

Participatory Plant Breeding for Organic Farming in France

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Breeding for organic farming (OF) knows a recent development, stimulated by both the 2092/91/EC European regulation application in 2004, and the mobilization of diverse organic movements and farmers. The private sector of plant breeding meets economic difficulties to answer to the OF demand, characterized by a great diversity of quality and adaptability criteria, and by breeding methods which respect the natural species characteristics (Lammerts van Bueren, 1999). Therefore, the availability of organic seeds is and will remain a great problem for organic farmers, if they do not organize breeding and seed production themselves.

From the genetic resources (GR) evaluation to participatory plant breeding: the example of cauliflower and cabbage in Brittany

In France, a Brittany regional organic umbrella (IBB, Inter Bio Bretagne), and some researchers from the national institute for agronomical research (INRA) have initiated a participatory plant breeding program for organic cabbages and cauliflowers in Brittany. This action was formalized by an internal call for proposals of the INRA-CIAB (Internal Committee for Organic Farming) from 2001 to 2003. The program was carried at the PAIS, the agrobiological experimental station of IBB on the organic site of an agricultural school (Suscinio, Morlaix). It consisted in the evaluation of genetic resources from several European gene Banks (INRA and GEVES in France, HRI in Wellesbourne, CGN in Wageningen, CHERAC in Switzerland). With all the concerned actors (farmers, processors, traders, trainers, researchers,...), the aim was also to define together the objectives of breeding for an organic way of production and development (Chable, 2002).

The main results were (i) the quality of the products and the good agronomical comportment of numerous open pollinated varieties, (ii) the initiative of the farmers to take in charge the breeding and the seed production of the observed cauliflowers. Several types of plants were chosen to be kept depending on the way of production and the putative way of commercialization for each farmer. In the northern Brittany, farmers have not forgotten traditional production of cauliflower seeds. From the end of the 19th century until the generalization of the F1 hybrids, the farmers had been breeding open-pollinated varieties which produced from January to June, the “Roscoff” type. Since 2003, the GR varieties evaluation has still been organized at the PAIS. For each autumn type variety, after a first observation at the PAIS, either the animator of the PAIS performs the first generation of breeding and seeds production, or a farmer takes in charge the variety. For winter type (“Roscoff” type), the sowing takes place at the PAIS and the farmers evaluate the varieties on their farms. From the GR evaluation to seed production, the PAIS, the collective structure, is the meeting point for all the involved actors (farmers, traders, trainers, researchers...). The farmers can find technical and scientific information, and they can share their experiences from the plant selection to seed production.

The constitution of others networks

In parallel, in France, other pioneer farmers, mainly organic farmers, have initiated a selection of traditional or ancient varieties for many species. They shared their first experiences, with researchers, small firms of breeding..., during a meeting in Auzeville in February 2003. This event has consolidated the farmers’ determination to take in charge themselves the future of their varieties and seed, and was also considered as the starting point for a new form of collaboration between researchers and farmers in France. The association “Réseau Semences Paysannes” (farmer seed network), was

born after this meeting and associates several local networks, assuring a link between farmers and authorities to stimulate the necessary adaptation of the French registration laws.

Today, several French participatory plant breeding initiatives have considered several species and farmers groups:

- *Durum wheat* in the Mediterranean area, in the South of France, with the aim to produce an organic grain with enough protein and vitrousness for the pasta process (Desclaux, 2005);
- *Bread wheat* with the “paysan-boulangers”, looking for very ancient wheat (from 1850) adapted to a traditional baking method, and for less gluten susceptibility for the consumers;
- *Maize and sunflower* in the South-West of the country, with several objectives of quality, rusticity and adaptation to dry conditions;
- *Tomato* with the aim to produce tomatoes in fields, with a high gustative quality;
- *Radishes and summer cauliflower*, in Pays de Loire to promote biodiversity and a best adaptation to a local production.
- Several other species on PAIS, as cauliflowers, cabbages, broccolis, parsnip, fennel,...are now involved with an internal breeding program and an PPB training on farm.

Definition of the participatory plant breeding (PPB) organisation from the experiences in France

We might synthesize these first initiatives and describe five main steps for the establishment of an action of participatory plant breeding for organic farming (Chable, 2005):

- Constitution of the group and creation of exchange space: farmers, researchers and others actors have to collect the funds to work together and to define the means of the common action;
- Definition of the priority in matters of crops and research of the genetic resources, with the priority given to the native and locally adapted varieties;
- Discovering, adaptation and selection in the farmers fields, in the crop conditions defined by the group;
- Seed production and distribution in collective organizations;
- Exchange of experiences and genetic resources through formal and informal, regional, national or international, farmer and organic professional meetings (accompanied by researchers and often enlarged to gardeners and trainers).

The seed distribution has been depending on the French legislative evolution. By nature, the varieties issued from PPB could not fill the DUS (Distinction, Uniformity, Stability) characteristics for registration, as their qualities should link the capacity of adaptation and evolution with their environment, and should promote the biodiversity at two levels, inside the fields and among the cultivated species. And mainly, by ethics, the organic way of development should enhance the ancestral link between the plant and the farmers, link which needs free exchanges to allow the evolution of the crops and the conservation of a living biodiversity.

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