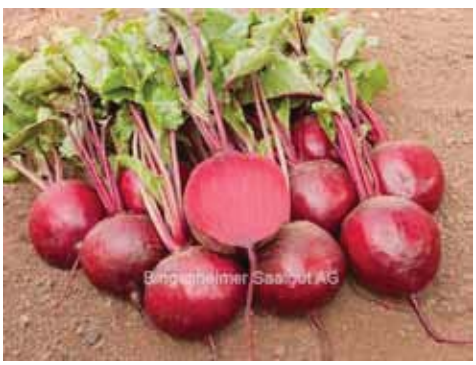
Biodynamic Plant Breeding and Seed Production workshop

A diverse group of biodynamic and organic growers, farmers, gardeners and seed producers, including representatives from the Irish Seed Savers, gathered at Ruskin Mill in Nailsworth, Gloucestershire, in February to share experiences and deepen understanding of biodynamic plant breeding and seed production. The workshop spread over three days and included a tour of Gables farm, the biodynamic farm belonging to Ruskin Mill Educational Trust, a presentation by Thomas Döring, the crops programme leader at the Organic Research Centre – Elm Farm, on its work with cereal populations and an evening talk by David Hampton, who runs a well established biodynamic farm in Essex and has many years experience in clover seed production. The main attraction, however was provided by Ute Kirchgaesser who has many years experience as a biodynamic plant breeder with Kultursaat, the German biodynamic plant breeding trust. It was a thought-provoking and at times challenging event, demonstrating how little we actually know about the world of plants and also how much we can learn from the biodynamic movement.

Jannis – the development of a new beetroot variety

Ute Kirchgaesser outlined some of the key principles of biodynamic plant breeding and described how they are put into practice, using the new beetroot variety Jannis as an example. Ute explained that her approach to breeding was to try to get a feeling for the crop plant and how it responds to various influences, on something akin to a soul level, rather than a purely botanical level. Starting in 2008, the mission was to create a fast-growing, small-leaved beetroot suitable for bunching. The old favourite boltardy, which is a free variety, was chosen as the starting point from which improvements could be made. Boltardy is maintained by Syngenta, but Ute says not much effort is made with open- pollinated varieties, compared with hybrids, and the quality has gone down over the years. There was a big emphasis on selection for taste, both raw and cooked, as well as on colour. Roots and leaves were measured and selections were initially made on 4 different leaf types, with a minimum of 100 plants in each line. Picturing methods, using chromatography were also used to assess nutritional quality. The boltardy selection from Vitalis was used as a control, for comparison. They found a correlation between short and wide leaf types with poor taste and bad shape. Lines were tested on a range of soil types. By 2009 they had selected down to one remaining line - a new variety. In 2009 Kultursaat was able to submit this variety for testing to the authorities, who agreed that it was sufficiently different to boltardy to be considered a new variety on two counts, it has a lighter colour and is less corky at the crown. Ute says that the other main differences are the taste and its picture quality (good nutritional quality). She tried to select for what she felt was a characteristic taste that suited the variety. In addition it is a little earlier than boltardy and has good storage, when sown late. It has been available for commercial sale from this year, though available quantities have been limited.



Biodynamic plant breeding in Germany

In 1985, as a result of a workshop at Bingenheim, an 'initiative circle for vegetable seeds from biodynamic farming' was created. This was an informal network for sharing experiences and discussing organic seed and plant breeding issues. In order to separate plant breeding from commercial activities they formed a non-profit organisation Kultursaat in 1994 to raise funds and coordinate their plant breeding activities. By 1998 they had registered 9 varieties on the national list. The organisation funds a number of breeders located all over Germany and also in the Netherlands and Switzerland working on all the major vegetable crops. These breeders are either commercial biodynamic vegetable growers or carry out their breeding on commercial biodynamic farms. In 2001 Bingenheimer Saatgut AG, a limited company, was formed to contract farmers to multiply the varieties developed by the breeders of Kultursaat together with other open-pollinated vegetable varieties suitable for organic growers. The shareholders of the company include the Kultursaat breeders and seed producers. License fees are paid to Kultursaat for the multiplication of varieties. Kultursaat is also supported by the Zukunftsstiftung Landwirtschaft, a foundation that was established to support organic seed and plant breeding initiatives.

It has been really successful and by 2004 was producing 3365 varieties and had put up a new building for cleaning seeds. In 2007 42 varieties of 16 crops had been officially registered, with 10 more varieties in the process of registration. Seed customers are not only commercial market growers and seed companies (such as Stormy Hall in the UK) but also amateur gardeners. Money from Kultursaat goes back to the growers.

There has also been an innovative marketing campaign - "Vegetables with Character" - which promotes the distinctiveness and superior taste of many of varieties. Promotional material has been developed for specific varieties, including posters, flyers and descriptions of the taste and culinary properties for display as labels on packaging. Open-pollinated varieties are also labelled as such, as consumers are starting to look for them.

Ute highlighted that there has been a massive decline in OP's on the national list and that it is no longer routine that a variety goes to a gene bank once it has been dropped from the list. In 2007 Kultursaat started a gene bank, co-funded by the German government, for the collection and in situ maintenance of OP's. Ute also questioned the quality of material in gene banks as samples are not big enough to allow selection when plots are grown out.

The effects of tone and music in plant breeding

For someone coming from an organic, as opposed to a biodynamic background, this session again led by Ute Kirchgaesser was the most challenging and intriguing. While the concept of devising an experiment whereby musical intervals are played to groups of plants (she started with lettuces and dandelions) or seeds in water and the effects then monitored was a little mind-boggling, the results were no less so, and quite compelling! As I understood it, as someone with no musical bent whatsoever, groups of tones within a range were played for periods of up to 60 minutes, in the case of seeds in water and with growing plants every 4th morning until the point of harvest. With dandelions the effects were most astonishing, with a very strong correlation between different leaf shapes and flowering patterns according to treatment. There were no leaves with 'extra ribbing' in the control (no music played) but extra ribbing was present in all the other treatments, up to 75%. One particular interval played had the effect of changing the dandelion from spring-flowering to autumn flowering! The experiment was repeated with the same results and what is more, it is also transferred to the next generation! In lettuce, a large amount of variation resulted and in carrots there were different shapes and forms of the roots in the second generation. There is certainly something going on, but what it means, how positive or negative an effect it is having on the plant or how it can be used is difficult to gauge. Ute suggests that cultivated plants seem to be more emancipated from cosmic influences than wild plants. She also pointed out that the effects are sometimes very chaotic. There are some differences in disease susceptibility between treatments, but these are not always the same in the second generation. For example one dandelion treatment became very susceptible to all diseases but had no mildew at all in the second generation.

Phil Sumption

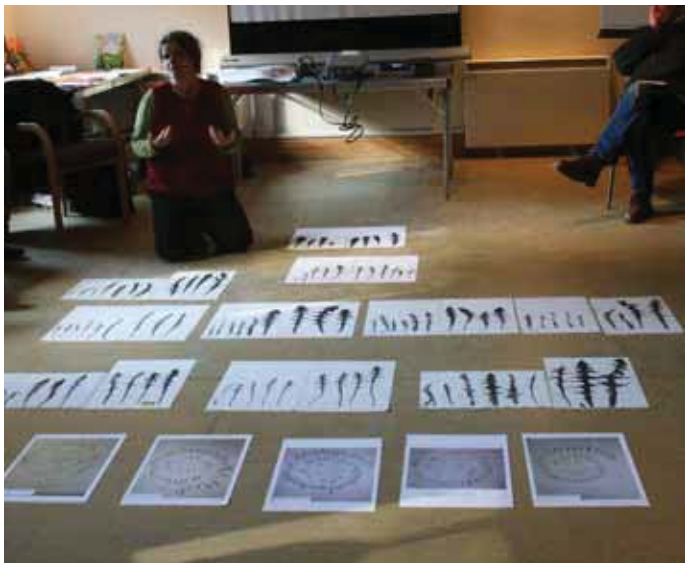


Photo: Phil Sumption

Ute Kirchgaesser with pictures of Dandelion growth patterns, influenced by muical intervals