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ENCOURAGING REGISTRATION OF VARIETIES FOR ORGANIC AGRICULTURE IN FRANCE

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Abstract: France aims to establish a national catalogue with varieties suitable for organic production to support the development of organic agriculture. To this end, proposals are to clarify the criteria specific to varieties for organic production, based on the needs of organic sectors, and to build evaluation systems adapted to each species, combining, at different levels, trials under organic and conventional conditions.

Introduction:

In Europe, marketing of seeds and seedlings is based on the registration of varieties in the EU common catalogue. In a context of strong development of organic agriculture, it is important that users have access to adapted varieties. The possibility to register them in the catalogue is therefore essential to increase the supply of suitable varieties for organic farming (OF), and it requires that VCU testing is not anymore only based on conventional farming approaches.

In France, the implementation of variety policy is managed, on behalf of the Ministry of Agriculture, by the CTPS (Permanent Technical Committee for Plant Breeding) and the management of the catalogue is carried out by GEVES (Varieties and Seeds Study Group). In 2017, the CTPS-GEVES set up a cross-cutting commission, the CISAB, in charge of encouraging the inclusion of the specific demands from organic farming in the regulations for the registration of each species.

This article reports on the progress of the work and reflections of CISAB, currently focused on arable crops, as well as on the resulting proposals.

Material and methods:

In addition to the expertise of its members, CISAB's work is based on the results of recent research projects (French national project "ECoVAB"; European H2020 project "Liveseed") and on the lessons learned from French approaches to registering bread wheat varieties in OF [7].

Various studies on evaluation and registration practices in other European countries were also taken into account [4]. Besides, the expectations of French organic farmers and cooperatives regarding the traits sought for arable crop varieties were investigated [2] and used.

A specific work of CISAB was to focus on the differences between OF and conventional farming (CF). Which specific traits are sought in OF? Which ones, if assessed in CF, are transposable to OF? Are there common growing conditions in OF, little or not encountered in CF, which require specific evaluations? What are the genotype x management mode interactions, when data are available in OF and CF on common varieties? The objective of quantifying the differences between OF and CF is to identify which valuations of data acquired in CF are possible in OF (and vice versa), in order to optimize the implementation and cost of evaluation systems for the official registration of varieties meeting the needs of OF.

Results:

In terms of variety description (i.e. assessing phenotypic traits), it appears that for certain criteria the demand for variety characterization is much more prevalent in OF than in CF, or even specific [3].

Thus, the evaluation of weed competitiveness of varieties is a recurrent demand, identified for many years [5]. It is strongly linked to the dynamics of canopy architecture during the cropping season (rapid covering capacity, high plant height, relevant leaf characteristics), including early vigour.

Efficiency of nutrient uptake is another important criteria. The lack of use of mineral nitrogen fertilizers in OF does not have the same impact for winter wheat whose yield and quality depends on quantity of nitrogen supply, and pulses which use rhizobium to capture nitrogen from the air.

Resistance or tolerance to diseases and pests is sought, being important levers mobilized in global strategies to control pests and diseases. The references from the CF are clearly useful for OF. Nevertheless, OF requires also evaluations for diseases that are little or not studied for CF, such as ascochytiopsis of faba beans, or common bunt for wheat.

In addition to the phenotypic description of the variety, evaluating it from the point of view of the system and interactions with the agro-ecosystem in which it is grown is also important. Thus, since the practice of crop associations is widespread in OF, the question of evaluating varieties in associated cultivation arises, in order to identify whether certain varieties are more suitable for this type of cropping system. In the case of soybean, its organic cultivation in France is much more widespread in non-irrigated systems than in CF. This has led to the start of an evaluation of the tolerance of soybean varieties to water stress.

It is also important to consider differences in use and processing. In organic farming, there are more local food systems, farm-made products for human consumption, which can lead to adapting the characteristics required for processing value, but also calling into questions the nutritional and organoleptic qualities.

Discussion:

The approach can be divided in three steps. First step is to identify traits sought by organic farmers, processors and consumers; the second is to build testing systems; and the final step is to adapt registration rules.

For each trait, its sensitivity to production systems (OF or CF) has to be considered. If varieties ranking is not impacted by the cropping system (weak genotype x management interaction), the trait could be evaluated just as well in OF as in CF.

This is the case for the most heritable traits such as height, precocity, and most disease resistances (especially for major genes). This also seems to be the case when cultivation management is very close between organic and conventional.

For instance, in soybean management, only weeding differs and the varieties cultivated in France are roughly the same

regardless of the cultivation system. This led to having 2 trials out of 12 run under OF in the French national testing network used for soybean registration. On the opposite, for wheat, differences in nitrogen nutrition between OF and CF strongly influence variety behaviour; references acquired in CF are not sufficiently predictive of organic references, particularly for breadmaking value [6]. Consequently, for the registration of bread wheat, evaluation of yield and baking value is carried out based on tests specifically conducted in OF.

New study protocols need to be developed to assess certain criteria. For example, GEVES is currently working on the validation of an early detection test for bunt to be included in the organic registration regulations for wheat varieties [1]. Finally, CISAB has proposed an approach to identify different evaluation systems according to the species: it depends on the size of the gap between OF and CF practices, the importance of the variety x management interaction, the economic importance of the species and the varietal turnover rate (Figure 1). Depending on the varieties, the evaluation systems will include more or less organic or conventional trials.

The registration decision is the final stage of the evaluation. As in France registration rules set out the required traits and help to target plant breeding, they need to be reviewed to give more weight to the characteristics important for OF.

Figure 1: The different evaluation systems for registering varieties adapted to OF

Conclusion

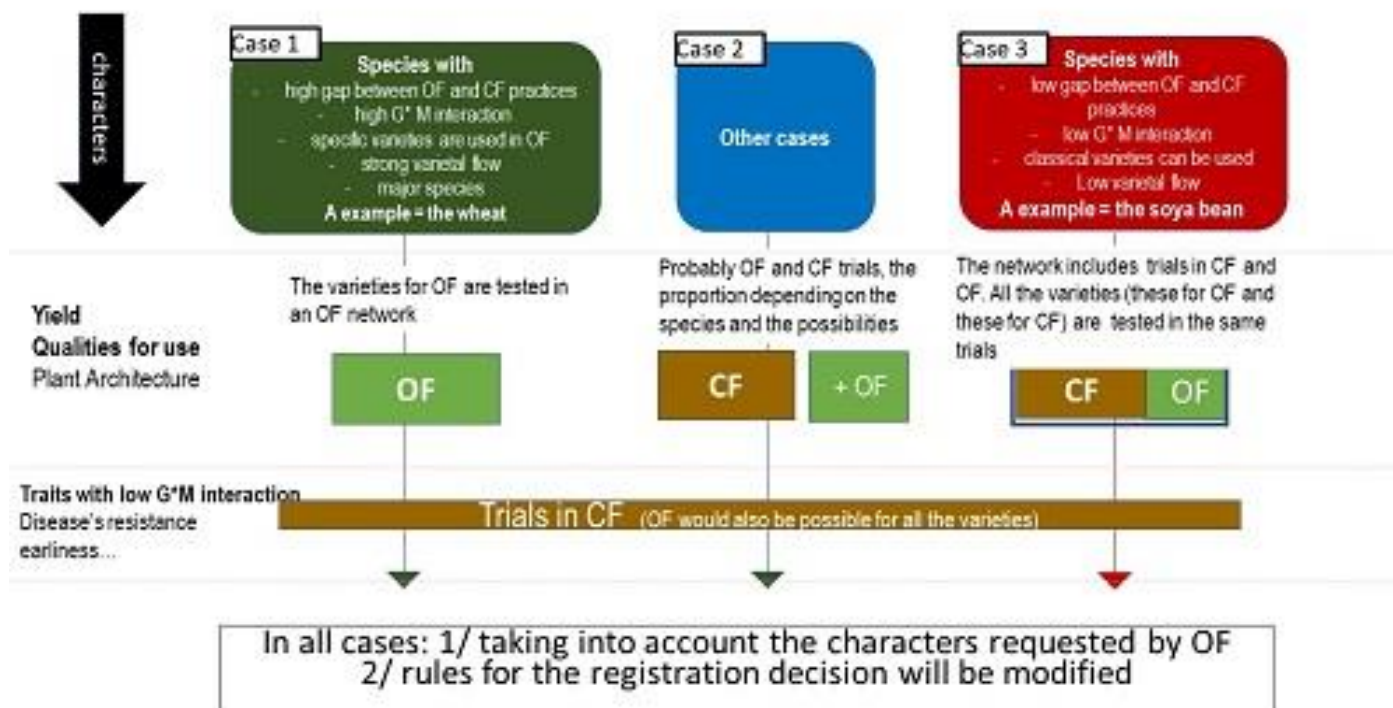
The work carried out shows that, in order to encourage the registration of varieties adapted to OF in the catalogue, it is important to carry out (at least partial) varietal evaluations in OF, it also shows that it is possible to take advantage of references acquired in CF, with a view to saving money and to be able to take into account all species but also to learn from each other between different farming systems. Indeed, French and European agriculture are going to shift towards environmentally friendly systems, with less pesticides and significant reductions in synthetic nitrogen. Registration regulations must therefore evolve in order to promote more hardy and resilient varieties, for organic but also for conventional productions.

References:

- [1] Cadot V , and al, 2018, Etude des virulences prédominantes en France et mise au point d'un test de résistance pour l'inscription au Catalogue français des variétés de blé tendre déposées en AB Végéphyll - 12e Conf. internationale sur les maladies des plantes, Tours – 11 et 12 Décembre 2018, 11p.
- [2] Fernier A., Fontaine L., Conseil M., 2016. Avis et attentes de la collecte sur les variétés en grandes cultures biologiques – Bilan 2015, ITAB
- [3] Fontaine L, Bernicot MH., Le Gall C., 2019. Les enjeux de l'évaluation variétale pour les grandes cultures en AB. Actes des 2es Rencontres des Grandes Cultures Bio, 22 janvier 2019, pp.36-39.
- [4] Kovács T., Mariegaard Pedersen T., 2019. Overview on the current organizational models for cultivar testing for Organic Agriculture over some EU countries, Liveseed H2020 Deliverable 2.1
- [5] Lammerts van Bueren E.T., 2002. Organic plant breeding and propagation: concepts and strategies. PhD Thesis Wageningen University, The Netherlands, 210 pp
- [6] Le Campion A., Oury F.X., Morlais J.Y., Walczak P., Gardet O., Gilles S., Pichard A. et Rolland B., 2013. Quelle(s) sélection(s) du blé tendre pour l'agriculture biologique? Innovations Agronomiques. N°32, 443-454.

[7] Rolland B., Fontaine L., Mailliard A. & Oury F.-X, 2017. From selection to cultivation with the support of all stakeholders: the first registration in France of two winter bread wheat varieties after value for cultivation and use evaluation in organic farming systems. *Organic Agriculture*, 7 (1) : 73-81

Image:



Disclosure of Interest: None Declared

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