



Kultursaat:

Breeding biodynamic vegetable varieties in German speaking Europe

The announcement in May of the proposed takeover of Syngenta by Monsanto shows how relevant the current theme has become. Plant breeding and the seed trade are being ever more tightly controlled by multinational corporations. Food sovereignty, the right of farmers and consumers to choose and even the comprehensive concept of the organic farming movement are falling prey to the interests of global business. Kultursaat has been working on finding solutions to this dilemma for the last 20 years.

Organic breeders take responsibility

More than thirty years ago a group of concerned farmers came together and founded an initiative Group to develop biodynamic vegetable seeds. They wanted above all to remain in control of the seeds of the various crops they were planting. By re-integrating seed production into their farm and garden organisms they sought to bring the goal of organic agriculture a step closer to realisation. This was long before the organic regulations (EEC 2092/91, the later EC 1452/2003 or the current EC 834/2007) demanded that organic growers provided evidence of the source of their organic seed. Over recent decades the use of hybridising techniques has become common place for many of our crops. Today the varieties on offer by the main seed companies are dominated by hybrids. The material used for *on-farm* variety maintenance and seed production is drawn increasingly from the market place. New varieties are appearing with ever increasing frequency thanks to the so-called advances in conventional plant breeding and their almost universal focus on questionable laboratory techniques; cell fusion for example is used to produce CMS *Brassica* hybrids without viable pollen.

A charitable association conserves and creates anew

From very early on members of the aforementioned initiative group recognised the importance of not only producing seed for organic agriculture but also developing varieties that thrive under organic conditions and even developing new ones. With this in mind 'Kultursaat' - a research association dedicated to breeding and maintaining vegetable varieties along biodynamic lines - was founded. Plant breeders working in this charitable organisation are also gardeners embedded in the practical life of their market gardens. The core task is to maintain tried and tested open pollinated varieties, develop new (open

pollinated) varieties and then register them in the name of the Association (in Germany with the Bundessortenamt). Although the current and conventional approach to the breeding of plants and livestock is organised according to a classic capitalist model, the framework and procedures of Kultursaat are designed to ensure that the varieties (both conserved and new) are not put in the service of personal gain but remain common cultural property. Kultursaat's activity so far has resulted in the registration of more than 70 new varieties.

Multifaceted partnerships among equals

Collegial exchange, fairness and transparency underpin the plant breeding ethos of Kultursaat. During the regular "plant breeding and variety days" commercial growers share their experiences cultivating open pollinated varieties on their fields, new varieties are presented and the challenges facing organic plant breeders are discussed. At the end of January each year a meeting of plant breeders takes place during which the overarching principles and goals are discussed and where those running specific projects can share their plans and gain new inspiration. For more detailed discussion of the issues and to coordinate specific projects working groups are formed that focus on particular vegetable species (cauliflower, carrots, beetroot etc.). Progress is made in plant breeding by visiting field crops together documenting the year's experiences and working on the best way of carrying the project forward. So that as many people as possible can hear about the Kultursaat breeding programme, articles are published in professional journals, summaries are sent to scientific conferences and an email newsletter is circulated periodically along with seasonal letters to members and interested friends. Information is also shared through brochures, leaflets and posters. Finally, as a condition for being certified as

a 'biodynamic bred variety' short biographical sketches of the Kultursaat varieties are made available on the website (www.kultursaat.org).

Strengthening community

Without the personal engagement of plant breeders Kultursaat would be unthinkable. Developing vegetable varieties for the organic sector that are viable in the long term and have consistent quality requires a considerable amount of input on the part of plant breeders - as well as from individuals and organisations for whom biodynamics is a labour of love. These include home gardeners keen to grow their own produce, smallholders who value the flavour and wholesomeness of Kultursaat varieties and the commercial market gardeners who want to free themselves from the 'Monsanto trap' as well as quality conscious consumers, retail shops and wholesalers who want to fill the concepts of 'sustainable' and 'quality' with life and meaning by actively addressing the issue of variety development. At present there are more than 300 gardeners, health food traders and consumers who are members of Kultursaat. Please continue helping us to make progress with our very demanding, *on-farm* approach to plant breeding within the context of organic certified farms that does not unduly interfere with a plant's flowering process. You can support us by becoming a member of Kultursaat, making a donation, using Kultursaat varieties, trying out new varieties that are being trialled. Do you have other ideas? We would love to hear from you.

(Michael Fleck, managing director)



Cultivated plants need human care

Kultursaat e.V. - research association dedicated to breeding and maintaining vegetable varieties along biodynamic lines

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From the Work of Kultursaat e. V.

Meeting the challenges of practical *on-farm* plant breeding (compiled by Michael Fleck)

New varieties are expected to be robust (resistant?!), high yielding, keep well and have a good flavour. The breadth of desirable traits is huge and the hurdles set are high both for the practical grower and the statutory testing stations. In the following pages some insight will be given into the concrete way in which Kultursaat works to develop and extend the range of its open pollinated varieties.

BÖLN Projects come to an end

In recent years the Federal Programme for Organic and Sustainable Agriculture (BÖLN) has often co-funded the activities of Kultursaat. During the three year 'Breeder's Seed Library Project' (<http://orgprints.org/19390/>) varieties of fennel, radicchio and courgette were investigated. In the case of fennel some particularly interesting open pollinated strains were found that promise to provide a valuable broadening of the range of varieties available to organic growers. These have either been taken on as *on-farm* breeding projects or secured for maintenance within the Kultursaat network. The first practical results of this work should be available to organic market gardeners within the next five years.

The funding period for the two projects 'Broccoli-Pop' (<http://orgprints.org/19460/>) and

BÖLN

Federal programme for organic and other forms of sustainable agriculture

'Chicorium-Pop' (<http://orgprints.org/19388/>) has fortunately been extended. The two concluding reports are still awaited. In the *Lactuca-lettuce* project two different strategies for dealing with downy mildew (*Bremia lactucae*) were investigated:

- decentralised simple crosses and breeding (<http://orgprints.org/19228/>) and
- so-called mixed lines and composite populations (<http://orgprints.org/19227/>).

The four year field trials were carried out on three different sites. The variants on which breeding had been realised, were significantly more resistant than the controls. The breeding approach that involved working with more malleable composite populations rather than pure lines, allowed for a broader range of downy mildew resistances to be put to use instead of the exclusive use of an easily disturbed vertical resistance. There is the question of course as to how the downy mildew situation will develop locally and regionally and whether it will be possible in the foreseeable future to market 'new mixed cultures' in boxes; and whether production and trade will play ball. And furthermore how this extended variety concept can be reconciled with the seed regulations? We will be pursuing these questions on various levels.

Open Source – a model for organic plant breeding?

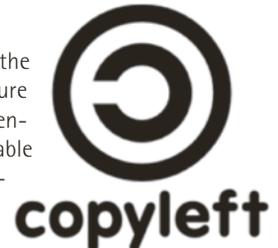
There is a growing conviction in many parts of the world that open source is not just a new and trendy idea but is also innovative and future orientated systems approach. First known in the field of IT, the term 'open source' has very positive connotations. In the context of computer programming it refers to a programming code that is freely available to all. This openness, in contrast to secretiveness, is the foundation for community endeavour and offers a possible answer to the encroaching power of monopoly. Transferring the principle of open source to our work with seeds and varieties would seem therefore to be well worth trying.

Since the beginning of 2014 this has become the task of a working group led by Dr. Johannes Kotschi (AGRECOL). During the autumn of 2015 a formal licence for the first Kultursaat varieties will be prepared together with a lawyer. To be legally effective – this much is already known – it must be a new variety, whose seed has never been made available before. Instead of the exclusive right of use enshrined by the variety patenting laws, under the open source concept there is a commitment to make the variety in question available freely and unconditionally. This also applies to further developments, derivatives and the products arising from them. It does not however mean that the seeds should be given away without charge by the licence holder. The costs (of variety maintenance and multiplication) still need to be covered.

With an open source licence a variety which had never previously been available can be protected from privatisation and retained securely as common cultural property. The so-called 'copyleft' clause in the licence ensures that this also applies to all subsequent developments. In this way we hope by creating this licence, to make a contribution towards increasing the amount of common cultural property available and offer an alternative to the continuous accrual of personal private property. The Open Source Seed Initiative (OSSI) managed by Jack

Kloppenburg in the USA (see picture below) and the Centre for Sustainable Agriculture in Hyderabad (India) are working in a similar direction.

We are in contact with both groups and hope to share experiences together in the summer of 2016 in the context of a workshop during the summer gathering of the Initiative Group.



Seed experts from across the world visit the Bingenheim research garden

Quality – a promise with many sides

Farmers and researchers have continued to develop their organic practices which have found increasing resonance in the wider population leading to a continued growth in demand for organic produce. This leads on to a discussion about the means and objectives (organic 3.0). For biodynamic agriculture in particular the question of quality is of central concern. As Rudolf Steiner stated in the Agriculture Course: *"The most important thing is that when these items reach human beings they are of the greatest nutritional benefit to them (...) that their inner existence is supported in an organic way."*

This has also been the aim of the plant breeding work of Kultursaat which from the very beginning has sought to develop high quality, open pollinated vegetable varieties. But what do we understand by quality? For us it concerns the very varied characteristics of crops and the diverse and mutually interactive relationship they have with their surroundings. Human beings can work creatively into this situation for instance as gardeners or plant breeders. Every gardener knows that with a judicious crop rotation, application of compost, irrigation and other more subtle measures, the outer form, size, colour, grading but also the inner nature of the products can be influenced. The

foundation for all biodynamic plant breeding is a biodynamic growing system. The sites chosen for Kultursaat projects are therefore either an integral part of a commercial biodynamic garden or a dedicated breeding and research operation that cooperates with a commercial garden. Regular exchanges between colleagues concerning the requirements and approaches needed as well as a collective problem solving quest, serve to connect the 200 or more different projects. In every situation it is the climatic and soil conditions that determine how selection is carried out and this means that site adaptation is an important issue for breeders.

Since the concept of quality is not limited to the immediately perceptible characteristics of the plant nor to those of the consumable products created from it, we consider that the way the variety has been developed also belongs to its quality (process). This enhanced level of awareness and involvement with the plant leads to a special connection with the human being which in turn helps the variety become a cultural asset. Every plant breeding plot can therefore be seen as a 'place of devotion', a place where positive mass selection, single plant selection or focused crossing may be carried out.

This means that plants are not merely considered for their utilitarian value, nor are designer characteristics imposed on them. Instead a process of careful observation leads to a development arising from the plant itself. Some breeders are investigating the effect for instance of eurythmy or tones to support plant development – the phenomena recorded so far in this regard have been amazing and open the door to exciting new ways of working with our cultivated plants. The integrity of the varieties being worked with by Kultursaat is fully respected and they are developed with reverence. The aim, along with non-invasive, life enhancing methods, is to achieve the most harmonious pattern of growth and that in turn is reflected in the product as good flavour and strong, vigorous forces of life. In a similar way health promoting ingredients and those that reduce quality need to be considered if the goal of producing food that provides appropriate human nourishment is to be achieved. Depending on the individual breeder's priorities one or the other aspect described above may be given greater emphasis. The graph below is an attempt to illustrate the diversity in this approach to quality – and even this presentation is 'work in progress'.



Award Winner 2015 in Federal Organic Agriculture Award (Bundeswettbewerb Ökologischer Landbau)

When Renate Künast of the German Green Party served as Minister of Agriculture for the German Government she paid tribute to exceptional achievements in organic agriculture by setting up an Award for Organic Agriculture known at the time as the Förderpreis Ökologischer Landbau. Award winners over the years often included organic plant breeding initiatives. In January 2015 the Award was given to the Kultursaat and Bingenheimer Saatgut

network during the National Green Week. The Ministry promoted the Federal Organic Agriculture Award: "The Award has become a symbol of excellence that not only bestows special recognition on the winning candidates but also on the organic movement as a whole". We are therefore delighted with this award and would like to thank all our partners, friends, members, supporters and customers without whom we could not have reached this point!

On receiving the prize we made a return gesture by presenting the Federal Minister of Agriculture Christian Schmidt, with an oversized bag of 'Ronjana' red beet – along with some of our political demands, namely to prohibit the planting of GM crops, strengthen breeder's rights and patenting law, bring transparency to the new molecular techniques in variety development procedures... so that future organic plant breeders can also be awarded.

'Nagels Frühweiß' or: The remarkable rescue of a cabbage variety



The new maintenance breeder Christine Nagel with 'Nagels Frühweiß' in full flower

Shortly before the de-registration of a variety: A visit to the Bundessortenamt (seed registrar)

It began with a visit to the Bundessortenamt by a representative from Kultursaat to see the varieties that were being assessed at the time. It took place in 2010 at the testing site in Rethmar. A comment was made during the discussion that: 'The cabbage variety 'Nagels Frühweiß' will soon no longer exist'. The reason: The breeder in whose name the variety was registered was no longer able to continue maintaining it for health reasons, an extension to its registration was therefore not being requested and would run out on 31st December 2011. With no reg-

The old breeder raved about the taste of her cabbage, how it rarely split and how healthy it was in the field.

istered breeder, no maintenance breeding, no future for the variety, there could be no permit - thus states the law. "Its a shame", we agreed - but what should we do?

'Nagels Frühweiß' had been maintained and developed by a horticultural family in North Germany for many generations. Working with cabbage is not easy for while the results of breeding normally appear in the next generation - in the case of the biennial cabbage an assessment can only be made after the next but one year. It did not take long for Kultursaat to decide that it would take on this variety. It soon found a new breeder - who coincidentally (!?) bore the same name as the cabbage!

Meeting at the former breeding site in Glückstadt (near Hamburg)

In January 2011 Christine Nagel the Kultursaat breeder, then made her way to Glückstadt at the mouth of the Elbe River. There she met the daughter of the former breeder, Helga Schakulat. It was not hard to recognise the place as a once thriving market garden. Greenhouses, sheds, cold frames - everything now stood empty and what had once been a field was now built over with houses. The gardener herself was advanced in age and had suffered a stroke. Shop talk between gardeners knows no boundaries. A conversation soon started about olden times, the Nagel garden and her father's breeding work. In the 1960s and 1970s business had been so good that they were able to sell their seed by the hundredweight to a medium sized seed merchant who sold it further. The old breeder raved about the taste of her cabbage, how it rarely split and how healthy it was in the field, its appealing appearance as well as rapid development and early head formation. Notwithstanding that the competitor variety 'Marner Allfrüh' matures a few days earlier still. Stories were told about the overwintering elite stock and of the huge fields

of selected stock for which a rail track had been laid to carry away the crop. Helga Schakulat also remembered a cauliflower variety whose seed had also found a significant niche in the market - these have been lost however.

The conversation then turned to the modern hybrid varieties. The Schakulats experienced their arrival on the market as a deep incision in their breeding work. During the 1990s demand for their open pollinated varieties declined steadily. "And that despite the hybrids having no flavour" said Helga Schakulat. Which is why they held on to the registration even though there was no market for the variety. But now she can carry on no longer, the stroke has brought her remaining gardening activity to an end.

So for Kultursaat it was now clear: The variety must continue to be available, it must survive. With this in prospect Helga Schakulat was, despite her personal sadness at having to withdraw from the work, much relieved that the variety would find a new home. And that with an unrelated colleague who carried the old family name... What an amazing meeting!



A scanned original from the Nagel family, Glückstadt 1957: The young breeder Helga with her own home bred but now lost cauliflower variety

Exciting first planting trial

Back home again in February this old cabbage variety 'Nagels Frühweiß' was sown in preparation for a viewing that same year. "What then met our eyes in early summer was an exceptionally early, very uniform, drumhead cabbage, with an appealing appearance, excellent flavour and which kept well on the field", said Christine Nagel. From there its re-entry into the seed registry of the Bundessortenamt by Kultursaat and with Christine as the variety's breeder was a mere formality. In 2013 the first of our own elite seeds selected from a large stand of plants, was sown at Gut Wulfsdorf near Hamburg. The feedback we received from the trial and test plantings showed that for everyone involved it had been more than worthwhile to have rescued this variety from oblivion. The fast growing, tasty, open pollinated white cabbage has been saved!



Scanned original from the Nagel family, Glückstadt 1947: The wife of the breeder Walter Nagel on the cabbage field; the rails used to facilitate the transport of the selected cabbages can be seen.