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Perception among Farmers for Yield and Yield Stability under Organic Farming

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Yield stability means the ability to continue on the same yield from year to year is the major concern in organic farming which is generally better with organic agriculture, except in cases of pest outbreaks. Organic farming is more prone to weeds and pest outbreaks, thus, yield stability can be worse in those cases. Yield stability can be either better or worse in organic production. But farmers generally assume that yield stability is always lower in organic agriculture compared to conventional farming system. Although it is true regarding low yield stability in some instance but there is a great scope of organic farming system.

Introduction

The dependability of an organic farming system is not only on (high) yield levels with low inputs, but also on yield stability. The fluctuation in yield stability is significantly high under organic farming compared to conventional farming system and that is the main reason of poor growth of organic market share. Although, organic farming systems aim at enhancing the self-regulatory ability and resilience in the farm-ecosystem. The first and foremost requirement of organic farmers is to have the higher yield stability through improved adaptation to organic farming systems and less yield reduction. They do not require varieties with a higher yielding capacity because of losing such profit by increased diseases susceptibility.

It is very important in conceptualization of variety requirements and organic breeding programmes that breeders should have close contact with organic farmers to better understand the organic farming system with its possibilities and limitations, and to benefit especially from the traditional knowledge of the farmers in their way of noting important plant architectural or growth dynamically aspects that can contribute to a higher yield stability. The breeders can support farmers in search of the best varieties for organic farming systems.

Perception among farmers for organic farming depends on many factors:

1. Whether it can be or become economically competitive with conventional agriculture. This depends on- (i) productivity of organic agriculture, (ii) demand for its products, and (iii) on the extent to which consumer prices reflect costs of externalities associated with both production orientations, including costs of environmental and health externalities. This factor therefore also has a strong policy component.

2. Competing claims on land and competition over other resources needed for food, feed and the bio-based economy and more importantly on natural conservation play an essential role.
3. The relationship between the type of agriculture and biodiversity is relevant.
4. As global food security has become a primary concern (Godfray *et al.*, 2010), the productivity of organic agriculture and its contribution to feed the world is an important factor.

Table 1. Desired variety characteristics and crop ideotypes for organic farming

Variety characteristics	Criteria
Adaptation to organic soil fertility management	Adaptation to low(er) and organic inputs; ability to cope with fluctuating N-dynamics (growth stability); efficient in capturing water and nutrients; deep, intensive root architecture; ability to interact with beneficial soil microorganisms, like mycorrhizae, atmospheric nitrogen-fixing bacteria; efficient nutrient uptake, high nutrient use efficiency.
Weed suppressiveness	Plant architecture for early soil cover and more light-competition, allele-chemical ability; allowing and resisting mechanical/physical control.
Crop health	Monofactorial and polyfactorial, durable resistance; field tolerance; plant morphology; combining ability for crop or variety mixtures; capable of interaction with beneficial microorganisms that enhance plant growth and suppress disease susceptibility.
Seed health	Resistance/tolerance against diseases during seed production, including seed-borne diseases; high germination percentage; high germination rate; high seedling vigour.
Crop quality.	Early ripening; high processing/baking quality; good taste; high storage potential.
Yield and yield stability	Maximum yield level and yield stability under low-input conditions

Designing ideotypes with a participatory approach among farmers, breeders and traders can contribute to a more adequate selection of varieties suitable for organic farming systems. Breeding programmes for new 'organic' varieties based on the proposed organic crop ideotype may benefit not only organic farming systems, but will also benefit conventional systems moving away from high inputs of nutrients and chemical pesticides. There are examples that show that as long as chemicals are relatively cheap (conventional) farmers will prefer highly productive varieties to more resistant and sometimes less productive ones (Bonnier and Kramer, 1991). This development prevents in some cases the marketing of resistant varieties for organic agriculture, as in the case of spring wheat (Lammerts van Bueren and Osman, 2002). This means that more research is needed to further optimize the organic farming system and to understand the different interactions within the farming system, including research on the role of variety improvements. In our experiences with variety trials with organic farmers the farmers in general do not so much look for higher yield potential, as for 'reliable' varieties that are able to cope with unfavorable weather and soil conditions.

Conclusion

There are enough arguments and perspectives to adapt organic farming systems. Additional research will be needed to integrate new traits in breeding programmes especially for organic farming. Traits like adaptation to organic soil fertility management require selection under organic soil conditions. New varieties, ideotypes and inter disciplinary approach in organic agriculture will outperform the conventional farming.

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