland and in South Wales.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

- Middle Growth Leaf erect, broad, not long, leaf sheath and margins bear long fine hairs.
- Panicle Unilateral, rachis stout but curved, long branches, erect, some quite close to rachis.
- **Spikelet** Large, usually two-grained, but three grains are often found. Glumes long, thick, broad and a deep colour with prominent veins or markings.
- Grain Very dark brown to deep black, short and broad with upturned apex. Base of grain glabrous. Rachilla short, glabrous. Thick husk.
- Straw Average length, fairly stiff, little coarse, and brittle when ripe. Bright colour. False node often present.

Awn Many of medium length, twisted at base.

1,000 Grain Wt.	40.2 grams	Average
Husk Content	29.7 per cent.	figures.

T



UNIQUE

Origin Introduced by Messrs. Gartons Ltd., Warrington, in 1931, it was derived from a cross between two pure line selections of Grey Winter. Grey Winter \times Grey Winter.

General General remarks as for Grey Winter. This variety has slightly stronger straw and yields a little better than the old variety. The feeding quality, like its parents, is excellent, both grain and straw. It is very winter hardy with a high tillering habit. The grain is white or very pale grey in colour. Suitable soils are those most suited to the parentage, and a somewhat lower seed rate may be applied owing to its high tillering nature. It has the ability to make up quickly where thin in spring.

PRINCIPAL CHARACTERS

Young Plant More prostrate habit of growth.

Middle Growth Leaf long, narrow, margins hairy, lower sheath hairy, pale colour.

Tillering Very high, 0-7, some weak.

- **Panicle** More equilateral but sometimes a little unilateral. Branches weak, pendulous when ripe.
- Spikelet Scattered or spread over branches, twograined. Glumes long, narrow, pointed, faintly marked.
- Grain Long and pointed, white or very pale grey colour. Base of grain few hairs. Rachilla long with few short hairs.
- Straw Long, fine, weak, excellent feeding quality. Nodes, glabrous above and below.

Awn Absent or occasional weak.

I,000 Grain Wt.38.6 gramsAverageHusk Content22.2 per cent.figures.

OATS

VICTORY

163

Origin Marketed by the General Swedish Seed Co. Ltd., Sweden, and raised at the Plant Breeding Station, Svalof, from a selection made from Milton.

General An old yet very popular spring oat. Victory should not be sown later than March for good yields. It grows strongly in early spring and ripens about average, usually a day or so earlier than Star but later than Marvellous and Abundance. The straw is rather long and is more likely to lodge than Star; nevertheless its resistance to lodging is fair. The panicle is medium-open, uniform and bears a large number of spikelets, many found with three grains. A white grain of large size, plump and having a husk content about average; slightly higher than Star but much lower than Marvellous, Ayr Bounty, S.84 and many others. The grain sells well and the straw is quite good for feeding. This oat is best grown on slightly less fertile land than for Star, the most suitable being a light land in high fertility, a medium soil in average fertility or a heavy soil in low fertility. Good yields can be expected under these conditions. Victory falls in the grain-producing group. Disease resistance is very good, although some Leaf Spot is always seen. Grown throughout the British Isles in fair acreage.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

- Middle Growth Leaf long, erect, medium width, margins of leaf and the sheath are glabrous. Usually deep green colour.
- **Panicle** Medium equilateral, stiff rachis, medium to short branches, rather stiff, may be slightly pendulous when ripe.
- **Spikelet** Two and three-grained, short and broad. Glumes deep colour, markings well defined.
- Grain Good colour, yellowish-white, broad, short. Base of grain glabrous. Rachilla glabrous.
- Straw Medium-long, nodes usually glabrous or occasional odd hair.
- Awn Few weak awns occasionally, not well developed, slightly twisted.

1,000 Grain Wt. 43 grams Average Husk Content 28.4 per cent. figures.

VICTORY II

Origin Selection from a Swedish hybrid oat and introduced in Ireland in 1921 by the University College, Dublin.

General Victory II closely resembles Victory in all its characters both in the field and botanically, also is best suited to the conditions that are favourable for the latter. In trials conducted in Ireland it has proved more prolific than Victory, which it is replacing rapidly. (See under Victory for all features.)

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Leaf held very erect, margins and sheath glabrous.

Tillering 0-3 weak.

Panicle Equilateral, medium open, stiff rachis and branches.

Spikelet Numerous small, two and three-grained, but usually two. Glumes pale colour, faint markings.

Grain Good white, small, broad and plump. Base of grain and Rachilla glabrous. Average husk content.

Straw Rather long, fairly stiff. Nodes few hairs above, odd below. Good feeding quality.

Awn Few weak and pale.

1,000 Grain Wt. $45 \cdot 6$ gramsAverageHusk Content $26 \cdot 6$ per cent.figures.

OATS

YIELDER

Origin Introduced by Messrs. Gartons Ltd., of Warrington, in 1909. This oat was derived from a cross between Waverley and Tartar King.

General Yielder can be sown a little later than some spring oats, but is better sown by the end of March. It grows strongly and ripens very early. The straw is of average length and fairly strong, but is inclined to be a little brittle when dead ripe. Resistance to lodging is quite good, and in some cases will harvest by combined methods. An open rather large panicle, with numerous spikelets, some having three grains. The grain is white and large, with high husk content. Most suitable soils are medium to heavy in nature and in average to high fertility, where it will give fair yields of grain. It is most suitable for late districts owing to its early ripening character. A good seeding is advisable. Grown throughout the British Isles, but more common in Scotland. Yielder tends to sport, and often a very large, more open panicle is seen in the crop.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Middle Growth Leaf long, fairly broad and erect, leaf sheath and margins few hairs.

Tillering Rather poor.

- Panicle Fairly large, equilateral, rachis very stiff, erect, branches long, stiff.
- **Spikelet** Medium size, two-grained, but often three occur. Long glumes well marked.
- Grain Medium length but fairly broad, plump, good white colour. Base of grain few short hairs or glabrous. Rachilla short and glabrous. Thick husk.
- Straw Average length, erect, fairly stout and strong, brittle. Nodes glabrous above and below. False node often present.

Awn Occasional awn, but not well developed.

J,000 Grain Wt. 42 grams Average Husk Content 34.6 per cent. figures.



SECTION III

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BARLEY

BARLEY

INTRODUCTION

BELONGING to the genus *Hordeum*, barley is probably our oldest cereal, for within this genus will be found some of the oldest of our cultivated plants. Since the seventeenth century our cultivated barleys have been classified and in the various groups will be found the types known to us all to-day. Since then barley has become more commercialised until the present time when its value is well known and easily seen by the large number of products made from it, not overlooking the maltsters, who consume a large proportion of our barleys for the beer and spirit industry. Most farmers consider their barley from its capacity to make a good malting sample, therefore commanding top price, but to-day with feeding stuffs for animals in demand another view is being taken by the farming world on the commercial value of the barley crop.

The varieties mentioned in this guide are all found in the British Isles, although some are now growing in a small acreage only. Many are very similar in type and very small botanical differences occur within these types. In the natural-size photographs these differences may be noted, but can be read under "Principal Characters," which will aid the identification of the variety.

As considerable importance seems to be placed on barley from the malting angle further reference to this will be made under "Selection of Variety."

ORIGIN OF THE VARIETY

Here, as in wheat and oats, the origin is given from information which is believed to be most accurate. In some older types the origin is obscure. As more acres are being sown to the Scandinavian varieties details as to the origin, etc., have been obtained direct from the breeder of the variety in question.

GENERAL DESCRIPTION

The general description once again is in brief, and is purely a guide in an elementary manner to the farmer, merchant or student. Much data has been obtained from many places, including farms, trial grounds, breeders' establishments both in Britain and from the Continent, but statements which follow are those which have been based upon observations made on light land in the centre of England.

Pursuing an enlargement of this heading, as this seems necessary, we arrive at the time-sowing factor; we turn more to the varieties for spring sowing here, as all winter barleys should be sown by late October or early November. All spring barleys should be sown as early as possible when the fear of damaging frosts has disappeared. By sowing early a longer maturing time is possible which not only tends to increase yields but is likely to produce a much better sample for the maltster than those which are late sown; this is easily seen in a dry hot season. There are of course barleys which can be sown later than others, these types usually fall into the Scandinavian group and are naturally early maturing types. Barley in this group is sometimes damaged by a keen frost if sown too early. On the other hand we have the English barleys which may be sown as early as the end of February in some parts of the Kingdom, in fact, these barleys should be sown earlier than those in the above-mentioned group. In some places these are sown in the winter with great success, but the practice would not be advisable as a general rule.

Free tillering is soon noted in the barley plant as it tillers more freely than our other cereals. Tillering will be very free in the Scandinavian varieties, and a somewhat lower seed rate may be an advantage here, except where a first-class sample is required for sale (see further under "Selection of Variety"). In this case too free tillering produces an uneven sample.

Earliness of ripening appears of great interest to the farmer, especially in the North and in Scotland. The advantages of this feature are many and may be one of the reasons why the early Danish and Swedish barleys are becoming ever more popular. The better malting barleys do not come from the early maturing types but from those varieties which have a longer growing period. One can only state here that the variety is very early, early, or average to late, as no dates can be given for any one part of the country owing to dependence on so many uncontrollable factors.

Length of straw may be more important than earliness, as only too many know lodging can be very unprofitable. It is true to say here that our best barleys for the maltster are inclined to lodge, or are the taller-strawed types, therefore only certain farmers can grow them, namely those who farm the lighter land in average fertility. The introduction of the short-strawed varieties has made it possible to grow barley where none could be grown before, and the combined harvester is useful with these types.

Type of ear can be plainly seen from the photographs and will be noted to be either long-narrow, narrow, broad or six-row. Grain characters are given for each variety.

Resistance to disease in barley is usually fair where the seed has been properly dressed with a standard seed dressing, but some varieties, especially the Scandinavian ones, are very susceptible to Loose Smut; this is controlled by the hot-water treatment only, and rather elaborate apparatus is involved. This treatment is being undertaken by at least one large seedsman in the country to-day.

Necking in barley, or the breaking off at the base of the ear when dead ripe, sometimes causes concern, but it will be noted that most varieties turn down when ripe and go even further when dead ripe, this sometimes results in the loss of some heads at harvest. It is true that some varieties break quite easily, but in the hands of a good grower this is seldom a great trouble.

Yields: again no figures can be given as yields can not only vary from one variety to another, but can vary so much within the variety when grown under different conditions that of neighbouring farmers one is satisfied while the other is not. It is however known that varieties do differ in their average yields, and many high-yielding barleys are being grown to-day, although in many cases they are not the best quality for malting but return to the farmer equal acreage payments.

We can dispense with any further enlargements of the general description as more will be said about malting barleys, high-yielding types, and also feeding types under "Selection of Variety."

SELECTION OF VARIETY

To select a variety of barley suitable to a particular farmer a few years ago was not easy as few varieties differed in their general characters. The trouble was in those days the difficulty of finding a barley suitable for a whole range of soils and conditions.

BARLEY

To-day, unlike wheat and oats, there are few barleys to choose from, but developments have taken place in barley-breeding during the past fifteen years which enables one to select a variety more suitable to given conditions, and thus more remunerative.

The chief outlets for this cereal, apart from home consumption, are to the maltster or to the provender miller. The more important outlet is to the maltster, and we must not overlook the fact that all barleys will make malt of some type, but some varieties malt better than others; these are samples that command top prices and fall into the malting barley class. The remaining varieties may make good malting samples in some seasons, but their characters differ chemically somewhat from the best malters and are never quite the same quality for this purpose. The nitrogen content in these varieties is usually higher, but may return to the farmer an equal acreage payment, even if sold for milling.

The characters of a good malting barley are influenced to a considerable extent by the soil, fertility, fertilisers applied, and, above all, the climatic conditions that obtain in the area. All barleys naturally do well and are likely to give good samples when all these conditions are favourable, but there are some varieties which vary in their growth by having a natural tendency to produce less vegetative matter (lower tillering) than others; thus seed formation is not delayed too long. The determination of a good malting barley has been a research problem for many years, and work is still going on in various research institutions and also in the laboratories of many maltsters and brewers.

There is no space here to deal with the chemistry of this cereal, and this subject is exhaustively treated in the work of the late Dr. Beaven in his book on barley. Here Dr. Beaven emphasises that the soil, weather, and the farmer all taken together have more influence on the quality of the barley for any purpose than has the plant-breeder.

The value of the barley to the maltster for the production of malt from which to manufacture beer and spirits, etc., is principally governed by:

- 1. The condition of the grain, freedom from excess moisture;
- 2. By the evenness in size of grain and the freedom from weed seeds, small or damaged corn;
- 3. By the degree of maturation and the mealiness of the grain;
- 4. By the total nitrogen content obtained by laboratory tests.

Varieties from the malting group when grown under most suitable conditions and well ripened present the best samples. The grain is well filled with skin nicely wrinkled but not coarse; these samples when cut across with a barley cutter usually present a white mealy interior which on analysis reveal a low nitrogen content. Other varieties of barley from the short-strawed, high tillering, early maturing and high-yielding group have a tendency to produce a more uneven sample of grain with a less degree of maturity due to the formation of more vegetative material in the form of tillers. Not unusually this grain when cut across presents a steely nature which is inferior, requiring a longer time on the malt floors than the mealy samples. The quality of the malt they produce is also inferior, and the quantity of the malt produced per 1 cwt. of grain is lowered.

The price paid for barley is dependent on the maltsters' desired characters being present, although many prefer to deal with samples of Spratt Archer, New Cross,

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Golden Archer, Plumage Archer, Earl or Pioneer, as these varieties are said to give the desired malting qualities when grown under favourable conditions. The remaining varieties must not be overlooked from the malting standpoint as in many cases the chemical composition runs very close to the Spratt Archer class. It must also be remembered that all seasons are not suitable to the production of ideal malting samples from the varieties mentioned; it is in these seasons that samples of Abed Maja, Abed Kenia, Freja, Ymer and others sometimes come to the fore, commanding an equal price to the varieties in the first group.

Developments in barley breeding have now put this cereal into the rotation on many more farms in recent years than could have been anticipated twenty years ago. Much of the breeding work has been devoted to the production of varieties to suit a range of soils and conditions, and less importance may attach to a slightly higher nitrogen content.

Class of Soil and Fertility

It is most essential in barley growing to be familiar with the soil and its level of fertility. Much trouble with the harvesting of this cereal has been encountered in the past on account of the soft nature of the straw, and low resistance to lodging. The varieties now offered to the farmer extend to many soil types, but it still remains a crop for the sheep and barley land, namely the light-medium land in no more than an average level of fertility. Soils which have been well limed or contain a high percentage of carbonates in the lighter classes are favourable for the production of good quality grain.

On the heavier and more fertile soils good quality barleys are not so frequently seen although these soils generally favour very high yields. It is usual for too much vegetation to be produced under these conditions, and maturation will be prolonged, resulting in a coarse, more steely, sample.

On the other hand a very light soil in a dry hot season will produce rapid maturation which again results in a steely sample. Consideration of quality alone must not take more space, but it can be generally expressed that all classes of soil must be well drained, well limed and in a state of fertility where normal maturation is not unduly delayed. Where too moist and fertile conditions exist lodging, apart from maturity, becomes a problem, especially when it is so essential to harvest barley dead ripe; therefore careful consideration must be given to the selection of a variety which will continue to stand well and mature at normal time in an average season.

Climatic Conditions

Of all factors to consider the climate is without question the most important. From the quality point of view we turn to the east side of England, where certain areas near the coast, particularly in Norfolk, are most suited climatically to the production of good-quality grain; it must not be assumed that other areas are not suitable, as excellent samples can be and are produced in many other parts of England. Good samples can be produced on the east side of Scotland, but there is a greater risk of too much rainfall and lack of sunshine delaying maturation; on the other hand too dry conditions cause very rapid ripening. In the first-mentioned area of England the favourable conditions link up with the favourable soils as in these parts will be found the barley soils mentioned above. There is no doubt at the present time that the bulk of the barley grown in these parts of Eastern England comes from the Spratt Archer group.

In other parts of the Kingdom varieties of barley must be adapted to varieties of climate. In parts of Scotland where higher rainfall and a more temperate climate is to be found, maturity is often delayed to a considerable extent and results in a late and badly harvested crop. Here enter once again the Scandinavian types with their shorter straw and earlier ripening characters, which are more suited to these conditions.

In the intermediate regions of soil and climate such as those found in parts of Yorkshire, in the Midlands and West of England, the barley Earl (which is an early ripening selection of Spratt Archer) together with Plumage, Plumage 63 or Gartons 63 and also Plumage Archer have their places.

Methods of Harvesting

When other factors have been taken into consideration and variety to grow has been decided, a thought towards harvest and the method to be employed may alter the decision on the variety. Barley will lodge quite easily especially where moist and fertile conditions exist until mid-summer. That is one of the reasons why varieties in the Spratt Archer group are always recommended for the lighter and less fertile soils, where rainfall is just enough to enable the plant to continue growth and mature normally. While these taller types may still be better harvested by the binder the barley crop is becoming ever more popular for combined harvesting.

Where this machine is used much more consideration is being given to-day to the shorter and more stiff-strawed varieties which withstand a higher fertility and are less susceptible to lodging, making them much more easily harvested by combined methods. Again these varieties, Freja, Abed Maja, for example, are usually prolific yielders and are naturally early maturing; time saved and lower labour costs in the harvesting of these barleys by the combine may often compensate the grower fully for the slightly lower price he may expect for this sample to the maltster. On the other hand barleys of the Spratt Archer class are frequently harvested by the combine when they are fully mature, if they are still standing. The winter barley Pioneer may be more suited to this method owing to its earlier maturation than spring-sown varieties in the same class.

Use to be Made of the Grain

This may be the first factor for consideration or may be set aside until all others have been considered, but in any case it has a strong bearing on the choice of variety to be grown. We may split this factor into "A" and "B":

A. Is the desired grain to be of malting quality or to be sold for this purpose ?

A. Is the grain to be kept, or sold for feeding unless malting barleys are in short supply ?

If it is "A" then a variety from the malting group should be selected, provided all conditions are really suitable; if it is "B" consideration can be given to the highyielding early maturing barleys in the Scandinavian group.

One other variety may be mentioned when one considers feeding only, and that is

Camton, which was bred for this purpose. This barley will stand well on somewhat better soils than those desirable for a good malting sample, it has a high nitrogen content and therefore a higher protein content, putting its value for feeding above all others. Camton may be best suited to form the barley percentage of a dredge corn mixture.

When considering the use to be made of the grain it must not be overlooked that the *seed rate per acre* bears an important part, and can often determine the use that can be made of the grain. The high tillering character of barley has been mentioned before, and it is true to say that some varieties tiller more freely than others; free tillering or excess vegetation is more often the cause of the uneven, unattractive sample which the maltster objects to. It is the object therefore in the production of a good malting sample to keep the tillering as low as possible without unduly affecting its remunerative yield. Soil, fertility and climate of course assume a high responsibility for this habit, but the seed rate per acre also has an important influence.

The normal seed rate is usually $2\frac{1}{2}$ bushels per acre, but some farmers in good districts sow 3 bushels and more per acre. This seed rate is inclined to produce smaller ears than would be found in a seed rate of 2 bushels, but high tillering would be suppressed, a more even sample obtained and a better state of maturity would be noted giving a more attractive malting sample.

When lower seed rates are applied, 2 bushels per acre in the case of some Scandinavian barleys, freedom to tiller is obvious and although the principal ears will be larger, the many semi-developed ears found at a lower level will be responsible for the uneven sample, more steely grain and a higher total nitrogen content, resulting in a lower price being offered by the maltster.

What one loses one way one gains in another, but it is a sound recommendation to sow thicker when the object is sale for malting, and sow thinly when the object is purely a high yield of grain. The latter can be applied when the crop is being grown for feeding stuffs or in the multiplication of seed stocks when small quantities have to be raised into bulk quickly.

PRINCIPAL CHARACTERS

The characters which are used in the identification of barley are not so prominent as those found in wheat and oats. In many cases it is essential to identify the variety from the ear or in the field, in others it is of equal importance to identify or at least classify the barley from the grain. Once again it is not intended here to deal too botanically with the examination of these characters, but it is necessary to deal briefly with the subject, thus enabling one to put the barleys into their group or class if failing to determine the variety by name.

Observations made on barleys at the Kinver trial grounds of Messrs. Edward Webb & Sons Ltd. were carried out in three groups, namely, the Spratt Archer group, which include all varieties of this class and bear long narrow ears; the Plumage Archer group, or all varieties of the broad-eared type, and, thirdly, the Scandinavian group, narrow-eared varieties usually smaller than Spratt Archer and having a much shorter straw length. In the above groups are found practically all of our common barleys with the exception of two six-row types which were observed separately.

Young Plant

The young-plant stage in most of our barleys is of the erect form, and this habit of growth continues throughout. Winter types are inclined to be more prostrate in habit and remain in this stage until early spring, when vigorous erect growth takes place. It is of some importance to note the colour of the leaf during its early growth; in some varieties a deeper colour will be noted, this colour often appears as a dull bloom; the leaves also vary considerably in width, taking up a flaggy nature at mid-growth.

Tillering

This character is usually found to be very free in barleys, but here again certain varieties show marked differences, even at the same rate of seed per acre. Tillering appears early, and this character is always best observed before any ear emergence takes place.

Leaf

Observations made on the leaf apart from the young-plant stage are of very little use in the identification of barley, except when grown side by side, then differences are quite easily noted in width, colour and length. The presence or absence of hairs along the leaf margins are the only observations necessary. It will be found that the winter barleys bear hairs along the leaf margins with the exception of Prefect, which has very few or none.

Examination of the Ear

This operation is best performed when mature, although it is plain to see at a much earlier stage if the variety is two-row or six-row, the only types of barley handled to-day. It will be found that the rachis or axis is divided into internodes of which there may be any number up to, and sometimes exceeding, forty. Each internode bears three florets, which are repeated on each side of the rachis alternately. Of the three florets, one, which is the primary, is always fertile, and lies in line with the rachis, the two remaining florets called lateral florets form two lateral rows; when these laterals are fertile the barley is called a six-row, when infertile it is termed the two-row. On examination of the ear it may be found to be short and narrow, long, lax, narrow, or wide and more dense, the latter may be called the broad ear, which is characteristic of Plumage Archer.

Unlike wheat and oats, we find no free glumes or chaff, the seed being enclosed in the outer and inner pales, the outer bearing the awn, which is found to be tapering, approximately twelve times the length of the seed, and often longer than the whole ear. Along both edges of the awn serrations are found which usually explain the term "barbed awns."

The Glumes

These occur in pairs outside the outer pales and are fixed to the rachis at their base at the same point as the grain. They are usually shorter than the actual grain and are tapering, sometimes bearing a short awn, plus a few hairs.

One may therefore quickly classify the barley by the ear examination; there are

few broad-eared barleys in cultivation and these are easily distinguished from the narrow types. Plumage Archer and Camton are the principal varieties in the broadeared group with Plumage and Plumage 63 or Gartons 63 following in this group, but bearing a somewhat medium ear although more broad and dense than Spratt Archer.

In the narrow-eared group we have more varieties to deal with and a greater difficulty is found in the isolation of an individual. The principal varieties in this group are Spratt Archer, New Cross, Golden Archer, Abed Maja, Abed Kenia, Freja, Ymer and Pioneer. Examination of these usually reveals various ear sizes regarding length; it will be noted that Spratt Archer for instance is longer and more lax than Freja. In the six-row class we have only two to deal with, namely, Prefect and the Scottish Bere, the latter being little grown in England, if at all.

Length of Awn

This is not an important character when examination is being carried out in the laboratory, but as a field observation it may be useful to note its length. It has been observed that the awn length of Abed Maja or Abed Kenia is much shorter than that of Spratt Archer or New Cross. The longer the ear the longer the awn does not always follow, as long ears of Abed Maja or Abed Kenia compared with an average ear of Spratt Archer still reveals shorter awns. Awn length of barleys governing the malting value is not to be relied upon; it has been expressed that the longer the awn the better quality the grain will be for malting, and the lower the nitrogen content; on the other hand the shorter the awn the more steely the grain. This so far unproved theory is a subject for maltsters' research departments.

Colour of Awn

Colour of the awn in the field is helpful at certain stages of growth; it is noticeable that Abed Maja and Abed Kenia have a dark reddish-brown tipped awn when compared with the bright awn of Spratt Archer, New Cross and Golden Archer.

Straw

Except for the length there is practically no naked-eye clues to be found useful in the identification of the variety. The colour and texture being practically the same in all our commonly grown varieties.

Examination of the Grain

Barley grain can be used to determine the variety with a fair degree of accuracy, often more work can be done here than by a field examination of the plant, although all available characters should be collected and at hand when the examination of the grain takes place.

Colour of the pales or skin can be only a slim guide; this may be white, yellow, dull or bright, but to some extent is dependent on the weather, harvesting, and may be the land. Size of the grain also varies from season to season, therefore other more fixed botanical characters must be studied. There are many characters to study, but all will not be dealt with fully here as some of these do not fall into everyday practice.

Grouping is always advised when attempting to identify cereals, and it will be found most essential to place the barley into the narrow-eared group, broad-eared





group, or six-row group. We may dispense with the latter and lesser group as it will be found on bench examination to be most irregular in size; more careful examination will reveal that two-thirds of these grains are not uniform and have a twisted appearance. The centre grain of a six-row barley is free to develop normally while the two laterals have only a one-sided expansion, causing curvature to take place where contact is made with the centre grain, see Fig. 1.



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Placing into the broad- or narrow-eared group can be done by examination of the base of the grain; where a large proportion of the grains have a nick or crease at the base and the remainder are flat or plain, one may immediately place the barley into the broad-eared group (see Fig. 2). In the narrow-eared group this nick or crease is not found, but in its place will be found a bevelled or sharply sloping surface down to the extreme base, which is usually smaller than that in the broad-eared group (see Fig. 3). This bevelled base is more often obscure in the Scandinavian varieties, being usually much smaller than that seen in Spratt Archer; however there is no nick present and it is placed into the narrow-eared group. Further isolation may be made here by the examination of the lateral nerves on the skin of the grain. The outer pair of nerves usually have some teeth (see Fig. 4), while the inner pair are often free. Where these small teeth are observed on the inner nerves together with a bevelled base it is possible to place the barley into the Scandinavian group. This character is not too reliable and is somewhat unimportant. It may be mentioned here that botanical differences between Spratt Archer and New Cross are practically nil, but it has been observed that a brighter colour usually persists in the nerves of New Cross than is found in Spratt Archer.

The Rachilla

This is situated in the groove of the barley and may be called a small branch of the rachis. To examine the rachilla it is always advisable to obtain an ear or some handthreshed grain as it is often found to be missing or damaged on machine-threshed samples. Consistency remains within the variety, but two or three types exist in the barleys of to-day. On examination it may be found that the rachilla is long and covered with long silky hairs which is typical of the Archer types; on the other hand it may be short and covered with short fine hairs, which is more or less found in the Plumage barleys. The examiner or inspector is the best person to place them into groups as only by his comparisons will familiarity appear. Examination of this feature is not all-important as some confusion always occurs when the Scandinavian barleys are examined in this way, but it serves as a link in the chain of characters which aid identification. (See Fig. 7 for rachilla types.)

Lodicules

Another character which one may say is fixed but not universally used is the lodicules. These take shape in the form of a pair of small scales bearing hairs, which are attached at the base of the pale or skin on the inside. To examine these a lens is necessary for careful observation; they are best prepared by cutting the grain in half, and with a needle carefully removing the skin without damaging the base. The lodicules are then seen and examination with the aid of a lens will expose the position, type and hairs. It will be noted in Figs. 8-10 that the position of the lodicules vary somewhat; in the lax-eared types such as Spratt Archer they are quite outstanding and seem to be situated more to the sides. This may also be noted in the Scandinavian barleys such as Abed Maja, but in these they may be smaller. In the broad-eared group it is common to find them situated lower down, almost coming up from the very base and possibly touching each other in a vertical position. The hair of the latter type may be more obvious and longer.

BARLEY

Other characters for examination, but of less importance, may be the "Collar," which is found at the top of the neck or at the base of the ear. This may be either cup-shaped or form a flat circle round the neck, which is to be found in practically all the Danish and Swedish barleys.

The neck itself may be observed, and it will be plainly seen that the thickness here varies within the varieties; here again the Scandinavian varieties are seen to have a small or narrow neck compared with the British varieties, in particular Plumage Archer, which has a thick neck and remains more erect when dead ripe. The thinness of the neck is not an indication of the barley being subject to necking or breaking easily at harvest. Most varieties turn down beside the straw when ripe, the stage when necking takes place; Freja is particularly noted for this habit and also for its very thin neck, but this variety is toughened and does not break off so easily as many with thicker and what one may quite simply take to be a stronger proposition. Several other lesser characters have been observed, but no conclusions have been

reached, and therefore are not worthy of mention here in this guide to varieties.



BARLEY GRAINS (Natural size) Key to Plate

1. SPRATT ARCHER	7. ABED KENIA
2. EARL	8. ABED MAJA
3. NEW CROSS	9. YMER
4. GOLDEN ARCHER	10. FREJA
5. PIONEER	11. HERTA
6. CHEVALIER	12. CRAIGS TRIUMPH

13. PL	UMAGE	ARCHER
14. PL	UMAGE	
15. PL	UMAGE	63
16. CA	MTON	5
17. PF	REFECT	
18 SC	OTTISH	BERE

Note.-All grown under the same conditions and treatment on light land in average fertility.

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BARLEY

ABED KENIA

Origin Introduced by the Abed Plant Breeding Station, Denmark. It was derived from a cross between Binder and Gold.

General A sister variety to Abed Maja and almost identical in every respect. It is suited to the same conditions, and yields are about the same. In closely observed trials Abed Kenia has been noted to be about 2 in. longer in the straw than Abed Maja, with the latter yielding slightly more on an average. The grain is said to be of somewhat better quality than Maja, but no conclusive evidence of this has been reported from tests covering a five-year period. This barley is very popular for more fertile conditions than those suited to the Archer type barleys.

PRINCIPAL CHARACTERS

Young Plant Erect growth, narrow leaf, purple base. Tillering High.

Ear Narrow, shorter than Spratt Archer and less lax, turns well down when ripe.

Collar More flat, lipped.

Grain Small-average, more yellow coloured, skin is more wrinkled and thicker than Archer barleys. Base of grain, Fig. 3. Rachilla, Fig. 7 D, Lodicules, Fig. 8. Several teeth on inner nerves. Fig. 4.

Awn Short, usually same as ear or shorter, reddishpurple colour, very distinct before ripening.

Straw Short, fairly stiff, resists lodging well.

1,000 Grain Wt. 46.7 grams.

BARLEY VARIETIES

NOTE.—1. Illustrations of barley varieties are all natural size.

- 2. 1,000 grain weights are based on average.
- 3. References under grain are to plate on p. 177.

ABED MAJA

Origin Introduced by the Abed Plant Breeding Station, Denmark, and was derived from a cross between Gold and Binder.

General This variety can be sown later in spring, but should be sown at normal time for best returns. It grows strongly and tillers very freely, a somewhat lower seed rate is an advantage in this case for yields, but not for quality samples. Ripening very early Abed Maja has a short and stiff straw which resists lodging to a high degree. The ear is narrow, average length (shorter than Spratt Archer), fairly lax, with short awns; it turns well down when dead ripe. The neck is reasonably strong and little necking is noticed at harvest. Its grain is small, but quite plump with a rather coarse skin, it is generally inferior in quality to Spratt Archer, Plumage Archer or New Cross, and is not considered a good malting barley. Suitable soils are those of a medium nature and in average to high fertility. On these soils this barley will out-yield most varieties in the Spratt Archer group; the yield per acre often gives the farmer a better acreage payment than the best malting barleys. Resistance to disease is not high and it is rather susceptible to Loose Smut. One of the best barleys for harvesting by combined methods. Grown throughout the British Isles, does well in Scotland and Northern districts. Almost identical with Abed Kenia.



PRINCIPAL CHARACTERS

Young Plant Erect habit of growth, narrow leaf, purple base.

Tillering High.

- Ear Narrow, not as lax as Spratt Archer, but shorter, turns down when ripc.
- Grain Small-average, yellow colour, generally more wrinkled and thicker-skinned than the Archer barleys. Base of grain, Fig 3. Rachilla, Fig 7 D. Lodicules, Fig. 8. Several teeth on nerves as seen Fig. 4.

Collar Flat but lipped.

- Awn Short, usually same as ear, reddish-purple tips very distinct before ripening.
- Straw Short, stiff. Resists lodging better than all the Archer barleys.

1,000 Grain Wt. 51.7 grams.

BARLEY

BERE (COMMERCIAL 6 ROW)

Origin An old commercial six-row barley which has been re-selected by many people, including W. M. Findley, Esq., of the North of Scotland Agricultural College.

General Very old Scottish variety of hardy nature, but not usually sown in the winter in Scotland. It should be sown early in spring for best returns. Ripening early the ear is normally a four-row, but is usually termed a six-row barley; it is rather short, medium density. The grain is rather deep coloured, average size and of poor quality for malting, being grown principally for feeding purposes only. It grows well under varied conditions, but most suitable soils are those of a lighter nature in no more than average fertility, where lodging is reduced and satisfactory yields obtained. The straw is rather long and weak, the ear turns down slightly, not vertical as is usual in many varieties. Grown more in the North of Scotland than elsewhere.

PRINCIPAL CHARACTERS

Young Plant More prostrate for a time, but later erect leaf with hair on lower margins and sheath.

Tillering High.

Ear Medium, four-row, or termed six-row, turns over when ripe, but not vertical.

Collar Small, not well formed.

- Grain About average size, dull colour, thick skin. Base of grain, Fig 3. Rachilla, Fig 7 D. Lodicules, Fig. 10, but smaller. No teeth, or occasional one or two found on lateral nerves.
- Awn Long, usually longer than ear but shorter than the Archer types.
- Straw Rather long and weak, low resistance to lodging.

1,000 Grain Wt. 55.5 grams.



CAMTON

Origin Introduced by the National Institute of Agricultural Botany, Cambridge. It was derived from a cross between Spratt Archer and Archer Goldthorpe.

General This spring-sown barley was introduced into commerce for feeding purposes only. It tillers well and ripens early-average; the straw is short and stiff, resistance to lodging being good. The ears are short and very dense, so dense that a natural twist appears in the ear before becoming dead ripe. Awns are long and spread open. The grain is of fair size, very plump, pale or dirty colour, and bears a rather thick skin. Its value for malting is very low owing to its high nitrogen content which makes it a valuable feeding barley. It is suited to the medium-heavy class of soil in average to high fertility, on which it will yield very well. Ears are held erect on very strong neck and no necking occurs at harvest. Resistance to disease is fair only. Not as good as Abed Maja or Freja for harvesting by combined methods, but is suited to this form of harvesting much better than the Archer barleys. Suitable for sowing with Eagle oats as a dredge corn mixture as both ripen about the same time. A slightly higher seed rate is advisable. Grown in small acreage in England.



PRINCIPAL CHARACTERS

Young Plant Erect habit; later leaf erect, narrow and inclined to flag a little.

Tillering Moderate-high.

- Ear Very dense, broad, twisted when mature, held erect throughout growth on strong neck.
- **Collar** Small, cupped, with steep lip often not completing the collar.
- Grain Short, broad but of good size, coarse skin, pale but dirty appearance. Occasional teeth on nerves. Base of grain, Fig. 2. Rachilla, Fig 7 A. Lodicules, Fig. 9.
- Awn Long and spread open.
- Straw Short and stiff with a high resistance to lodging.

1,000 Grain Wt. 59 grams.

BARLEY

CHEVALIER

Origin Raised by the Rev. Chevalier from a single ear selected by a labourer in the parish of Debenham, Suffolk, in 1819.

General Many of the characters of this barley are similar to those of Spratt Archer. Its ear is long, narrow and lax with very pale-coloured grain of average size bearing a nicely wrinkled thin skin. The quality of the grain is good and is considered a good malting barley. Yields in trials of this barley have been inferior to New Cross, Spratt Archer, Golden Archer and Earl, also its straw is even less resistant to lodging. Breaking at the neck is often noted at harvest which is another disadvantage. Suitable soils are those of a light nature in a low to average state of fertility. Not grown in large acreage and is gradually going out in favour of more remunerative types.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth, later, leaf held erect, very narrow, deep colour.

Tillering Moderate-high, some weak.

- Collar Cupped, very deep with small or no lip, uniform.
- Grain Average size, plump, very pale colour, good quality, thin wrinkled skin. Base of grain, Fig. 3. Rachilla, Fig 7 A, but very few short hairs only. Lodicules, Fig. 10, but more triangular. Nerves usually bear no teeth.
- Awn Long, shorter than Spratt Archer, but usually ear-length.

Straw Long, soft and weak, lodges easily.

1,000 Grain Wt. 54.7 grams.



CRAIG'S TRIUMPH

Origin A selection out of Common Barley made by the Scottish Society for Research in Plant Breeding, Edinburgh.

General This barley resembles the old variety Gold in many of its characters. Craigs Triumph, like Common Barley, is more suited to acid conditions than is normal for barley growing. The ear is average-long, lax and turns down when ripe on a thin fibrous neck. It bears a small-average grain, grey-coloured, with a rather coarse wrinkled skin. Quality of the grain is not high for malting, but good samples are often forthcoming from Northern farms. It ripens early to very early on a straw which is stiffer and shorter than most selections from Common Barley. Resistance to disease and lodging is quite high, much better than the old variety. Yields are quite good; it is not considered a high-yielder when compared with many English types, but can be grown to advantage where others cannot. Suitable soils should be of a light to medium nature in average fertility in the North of England and Scotland.



PRINCIPAL CHARACTERS

Young Plant More erect habit of growth, leaf long, medium width, flaggy, pale colour, some hairs on lower sheath.

Tillering High.

Ear Average-long, lax, turns down when ripe.

Collar Slightly cupped only, steeply sloping.

- Grain Small-average, plump, more greyish colour, skin well wrinkled, rather coarse, fair quality only. Base of grain, Fig 3. Rachilla long silky hairs, Fig. 7 D. Lodicules, Fig. 10. Occasional teeth on nerves.
- Awn Not long, sometimes shorter than ear, straight, very sharply barbed.
- Straw Short-average, fair to good resistance to lodging.

1,000 Grain Wt. 50 grams.

BARLEY

EARL

Origin An early ripening selection from Spratt Archer made by the Plant Breeding Institute, Cambridge. It was introduced by the N.I.A.B. in 1947.

General Earl resembles Spratt Archer in all its botanical characters, and is suited to the same soil and conditions. It differs only in its early ripening habit, which is approximately ten days earlier than Spratt Archer when sown and grown under the same treatment. The malting quality is high, and it appears most suitable for the farmer who normally grows a large acreage of Spratt Archer; in this case a proportion of his acreage could be sown with Earl, thus spreading over the harvest period more successfully. It is also suited to the later districts and is more satisfactory than Spratt Archer in Scotland.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth, later leaves long, flaggy, deep colour.

Tillering Moderate, strong tillers.

- Ear Narrow, long, lax, turning down when ripe.
- **Collar** Cup-shaped, but more level than is found in Spratt Archer.
- Grain Large, plump, pale colour, thin wrinkled skin, good quality. Base of grain, Fig. 3. Rachilla, Fig. 7 D. Lodicules, Fig. 10. No teeth on inner nerves.
- Awn Long, usually about same length as ear, purple colouring distinct before maturing.

Straw Long, weak, low resistance to lodging.

1,000 Grain Wt. 59.9 grams.



FREJA

Origin Marketed by the General Swedish Seed Co. Ltd. and bred at Svalof from a cross between Seger and Opel. Introduced in 1947.

General This barley can be sown a little later than the majority of spring barleys, but best returns are always obtained by sowing on time. It grows strongly, and despite its very high tillering character ripens very early, five days earlier than Abed Maja, thus it is the earliest ripening spring sown barley in cultivation to-day. The straw is short, and stiff, resistance to lodging being excellent. Ears are of average length, narrow, lax-medium with long awns; they turn down when ripe but the neck is fibrous, and no necking takes place at time of cutting. The grain is small-average, bright coloured, with a rather coarse skin. Like most Scandinavian barleys the quality is not so high as the Spratt Archer group, but, when compared with Abed Maja and Abed Kenia, it has a higher value for malting. Suitable soils are those in average to high fertility, including the more heavy types. Yields from Freja can be very high, and it is possibly the highest yielding barley in cultivation. Resistance to disease is fair, better than Abed Maja or Kenia, but an occasional ear of Loose Smut is seen. An ideal barley to harvest by combined methods. Suits late districts, and the North, but is grown in many parts of England and also Scotland. First sold in England in 1947 and is becoming very popular.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth, narrow leaf, dark colour, purple base.

Tillering Very high.

Ear Medium size, narrow, fairly lax, turns down when mature on thin, fibrous neck.

Collar Flat, well formed.

- Grain Small-average, bright colour, wrinkled, rather thick skin. Nerves bear several teeth, Fig. 4. Base of grain, Fig. 3. Rachilla, Fig. 7 D, but shorter. Lodicules, Fig. 8.
- Awn Long, usually longer than ear, much longer than Maja or Kenia. Dark colour at tip before maturing.

Straw Short and stiff.

1,000 Grain Wt. 49.7 grams.

BARLEY

GARTONS 63 or PLUMAGE 63

Origin Selection from Plumage made by Messrs. Gartons Ltd., Warrington. Introduced in 1938.

General This barley resembles Plumage in its characters and habits, therefore the general remarks will be found under Plumage. It is considered a good malting barley in some areas of England, especially in Yorkshire and Lincolnshire, where it is grown in a larger acreage than elsewhere. When grown in trials beside Plumage it has been observed to possess a slightly shorter straw, which is in its favour for some conditions.

PRINCIPAL CHARACTERS

Young Plant Erect or semi-erect habit, later leaf a little flaggy, medium width, rather pale colour.

Tillering Moderate for barley.

Ear Medium length, broad, but more narrow than Plumage Archer.

Collar Almost flat, slight lip.

Grain Large, plump, pale colour, fair quality, reasonably thin skin. Base of grain, Fig. 2. Rachilla smooth, this feature is not found in other broad-eared barleys. Lodicules, Fig. 9. Nerves, occasional or no teeth.

Awn Long, usually longer than ear, straight.

1,000 Grain Wt. 59 grams.



GOLDEN ARCHER

Origin An introduction from the Barley Research Station, Warminster. It was derived from a cross between Plumage Archer and Spratt Archer.

General In general this barley resembles Spratt Archer, but its straw may have a slightly higher resistance to lodging. It ripens a day or two earlier than its parents, and the grain is of a good colour and good quality. The awns may be a deeper colour just before maturity than that observed in Spratt Archer. It is suited to soils and conditions as for Spratt Archer and is said to give 2 to 3 per cent. better yields. Resistance to disease is high and also to necking at harvest. Harvesting by the combine is not always easy owing to the straw length, which may be inclined to lodge when dead ripe. Grown in small acreage, principally in England.



PRINCIPAL CHARACTERS

Young Plant Erect habit of growth, later leaf long but fairly erect.

Tillering Moderate.

Ear Narrow, long, lax, turning down when ripe.

Collar Cup-shaped, rather deep.

- Grain Large, plump, pale colour, thin wrinkled skin, good quality. Base of grain, Fig. 3. Rachilla, Fig. 7 D. Lodicules, Fig. 10. Nerves bear no teeth.
- Awn Long, ear-length or longer, less purple colouring before maturing than Spratt Archer.

Straw Long, weak, lodges easily if on too strong soil.

1,000 Grain Wt. 57.7 grams.

HERTA

Origin Bred by Messrs. Weibulls, Landskrona, Sweden. It was derived from a cross between Kenia and Isaria. Introduced in 1950 by Messrs. Edward Webb & Sons Ltd., Stourbridge.

General Should be sown as early as possible for best yields, but this barley can be sown later than those in the Spratt Archer class. The tillering is high and Herta ripens early, a day or two later than Freja. The straw is short and stiff, the resistance to lodging being high. Resistance to disease is fair, but an occasional head of Loose Smut may be noted in some seasons. The ear is narrow, two-row, average length, fairly lax with short awns, turning well down when dead ripe but no necking has been observed. Grains are small-average, plump and bright-coloured with a fairly thick skin. Quality of the grain is fair only for malting, but it is considered better than Abed Maja for this purpose and quite equal to Freja. Suited to a range of soils but may be better on the more medium types in average to high fertility. In trials Herta has equalled Freja in yield and has consistently out-yielded Abed Maja. This is one of the highest-yielding barleys of the Scandinavian types and one which will harvest by combined methods quite well. A new barley which should become popular.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth.

Tillering Very high.

Ear Narrow two-row, lax, average length, turns well down when ripe.

Collar Steeply sloping lipped collar.

- Grain Small-average, bright golden colour, wrinkled, rather thick skin. Base of grain, Fig 3. Rachilla short with long hairs. Lodicules, Fig. 8. Very occasional tooth on nerves.
- Awn Short, about same length as ear, little purple colouring before maturity.
- Straw Short, stiff, equal to Freja, thin and soft, bright colour.

1,000 Grain Wt. 52.8 grams.

N

NEW CROSS

Origin Introduced by Messrs. Edward Webb & Sons Ltd., Stourbridge. It was derived from a cross between Chevalier and Spratt Archer.

General In general the description of this variety is as for Spratt Archer, which it closely resembles. The ears turn down two or three days earlier than Spratt Archer and it often produces a brighter sample of grain which will command top price. Its yield is usually slightly better than Spratt Archer when compared in carefully conducted yield trials. Strong-necked and having a high disease-resistance it is considered an excellent malting barley. Grown throughout England. (See under Spratt Archer for further points.)

PRINCIPAL CHARACTERS

Young Plant Erect habit when young, later leaf long and very narrow, a little flaggy.

Tillering Moderate, strong tillers.

Ear Long, lax, narrow, turning down when ripe.

Collar Very deeply cupped with lip.

- Grain Large, plump, pale coloured, thin wrinkled skin, good quality. Base of grain bevelled, Fig. 3. Nerves bear no teeth. Rachilla long-haired, Fig 7 D. Lodicules, Fig. 10.
- Awn Long, usually same length as ear, purple tip before maturity.

Straw Long, fine, weak, resistance to lodging poor.

1,000 Grain Wt. 58.6 grams.

BARLEY

PIONEER

Origin Bred at the Plant Breeding Institute, Cambridge, and introduced by the N.I.A.B. in 1943. It was derived from a cross between Tschermaks Two-row Winter and Spratt Archer.

General For best returns this barley should be sown in October, although it can be sown much later, even in February. It tillers well and is very winter hardy, surviving quite severe conditions. Ripening very early with straw rather long and weak, but it may resist lodging slightly better than Spratt Archer. The ear is long, narrow, rather lax, with long awns, similar in appearance to Spratt Archer. Its grain is plump, of good size, but bearing a slightly thicker skin than the latter parent; quality of the grain is good, and it makes a good early malting sample, although somewhat inferior to the spring-sown malting barleys. Suitable soils are those in low to average fertility and in the lighter class to avoid lodging. Yields from Pioneer are equal to Spratt Archer and can be quite high. It is resistant to most common diseases, including Loose Smut. Owing to its rather long straw it does not harvest by combined methods so easily as the Scandinavian varieties, although this is commonly practised now when the crop is all standing. Grown in many parts of England to-day and is becoming increasingly popular.

PRINCIPAL CHARACTERS

Young Plant More prostrate habit of growth. Leaf sheath and margins very hairy lower plant; purple-red base, purple oracles.

Tillering High, strong maturing tillers.

Ear Narrow, long, fairly lax, turns down when ripe.

Collar Cupped, but more flat than Spratt Archer.

- Grain Long, plump, pale colour, wrinkled skin, slightly thicker than Spratt Archer, good quality. Base of grain, Fig. 3. Rachilla Fig. 7 D. Lodicules, Fig. 10. No teeth on inner lateral nerves.
- Awn Very long, usually longer than ear; less colouring before maturing.
- Straw Long, rather weak, will lodge easily on too fertile soil.

1,000 Grain Wt. 58.2 grams.

N*

PLUMAGE

Origin Selected by the late Dr. E. S. Beavan, this barley is of Scandinavian origin and an old variety.

General For sowing in spring; this barley grows strongly, tillers fair and ripens about average. The straw is average to long, slightly longer than Plumage Archer and resists lodging reasonably well. The ear is broad or medium, being broader than Spratt Archer but more narrow than Plumage Archer; it is fairly dense and the grain is large, plump, pale-coloured, with a slightly thicker skin than Plumage Archer; its quality is quite good and falls into the malting group. The ear is held more erect until dead ripe, when it turns down. Necking seldom takes place at harvest. Resistance to disease is reasonable, on rare occasions an odd ear of Loose Smut is seen. It is suited to soils of a medium nature in no more than average fertility and does well in parts of Yorkshire and Northern England. Will give fair yields and is better to harvest by the combine than Spratt Archer, Golden Archer or New Cross, but inferior to Abed Maja, Abed Kenia and Freja. Grown in several parts of the British Isles.

BARLEY

PLUMAGE ARCHER

Origin Introduced by the late Dr. E. S. Beaven of the Barley Research Station, Warminster. It was derived from a cross between Plumage and Archer.

General This variety should be sown before other spring types for best returns. It grows strongly, tillering only moderately, and ripens a little later than Spratt Archer, New Cross and Golden Archer; resistance to lodging is fair. It has a strong neck, holding the ear erect or more so when ripe, which reduces the loss by necking at time of cutting. The ear is broad, dense with long awns. Quality of the grain which is large, plump, pale colour and thin-skinned is very good, making an excellent malting sample. Most suitable soils are those in average fertility except on heavy land, where the fertility should not be more than low. Yields from this barley are generally quite good and may be slightly better than Spratt Archer in some places. Resistance to disease is high. Its ability to harvest by the combine is fair only, better than the three mentioned above but inferior to the Scandinavian types. A very popular barley in England to-day.

PRINCIPAL CHARACTERS

Young Plant More semi-erect habit, leaf broad and sometimes flaggy, deep colour.

Tillering Not high for barley.

Ear Medium size, broad and dense, held fairly erect when ripe on short neck.

Collar Cupped with irregular lip.

- Grain Large, plump grain, pale colour, excellent quality, thin wrinkled skin. Base of grain nicked, Fig. 2. Rachilla short, silky hairs, Fig. 7 C. Lodicules, Fig. 9. Nerves bear no teeth, or an occasional one or two.
- Awn Frequently much longer than the ear and slightly spread open.
- Straw Medium length, resists lodging better than the Archer types.

1,000 Grain Wt. 60 grams.



PRINCIPAL CHARACTERS

Young Plant Erect—semi-erect habit of growth when young, later leaf flaggy, medium width, paler colour.

Tillering Moderate for barley.

Ear Medium length, broad, but more narrow than Plumage Archer.

Collar Almost flat, slight lip.

Grain Large, plump, pale colour, fair quality, medium wrinkled skin. Base of grain flat or nicked, Fig. 2. Nerves, occasional or no teeth. Rachilla, short hairs, Fig 7 C. Lodicules, Fig. 9.

Awn Long, usually longer than the ear, straight.

Straw Average-long, longer than Plumage Archer, resists lodging better than Spratt Archer.

1,000 Grain Wt. 60.7 grams.



PREFECT

Origin Introduced by the National Institute of Agricultural Botany, Cambridge, in 1944. It was derived from a cross between Praecox and Spratt Archer.

General Should be sown in early autumn for best returns. It grows strongly and tillers well. Ripening early, about the same as Pioneer, its straw is slightly taller but stiffer than the latter. Resistance to lodging is fairly good for barley, and it can be grown on a little better land than that for Pioneer. The ear is a lax six-row with medium awn length. Quality of the grain is good and makes a reasonable malting sample, but . Pioneer is better for this purpose ; size of the grain is about average with reasonably thin skin. It stands a hard winter well, but under severe conditions Pioneer may be hardier. Yields are good in many places, but in trials conducted recently on light land it has only averaged 85 per cent. the yield of Pioneer. Resistance to disease is fair, but some breaking at the neck has been noted when dead ripe. Not very popular, but small acreage grown, principally in England.

PRINCIPAL CHARACTERS

Young Plant Rather prostrate habit of growth. No hairs on leaf margins or sheath.

Tillering High.

Ear Medium size, rather lax, four-row, or may be better termed six-row, turns well down when ripe.

Collar Irregular and not consistent.

- Grain Average size, pale yellow skin, reasonably thin. Base of grain, Fig. 3. Rachilla, Fig. 7 D., long silky hairs. Lodicules, Fig. 10, but smaller and more triangular. Many teeth on lateral nerves.
- Awn Usually longer than ear, straight, deep yellow colour.

Straw Average-long, quite stiff for length.

1,000 Grain Wt. 52.2 grams.

BARLEY

SPRATT ARCHER

Origin Bred by the Plant Breeding Division, Irish Department of Agriculture. It was derived from a cross between Spratt and Archer.

General Should be sown as early as possible in spring, earlier than the Scandinavian varieties. The seed rate can be higher than the latter as it tillers somewhat less, an asset to quality. It ripens average-late but may be considered a late variety in some districts. The straw is inclined to be long, resistance to lodging being poor if grown on too good land. Ears of Spratt Archer are long, narrow and lax, with very long awns. The grain is bright, pale, plump with thin wrinkled skin. Suitable soils are those of a light nature in average fertility; if grown on heavier land the fertility should be low. Quality of the grain is very good and is considered one of the best malting barleys grown to-day. Yields are good but usually lower than the Scandinavian types. It resists many common diseases, including Loose Smut. The ears turn down when ripe, but it has a fairly strong neck and necking is not commonly encountered. Harvesting by combined methods is not in common practice. Very popular throughout England to-day, also grown in Wales, Scotland and Ireland in smaller acreages.

PRINCIPAL CHARACTERS

Young Plant Erect habit of growth, later leaves become long and flaggy. Deep colour.

Tillering Moderate, strong tillers.

Ear Narrow, long, lax, turning down when ripe.

Collar Cup-shaped, rather deep, sometimes with lip.

- Grain Large, plump, pale colour, thin wrinkled skin, good quality. Base of grain is usually bevelled, Fig. 3. Nerves bear no teeth. Rachilla, long hairs, Fig. 7 D. Lodicules, Fig. 10.
- Awn Long, usually same length as ear or longer. Purple at tip before maturing.

Straw Long, rather fine and weak, lodges easily.

1,000 Grain Wt. · 57 grams.



YMER

Origin Introduced by the General Swedish Seed Co. Ltd., Sweden, and raised at Svalof from a cross between Nidar and Grenada. 1948.

General One of the new Scandinavian barleys which closely resembles Abed Maja, Abed Kenia and Freja in its habits and characters. It is very early ripening and like the three mentioned can be sown a little later than normal. Its tillering is high, and the straw when mature is short and stiff, resistance to lodging being high; suitable for harvesting by combined methods in some parts. The ear is narrow, average length with short awn, turning down when mature on small but strong neck. Quality of the grain is fair but the skin is a little coarse and therefore is not considered a first-class malting barley. The grain is small-average and is of a bright golden colour. Suitable soils are those suited to Abed Maja, Abed Kenia and Freja, they should be in a reasonable state of fertility. It is suitable for late districts and does well in Scotland, where some heavy yields have been recorded. In trials Ymer has equalled Maja and Kenia, but has been slightly inferior to Freja. Rather susceptible to Loose Smut. Grown in parts of England, but more in the North and Scotland.

PRINCIPAL CHARACTERS

Tillering Very high.

Ear Narrow, medium density, rather long, but shorter than Archer types; turns well down when ripe.

Collar Slightly cupped only, more flat, complete, rather small.

Grain Average size, bright golden colour, nicely wrinkled skin, but skin a little coarse. Base of grain, Fig 3. Rachilla, Fig. 7 B. Lodicules, Fig. 8. Nerves bear few teeth only, less than Maja, Kenia or Freja.

Awn Short, usually shorter than ear but never longer.

Straw Short, stiff, high resistance to lodging.

1,000 Grain Wt. 50.4 grams.

THE RECOMMENDATION OF VARIETIES

When one considers the many varieties of wheat, oats and barley described it is understandable that many people find difficulties in recommending a variety to the farmer. In the interest of the farming community and agriculture it is important that people connected with cereals should thoroughly understand them; this applies particularly to the representatives of seedsmen who are responsible for supplying the farmer with his seed corn.

Much has been discussed under the heading "Selection of Variety" which will aid recommendations. Certainly the more important factors to consider are mentioned there, but with the numerous varieties in circulation it is practically impossible to recommend them all.

There are varieties in the country to-day which will cover most of the conditions where it is possible to grow cereals, but more new varieties come along from the many plant-breeding stations and seedsmen throughout Europe.

It is not difficult to produce a new variety, something that may be quite distinct; this new type may, for example, be short stiff-strawed and therefore suitable to the more heavy fertile soils, but if this new variety has not been proved superior in one character or another to the existing types in the same class it is not worthy of a recommendation.

Confusing as it may seem to have to consider so many varieties as there are at the present time many have their place, and many have been proved suitable to fill certain conditions of soil and climate that may be found in some cases to occupy only a small portion of the country.

It is quite safe to say that all new varieties coming from well-known plant-breeding stations at home and abroad, and also from the plant-breeding grounds of well-known seedsmen, have been proved to be superior in some characters to the existing varieties in that class or group.

The word "proved" is all-important when used in front of variety, it means that the variety in question has been subjected to observations and trials over a period of three or more years.

Here we may refer to the work of the National Institute of Agricultural Botany, Cambridge, and its many centres throughout the country.

Varieties submitted for trial are carefully observed and trialed for their yields at these centres, thus the institute is able to find out the better types which are not only superior in yield but are less susceptible to disease, and also varieties which are suitable for the various conditions that exist in the farming communities of the country. Satisfactory conclusions to their trials on varieties to date have resulted in the formation and publication of a recommended list of cereals which have been proved suitable types to grow, covering most of the many soil types and climatic conditions.

Apart from the importance of this available list some consideration must be given to varieties which are not included or are not yet placed among the recommendations of the N.I.A.B.

Many of the more adaptable cereals are found to be entered in most seedsmen's catalogues, but their complete lists differ, and one or other include a lesser-known variety, or a variety which is not universally recommendable. A good seedsman knows

his customer's needs, conditions of soil and climate, therefore he offers to him varieties which suit his farming practice.

It is openly stated that there are several varieties which are no longer required in the Kingdom, but there are cases where seedsmen have to cater for a small acreage on perhaps one or two farms where a lesser-known variety does exceptionally well.

Only by trials and more trials can the many types be sorted out and the best brought to the farmer's notice. The value of trials is appreciated by many farmers, and his interest is always welcomed by his seedsman. There are farmers who are trialing cereals for themselves by dividing their cereal acreage up into several varieties, thus forming their own opinions. This is to be encouraged as the farmer has every right to his own choice, and when necessary should be able to utilise available trial reports.