Life needs diversity

Biodynamic/organic seed

Introduction

Originally as plants existing in a wild state, the vegetables and grains we know today have been domesticated by the hand of man through their cultivation over many thousands of years, yielding as a result of this activity a huge range of varieties

The basis for it was, and remains, natural diversity. This guarantees the capability to adapt to specific environments, and as a result is the foundation of agriculture, ensuring healthy and sufficient food. Over the last hundred years, since the start of plant breeding to produce high yielding varieties, 75% of domestic plant diversity has been lost. Patenting of plant varieties has exacerbated the situation further.

Biodynamic agriculture imparts vitality through the use of the Biodynamic preparations to the soil (measurable as increasing soil fertility) and the plants growing there (seen in their intrinsic qualities). Agriculture needs plants that are open to these forces; it needs varieties that may be grown on each year from saved seed. This is not possible with F1 hybrids.

Biodynamic/organic breeding

Healthy seed has always underpinned a healthy and reliable food supply. However the conventionally bred seed lines currently available for grains and vegetables have only limited use in organic agriculture, and even less for Biodynamics: characteristics have been bred into them – often for technological reasons – which do not suit the specific growing conditions on organic farms. This means that the high food quality parameters that are the aim of in particular Biodynamic agriculture, can no longer be achieved.
For this reason, new varieties for commercial production are being bred by committed expert seed breeders under Biodynamic conditions. These breeders are achieving a high level of diversity with respect to a range of parameters: regionalism, taste, shelf life, nutritional content etc. The work is carried out using the proven classical breeding methods of crossing and selection. The ability to grow subsequent generations from each seed harvest is a prerequisite for these varieties.

Over recent decades, reasearch into seed breeding has been largely supported by private financial investment, in the main from foundations. As a result, around 50 varieties have been developed to marketability, gaining the necessary registration. For this to be achieved, for instance the development of a new variety of grain from the beginning of the breeding process until bread made from it can be bought from the baker, requires about 14 years – a lengthy and expensive process.

Biodynamic seed breeding research is locally adapted, but also respects holistic diversity. It assumes a close connection between the plant and its surroundings and the influence each has on the other. Over and above the classical breeding objectives (gluten content in grain, yield, disease resistence, form) are other important aims such as:

- Strengthening overall plant resistance
- Specific resistances
- Harmonisation of growth
- Vigour
- Pronounced root growth
- Good nutrient acquisition capacity
- Maturation that leads to more flavour, taste, and health (due to the increased level and wider range of nutrients)

The product range is also strengthened through regional processing and marketing, which all adds to making healthy, appropriate nutrition available to man. Use of the Biodynamic preparations in the sense of system regulators, and respect for natural rhythms show an openness to the idea of external influences on the organism.
Biodynamic breeders and farmers know: Seed has to be sown, Man needs a varied diet. But diversity increases the possibilities for forming the landscape too. The objective is the maintenance and further development of varieties in widely differing localities. Seed line maintenance and breeding must be oriented toward the conditions found in Biodynamic and organic agriculture, if our plants are to give us high quality yields for the healthy development of man.

Conventional breeding objectives	Biodynamic/organic breeding objectives
"Total - potential principle" of plant cells (undifferentiated – can develop to all plant cell types) => Reduction to the cell	Plant in interaction with specific environment. Genes are a part of the cell, the plant, the environment => plant depends on many factors
=> Genetic manipulation legitimises, Genetic technologies Reductionism viewpoint	"Healthy" selection in the field => In situ (on farm) maintenance and development. "Holistic"/system-oriented, organic viewpoint
Highest yield	Regional range of varieties used in each locality.
Visual qualities => standardisation	Locally adapted varieties (weed/companion plant tolerance, yield levels etc.)
Efficient uptake and metabolism of nutrients.	As for conventional with the additional objective of healthy plants without synthetic support.
Increased tolerance to environmental stress factors.	As for conventional with the additional objective of high nutritional qualities though balanced growth, intensive maturation leading to flavour and taste development and a broad (quantitative) resistance to specific diseases.

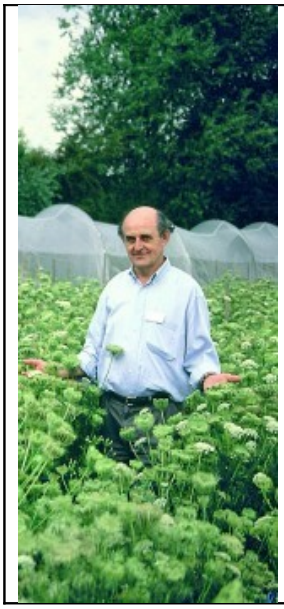
Examples for biodynamically bred vegetable varieties:

1. vegetables (Kultursaat e.V.)
carrot: Rodelika, Milan, Robila
white cabbage: Dowinda, Dottenfelder Dauer, Holsteiner Platter, Amarant
red cabbage: Rodynda, Topas
salad: Briweri
pepper: Pantos
Kohlrabi: Blaril
Tomato: Zuckertraube
Cucumber: Persika
Pepper: Jumbo
Celery: Ortho, Hochdaler Markt
Spinach: Winterriesen

2. registered biodynamically bred cereal varieties (Sativa AG, Rheinau)
Winter wheat: Pollux, Ataro, Aszita, Wenga
Spelt: Alkor, Sirino
Spring barley: Lawina
Einkorn: Albini, Tifi, Terzino

Genetic technology is no solution to the challenge

Hybrid breeding and genetic technologies are not used since they do not lead to increasing complexity and diversity. In fact they epitomise the existing standard in the case of many domesticated plants. Using the same narrow genetic base, a few genes are merely exchanged.
Seed production becomes concentrated ever more in the hands of multinational chemical firms. Together with the instruments of plant patenting and the regulation of using saved seed, this trend contributes to increasing plant diversity loss. Added to these problems there is the danger with conventional breeding that genetic technology enters by the "back door" e.g. through techniques such as protoplasmic fusion. The use of genetic technologies like this is prohibited in organic agriculture with good reason.



Portrait of an exemplary breeder: Dietrich Bauer and co-workers, Dottenfelderhof, Bad Vilbel, Germany

Breeding work using selection and line development on round cabbage since 1972. From 1980 intensive selection work on carrot varieties for storage, since 1990 using taste selection methods. With both the carrots and the cabbages, based on material from gene banks and other homozygous varieties, an extensive collection of breeding material has been brought together which provides a basis for morphological studies and for the development of further varieties. Since 1998 – based on a university thesis – work has been done on parsnips.
Dietrich Bauer: "Selection from plantings covering large areas leads to success. Experienced farmers can also be breeders. Our primary breeding goals are flavour and nutritional quality for the consumer."

Biodynamic/organic breeders

1. Cereals

- Dr. Bertold Heyden und Martina Geith (DE) "J. und C. Graf Keyserlingk-Institut"
- Eckart Irion (DE) "Verein für Pflanzenzucht Hof Grub"
- Peter Kunz (CH) "Getreidezüchtung Peter Kunz"
- Hans Larssorn (SE)
- Dr. Karl-Josef Müller und Martin Timmermann (DE) "Getreidezüchtungsforschung Darzau"
- Dr. Hartmut Spieß (DE) "IBDF im Forschungsring" & "Landbauschule Dottenfelderhof"

2. Vegetables

- Dietrich Bauer (DE) "Landbauschule Dottenfelderhof" & "Kultursaat"
- Ulrike Behrendt (DE) "Kultursaat"
- Reinhild Frech-Emmelmann (AT) "Reinsaat"
- Thomas Heinze (DE) "Kultursaat"
- Christina Henatsch (DE) "Kultursaat"
- Julian Jacobs (DE) "Kultursaat"
- Ute Kirchgässer (DE) "Kultursaat"
- Christoph Matthes und Dr. H. Spieß (DE) "Landbauschule Dottenfelderhof"
- Michael Pickel (DE) "Kultursaat"
- Richard Specht (DE) "Kultursaat"

3. Fruit

- Niklaus Bolliger (CH) "Pomaculta"
- Association of Biodynamic plant breeders www.abdp.org

Literature from the Forschungsring e. V. on the subject

- Techniken der Pflanzenzüchtung bei Gemüse. Julia Kaiser, 2004 (Forschungsring-Materialien Nr. 15), € 6,50
- Saatgut-Nachbau und Saatgut-Pflege – eine Umfrage bei Demeter-Landwirten und –Gärtnern (Saatgut-Projekt 1998, 1. Schritt), 1998 (Forschungsring-Materialien Nr. 3a), € 10,-
- Pflanzenzüchtung konventionell und ökologisch: eine Umfrage bei konventionellen Züchtern und züchtenden Demeter-Landwirten und –Gärtnern (Saatgut-Projekt 1998, 2. Schritt), 1998 (Forschungsring-Materialien Nr. 3b), € 10,-
- Themenheft Saatgut – eine Orientierungshilfe für Nachbau und Hofzüchtung (Saatgut-Projekt 1998, 3. Schritt), 1998 (Forschungsring-Materialien Nr. 3c), € 10,-
- Fachtag Saatgut, 1995 (Forschungsring-Materialien Nr. 3), € 5,-
- Getreide in der biologisch-dynamischen Forschung, 1995 (Forschungsring-Materialien Nr. 1), € 5,-
- Bildekräfte im Lebensmittelbereich – Grundlagenforschung am Weizenproteom von Sorten und Stämmen aus biologisch-dynamischer Züchtung 2003-2004. Dorian Schmidt, Dr. Ludger Linnemann, 2006 (Forschungsring-Materialien Nr. 16), € 19,-

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