

# **Brockwell Bake Association: BUSINESS PLAN 2011-2013**

## SUMMARY

The Brockwell Bake Association has grown in the space of three years from a single annual local event to an annual year long programme of education and event activities related to cereal cultivation and processing in and around our local area of Lambeth and Southwark with over eighty members in our association.

The 2009/10 season saw Brockwell Bake heritage wheat sowings on 3 allotment sites, 13 community gardening and farming sites and 7 school or college gardening projects. A programme of wheat and baking related workshops was delivered to Key Stage 2 children at four local Primary Schools and the Association provided harvesting and kids pizza making at three major events and three smaller community local events. Aside from the bank of heritage wheat landrace and early commercial cultivars that the Association now holds, the Association gained during the season a viable small mill for use at events and for limited flour production and an oven which can become our core mobile oven for events.

The 2009/10 season's activities were really a runaway success (precluding completing our Local Food funding application earlier than now) and demonstrated the demand and interest for our work. However they relied on a lot of volunteer input from a few key members (as well as a wider group of volunteers at events) which is not sustainable in the longer term. In particular our main organizer Andrew Forbes lived off a small inheritance during spring/summer 2010 which is now expended and will need other financial resources to continue to do Brockwell Bake work in the new season. The current project is that of achieving the necessary income for the Association so that its activities can be continued and developed.

If awarded a Local Food Lottery grant this would be applied to capital investments that we expect to help achieve this, a larger mill and the increased mobility of our oven and funding to support the development in-house of an online database of heritage cereals, before reaching our Association's full revenue potential when our heritage crop development work starts bearing full fruit in seasons 2011/12, 2012/13 and beyond.

## HISTORY

### Introduction

#### 1st Brockwell Bake 2008

<http://www.brockwell-bake.org.uk/first.php>

<http://www.myplot.org/gallery.php?project=35>

The first Brockwell Bake event was in August 2008 at Lambeth's Urban Green Fair in Brockwell Bake. The event's main feature was a "real baking" competition for amateur and pro bakers with as chief judge the baking writer Dan Lepard. The intention of the event and its competition was both a chance for amateurs to get feedback on their efforts not normally available to them and for the professionals to both showcase "artisanal baking" in our area and encourage the pros to "raise their game" in relation to each other. We made contact with members of the Traditional Cornmillers Guild <http://www.tcmg.org.uk/> who are the national association of water and wind millers using traditional milling methods to produce flour, their members sponsored the various categories in the competition as well as providing flour from their mills for the winners. We also attracted sponsorship from a number of wholefood and sustainable energy companies. This first event, despite poor weather on the day, was very well received by the Urban Green Fair audience (especially when they got to eat the competition entries) and it also started the process of forming an organised group of interested people both locally and nationally around Brockwell Bake activities.

#### 2nd Brockwell Bake 2009

<http://www.brockwell-bake.org.uk/second.php>

<http://www.myplot.org/gallery.php?project=51>

The second Brockwell Bake event was in September 2009 again at Lambeth's Urban Green Fair. In addition to our "real baking" competition, this time with chief judge John Downes, sourdough baking pioneer and guru from Australia, we added a number of other elements to the event. Due to requests from public to purchase flour at the 2008 event we organised with the Traditional Cornmillers Guild a flour stall with flour from over 20 of their members, which proved very popular and sold out by end of the day. Working with wholefood baker Paul Jones from Melton Mowbray, including the loan of his wood fired mobile oven, we ran a "kids pizza making" stall where kids (and one or two older people) were able to experience preparing and topping their own pizzas, this was also a very popular attraction in our event. Between these two activities we managed to raise, after costs, £225 for the Society for Protection of Ancient Buildings, Mill Section's Repair Fund. In addition to all of these elements we also put on a programme of talks during the day by millers, bakers and wheat growers/breeders around the interests of Brockwell Bake. The 2009 event also benefitted from the involvement of the then recently founded national "Real Bread Campaign" with whom we share a great deal of our aims.

#### Brockwell Bake developments, wheat growing season 2009/10

Prior to the September 2009 event we envisaged starting to take Brockwell Bake activities out and about our area from the annual event and submitted an first round application to the Local Food Lottery fund and gained funding from other sources to enable this, primarily in order to procure a mobile oven of our own with the idea of taking this out to do demonstration and participatory baking courses at local schools and additional community events.

Subsequent to the September 2009 event, partly due to the inspiration of a talk by the heritage wheat grower, John Letts from the Oxford Bread Group at our Urban Green Fair event and partly due to feedback and results of local research, we added to the idea of taking "real baking" out into the community, the idea of taking on both the growing locally of wheat and its milling.

The appetite has been really impressive for the offer of heritage wheats from Brockwell Bake to be grown by school and community gardens, and help and guidance with doing this from Brockwell Bake including the facilities to harvest and mill. We have been able to very quickly link into and get a good response for our Brockwell Bake activities from wider “local food” growing and processing groups and schools through a number of channels including Lambeth’s Green Community Champions Programme, the local networking website <http://www.projectdirt.com/>, local food umbrella organizations such as “The Onion Shed” in North Lambeth/Kennington area <http://www.projectdirt.com/group/theonionshed> and “Growing Southwark” <http://www.projectdirt.com/profile/GrowingSouthwark> and the Feast on the Bridge, the Mayor’s Thames Festival.

Brockwell Bake constituted itself as “an unincorporated organization having a membership” in December 2009 to

“promote in our local area of the London Borough of Lambeth and elsewhere improvements in the understanding of and skills relating to the growing of cereals and their processing into bread and other baked goods. In particular we want to enhance in our area the creation, provision and appreciation of baked goods (and their ingredients) of best nutritional and gustatory quality and value produced as sustainably as possible.” (extract from BBA constitution)

and currently has a membership of over 80 which continues to grow.

The Brockwell Bake association provided grain for wheat sowing either from winter 2009 through to spring 2011 (or both) to the following groups and locations in our local area:

### Community Gardens

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Hyde Farm Community Garden SW12

Arden House, Lambeth Walk SE11 5QH

Community Garden, Mayow Park, Sydenham SE26

Brookwood House Council Estate Community Garden, Southwark SE1

Guinness Trust Estate Allotments, Brixton SW9

Blenheim Gardens Estate, adult and children’s gardens, SW2 5ED

The Onion Shed @ Roots and Shoots SE11 6DN

Brockwell Park Community Greenhouses SE24 9BJ

Vauxhall City Farm (with local Primary School) SE11 5HS

Cowley Estate Farm SW9 6LZ

Sutton Community Farm SM6 0SH

Myatt’s Fields Park Project Group SE5

Brockwell Park Community Greenhouses SE24 9BJ

### Schools and Colleges

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Rosendale Primary School SE21 8LR

Friars Primary Foundation School SE1 0RF

Walnut Tree Walk Primary School SE11 6DS

Rea Primary School SW9 0EN

All Saints’ C. of E. Primary School SE3 OTX

Streatham and Clapham High School SW16 1AW

Hackney Community College N1 6HQ

Camberwell School of Arts SE5 8UF

### INTRODUCTION

Historically the domestication of cereals for human cultivation and consumption was at the core of the move from hunter gathering to farming and settled human communities and therefore central to the development of our present society. Even if bread is not the central staple of the UK diet that it was once, it and other products made from wheat and other cereals remain at the top of the food source list for most UK inhabitants. Simply asking a class of seven year olds to list these wheat derived foods they all eat every day can be a big revelation for them, that so many have a single common main ingredient.

Having this central importance in cultivation and consumption, cereals, in particular wheat and its products have been subjected to intense governmental and private business led development in breeding, in cultivation practice and in processing over a long period. These developments including heavy capital intensification of almost all stages of cultivation and processing have had the effect of removing wheat and cereals very far from the typical focus of Local Food production, consumption and education. Developments such as the “Green Revolution” of the 1960s which centrally impacted wheat breeding and the Chorley Wood Process which fundamentally altered the prevalent baking technology of the UK do however raise questions of food quality and sustainable supply into the future that merit the attention of a much wider audience than is current. The Brockwell Bake Association has forged a locally based programme of activity, both practical and educational, to raise the understanding and involvement of a wider public in these issues.

Giving kids and adults the opportunity to follow through, hands on, for themselves the process of creating bread, “from crop to crust” is at the core of Brockwell Bake’s activities. From this creative learning experience some participants may take up baking or even wheat growing for the long term, but hopefully all will learn more about the ingredients of bread and other cereal products, more respect for the producers of these products, farmers, millers and bakers, but also a more understanding and informed choice approach to the wheat and other cereal products they consume.

Brockwell Bake activities can be broadly categorised under four headings, education, harvest events, crop development and production (principally milling).

### EDUCATION: talks and workshops

For the 2009/2010 wheat season we provided between late June (when ears will have formed on school wheat sowings) and the end of school summer term a series of three baking and wheat related workshops to Key Stage 2 children (7-11) at four primary schools in Lambeth and Southwark. The schools were Rosendale Primary (programme funded by Lambeth Green Community Champions programme) and Friars Foundation, Reay and Walnut Tree Walk Primary Schools with the programme funded by the Feast on the Bridge, The Mayor’s Thames Festival.

Our primary school workshops programme has been designed to link into a large variety of Key Stage 2 curriculum areas including Geography, English, Mathematics, Design & technology, and PSHE. Workshops used projected illustration media, talks by practitioners and class hands on activities.

Teacher’s notes (including Health and Safety concerns) were prepared and made available from our website for use by schools in general, as in the example of teacher’s notes for planting wheat [here](#). We are currently working closely with and advising the [Real Bread Campaign](#) who are about to launch nationally in Spring 2011 a “bake your lawn” manual initially aimed at teachers and their students.

The workshops delivered in 2010 season were as follows

### “Story of Wheat” workshop

Building on the wheat sowing all schools have done already, this workshop covered, the significance of wheat in our food today, the origins of wheat as a domesticated plant, the significance of this development for human society and the development of wheat processing, including harvesting, thrashing, winnowing, milling and baking.

### Baking workshop

Lead by an experienced school baking workshop professional, children created and baked small rolls or pizzas for their lunch.

### “Show and Tell” local baker’s workshop

Artisan small bakers from within catchment of the school concerned will did a “show and tell” with a basket of their produce, which children were then be able to taste, with illustrated talk of the baker’s day (or night). Images showing BBA member, young French baker Vincent Talleu at Rosendale Primary School

The cost of delivery per school for these workshops was £334 (predominantly the cost of the baking workshop) which should not significantly alter for 2011.

Having just (December 2010) completed our winter wheat sowing whose programme is largely focused on crop development (see below) we will now be moving on to focus in April and March 2011 on Spring Wheat sowing with schools from our existing contacts and from a pool of new enquiries with whom, funding allowing, we would then hope to repeat our workshops programme in 2011.

### HARVEST activities and events

A main issue in creating demand for and a supply of local food is re-connecting the average modern urban inhabitant with the concept of the seasonality of produce. From the point of view of quality and price most fresh food crops are at their best when in season locally, but relatively few people know when or where to look out for specific locally sourced crops coming into season, if they are available to them at all.

The average urban dweller is of course aware what season is current, Spring, Summer, Autumn, Winter but within this the rhythm of the seasons, of one passing to another, and the affects of this on agriculture is obscured, principally by the blurring effect of all year round strawberries in supermarkets and such like as well as the relatively short periods most urban dwellers spend outdoors.

“Harvest”, quintessentially for the UK, the wheat harvest, is the major traditional seasonal event and celebration in the UK agricultural year. Creating the opportunity for young and old to participate in the wheat harvest Brockwell Bake believes can have a major positive impact on people understanding and appreciating seasonality in general.

On September 11th 2010 <http://www.brockwell-bake.org.uk/gallery.php?project=64>, Brockwell Bake took part for the first time in the annual “Feast on the Bridge” event with threshing, winnowing, milling and baking of our harvested local wheat taking place. Situated within the Mayor’s Thames Festival, held on the second weekend of September, the “Feast on the Bridge” sees Southwark Bridge pedestrianised and long tables and seating along its length, the entire bridge given over to the celebration of food and harvest time in particular.

At the feast we processed our wheat harvest, including that brought from local school and community gardens, by simple traditional manual methods that the public will be able to take part in, threshing over a barrel, winnowing with especially made winnowing sieves by the UK’s remaining hand sieve maker [Hill & Sons](#), milling with hand quern and our hand cranked Dutch vertical stones mill, and then baking in our own and hired wood fired ovens, with kids pizza baking and bakery demonstrations. The central harvesting activities were complemented by demonstrations of thatching, skep making and corn dolly making. We are looking forward and already planning for our participation in the Feast on the Bridge 2011.

Other events we participated in during 2010 included [food junctions](http://www.brockwell-bake.org.uk/gallery.php?page=1&project=59) at the Camley Street Nature Reserve behind Kings Cross Station <http://www.brockwell-bake.org.uk/gallery.php?page=1&project=59>, Myatts Park Midsummer Fair, Lambeth <http://www.brockwell-bake.org.uk/gallery.php?page=5&project=59>, Melton Mowbray Country Fair <http://www.brockwell-bake.org.uk/gallery.php?page=7&project=59>, the Brixton Windmill Festival <http://www.brockwell-bake.org.uk/gallery.php?page=9&project=59>, Lambeth Country Show <http://www.brockwell-bake.org.uk/gallery.php?page=12&project=59>, Lambeth Urban Green Fair <http://www.brockwell-bake.org.uk/gallery.php?project=63> and Cowley Estate “Community Farm” Summer Fun Day <http://www.brockwell-bake.org.uk/gallery.php?page=19&project=59>.

Our first event for 2011 was to arrange mobile wood fired oven and “oven stokers” for a variety of bakers at the “Crop to Crust” conference (SPAB Mill Section, TCMG and RBC) at the NFU HQ, Stratford upon Avon, April 16th, next will be participation in parade and with milling demonstration at the [re-opening of Brixton Windmill](#) on May 2nd followed by milling weekend there on May 13th and 14th. We expect to be at all the annual events listed above for 2010 during 2011.

## HERITAGE WHEAT GROWING

At our Brockwell Bake Lambeth Urban Green Fair 2009 event archaeobotanist and wheat grower John Letts of the Oxford Bread Group introduced us to heritage wheats and supplied us with over a kilo of seed of his heritage winter wheat mix. This really transformed our plans for the 2009/10 season which had already included expanding the scope of Brockwell Bake’s activities to go out into the community and schools, from just taking baking out and about to a holistic approach covering from “seed to sandwich”. Modern high yield varieties of wheat are principally designed to work with high inputs of inorganic fertilizer and also require application of herbicides, pesticides and fungicides to thrive. Only with pre-Green Revolution heritage wheats is there the realistic possibility of growing wheat as an educational hands-on experience with local community gardening projects and on local school gardens without high inputs.

The unsuitability of modern wheat varieties for low input cultivation also affects UK organic farmers with the particular implication that less than half the UK’s consumption of organic flour is UK grown. To try to help address this problem and in order to develop a revenue to support our educational and events programmes we have established partnerships with local farmers, initially with Michael and Jayne Duveen on biodynamic Hophurst Farm, East Grinstead, W. Sussex (29 miles due south from Lambeth) but also with two other biodynamic farms, Plawhatch near Forest Row, E. Sussex and Perry Court near Canterbury, Kent. With these partners we are working on the retrieval of local heritage landraces of wheat from the UK and other European gene banks and the bulking up of these and our ongoing heritage winter wheat mix to quantities where there we will be able to commence providing stone ground heritage wheat flour in South London. The background to and details of our heritage wheat development programme are provided in Appendix 1 of this document.

## PRODUCTION/MILLING

Currently we have our small “Bio 90” stone mill built by Dutch millwright Hans Titulear [LINK](#), this can either be used with hand crank at harvest events or driven by engine. When driven by engine it can produce between three and four kilos of flour per hour and although this is really a very slow production rate we have begun exploring the local demand and market for freshly milled locally grown wheat in our area. Milling blends of modern variety grain from the three farms mentioned above we are gradually building customer contacts selling through the stalls that the Duveen’s run at Borough Market and on Druid Street behind London Bridge station and the stall that Perry Court has at weekly Farmer’s Market in Kennington. We hope to expand slightly selling through deli/restaurant partners Cornercopia [LINK](#) in Brixton Market in 2011. However the limitations of our present mill mean that this production is really preparatory and exploratory, we cannot for instance do more than wet the



appetite of the several London bakers who are interested in baking with local heritage wheats. With a much larger mill which is one of the subjects of this Local Food funding application then we believe this aspect of Brockwell Bake activity can provide substantial revenue in support of our educational and community programme.

#### ONLINE PRESENCE and HERITAGE WHEAT SEED SUPPLY

Our website <http://www.brockwell-bake.org.uk/> has consistently developed and grown alongside the growth of our association's activities and membership so that it has become a key reference point for the media and public in relation to heritage wheat and "real baking". Recent additions have been a news content admin and database and making a link to images at <http://www.myplot.org/> so that selected galleries of relevant images from that site now appear within the Brockwell Bake website and the addition of a bread baking recipe and quantities calculator <http://www.brockwell-bake.org.uk/calculate.php>.

During Spring 2011 with the launch of the Real Bread Campaigns project "Bake your Lawn" we both advised on the documentation and are listed as a supplier of limited quantities of heritage wheat seed alongside the John Innes Centre [http://www.sustainweb.org/realbread/bake\\_your\\_lawn/#seed](http://www.sustainweb.org/realbread/bake_your_lawn/#seed). This produced a fair amount of response from across UK despite the emphasis in wording about the limitations of our supply. We were able to make a small expenses charge for providing seed in line with international treaty "Standard Material Transfer Agreement" procedure but did also ask at same time if recipients wanted to make small donation to BBA – most of whom did so – thus providing a small but valuable increment to BBA income. We believe with current stock of over one hundred lines of heritage wheat most of whose volume we are increasing this season we will be in a good position to continue and develop this service in the future, supplying slightly larger quantities (up to a hectare's worth of seed for educational and research use has now been approved by DEFRA) than is typically possible from The John Innes Centre.

Alongside this service and to compliment it as well as serve the purpose of increasing the knowledge base relating to heritage wheat and specific lines in of these we would like to develop an online database of our wheat lines (and eventually those held by others in the UK and elsewhere).

In the last few years a number of heritage wheat and other cereal related databases have been put online, here is a partial list of some of them

The European Wheat database (EWDB) <http://genbank.vurv.cz/ewdb/>, invaluable for searching Europe wide, some seasonality information – no synonym information or pedigree

French UMR Génétique, Diversité et Ecophysiologie des Céréales, INRA-Clermont database, quite new and very good, one of first to include some images and also synonym information

Dutch CGN <http://www.cgn.wur.nl/applications/cgngenis/ZoekGewas.aspx?ID=ibhq0y55&Cropnumber=01> one of Europe's top collections unsurprisingly, very high level of information including such things as crop susceptibility to disease and lodging (falling over)

German IPK Gatersleben [http://gbis.ipk-gatersleben.de/gbis\\_i/home.jsf](http://gbis.ipk-gatersleben.de/gbis_i/home.jsf) good collection partly because divided into two after war and therefore often have more than one example of particular lines – nice information field listing primary historic literature source for some lines

UK's John Innes Centre's BBSRC Small Grain Cereal Collections searchable database – valuable but does not currently show seasonality (Spring or Winter sowing) and other possible useful information.

Wheat pedigree database maintained by the Vavilov Institute in Russia <http://genbank.vurv.cz/wheat/pedigree/pedigree.asp> valuable resource for tracing possible synonyms of wheats.

French heritage wheat listing by individual, Christian Lemaire – much interesting background history unavailable elsewhere [http://moulin.chauffour.free.fr/autour\\_des\\_moissons/varietes\\_de\\_ble.htm](http://moulin.chauffour.free.fr/autour_des_moissons/varietes_de_ble.htm)



[le Spicilège](#) (the scrapbook) – online heritage seed database by French organisation [Réseau Semences Paysannes](#) whose level of information possibly approaches what we envisage but does not seem to have come into general use for the many followers and growers of heritage cereals in France.

As can be seen from these notes most of these gene bank databases have their uses and most have some particular virtue, such as some field of information others don't contain. However they do tend in common to be more facing their fellow gene banks and colleagues than facing potential cultivators in the field and are even more so lacking any information as to culinary and other uses of these cereals. Curiously in this respect a much older catalogue of wheats, that of the French Vilmorin seed company in 1880 "[Les meilleurs blés](#)" offers a model of much more subtle, nuanced and detailed information on each of its entries, sowing times often much more specific than merely Spring and/or Winter, notes on appropriate soils for different varieties, notes on usage and so on - not to mention lovely illustrations.

So by putting up our own database of wheats online we would design it to take some of the best practice from existing modern examples and learn also from earlier examples such as the Vilmorin catalogue. But we would also add some elements from modern internet networking practice that have not been attempted before by the national and international cereal databases - as far as we know. Whilst the primary information such as species, taxon and sub-taxon and so on might be controlled exclusively by one or two editors in the classic manner, other less dry information such as culinary use might be edited by a registered community in the manner of Wikipedia. In addition and possibly most excitingly it should be possible for individuals or groups (community or school) to add a crop report or even keep a diary of cultivation and growth against the entry for the variety or varieties they are growing. In this manner we would hope to build up and in some cases restore a collective body of information about specific heritage cereals where often this has been lost.

In relation to the above developments and services we are currently studying with help of Mike Ambrose, curator of the [BBSRC Small Grain Cereal Collections](#) whether Brockwell Bake can and should start issuing "[Standard Material Transfer Agreements](#)" when providing heritage seed to others in order to help avoid unregistered commercial exploitation of this material. We are also talking to members of the French organization [Réseau Semences Paysannes](#) to see if they would like to collaborate with us on development of online catalogue and therefore whether it should be bi-lingual from the outset.

Fortunately we do have the skills to develop and construct this proposed online resource in-house and therefore at much less cost than if having to pay a full commercial rate.

the future - sustaining Brockwell Bake activity

As remarked in the Summary at beginning of this document, the expansion of Brockwell Bake activity that started in 2009 has been made possible by a high level of voluntary effort. In particular specific seasonal periods of activity, winter and spring sowing, school workshops when wheat is in ear during July and harvesting with its related events during August and September really require that at least one person from the association must contribute enough time for administration and other work such that that person cannot hold down a full time regular job. So the association really needs to create the regular income to support the efforts of that person (which for the time being would be the association's secretary, Andrew Forbes) at least on a part time basis of pay. School workshops in particular also need to find funding not only for their administrator but also the expenses and costs incurred by those giving these workshops. Both these financial objectives really need to be achieved without relying solely on continually chasing of the now much reduced public and other funding opportunities.

The eventual sustainability of Brockwell Bake is most likely to be as a result of the development to "agricultural conservation variety" listing of a number of heritage wheats so that they can then be made available for commercial farming and processing as detailed in the Appendix "[Brockwell Bake Association: HERITAGE WHEAT PROGRAMME](#)". Revenue would be from either from a "local food education levy" where our heritage wheat lines are provided to external growers and processors or from our own growing and processing activities. The need is to put into place the necessary capital equipment so that we can process as much as possible of our heritage wheat crop ourselves and to bridge the gap between now and the point at which our heritage wheat lines have been bulked up to

full crop level. We should have a small amount of heritage “Blue Cone Rivet” to mill from the 2011 harvest with farming partners on Hope Hurst Farm, a greater quantity of “Brockwell Latino winter mix” to sow and harvest from various partner farms for 2012 but our most promising lines for the future “Old Hoary of Brockwell” and Brockwell Red Lammas types (“Old Kent Red” and Red Lammas) we can’t expect to fully crop for several more years (probably 2014 or 2015).

Our present milling and flour sale trials, whilst extraordinarily limited by our small existing “Bio 80” Dutch mill’s capacity – between 2 and 2.5 kilos per hour – do demonstrate there is the demand for our fresh flour milled from locally bio-dynamically grown grain even without this grain being heritage wheat. Whilst we do offer to local residents taking over 5 kilos flour at the very competitive price of £1.50 per kilo our general sales at farmers’ markets and Borough Market show we can sell flour at a premium retail price of between £1.85 and £2 per kilo. This price should provide a margin after costs and retailers margin other than labour of around £0.65 per kilo. We have also had positive feedback from various bakers for them to take 25K sacked flour on regular basis in quantities up to half a tonne per week at a price point between £1.20 and £1.40 per kilo which is around 40% higher than the going rate for stone ground organic flour and which would provide a margin before labour of around £0.70.

If we do receive Local Food Lottery funding and therefore are able to purchase the Moulin Astrié 0.5 metre diameter stones mill with output of 15K per hour this should provide an income in excess of £300 per week which would be sufficient to cover the labour of Andrew Forbes as miller and as main BBA organizer plus fund several programmes of school workshops.

Though we don’t have firm figures yet as to yield in cultivation of our heritage wheats in comparison with modern types and therefore price ex-farm we can expect to be able to raise our retail and wholesale prices somewhat from the above in at least some markets to maybe a point between current common stone ground organic tender wheat and spelt prices (spelt currently £1.70 per K so maybe around £1.50 to £1.55 per K).

## APPENDIX 1

### Brockwell Bake Association: HERITAGE WHEAT PROGRAMME




John Letts Heritage Winter Wheat “landrace population” on Rosendale Allotments, August 2010. Canary Wharfe behind.

#### Introduction


The incredible biodiversity of our environment is the cradle which has enabled us to fashion our current existence. It is also the cradle which could very likely save us in the case of catastrophes in our environment allowing for the possibility of adaptation of our environment to meet short or long term threats. However ...


“We are living in a time of unprecedented extinctions (Myers and Knoll, 2001<sup>[1]</sup>). Current extinction rates have been estimated to be 50-500 times background rates and are increasing; an estimated 3,000 - 30,000 species go extinct annually (Woodruff 2001). Projected extinction rates vary from 5 to 25% of the world’s species by 2015 or 2020. Approximately 25% of mammals, 11% of birds, 20% of reptiles, 34% of fish, and 9-34% of major plant taxa are threatened with extinction over the over the next few decades (IUCN 2001). Over 50% of animal species are considered to be either critically endangered, endangered or vulnerable to extinction (IUCN 2001).”<sup>[2]</sup>


Biodiversity exists at three interrelated levels, ecosystem, species and genetic. For the purposes of this document we are principally concerned with erosion of genetic diversity<sup>[3][4]</sup> particularly for the domesticated species *Triticum* (wheat). In applied genetics, genetic diversity is a statistical concept referring to the variance at individual gene loci (among alleles of a gene), among several loci or gene combinations, between individual plants within plant populations, or between populations - the combination of the last two being referred to as “spatial genetic diversity”. In principle, each level or type of variance can be estimated from measurements taken on a sample of plants drawn from the plant population or populations in question.<sup>[5]</sup>

[1] “The biotic crisis and the future of evolution” Myers and Knoll, 2001 

[2] “Conservation and the genetics of populations”, Frederick William Allendorf, Gordon Luikart, 2007

[3] “GENETIC CONSERVATION: OUR EVOLUTIONARY RESPONSIBILITY” Otto Frankel, 1974 

[4] “Plant Genetic Resources: Selected Issues from Genetic Erosion to Genetic Engineering” K. Hammer and Y. Teklu, 2008  for a recent review of issues of genetic erosion.

[5] CIMMYT. 1996. Mexico, D.F.: CIMMYT 1995/96 “World Wheat Facts and Trends: Understanding Global Trends in the Use of Wheat Diversity and International Flows of Wheat Genetic Resources”, M. Smale and T. McBride. 1996 



Due to its importance wheat has received the attention of modern plant breeders and seedsmen from an earlier date and more intensively than many other crops. The general imperative of wheat breeding has of course been first of all to increase productivity but with additional imperatives which are also significant. First, the process of commercialization has dictated that breeding has aimed to create cultivars that can perform over as wide an area as possible, secondly that the cultivar tends to be “distinct, unique and stable” (DUS) thus facilitating its identification in the market place and latterly its legal “Plant Breeder’s Rights” status so the breeder can protect his product and claim royalties. Both of these imperatives have militated against local adaptation and for monocultural genetic homogeneity in the crop. The further corollary of the first is that plant breeding and the agro-business in general, linked to the development of fossil-fuelled chemical industries has moved agriculture in the direction of changing the environment, through chemical and mechanical inputs to eliminate variables in the growing environment rather than the traditional approach of changing the crop and/or seed to match the environment.

## UK wheat 1760-1930

The effects of these tendencies in regard to the UK wheat crop can be detailed. The wheat genome has undergone three significant narrowings, that in original domestication, that in the move from landraces to commercial cultivars and that associated with the “Green Revolution”. Landraces are farmer created and saved genetically diverse sowings of a crop designed to match the locality of the farmer and typically for low input and stability in yield across seasons<sup>[6]</sup>. A combination of circumstances from the beginning to middle of the 19<sup>th</sup> Century saw many UK farmers start to move away from local wheat landraces of previous generations to “pure line” commercial cultivars, the first region of farmers worldwide to do so. A series of poor wheat harvests across Europe prior to the French Revolution and continuing into the



Colonel John Le Couteur of Jersey, breeder of Jersey cows and wheat including “Talavera de Bellevue” whose origin is Spanish.

Napoleonic period, advances in breeding of both livestock and plants, “improved agriculture” and Land Enclosure, the beginnings of agricultural mechanisation and an increase in wheat imports especially after the repeal of the Corn Laws in 1846 reshaped the UK wheat crop. To a certain extent both in the historical record and in surviving germplasm the UK origin wheat landraces are frozen in time at the point at which they were being compared to the new cultivars in the 19<sup>th</sup> Century, landraces such as “Red Lammas” and “Rough Chaff White” (aka “Old Hoary”, “Tunstall”) for England. Landraces such as “Devon Old Orange” and “Hen Gymro” in Wales clung on in cultivation into the 20<sup>th</sup> Century as the climate of these westerly areas was not as tolerant of the new cultivars<sup>[7]</sup>. Significant for our purposes is that not only did early breeders such as Colonel Le Couteur (“Talavera de Bellevue”) and Patrick Shirreff (“Shirreff’s Squarehead”) in Scotland triumph “pure line” wheat varieties versus the perceived varietal diversity of landraces but the desired product of the UK wheat crop changed.

Prior to the 19<sup>th</sup> Century those areas of the UK (south east England) that did as a whole eat wheat flour bread (as opposed to combinations of wheat/barley/rye/oats preparations eaten as staple in other areas of the UK<sup>[8]</sup>) relied essentially on the UK crop. The new cultivars such as “Spalding’s Prolific”, “Hickling’s Prolific”, “Chidham”, “Browick” and the various Squareheads, followed by the cross “Squarehead’s Master” had in common that they were more productive than the preceding wheats but what they gained in quantity they lost in quality for bread making. These varieties were primarily “softer”, more suitable for livestock fodder and biscuit making. For baking the UK began to rely on cheaper more uniform quality, “hard” higher gluten imports from the Baltic and the Ukraine and then

[6] “Landraces, a review of definitions and classifications”, A. C. Zeven, 1998 [↗](#)

[7] “Wheat in Great Britain”, John Percival, 1934

[8] “Dietary Change and Cereal Consumption in Britain in the Nineteenth Century”, E. J. T. Collins [↗](#)

from North America (though for flavour UK wheat continued to be mixed into the milling grist for bread baking flour). These changes and their causes are detailed in an essay for the British Agricultural History Review “Varietal innovation and the competitiveness of the British cereals sector, 1760-1930” by John Walton, 1999 [↗](#)

## The Green Revolution

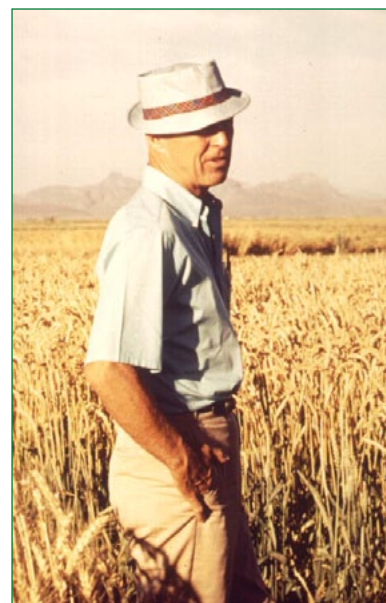
Prior to the 20<sup>th</sup> Century the availability of new forms of fertilizer had already begun to influence agriculture such as guano and urea. The traditional wheat plant, both of landraces and early cultivars were more or less efficient scavengers of nitrogen designed for low input. Higher fertilizer inputs for these created the effect of heavier ears and taller straw which lead to an increased risk of the crop toppling over (known as “lodging”) and thus been lost. Later 19<sup>th</sup> and early to mid 20<sup>th</sup> century wheat varieties had already started to be bred for shorter straw such as “Yeoman” and “Atle” but the real step change came post WWII with inorganic fertilizer becoming more widely and cheaply available, with what is known as the “Green Revolution”. Dwarf wheat “Noren 10” was brought back to the US and Mexico from the US occupation of Japan, at the International Maize and Wheat Improvement Center (CIMMYT) in Mexico led by Norman Borlaug this was used cross-bred with other wheats with specific disease resistances to create the first “high-yield varieties” (HYVs), much shorter in stature than previous wheats and thus avoiding lodging when fed copious fertilizer. The by-product of the shortening of modern wheat is that it no longer provides the shade to keep down weed growth thus necessitating application of herbicides.

The resulting genetically homogenous monoculture of vegetation remaining after herbicide application, often not only in single fields but over very large areas, results in the possibility of epidemic scale plant disease and pest infestation and necessitates the widespread use of chemical seed treatments, pesticides and fungicides and growth regulators.

Personnel and supporters of CIMMYT will argue that their work on wheat and other crops has resulted in an increase in genetic diversity of various crops by a number of measurements, specifically in comparison with the early 20<sup>th</sup> Century (where early commercial cultivars had supplanted landraces) and post the initial generations of HYVs<sup>[9][10]</sup>. Even in the case of the initial crossing with “Noren 10” it can be argued in that this brought in genetic material from a Korean landrace “Daruma” it significantly increased the genetic scope of the typical breeding stock of the time. However as M. Smale herself writes concerning this “As this example suggests, today’s breakthrough in achieving genetic diversity is tomorrow’s potential source of narrowing precisely because such breakthroughs often produce wheat cultivars that many farmers adopt.” The dangers inherent were amply demonstrated in 1970

“... this maize (edit. Texas T cytoplasm) is highly sensitive to host selective toxin (T toxin) produced by race T of *Cochliobolus heterostrophus*, the casual organism of southern corn leaf blight (Hooker et al., 1970). In 1970 this blight swept through fields of “Texas T cytoplasm” corn and yield was reduced by approximately 710 billion bushels. The cost to farmers was about \$1 billion (Ullstrup, 1972). Browning (1988) argued that the epidemic was “the greatest biomass loss of any biological catastrophe” and that it was “a man-made epidemic caused by excessive homogeneity of the USA’s tremendous maize hectarage.”<sup>[11]</sup>

In early CIMMYT HYVs often resistance to specific diseases was added to the plant genome by crossing to add a single gene expression (“monogenic resistance”), but the kind of incident as above highlighted the dangers of this approach and subsequent CIMMYT work has moved towards “durable resistance” with combinations of genes building up a more in depth level of resistance. This kind of



Norman Borlaug, father figure of the “Green Revolution” amongst some of his semi-dwarf wheat

[9] CIMMYT. 1996. Mexico, D.F.: CIMMYT 1995/96 “World Wheat Facts and Trends: Understanding Global Trends in the Use of Wheat Diversity and International Flows of Wheat Genetic Resources”, M. Smale and T. McBride, 1996 [↗](#)

[10] “Dimensions of Diversity in CIMMYT Bread Wheat from 1965 to 2000”, M. Smale et al, 2000 [↗](#)

[11] “Plant Genetic Resources: Selected Issues from Genetic Erosion to Genetic Engineering” K. Hammer and Y. Teklu, 2008 [↗](#) for a recent review of issues of genetic erosion.

approach hand in hand with renewed resulting emphasis on forming gene bank collections for the “ex-situ” conservation of landrace genetic material that might be useful for this work has resulted in the justifiable claim for increased genetic diversity other than spatial diversity in CIMMYT varieties in recent times. However it remains the case that if a single plant of wheat in a field is successfully attacked by for example a new race of rust, if the neighbouring plants, those of the whole field and maybe adjacent fields are genetically identical, as is very often the case in modern farming, other things being equal that disease is guaranteed to spread. Currently the world wheat and barley crops are under threat from a new stem rust “ug99” (discovered in Uganda in 1999) for which the previously very effective rust resistance conferred to many CIMMYT wheats by gene *Sr31* on the 1B/1R chromosomal translocation from rye<sup>[12]</sup> does not work. The previous effectiveness of *Sr31* had lulled the CIMMYT breeders into an unwarranted complacency within their own terms<sup>[13]</sup> that is now costing many millions of dollars in lost yield where ug99 has arrived (East Africa, the Yemen and West Asia) and research and breeding funds to attempt to redress the situation before it arrives elsewhere<sup>[14]</sup>.

CYMTT texts<sup>[15]</sup> argue that the increasing choice of different CIMMYT varieties for farmers, some 30,000 varieties since project conception, plus the increasing complexity of the pedigree lines of CIMMYT HYVs is another measure of increased or at least stable genetic diversity in the total world wheat crop (CIMMYT varieties constituted 96.5% of the 1997 total spring bread wheat crop<sup>[16]</sup>). This partially ignores that systems maybe in place effectively limiting choice within CIMMYT varieties such as the “Recommended Lists”<sup>[17]</sup> in the UK and that there remains pronounced morphological shared characteristics across all CIMMYT wheat lines regardless of the complexity of and overall “distance” in their genealogies. The most easily noticeable characteristic is the shared dwarf or semi-dwarf stature of CIMMYT wheats but equally important may be that they also typically have two thirds or less of the root mass of landrace wheats<sup>[18]</sup>. This comparatively short root appears to have arisen as a fuller root system became effectively redundant as a breeding objective when the plant is grown with surface delivered inorganic fertilizer dressings. Anybody who has grown HYV wheats next to landrace stock without either fresh manuring or inorganic fertilizer will be able to testify that in general the landrace wheats will out perform the HYVs both for total biomass and grain yield.

It has been posited that the essential component of inorganic fertilizers whose supply is finite, phosphate rock, will reach peak production in the next few decades and maybe totally exhausted in under 100 years<sup>[19][20]</sup>. Phosphate rock (and other fertilizer feed stock) prices rocketed by up to 1100% between 2005 and 2008, then fell back at the end of 2008 but are now steadily climbing again to well above their early 2000’s level<sup>[21]</sup>. Thus the problems faced by organic farmers now with predominantly only CIMMYT cereal seed lines available to them (see below), may also be faced by some or all conventional farmers within the foreseeable future. Fertilizer prices may in this scenario steadily rise but there is also the question of possible interruptions of supply (phosphate is primarily sourced from North Africa - Morocco and Tunisia) of fertilizer or of other high inputs such as herbicide that CIMMYT

[12] This “Veery” line of CIMMYT wheats with the 1BL/1RS wheat-rye translocation (originally wheat “Kavkaz” from a spontaneous cross in a farmers field, USSR) is in itself a good example of very considerable genetic widening of diversity when measured in the single wheat plant, but as is illustrated has lead to a genetic narrowing and resulting vulnerability in terms of the worldwide wheat crop.

[13] “Historic overview of stem rust research” M. A. McIntosh, 11th International Wheat Genetics Symposium 2008 Proceedings -, Volume 1, 2008 [↗](#)

[14] “Foundation Grant Helps Advance Fight Against Wheat Disease: Threat to agriculture concerns many countries” [www.america.gov](#), March 2009 [↗](#)

[15] “Genetic Variation Among Major Bread Wheats in the Developing World”, Part 1.3 of “World Wheat Facts and Trends: Understanding Global Trends in the Use of Wheat Diversity and International Flows of Wheat Genetic Resources”, M. Smale and T. McBride, 1996 [↗](#)

[16] “Dimensions of Diversity in CIMMYT Bread Wheat from 1965 to 2000”, M. Smale et al, 2000 [↗](#)


[17] [↗](#) Note only two spring bread varieties are listed for 2011/12, only one, “Paragon” was listed for 2010/11

[18] “Domestication and Crop Physiology: Roots of Green-Revolution Wheat”, J. Giles Waines and B. Ehdaie, 2007 [↗](#). The authors suggest that the drop in root mass was simply ignored or over-looked at CIMMYT.

[19] “Peak Phosphorus: the sequel to Peak Oil”, S. White and D. Cordell, 2008 [↗](#)


[20] US government mineral report for phosphorus 2010 [↗](#)

[21] “Phosphate Rock Price Chart 2000-2010” [↗](#)

HYV wheats typically require in their culture. It has been estimated by researchers at Newcastle University<sup>[22]</sup> that the current average yield, 9 tonnes per hectare for HYV wheat could fall to between 4 and 2.5 tonnes per hectare without phosphate based fertilizer which is lower than current typical organic farming results and only matches or under-performs 1836 early cultivar and landrace field trials .

As detailed below a sensible insurance policy for world food supply it seems would be to encourage the diversification of approaches to wheat breeding, cultivation and genetic conservation. “Ex-situ” conservation of landrace genetic material which has increased markedly starting in the 1920’s and 30’s with the work of Nikolai Ivanovich Vavilov in the USSR and continuing since is certainly vital both to the continuance of HYV breeding and to maintaining possibilities of other approaches. “Ex-situ” conservation maintenance of seed is normally designed to be as neutral in terms of selection as possible but inevitably cannot match “in-situ” (growing on in the area of origin of accession) landrace conservation maintenance. In turn gene bank “in-situ” maintenance cannot duplicate dynamic human farmer intervention in landrace seed selection and cultivation that is the historical background to plant domestication. A limited number of farmer-participatory landrace improvement, maintenance<sup>[23]</sup>, creation and seed distribution schemes are running but predominantly in developing country situations. Such schemes should be encouraged in developed countries also and where legal barriers to such activity exist such as restrictive seed ownership transfer regulations, these need removing.

## Organic cultivation


There currently only remains one pre HYV variety of wheat, “Maris Widgeon” (for thatching) listed in the UK “National List of Permitted Varieties” and therefore legal to sell as seed or even give away as seed. The most immediate problem this situation creates is for the organic (OA) farmer who is not permitted the use of chemically derived products as in “Conventional Farming” (CA). At the present time there are only a very limited number of varieties of wheat deemed slightly more suitable than others for organic growing of bread wheat legally available to the UK farmer and all of these are in fact HYV derivatives. The obvious result is that less than 50% of UK demand for organic bread baking flour is typically met by UK organic farmers<sup>[24]</sup> and this is duplicated across Europe. The problems involved and possible strategies to improve this situation are reviewed in “Developments in breeding cereals for organic agriculture”, Wolfe et al, 2008 , the main conclusion of which is to move towards greater genetic diversity to buffer for biotic and abiotic stresses that cannot be countered with chemicals in OA.


“An important tool to help deal with highly variable environments is the use of genetically diverse crops, including inter-cropping, mixtures and populations, which will all play larger roles in OA. Such approaches can also be valuable in helping to restore or increase biodiversity within the crop.”


Of course giving such conclusions is very close to saying ‘bring back landraces’. Their conclusions of course can also be transposed to conventional farming into the future with the threats of climate change and peak oil.

The Brockwell Bake Association aside from assembling a collection of around 80 distinct heritage wheats from private sources and gene banks from the UK, France, Germany, Madeira and Holland is pursuing three main threads in development of crops for use by itself in South London and by partner farmers in the South East England. These threads are the retrieval of named local landraces, further development of a winter “landrace population” and study and multiplication of Madeiran landrace wheat as a crop and from a cultural and social perspective.

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[22] “Wheat Yields Could Halve By 2040”, report of speech to Soil Association’s National Conference – Food and Farming in 21st Century Britain – Professor Carlo Leifert 

[23] for instance “Participatory crop improvement and formal release of Jethobudho rice landrace in Nepal”, Gyawali, S et al, 2010 

[24] “Better Organic Bread: Integrating Raw Material and Process Requirements for Organic Bread Production” DEFRA, 2005 



## Retrieving local landrace wheats

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After much research of historical records we are attempting to retrieve from gene banks landrace type wheats for milling (equivalent NABIM Group 1<sup>[25]</sup>) with records of having been grown prior to 1830 in the South East of England. We are fortunate that although there were only two relevant accessions in the UK's John Innes Centre [BBSRC Small Grain Cereal Collections](#) as of 2010 the wheats we are looking for are held by a number of other European gene banks from where we have been able to retrieve them with the help of the BBSRC cereals curator Mike Ambrose.

### Old Hoary, Old Kent Red, Red Lammas and Blue Cone Rivet

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We have identified two principal grown bread wheats of South East prior to 1830 as “**Old Hoary**” and “**Old Kent Red**”, a local variant of “**Red Lammas**”. In addition we have retrieved a stock of the rivet wheat “**Blue Cone**” with a similar pre-1830 UK historical record.

The earliest possibly relevant text for “**Old Hoary**” found so far is in “The Modern Husbandman, Or, The Practice of Farming”, William Ellis, 1744 [↗](#), farmer from Little Gaddesden, Hertfordshire, who has this to say of what resembles “**Old Hoary**”

*“White Wheat. This white Wheat has a white Straw, and a white bunchy Ear; it kernels as big as Pirks, grows closer together than the red or yellow Lammas, and thus is better secured from Strokes and Blights than they are. Now this Corn is mostly defended against these Incidents by Means of its rough Chaffs as for the right Sort of white Wheat has two or three that encompass each Kernel, which also preserve it in a great Measure from the Damage of Flies, and other Insects, which are apt to spoil Wheats while it is growing in the Ear. When this excellent Wheat is near ripe, its true Sort may be known by its Aspect, for then it will appear, as if it were hoary all over its Ear. About us, it is more and more sown, as being a Sort that thrives well in our inclosed, poor, gravelly, chalky, and light loamy Soils ; and, by many, this, or any other of the white Wheats, is much sown in a Mixture with red or yellow Lammas, because this Wheat will help to keep off Blights from that, but is a most proper Sort to sell and grind with the red or yellow *Lammas*, by Reason one is of a short, brittle Nature, and the other tough ; which prevents the White from running too much into small Bran, as it is apt to do, if ground alone, and then its Flour will be the coarser. This Wheat weighs rather lighter than either the red or yellow *Lammas* or Pirks, yet makes more Stuff or Flour than they do, because its very small Bran, remaining among it, is not easily perceived, for, as its Coat, or Skin, is of a light Colour, it gives the Meal and Bread a pleasing yellowish Cast.”*

In 1793 the “Board of Agriculture” a government funded, but at this time private association, essentially dedicated to propagandizing for “improved agriculture” and enclosure commissioned a series of surveys of the agriculture practice for each county of the United Kingdom, revised editions of which were then re-printed around 1801 to 1815. The recording of prevalent wheat grown is uneven cross the county surveys, but for Kent the following is written by John Boys, a Betshanger farmer in the revised 1801 edition [↗](#)

*“The new sorts of wheat which have been introduced into this county within these last twenty or thirty years, are the Hoary White, the Nonpareil, the Pilbeam, the Square Ear, and the Hoary Brown; with a variety of other sorts very lately introduced, and but little known. The Hoary White, by some called the Velvet Eared, is by far the most valuable, because it is very productive, and the best for the millers’ use. The straw is white and short, the chaff is covered with a thick fine down, somewhat of a brownish hue ; the grain is remarkably small, and of a dull white colour; the bran very thin, so that some grains are almost transparent when held up to the light. It grinds very mellow, and makes a beautiful fine white flour. From the quantity of down upon the chaff, and its small ears binding up very close in the sheaf, this kind, in a rainy season, is apt to vegetate very freely in the field; on which*



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[25] NABIM Wheat guide 2009 [↗](#)

account it is not so proper to cultivate in a moist climate, and in small enclosures, that are not open to the winds and sun.


[This sort of wheat is now entirely lost in East Kent, very much to the regret of the millers, and many farmers. It was a good sort for producing quantity as well as quality ; and was said to have been originally introduced into this country from Dantzic; but I have examined many parts of cargoes of wheat from thence, and have made many inquiries to get some of it again, without success.

We have a new Hoary White, introduced within these few few years, which grows in a larger ear, has a larger grain, and is thence by some called the Great Hoary; but by others the New Hoary: it is a very good sort, and earlier ripe than the Old Hoary, but it has not quite so thin a bran.] ”


The 1796 edition  however does not mention the “White Dantzic” attribution or the “New Hoary” or the loss of the wheat from East Kent. “White Dantzic” is repeated, given as name of the wheat, which is certainly the same, in the survey for Surrey by William Stevenson in the 1809  and 1813 editions.

“The different varieties of wheat that at present prevail most in Surrey, are the following, classed according to the degrees of their goodness\*:

White Wheats.—1. White Dantzic.—This kind of wheat has been grown in Surrey between 20 and 30 years: it is found in every part of the county, more or less; but perhaps is more generally grown in the Weald than in any other part. The ear is small, and covered with a soft velvet down. In rainy climates, this might render it apt to continue moist, and prevent it from being fit to harvest as soon as some other kinds : but in a dry climate, it is no disadvantage; and in a windy season, it prevents it from shaking. The grain is very small and translucent: it is apt neither to be affected with the smut, nor to lodge. In very dry seasons, it is rather too flinty. The general weight of the bushel is from 62 to 63 lb. Four quarters and a half is a great crop, on land well prepared. From the smallness of the grain, one bushel and a half is sufficient seed, on good and well-prepared land, per acre. The bakers prefer the flour of the white Dantzic, to that of any other kind of wheat—from a sack of it they often get one or two quartern loaves, more than from a sack of any other kind of flour.”

However the “White Dantzic” name is not reported by Andrew Young (the secretary of the Board of Agriculture” and most prolific writer of county surveys) for Sussex in 1809 or 1813 editions 

“Of the several sorts of wheat in cultivation in Sussex, the velvet-eared is preferred in the Weald, having by much the thinnest skin: they call it fluffed. It weighs upon an average 59 to 60lb. per bushel. It is an observation of Mr. Gell, of Applesham, one of the most spirited and intelligent farmers in the county, that the white fluff on good land answers best, as being the most saleable; but on poor land, subject to poppies: the strong-strawed sort that overpowers this Weed, should certainly be sown.”

What is notable is that despite the supposedly relatively recent arrival of this wheat in Kent and Surrey related in these reports, other county surveys from much further afield are already referring to the wheat as the “Kent Downy”, for instance that for the North Riding of Yorkshire written by John Tuke, 1800 edition 

“Sort.—The species of wheat which it is the general practice to sow upon the dry and best lands, is the Downey Kent, and sometimes, though not often, the Dwarf Kent; the red wheat, and the Hertfordshire brown, are preferred for cold thin soils, upon which some have sown the awned six-rowed wheat, but it being flinty, is not much liked: the yellow Kent is sometimes met with upon the lighter soils; but being more, subject to shake out of the ear, and also to sprout sooner in a wet season than the other sort is though a good wheat, is not so much in favour now, as some years since.”

and repeated for instance for Durham in 1810 edition  and in “Rural recreations; or, Modern farmer’s calendar” 1802 

“2. Downy Kent. Chaff white, downy, and awnless; ears middle sized; grain white and small; straw short. This kind, when sown on good rich land, usually yields, well, notwithstanding the smallness of its grain.”

What best can be said is that if William Ellis’ description of 1744 is judged to match that of “Kent Downy” it was clearly known to him earlier than 1760, but in his time had not yet acquired its later domination of cultivation in Kent, Surrey, Sussex and Essex and its association with those counties elsewhere. It is possible to speculate that the names given, both “White Dantzig” and “Kent Downy” reflect that association with these regions of production might be good for business when selling grain in London.

Certainly by the early 19<sup>th</sup> Century there is little confusion about what “Kent Downy” and various other related names are actually referring to. Colonel Le Couteur shows an illustrative plate and gives a description as a model for describing other wheats in this 1872 edition of his 1836 book “On the varieties, properties, and classification of wheat” [\[1\]](#) where he gives names “Kent Downy”, “Rough Chaff” and “Hoary”. In 1839 he wins 20 sovereigns for write up of fields trial of four wheats in “The Journal of the Royal Agricultural Society of England Volume 1” [\[2\]](#) including that for “White Downy”

“One of the best varieties of wheat in general cultivation, from which I have raised large crops, is the “White Downy,” or hoary—the “Velouté” of the French—described in my work on Wheat. This excellent variety is believed to be the same that is so well described by Boys, in his ‘General View of the Agriculture of Kent,’ as the “Hoary White,” or “Velvet-eared;” said by him to have been much prized by the millers, but then entirely lost.”

Le Couteur gives a yields per acre 1,352K of grain (per hectare 3.342 tonnes of grain, 5,118K of straw and 353K of chaff). In “The agriculturist’s manual”, Edinburgh, 1836 [\[3\]](#), the following is written

### “13. White Velvet Or Woolly-eared Wheat.

Also known in Sussex and Kent, where it is much cultivated, by the names of Hoary, White, and Stuffed wheats; also by the name of Hedge wheat (*Blé de Haie*, Fr.); but this latter is also applied to other varieties. Straw short, ears small, but close and compact; chaff white, covered with a fine velvety-like down; grains middle sized, well formed, of a semi-transparent whitish colour. This is a favourite variety with the London millers, on account of its yielding little bran and a fine white flour. In Scotland its cultivation has often been attempted, but never carried to any great extent, from an opinion being prevalent amongst growers, that its woolly chaff is apt to retain the moisture in damp seasons, thereby materially injuring the sample, by discolouring it, and causing it to sprout. It is therefore seldom met with in this country, except when mixed among the common white (No. 1).

Sample in straw and grain by Messrs Drummond and Sons, Stirling, under the name of Downy Kent wheat; and in grain by Messrs Vilmorin and Co., Paris, under the names *Blé de Haie* ou *Froment blanc velouté*.

Introduced into France from the south of England upwards of twenty years since, and is now cultivated pretty extensively in that country.”

And Percival in “Wheat of Great Britain” page 111 (edition 1934) writes the following regarding the wheat we are referring to as “Old Hoary”.

### “Rough Chaff White

A mid season wheat of fine quality, now rarely cultivated. Last century, down to about 1880, this and other forms closely resembling it were grown extensively in Essex, Kent, Sussex and



Blé à duvet ou velouté from the Vilmorin 1880 catalogue “*Les meilleurs blés*”, page 62 [\[4\]](#)

other southern and south-midland counties under the names Velvet Chaff, Hedge Wheat, Old Hoary and Tunstall.”

Unfortunately no identifiable accessions of “Old Hoary” existed in the UK’s [BBSRC Small Grain Cereal Collections](#) as of 2010 however “Old Hoary” passed into France around or before 1820 to the Vilmorin seed company in France (see mention in Edinburgh exhibition 1836 above) and was in their collection in two forms in 1880 recorded in their publication “[Les meilleurs blés](#)” on page 64 [↗](#) as “Blé Tunstall ou Blé de haie” and on page 62 [↗](#) as “Blé à duvet Syn. : Blé velouté; woolly eared wheat; rough chaff white wheat.”. From here it has passed into the modern cereal collections of several European countries thanks to its separation in two by the Vilmorins and subsequent spelling mistakes sometimes stored as many as four times in a single gene bank. With the assistance of Mike Ambrose, curator of [BBSRC Small Grain Cereal Collections](#) we have recovered nine accessions (typically 2.5g each) from the French, Dutch and German gene banks and Mike Ambrose and ourselves will be growing them on in 2010/11 season, the result to be pooled as a single crop for further multiplication in 2011/12 with some possibility of enough to start milling and baking tests in 2012/13. Although the break in “in-situ” cultivation of “Old Hoary” in the Kent, Sussex and Essex area is naturally unfortunate hopefully in that we have more than a single “ex-situ” accession to work from, maintained in a variety of locations, this will have permitted the retention of at least some of the genetic diversity of the original landrace.

In the case of “**Old Kent Red**” the earliest mention seems to be in Ray’s “*Catalogus plantarum ... circa Cantabrigiam nascentium*” of 1660 page 170 [↗](#).

In 1770 Charles Varlo writes in “A new system of husbandry” [↗](#).

“The Kentish wheat is a good sort, and very near a-kin to red lammas: any of the other sorts of wheat may grow here, though not with that success. Were I to enlarge as much upon every different sort, I should swell this work beyond my first intention; therefore shall confine myself to what I have already said, being the most proper for these kingdoms.”

We also have the following mention in “The agriculturist’s manual”, Edinburgh, 1836, [↗](#) which is worth reading in context with the following description for Red Lammas

“22. Red Kent Wheat.

Spike resembling that of the last, but its grains are much larger, of a more uniform and darker colour, and also more transparent, hard and flinty.

Specimens in grain by Messrs Jacob Wrench and Sons, seedsmen, London ; weight 65 lb. being considered a very superior sample.

23. Lammas Or Red English Wheat. Froment ble Lammas ; ou, Ble rouge Anglais.—Fr.

Originally from England to the north of France, where it has been cultivated with a considerable degree of success; but although taken from a northern to a southern latitude, it is found less adapted for withstanding the winter in the neighbourhood of Paris than the common red wheat (No. 19). This can only be accounted for by the winter in that part of France being generally colder than in England. Form of the ears more waved than in those of the last mentioned sort, also thinner, and not so much reclined or bent to the side. Spikelets bright red towards the extremity, lighter and more of a copper colour towards their insertion into the rachis.

The French consider this sort as yielding the finest sample of any of their red wheats. It is, however, liable to be shaken when fully ripe, and should, therefore, be cut a day or two before arriving at full maturity. In the quality of its sample, this variety very much resembles that of the Red Kent, to which it also bears a marked resemblance in its general character;



Red Lammas trials at the John Innes Centre



so that they are very probably of the same origin, and owe any distinction more to the effects of a difference in climate, soil, or culture, than to anything else.”

We have only manage to trace one named accession of “Old Kent Red”, that in the Dutch gene bank, however they also hold two accessions that we have retrieved under name of “Kentish Red Straw” which we hope may turn out to be a synonym for “Old Kent Red”. Clearly the above quotes speculate that “Old Kent Red” is a local variant of the more famous “Red Lammas” referred to by Ellis in 1744 as “The King of Wheats” [↗](#) and it seems true in general that “Red Lammas” had a wide variety of regional selections across England as befits its landrace status. As of 2010 the UK’s [BBSRC Small Grain Cereal Collections](#) only had a single Lammas accession however we have now retrieved in consort with Mike Ambrose from European gene banks a further five accessions as well as a number under other names that may be further local variants which we hope will constitute a valuable improvement in the total available germplasm for “Red Lammas” in the UK.

The final heritage wheat that we are currently growing for ongoing crop development is “**Blue Cone Rivet**”. Rivet wheats (*Triticum turgidum*) are tetraploid wheats similar to durum wheats but in occasional examples are better adapted to Northern European and Southern Europe mountainous climes than durums. These are characterised by being hardy and very productive. By themselves they do not compare to hexaploid bread wheat (*Triticum aestivum*) for bread baking but can be useful as part of a bread baking flour mix, some can be used for pasta making.


The Blue Cone Rivet has a very long history in the UK, certainly dating back into medieval times and having been known under a very wide number of names as described by Ellis in 1744 [↗](#). “Poll” is an earlier alternate name for rivet or cone wheat, an abbreviation of still earlier name “pollerd” or “pollard” clearly an anglicisation of the French name “poulard”.

“Duck-bill or Dugdale Wheat. In Essex they call this Grey-poll Rivet ; in Huntingdonshire, Dunover Wheat ; in the West-country, Grey-poll and Bluepoll Wheat; in Hertfordshire, Duck-bill, or Dugdale Wheat.”

Reputedly Nelson’s last breakfast consisted of Blue Cone Rivet toast and certainly this might be very appealing as bread made from it has a distinct nutty flavour. The “Blue Cone Rivet” was previously represented in the UK’s [BBSRC Small Grain Cereal Collections](#) by “Percival’s Blue Cone” which Percival records as having been raised from a single grain selection in his “Wheats of Great Britain” in 1934. The stock we now have is derived from Vilmorin’s “Poulard d’Australie Syn. : Blé d’Australie; poulard bleu ; poulard bleu conique; blé gris souris; blue cone rivet” listed in their publication of 1880 “[Les meilleurs blés](#)” on page 130 [↗](#) and which we hope will prove to have a wider genetic base than Percival’s. Extensive cultivation, usage and historical notes have been given to us by the French farmer and wheat breeder, Florent Mercier [↗](#) who provided us with our stock of several kilos which is now sown in Lambeth and on Hophurst Farm in West Sussex and Hungry Lane Farm, Leicestershire. We can expect enough of a crop to be able to test for baking and pasta making from the 2010/11 harvest.







An ear of Blue Cone Rivet in 2009/10 crop, Rosendale Allotments

It is quite plausible that if we can succeed in retrieving and reconstituting, if only partially, the wheat landraces listed above we will have increased the extant wheat landraces of England growing or stored in the UK from the four mentioned in “UK National Inventory of Plant Genetic Resources for Food and Agriculture”<sup>[26]</sup>, Maria Scholten, Nigel Maxted & Brian Ford-Lloyd, 2004  to seven plus an improvement for Blue Cone Rivet. We retain a watching brief on a number of other UK and other origin wheats, growing on in the 2010/11 season over 80 accessions, including examples of selections from UK landraces (i.e. non-commercial cultivars) Devon Old Orange and Hen Gymro from Wales. We have a selection of Blood Red types such as Rouge d’Ecosse and Golden Drop from a number of gene banks in order to establish the morphological relation of these to each other and to the Red Lammas type (local variants?). Other accessions we are building up to the kilo seed level include examples with origins in Italy, Spain, France, Portugal, Sweden, Georgia, Switzerland and Ethiopia, these may help for comparative study of performance, as swaps with other wheat breeders internationally and for education work, spring planting heritage wheats being of particular relevance for this.

### Agricultural conservation variety registration

In order for agricultural seed to be legally traded (or even given away) other than for research and breeding purposes the variety of the seed must be on the relevant “National List” for that crop. Until recently this meant there was no exception for any new variety other than it had to undergo a typically two or three year trial at an official crop testing station for “Distinctness, Uniformity and Stability” (DUS) and “Value for Cultivation and Use” (VCU)<sup>[27]</sup>. In that many landraces of agricultural crops by definition are genetically diverse they are liable to fail the test for Distinctness (landraces may overlap in their genetic content) and Uniformity and in that landraces are used dynamically by ongoing natural and human selection so as to become suited to a particular locality or individual farm they will fail the test for Stability when properly used. The tests for “Value for Cultivation and Use” requires that a new agricultural variety shows an overall improvement essentially in profitability over previously existing crop varieties which certainly within the scope of “Conventional Farming” present practice any landrace or early cultivar is unlikely to do. VCU trials also require the crop variety to show resistance to a number of specific diseases and to lodging which landraces wheats are unlikely to pass when matched against HYV wheats although they may show better broad spectrum low level and adaptive resistance to disease including new threats that HYVs may have no resistance to. In addition the cost of paying for

[26] The four extant bread wheat landraces mentioned in “UK National Inventory of Plant Genetic Resources for Food and Agriculture”, Maria Scholten, Nigel Maxted & Brian Ford-Lloyd, 2004  page 61, “April Bearded”, “Squarehead’s Master”, “Sheriff Wheat” and “Little Joss” are however open to some debate. The authors makes a distinction between “primary landraces” and “secondary landraces”, those that have been subjected to some formal breeding, and those that have not. There are two UK accessions of “April Bearded”, one Welsh, one assumed English as well as a Swedish in the [BBSRC Small Grain Cereal Collections](#), all are clearly related but distinct - an early Swedish/Nordic origin seems most likely as Spring wheats are more prevalent there in traditional agriculture - are almost certainly “primary landraces” in the terms of these authors. The “landrace” status of the remaining three listed is less obvious. “Squarehead’s Master” from its morphology and by repute viz. “Wheats of Great Britain”, Percival, 1934 page 119, is a selection by Teverson of a naturally occurring cross between an early commercial cultivar Squarehead type (Scholey’s) and a Golden Drop type. “Sheriff Wheat” is most likely “Sherriff’s Squarehead”, an early and very important pure line selection though Patrick Shirreff did create other wheats besides this. “Little Joss” was Biffen’s Cambridge Plant Breeding Institute’s first 1908 important release, showing particularly rust resistance, a hybridization of “Squarehead’s Master” and “Ghirka”, a Ukrainian hard wheat, and certainly can’t be considered a “landrace”. The [BBSRC Small Grain Cereal Collections](#) as of 2010 does contain an accession of the Welsh landrace bread wheat “Hen Gymro” (should not be confused with the Welsh barley landrace of same name), however this is probably a selection from within this landrace commissioned by Percival though some diversity is still seen present in the 2010 JIC trials . Two other accessions of Hen Gymro wheat are extant in the Dutch and Russian gene banks, “Hen Gymro S70” and “Hen Gymro S72” which were selections developed at the Welsh Plant Breeding Station near Aberystwyth in the early 20<sup>th</sup> Century. An accession of “Old Devon Orange Blue Chaff” has also been retrieved to the [BBSRC Small Grain Cereal Collections](#) and to Brockwell Bake during 2010 though again this may be a Percival commissioned selection from within the landrace. It is certainly true that there may well be more UK origin landrace accessions scattered around international gene banks, quite commonly with misspelt names or mistaken country of origin, waiting to be re-found and retrieved. For instance there seems to be a single accession of White Lammas (misspelt “Lemmas”), common in Ellis’ time but unmentioned later than 1830, stored in Sadova, Bulgaria .

[27] Protocols and Procedures for Tests and Trials, DEFRA 

DUS/VCU trials per variety for wheat is around £2000. In summary the DUS/VCU tests are the eye of a needle through which it is impossible for heritage cereal varieties and landraces, often maintained by individuals with minimal resources, to pass.

However in June 2004 the UK and the European Community ratified the “International Treaty on Plant Genetic Resources for Food and Agriculture”<sup>[28]</sup> whose aim is to protect and nurture world crop variety genetic and bio diversity. The EU COMMISSION DIRECTIVE 2008/62/EC [↗](#) “providing for certain derogations for acceptance of agricultural landraces and varieties which are naturally adapted to the local and regional conditions and threatened by genetic erosion and for marketing of seed and seed potatoes of those landraces and varieties” means that landrace and heritage cultivars only need to fulfil the following test in order to be listed

“By way of derogation from the first sentence of Article 7(1) of Directive 2002/53/EC, no official examination shall be required if the following information is sufficient for the decision on the acceptance of the conservation varieties:

- a. the description of the conservation variety and its denomination;
- b. the results of unofficial tests;
- c. knowledge gained from practical experience during cultivation, reproduction and use, as notified by the applicant to the Member State concerned;
- d. other information, in particular from the plant genetic resource authorities or from organisations recognised for this purpose by the Member States.”

The UK implemented this directive in “The Seeds (National Lists of Varieties) (Amendment) Regulations 2009” [↗](#) and the changes are outlined in “GUIDELINES FOR MARKETING SEED OF AGRICULTURAL CONSERVATION VARIETIES IN ENGLAND AND WALES” from FERA [↗](#).

These amendments to seed legislation are by no means ideal as they do not allow the breeder to experiment with the historically important ability to import landrace material from outside of a given region and there is no provision for any re-combination of heritage seed stock in order to constitute new landrace types. However the advice we have received is that the heritage wheats that Brockwell Bake is concerned to develop, as listed above here, can get on to the relevant National List without fulfilling normal DUS/VCU testing.

Several points are noteworthy in these legislative changes.

There is no requirement that a heritage landrace or cultivar has been continuously grown in the region from which it originated which would allow the listing of all the heritage wheats that Brockwell Bake is interested in given that the historical record of their origin in England or regions of England is clear.

In the FERA guidelines the following appears as item 3 “Quantitative restrictions”

“Marketing of conservation varieties is subject to the quantitative restrictions set out in the Regulations. That is, i) for each conservation variety no more than 0.3% or 0.5% (depending on species) of the UK’s total for that species, and ii) for all conservation varieties of a species no more than 10% of the total UK seed requirement. As a minimum, seed of any one variety may be marketed to sow 100 ha.”

The last sentence may be read to mean that a minimum of enough seed in order to sow 100 hectares must be available before that seed can be marketed. The equivalent wording in the EU Directive makes it perfectly clear that this is not the correct meaning. Article 14

“However, the total quantity of seed of conservation varieties marketed in each Member State shall not exceed 10 % of the seed of the species concerned used yearly in the Member State. In cases where this leads to a quantity lower than necessary to sow 100 ha, the

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[28] International Treaty on Plant Genetic Resources for Food and Agriculture website [↗](#)



maximum amount of seed of the species concerned used yearly in the Member State may be increased so that to reach the quantity necessary to sow 100 ha.”

Of course getting a wheat onto the National List is not the only requirement before seed of it can be marketed, there are also stringent requirements for seed cleaning, for bagging and sealing, for recording and testing seed lots and so on. Brockwell Bake may need to look at commercial partnerships with established organic seed merchants in order to be able to fulfil these requirements should our wheats prove at all widely attractive crops for organic farmers.

## Keeping it “open” and an education levy

The DUS/VCU trials, National Lists, seed cleaning, testing, storage and so on are all of course systems that have built up in response to specific demands. On the one hand the farmer wanted to be able to buy seed with the assurance it will be clean, fertile and free of disease and that it will be what it says on the packet. On the other hand the plant breeders and seedsmen wanted to see a profit from their work and so we have “Plant Breeders Rights” (PBRs), akin to intellectual property rights, and a form of royalty payments linked to this. Of course we can then see ways in which the systems in place have moved to militate in favour of the biggest players, tests for crop cultivation and usage that only work within a complex of chemical inputs and specific (“vertical”) disease resistance and tests that are beyond the means of small breeders. In recent times not only have monopolistic practices raised questions about a few large multinational companies cornering and privatising new plant breeding knowledge and developments, precipitating a crises of genetic erosion but also the issue of multinationals “mining” the diverse genetic resources of developing countries is prominent. These issues gave rise to the “International Treaty on Plant Genetic Resources for Food and Agriculture” [\[1\]](#), including in the Treaty the concept of “Farmers’ rights” (Part III of the treaty) which should both reward in some form traditional farmers for germplasm that may be derived from their heritage landraces and varieties when it is used in modern formal plant breeding and ensure that such material remains open for use both by the farmer and other breeders. This is in part achieved by the “Standard Material Transfer Agreement” (SMTA) system which obliges participating signatory countries and institutions to provide free and open access to germplasm stored in their gene banks and so on. The SMTA system is that under which Brockwell Bake has obtained a large proportion of our accessions.



BBA member and local pro baker Vincent Talleu “show-tell-taste” workshop at Rosendale Primary School, Lambeth, July 2010

The heritage wheat crops which Brockwell Bake is working with are clearly the product of generations of UK farmers long passed away. Even if we could claim “Plant Breeders’ Rights” on the wheats we are working on we don’t believe this would be the right course, we want to keep our work “open access” both by issuing samples to other individuals and organizations ourselves possibly using the SMTA system and by placing samples of our work with the [BBSRC Small Grain Cereal Collections](#) from where they would likewise be openly available to others with signing of a SMTA. However we do need and want to see where possible a direct benefit to Brockwell Bake and its activities from the work we are doing on retrieving UK wheat landraces. Where wheats we have worked on become grown as a commercial crop we propose that growers and food industry users of that crop will be encouraged (but not obliged) to pay a “Local Food education and development” levy on the finished product. At the moment it is suggested this would be from the retail price of the finished product, 2.5% towards Local Food education and 1% towards ongoing heritage and Local Food crop development and promotion, where the crop is not sold directly to Brockwell Bake for its own milling operations. Payment of this levy would entitle


the producer to show on the labelling of their product that it contained “Brockwell Bake Heritage” cereals and that a proportion of the retail price was being donated through Brockwell Bake for “Local Food” education and crop development. The application of the resulting funds from this levy should be agreed with the individual producer, if they prefer it, to be used in educational programmes in their


own area's schools, preferably on the subject of wheat and its uses, with the first option for delivering of that educational programme being offered to the Brockwell Bake Association. If the producer does not want or cannot organise the use of the funds in their own area's schools they will be used by Brockwell Bake in London. Hopefully the good publicity generated by this approach will mean that it will be in the commercial interest of the producer and retailers to work with Brockwell Bake in this manner.


### Brockwell winter "landrace population"

John Letts, archaeobotanist, heritage wheat breeder and collector of the Oxford Bread Group introduced Brockwell Bake members to the subject of heritage wheats at our 2009 event. He also very generously gave us around one and half kilos of seed of his heritage winter wheat "landrace population". This consists of collection of heritage landrace and early cultivars assembled by John over several years, from the UK and elsewhere originally numbering over 150 though this may have reduced to around 75 after several years of having been grown on by John in and around Oxford.

John's project can be described as that of providing to the grower a "proto-landrace" or "landrace starter kit" since the object is to provide an extremely diverse set of heritage origin seed, landraces and early cultivars, which will over a period of years of being used by the grower settle into the grower's locality to become a "new landrace" for that locality. Professor Martin Wolfe of the Elm Farm Organic Centre has followed much the same line as this and as recommended in the document he helped produce

"Developments in breeding cereals for organic agriculture"  but instead of using heritage germplasm has created the initial

base set of seed by the formal crossing of sets of modern wheats (top dozen for quality and top ten for quantity) with each other. Professor Wolfe's work with these Composite Cross Populations (CCPs) is described in "Adaptive winter wheat populations: development, genetic characterization and application" , the hope is that by this extensive crossing new re-combinations of genes will have been created or re-created, including the expression of genes inherited from pre-HYV varieties.

For the 2010/11 season Brockwell Bake has chosen to take a small selection of the crop from our 2009/10 harvest of John Lett's "landrace population", working on the hypothesis that bread-baking qualities can be enhanced by attempting to remove any Squarehead and prolific types. Our approach to this has been given credence by the essay "Varietal innovation and the competitiveness of the British cereals sector, 1760-1930" by John Walton, 1999  in particular by the wet gluten tests on home grown and imported wheats for the 1883/84 harvests shown on page 49. In addition we have sown this selection at all five Lambeth locations half just by itself and half cut with a third of a composite mix of some dozen heritage winter wheats from Spain, Portugal and Italy, our "Brockwell Latino re-mix". We hope that the Latin additions which generally have slightly faster growth than is typical of John's mix may give extra cover against weeds to the remainder of the mix, may increase resistance to lodging by providing a more diverse plant architecture, may add some strength to the resulting flour and may add some drought stress resistance. If this 2010/11 experiment is successful then we may combine the harvest with the non-Latino re-mix portion to create a single seed stock for farm trials for the 2011/12 season.



Dr. John Letts of the Oxford Bread Group on Rosendale Allotments to see BBA wheat, 1st July 2010



## Madeiran landrace wheats

In addition to the above projects, as a separate project to the overall Brockwell Bake 2010 to 2013 project which this Local Food application covers Brockwell Bake is also pursuing interests in Madeiran landrace wheats.

The borough of Lambeth has a significant Portuguese origin community, some 60,000, which by the borough council's estimate is the largest single ethnic community in the borough. By far the largest element within this community are families originating from the Macaronesian islands of Madeira, mostly with a rural, low income and poor education background. The Madeiran origin community of Lambeth continues to suffer from low income, low educational achievement, poor physical and mental health, poor quality housing and poor English language skills in comparison with other ethnic communities in Lambeth borough, which is itself already one of the most deprived boroughs of London and the UK. However under this statistically deprived circumstance lies a communal cohesiveness and a depth of culture that many other local communities cannot rival. However there seems a danger, especially for younger generations, that some of these attributes may be lost before they are properly valued.

Madeiran plot holders form a distinctive and very significant proportion of allotment users in Lambeth. Farming skills and knowledge, tools and seeds have been transferred to London and Madeiran plot holders are recognised as typically very productive and committed to their plots both for food production and as a focus for family and community socialising.

Very early on when Brockwell Bake started sowing wheat we were given an example of a Madeiran wheat grown in Lambeth for over 4 years by an older Madeiran allotment holder. This wheat which is an early to medium growth type is certainly pre modern in height, genetically very diverse and typically "flinty" (strong) in its grain. It did very well in comparison with others in Brockwell Bake's sowing trials on the Rosendale Allotments for the 2009/10 season. Reportedly it is the most common type used for thatching in northern Madeira around the area of the town of Santana.

On subsequent investigation it transpires Madeira is one of the only Western European locations where landrace wheats have remained in continuous "in situ" farmer saved use and there are at least 16 botanically distinct local varieties extant. This may be attributed to the geographic remoteness of Madeira but also to the wide range of elevations on Madeira at which individual farmers cultivate wheat and the particular requirements of Madeira's relatively young volcanic soils as well as a number of specific historical factors. Whilst remote from everyday contact with continental Europe and internally farming communities are separated by steep valley sides its position on early trade routes between African, Europe and the Americas does mean genetic input to wheat varieties from a wide range of sources adds an extra dimension to the interest of its surviving wheat landraces. During the 19<sup>th</sup> Century Madeira was used as a kind of quarantine and agricultural testing station by the Portuguese Empire. Some idea of the diversity of the wheat germplasm of Madeira is given in "Morphological characterization of wheat genetic resources from the Island of Madeira, Portugal", Miguel Â. A. Pinheiro de Carvalho et al, 2008 [↗](#)



Rosendale Allotments plotholder Antonio Luis next to some of his Maderia wheat





Selection of ears from Madeiran crop  
25/7/10

As well as resowing our Madeiran accession for the 2010/11 season, Brockwell Bake is currently looking for suitable personnel and funding opportunities to conduct a project to get responses to a questionnaire on landrace usage and practice in Madeira and amongst Lambeth Madeiran origin cultivators. This questionnaire could be based on the work of Teshome Hunduma “Local Crop Genetic Resource Utilization and Management in Gindeberet, west central Ethiopia”, 2006 [\[1\]](#), in particular the questionnaire reproduced as Appendix 7 in Teshome’s article. The results of such a survey conducted in Madeira and Lambeth could feed into the debate as to the extent of human selection and swapping/“refreshing” of seed in landrace traditional usage as outlined by A. C. Zeven in “Landraces: A review of definitions and classifications” 1998 [\[2\]](#) and in turn inform the proper practice and legislative framework for landrace conservation and development.

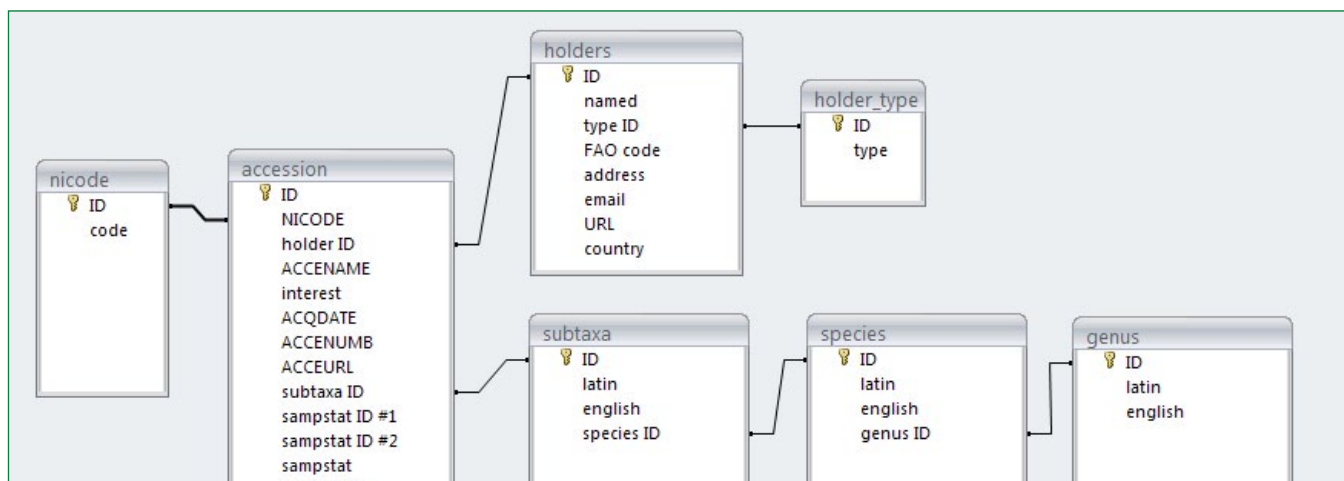
A major aim of the project would be to promote respect and interest in the agricultural inheritance of Madeira particularly amongst young people of Madeiran origin now living in Lambeth.



Harvest on Plot 36, Rosendale Allotments, Lambeth, 12<sup>th</sup> August 2010

## APPENDIX 2

### Heritage cereals online database draft specification



The objective of the proposed BBA heritage cereals online database is to create a cultivator facing reference resource to encourage, support and facilitate the re-introduction of heritage cereals into regular cultivation whether for educational purposes or research potentially leading to full agricultural cultivation.

As such one objective of the proposal is to bridge between the interests of the potential cultivator, crop history, crop suitability for the cultivator's situation and location, culinary usage and so on and the focus of established gene bank online resources.

The principle interests of the established national gene banks in recent years has been a) straightforward preservation and b) the use of heritage cereal genetic material as a source for crossing by hybridization specific desirable characteristics into modern cultivars. However to the modern movement to reintroduce heritage crops and animals into regular cultivation the interest is often not specific genetic traits of a line but the breadth of the germplasm of a specific line or accession and the authenticity of that germplasm. Questions become important such as whether a line has been in continuous farmer cultivation, if not has it been preserved in-situ (in the region or country of its origin) by a genebank or is the accession preserved ex-situ, are there multiple accessions of a given line across genebanks etc. We hope that this new resource will address these new focuses of study whilst maintaining linkage in data to genebank accessions from which in most cases material in cultivation is derived.

Potentially the most rewarding area of the proposed new online resource will be to use the tools and tactics of modern networking applications to allow users to add crop reports and comments to the data. We hope this will function to re-discover the qualities and nature of heritage cereals line where this knowledge has been lost.

Since BBA organiser Andrew Forbes has the professional skill and experience plus available web server space, we should be able to complete this project within a very small budget considering its scale and ambition. Current estimate for time to complete is five weeks (40 hours per week) - an estimate that will be binding - and which Andrew Forbes will charge at £25 per hour representing an approximate 50% saving on open market commercial rates.



## Draft specification

### Fields to be entered by database managers/editors

#### A Main descriptors

- A.1 National Inventory code **(NICODE)(0)**
- A.2 Code for FAO Institute **(INSTCODE)(1)** or **(COLLDESCR)(29)** individual or group that is holding accession of this line
- A.3 Latitude and longitude of cultivation site of accession (seed held)
- A.4 Acquisition date **(ACQDATE)(12)**
- A.5 (Accession) Name\* **(ACCENAME)(11)**
- A.6 Accession number **(ACCENUMB)(2)**
- A.7 Accession URL **(ACCEURL)(33)**
- A.8 Synonyms
- A.9 Name of the crop in colloquial language, preferably English. \* **(CROPNAME)(10)**
- A.10 Latin name\* **(GENUS)(5)**, **(SPECIES)(6)**, **(SUBTAXA)(8)**
- A.11 Introductory “interest of the variety or main use” (text)\*  
Reference docs  
[http://www.spicilege.org/index.php?option=com\\_adsmanager&page=show\\_ad&adid=75&catid=131&Itemid=0](http://www.spicilege.org/index.php?option=com_adsmanager&page=show_ad&adid=75&catid=131&Itemid=0)  
[http://www.museum.agropolis.fr/pages/documents/bles\\_vilmorin/fiche.php?page\\_actuelle=64&no\\_ouvrage=1](http://www.museum.agropolis.fr/pages/documents/bles_vilmorin/fiche.php?page_actuelle=64&no_ouvrage=1)
- A.12 Introductory Provenance/history (text)\*
- A.13 Biological status of accession **(SAMPSTAT)(20)\***
- **300** traditional (pre-Green Revolution) cultivar/landrace
    - **311** landrace continuously in cultivation, farmer maintained
    - **312** landrace re-introduced to cultivation from genebank(s)
    - **313** modern re-combination from multiple genebank accessions of a heritage line re-introduced to cultivation
    - **314** early (pre-Green Revolution) commercial cultivar by selection
    - **315** early (pre-Green Revolution) commercial cultivar by hybridization
  - **420** natural hybrid or mutation
  - **500** modern commercial hybrid – post Green Revolution
  - **999** modern collective population/landrace from heritage material **(REMARKS)(28)**
  - **999** modern collective population/landrace by hybridization from modern material **(REMARKS)(28)**
- A.14 Maintenance **(STORAGE)(27)**
- **as received** direct from donor
  - Grown on for storage
  - Proportion of a cultivated crop
  - Selection by a cultivator from crop
- A.15 Pedigree if hybrid, selection, mixture **(ANCEST)(21)**
- A.16 Primary image\* and secondary images
- A.17 Historical period of common cultivation

- \* indicates the field is compulsory
- indicates options for a field

**RED FORMATTING** indicates field name and number that relate to the EURISCO extension of the FAO/IPGRI multi-crop passport descriptors (MCPD)

- A.18 Country of origin or “unknown”\* **(ORIGCTY)(13)**
- A.19 Region of origin
- A.20 Donor Institute **(DONORCODE)(23)** or person or groups **(DONORDESCR)(31)**
- A.21 Donor Institute ID number **(DONORNUMB)(24)**
- A.22 Donor Institute accession name if different from the above
- A.23 Donor Institute accession URL if available
- A.24 Other identification (numbers) associated with the accession **(OTHERNUMB)(25)**  
(this should be used for re-combination of multiple accessions accompanied by a note in **(REMARKS)(28)**)

## B Botanical Plant Description

**Note: there can be more than one botanical description if wheat is a population/landrace with information of proportion in population for each**

Should be list of distinctive or distinguishing characteristics (include images where possible) rather than data for all fields other than those with \*

Two reference docs

<http://www.inspection.gc.ca/english/plaveg/seesem/man/swi-cereale.shtml> 

<http://www.plantauthority.gov.in/pdf/GBread%20Wheat.pdf> 

- B.1 Primary image\* and secondary images

### Characterisation

- B.2 A general description text field and then data as follows\*
  - B.3.1 Plant generally classed as “red” or “white” on the basis of grain colour\*
  - B.3.2 Plant, initial growth habit (erect to prostrate)\*
  - B.3.3 Leaf colour (light green, green, dark green)\*
  - B.3.4 Flag leaf width (mm)
  - B.3.5 Flag leaf attitude (erect, semi-erect, drooping)
  - B.3.6 Flag leaf waxiness (1-5 scale)
  - B.3.7 Height when fully ripe when grown organically (stem plus spike, excluding awns) cm\*
  - B.3.8 Head length (excluding awns, use first tiller) cm\*
  - B.3.9 Head shape
  - B.3.10 Head waxiness (1-5 scale)
  - B.3.11 Head attitude (when fully developed)\*
  - B.3.12 Head density (lax, medium, dense)\*
  - B.3.13 First tiller lower third head grains per spikelet
  - B.3.14 First tiller head number of spikelets
  - B.3.15 Rachis margin pubescence
  - B.3.16 Pubescence on upper culm internode
  - B.3.17 Upper culm internode waxiness
  - B.3.18 Upper culm tapering walls/parallel
  - B.3.19 Upper culm neck shape (straight, bent, crooked)
  - B.3.20 Straw pith and wall
  - B.3.21 Straw colour (when ripe and before rain)\*
  - B.3.22 Supernumerary spikelets
  - B.3.23 Awned? (Awnless, Apically awnleted, Awnleted, Awned)\*



- B.3.24 Awn attitude
- B.3.25 Awn colour\*
- B.3.26 Awn length\*
- B.3.27 Awns barbed?
- B.3.28 Awns fall off at maturity?
- B.3.29 Lower Glume beak shape and length\*
- B.3.30 Lower Glume shoulder shape and width
- B.3.31 Lower Glume length
- B.3.32 Lower Glume width
- B.3.33 Lower Glume pubescence
- B.3.34 Lower Glume colour(s) (when ripe and before rain)\*
- B.3.35 Grain hulled or naked
- B.3.36 Grain shape
- B.3.37 1000 grain weight (g)
- B.3.38 Grain colour\*
- B.3.39 Grain opaque/horny or mix of these?

## **C Growth habit and notes**

**Should be list of distinctive or distinguishing characteristics rather than data for all fields other than those with \***

- C.1 A general description text field and then data as follows
  - C.2.1 Seasonality? (winter or spring or either)\*
  - C.2.2 Suggested sowing dates in Northern Hemisphere
  - C.2.3 Density to sow
  - C.2.4 Tillering\*
  - C.2.5 Suitability for soil type
  - C.2.6 If Spring, days to boot
  - C.2.7 Maturity time in relation to others
  - C.2.8 Disease problems (text)
  - C.2.9 Frost resistance
  - C.2.10 Liability to lodging (score and text – site on plant and type of lodging?)
  - C.2.11 Harvesting notes (tendency to shatter or not etc)
  - C.2.12 Productivity when grown organically

## **D Bibliography/History**

- D.1 A general description text field and then data as follows
- D.2 Literature references (URLs and publishing info)

## **E Plant usage/ethno botanic interest**

- A.1 A general description text field and then data as follows where available
- E.2 Baking interest (text)
- E.3 Baking interest (bread, cake, pastry, pasta, whole grain for soups/salads etc)
- E.4 Grain preparation (milled, pearled etc)
- E.5 Milling notes
- E.6 Nutritional value
- E.7 Aromas

E.8 Straw usage

## **F Availability from Brockwell Bake**

F.1 available?

F.2 quantity available from BBA to a single cultivator

F.3 cost (expenses, P&P)

F.4 Suitability for school and community garden sowings

F.5 BBA seed stock quantity

F.6 BBA seed stock age (year of creation)

F.7 BBA seed stock fertility (%)

## **Fields to be entered by (registered) cultivators**

### **G Cultivator crop diary and report**

G.1 crop location (latitude and longitude)\*

G.2 crop location name (field name etc.)

G.3 crop location aspect

G.4 crop location soil

G.5 date of sowing\*

G.6 rate of sowing

G.7 time of flowering

G.8 time of maturity

G.9 lodging incident(s)

G.9.1 date of lodging

G.9.2 proportion of crop lodged

G.9.3 degree (angle) of lodging

G.9.4 any remarks on cause and/or nature of lodging

G.10 lodging score at time of harvest (1-5 scale)

G.11 date of harvest\*

G.12 harvest remarks and notes

G.13 height at maturity (soil to top of the peduncle) (cm)

G.14 yield (tonnes per hectare)

G.15 diary: multiple entries - can be date stamped growth stage and/or plant height reports + images attached

G.16 images

G.17 endosperm texture

G.18 protein (%) estimate

G.19 protein (%) test

G.20 Hagberg falling number

G.21 gluten properties

G.22 baking performance

### **H Cultivator comments**

H.1 A single text/memo comment added by registered users