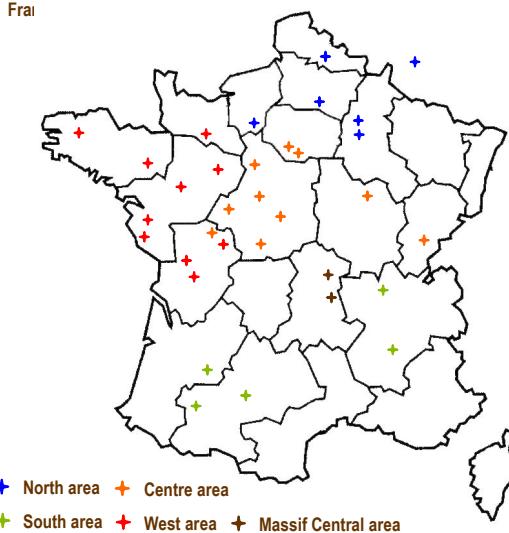


Bread wheat variety testing in organic farming in France: contributions to organic breeding programmes

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The acreage of bread wheat is considerable in French organic agriculture (about 30 000 ha in 2006), being one of the most important cash crops for organic farmers in France. The question of the kind of varieties organic farmers should be using is therefore very important. As most of varieties available on the market were bred for conventional farming systems (with high inputs of mineral fertilizers and chemicals for crop defense), it is important i) to screen current varieties to find the best suited for organic conditions, and ii) to rapidly obtain suitable varieties that are specifically bred for organic farming conditions. A ringtest of bread wheat variety trials has been set up under organic conditions in France since year 2000. The aims of this ringtest are not only to compare varieties, but also to support organic breeding.

Figure 1. Localisation of wheat variety trials in organic farming in France



Ringtest of cereals variety trials in organic farming

- About 30 trials each year for wheat (10 for triticale), a large range of soil types and climatic conditions
- Trials are independent, run by Chambres d'Agriculture, Arvalis, INRA, Organic Associations, ... ITAB coordinates the network.
- Beginning of network in 2000. Processed results over the years (data combined across sites and years) by ITAB and Arvalis.
- Referent varieties : Renan (29 % of acreage of wheat in 2006) for compromise between yield and proteins, Saturnus for high level of proteins, Attlass for high level of yield.
- Difficulties: to have common varieties and common notations, to centralise data in order to process results within large areas



Objectives

- To determine relative performance of cereal varieties grown under organic conditions
 - Conventional varieties with traits that are supposed to best answer organic constraints (good response to low level of nutrients, good competitive ability against weed, ...)
 - Foreign varieties, with priority to those specifically bred for organic agriculture (Swiss, Austrian, German and Italian cultivars are tested)
 - Advanced lines from french specific organic breeding programmes
- To provide information for organic breeding programmes
 - Ringtest gives the opportunity to evaluate ability of lines bred for organic farming to meet the farmers and millers demand (agronomic and quality traits)
 - Trials are used to study specific traits required for organic farming (such as weed competition), to transfer them as selection criteria in specific breeding programmes

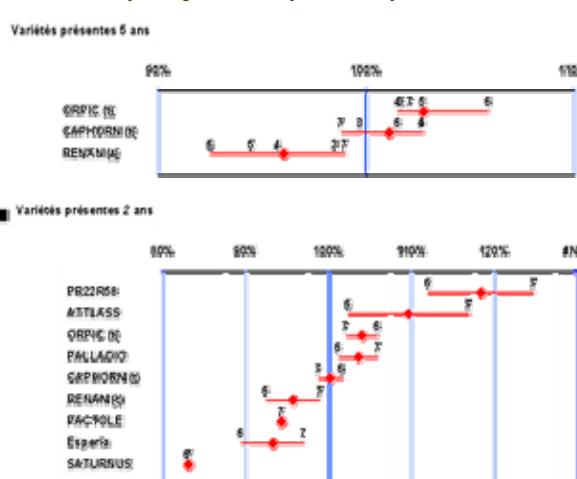
Examples of results for South area in 2007 (figures 2, 3)

Data are combined by sites for results of the year, and by years for varieties in common

Figure 2. Yield in south area (in % of common varieties) for

- 3 varieties that have been in trials for 5 years
- 9 varieties that have been in trials for 2 years

Numbers above red line give year of trials (7 for 2007, etc.). A short line indicates stability, a long line variability of the variety.

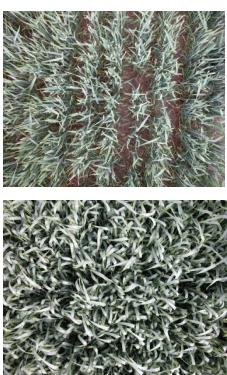
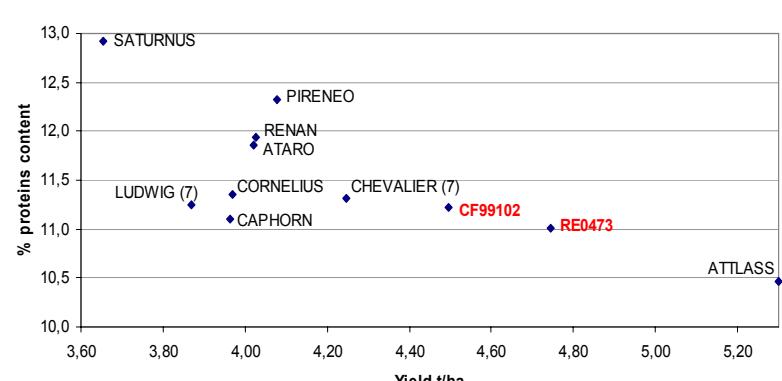


INRA wheat variety trial in Rennes, May 2006

Evaluation of advanced lines in the ringtest (figures 4, 5)

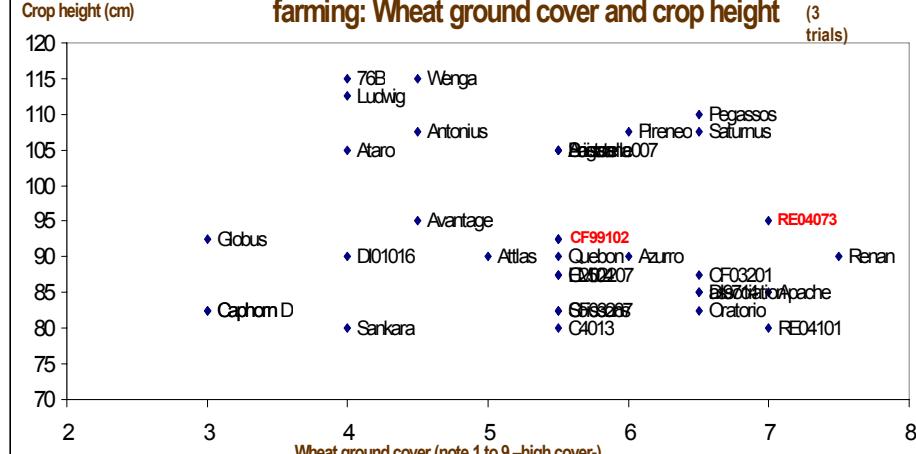
Figure 4. Relative performance of 2 wheat lines bred for organic farming (yield and proteins content)

Year 2007, 8 trials (2 varieties in 7 sites)



Differences of wheat ground cover. CAPHORN above, RENAN below (pictures 2 m above ground).

Figure 5. Relative performance of wheat lines bred for organic farming: Wheat ground cover and crop height (3 trials)



Discussion

Organic farmers need bread wheat varieties suitable for both organic conditions (agronomic traits) and organic market demand (quality traits). Already in France some initiatives exist to set up specific organic breeding programs to meet the requirements for adapted genotypes. Besides the screening of conventional varieties, national network of variety trials in organic farming complete those breeding programs, as they give information of performances of advanced lines and help to improve selection criteria. A problematic issue which needs more attention is the registration system, not being adapted to lines for very low input and organic conditions. Therefore another value of the national network would be to transform some of the trials into official VCU trials. This still has to be discussed. In 2007/2008, there is a special experiment going on for the first time in organic field: national organism dealing with evaluation of cultivars (GEVES) is testing a durum wheat line from INRA participatory breeding programme. One site is in organic farming and part of the national screening network.

