

On farm research for quality of maize. Populations evaluation for old and new recipes in France.

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Author's Background

Véronique Chable is a senior researcher on cultivated biodiversity and participatory research since 2001, and SOLIBAM coordinator (EU FP7 project, Strategies for Organic and Low Input Integrated Breeding and Management). Rémy Lebrun is coordinating of on-farm trials and processors experimentation within AgroBio Périgord that has been involved in Participatory Plant Breeding since the 2002.

Summary

Participatory research in South of France aimed to create and exploit diversity on maize. Farmers and researchers have organized an on-farm experiment with traditional and new populations to assess key quality parameters. Population characteristics were evaluated through the different steps of food processes. Chef and cooks have also proposed new recipes to better exploit the diversity.

Background

In the South West of France, since 2001, organic farmers are involved in participatory research with several objectives for breeding, including quality, rusticity and adaptation to dry conditions. Only F1 hybrids are available on the seed market, farmers wish autonomy for seed supply and low inputs (irrigation, fertilizer...) for environmental reasons. In this paper, we will focus on quality objectives for human consumption, to re-discover the traditional dishes and to create new recipes, re-introducing the diversity of maize in the fields. The project was led by a local farmers' organisation (AgroBio Périgord), and locally funded by the region and Europe. The research was jointly organised with INRA (Institut National de la Recherche Agronomique) in the framework of a participatory research organization within SOLIBAM EU-FP7 project.

Main chapter

The first stage of the participatory breeding programme was to better assess data to describe and measure quality for human consumption of maize tested on farm with low inputs logic. Organic farmers objectives is to reduce or suppress irrigation. The trial was designed to determine the most relevant methods from available organoleptic assessment with a choice of the traditional varieties still existing from France and other countries, for traditional recipes or end-use of maize. For this study, eight populations have been chosen to represent several components of the diversity: precocity, colors, type of grains, geographical origin, varietal type and traditional uses.

The tested varieties are: (1) Aguartzan, a traditional landrace, from the South of Pays Basque (Guipúzcoa), (2) Lavergne, a new landrace created by a farmer in Périgord from a mix of 10 landraces and one F1 hybrid, (3) Sponcio, a traditional landrace from the North of Italy (Venitia) (known from the middle of 19th century), with small orange and sharp grains, generally used for polenta, (4) Abelardo, a traditional landrace from Spain (Alicante), (5) Sical, a traditional landrace from Guatemala, (6) Miguel, a traditional landrace from Portugal, with high level of proteins, (7) Rouge d'Astarac, a traditional and local landrace from the region of French Astarac used for polenta and the "mique", (8) one F1 hybrid, 'Nauddi'. A mix of 13 landraces was added for several methodological approaches: Sical, Abelardo, Lavergne, Aguartzan already described and individually analysed, with nine other populations (Porto, Ruffec, Grand Roux Basque, Belet, Hélène Guate, Italo, Benastone, Ribeyrolles, Chavito).

For this first period of the project (2010-2011), the eight varieties were studied for three aspects:

- Milling: observation of the behavior of the varieties and methodological aspects of the flour sifter to optimize the quality of the flour and the semolina
- Cooking: testing the different flour and semolina by several professionals of cooking (bakers, cooks, collective cooking and chefs...)
- Tasting: evaluation of sensorial qualities of varieties and their flour and semolina.

Then in 2012, based on the first observations, the actors focused on more informative elements for end-users as water absorption, texture and volume increase. Two methods were experimented for tasting evaluation: the triangular test and a ranking test. The ranking test is the easiest to manage in our conditions: no trained people, statistical robustness. The sensorial pattern is more difficult to organize as it generally needs trained persons. Nevertheless, we tried to determine it by professionals (chef, cooker, slowfood experts) to respect our participative organization.

Elsewhere, new recipes were experimented from the samples of 8 varieties. Each variety was evaluated for qualitative parameters: water absorption, cooking time, smell and aroma, aspect and conservation of the final products.

Some examples of recipes were created by the chef and cooker:

- Mini-cake with maize flour and essential-oil of lemon (recipe without gluten)
- Bread with a pelt sourdough (comparison between maize 40% and maize 100%)
- « Bouchée de polenta au lait d'amande et au pesto » (semolina cooked with almond milk and basil with olive oil)

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- « Bouchée de polenta » with sugar
- Dry biscuit of maize (without gluten)
- Polenta « montée en mousse » like « espuma » (semolina turn in mousse, with a very smooth texture).

In parallel, in 2012, experiment has been done on natural drying process quality of the grain. It would be interesting to compare, in the future, with artificial heating. According to the first results, actors aim to test the combination advantages of both methods with low temperature ventilation. Conservation and milling processes had a lot of influence on the sensorial qualities. Year 2012 offered decisive progress on several points dealing with the complexity of the characters.

Data from different experiments and exchanges with Portuguese farmers (within SOLIBAM activities) had allowed to improve the 2012-2013 experimentations. New milling procedures were proposed to enhance cooking researches, and then new aspects for tasting. Milling test characterized behavior of the tested varieties and the effects of external factors on the rate of semolina and flour from grain. The varieties have been cultivated again in 2011 in order to have enough grain for experimentation in 2012. Nutritional analysis had been added in 2013.

Core messages and conclusions

Within this experience, researchers and farmers have collected as many information as possible to better understand the quality elaboration in maize products. This information constitutes a common knowledge, essential to better manage further breeding programmes all together.

Recipe progress had been intensively developed with the awareness of a broader public which were very large during several meetings about Community Seed Banks, traditional food on organic fair and Slow Food events. Farmers involved in PPB programmes tried to favor at the same time the revival of the traditional populations (and their attached recipes) and the development of new populations with creation of new valorization of on-farm diversity.

Next year, all the stakeholders involved in Perigord will go on finalization of recipes as well as scientific publications. A recipes book will be edited to exploit the 4 years programme of SOLIBAM. This book will disseminate to professionals and consumers the many recipes created and make a better link between fields and plates, to bring the maize in the French daily cooking.

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