



Organic Breeding: A Way to Cultivate Healthier Harvests

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In recent years, the global agricultural landscape has witnessed a significant shift towards more sustainable and environmentally friendly practices. One crucial aspect of this movement is organic breeding, a method that prioritizes natural processes and biodiversity conservation. Organic breeding stands as a beacon of hope in an era where concerns about food security, climate change, and ecological sustainability are at the forefront.

Organic breeding, an intricate blend of traditional methods and modern scientific advancements, stands as a cornerstone in the sustainable and healthier production of crops. This method of plant breeding prioritizes natural processes, eschewing synthetic chemicals and genetically modified organisms (GMOs) to foster resilience, taste, and nutritional value in plants.

Why?

- **Sustainability:** Organic breeding aims to create crops that are well-suited to organic farming techniques, with an emphasis on natural inputs and a reduction in reliance on synthetic pesticides. This encourages sustainable agricultural systems by reducing the environmental effect of conventional farming.
- **Resilience to Pests and Diseases:** Organic breeding aims to create varieties that are naturally resistant or tolerant to pests, diseases, and environmental stresses. This reduces the need for chemical interventions, contributing to the overall health of ecosystems and reducing agricultural chemical runoff.
- **Preservation of biodiversity:** Organic breeding often involves utilizing diverse genetic resources, including heirloom or traditional varieties. This helps to conserve biodiversity in agriculture by retaining valuable genetic features and providing farmers with more alternatives.
- **Adaptation to local conditions:** Organic breeding programmes concentrate on creating varieties that are well-suited to certain local climates, soils, and conditions. This localized method decreases dependency on external inputs, making farming more robust to changes and promotes regionally sustainable agriculture.
- **Reduced reliance on synthetic outputs:** Organic breeding endeavors to create crops that require fewer synthetic inputs such as pesticides, herbicides, and fertilizers. Organic farming becomes more economically feasible and ecologically beneficial by minimizing dependency on these inputs.
- **Consumer demand for organic products:** With rising global demand for organic goods, there is a greater need for enhanced organic cultivars that fulfill the criteria and desires of customers seeking healthier, more sustainably produced food.
- **Regulatory compliance:** Organic certification standards often require the use of organic seeds or varieties. Thus, the availability of suitable organic varieties becomes essential for farmers seeking organic certification.

Methods involved in organic plant breeding

- **Population breeding** : This approach involves breeding a population of plants instead of individual lines. The goal is to maintain genetic diversity within the population, allowing for the adaptation of various plants to different environmental conditions. This method is particularly useful for organic farming, where diverse traits are needed for resilience.
- **Participatory plant breeding** : This method involves collaboration between plant breeders and farmers. Farmers participate in the selection process, evaluating and choosing plants that perform well under local organic farming conditions. This approach ensures that new varieties are well-suited to the needs of local farmers and ecosystems.
- **Organic trait evaluation** : Throughout the breeding process, emphasis is placed on evaluating traits under organic farming conditions. This includes assessing resistance to pests and diseases without chemical interventions and evaluating adaptability to organic soil management practices.
- **Hybridization** : Controlled cross-breeding between different plant varieties or species is a common method in organic breeding. This technique aims to combine desirable traits from two different parent plants, such as disease resistance from one variety and high yield from another.

Organic seed production

Producing organic seeds involves adhering to specific organic farming practices throughout the seed production process. The steps involved in producing organic seeds through plant breeding include:

1. **Field Selection and Isolation:** Organic seed production begins with the selection of suitable fields that meet organic requirements and are free of prohibited chemicals. Isolation distances are kept as short as possible to avoid cross-pollination with non-organic or genetically modified crops. This guarantees genetic purity and keeps contamination at bay.
2. **Seed Selection and Breeding:** Selecting parent plants with desirable traits suited for organic agriculture. Traditional breeding methods such as selection, cross-breeding, or hybridization are used to develop new varieties that exhibit characteristics like disease resistance, adaptability, and high yields without the use of synthetic chemicals.
3. **Crop Management:** Throughout the growing season, organic farming practices are employed, including the use of organic fertilizers i.e. compost and manure, natural pest control methods i.e. crop rotation and beneficial insects, and weed management through mulching and hand weeding.
4. **Pollination and Seed Development:** Careful management of pollination ensures that the desired plants are fertilized by pollen from suitable, compatible plants. The plants are allowed to mature and produce seeds naturally. Attention to preventing cross-pollination from non-organic sources is critical to maintain the purity of the organic seeds.
5. **Harvesting:** Seeds are harvested when they are mature and dry. Harvesting methods ensure minimal contamination and maintain seed quality. This includes proper drying and handling to prevent mold or degradation.
6. **Cleaning and Processing:** After harvesting, the seeds are cleaned to remove debris and other plant materials. Organic seed processing facilities must follow organic certification standards to ensure the integrity of the organic seeds. This includes equipment sanitation, storage, and packaging procedures compliant with organic regulations.
7. **Certification:** Organic seeds must undergo certification processes to verify their organic status. This involves documentation and inspection by certifying agencies to ensure compliance with organic standards from field to packaging.

8. **Storage and Distribution:** Organic seeds are stored in optimal conditions to ensure viability and quality. They are then distributed to organic farmers and gardeners, often accompanied by documentation to confirm their organic certification status.

Challenges

Despite its numerous benefits, organic breeding faces several challenges. Limited funding and research support compared to conventional breeding methods hinder the widespread adoption and development of organic varieties. Additionally, the time-consuming nature of organic breeding processes often requires more extended periods to develop new cultivars compared to conventional breeding methods.

To overcome these challenges, greater investment in research and development, collaborative efforts among farmers, breeders, and policymakers, and increased consumer awareness and demand for organic products are crucial. Governments, research institutions, and agricultural organizations must allocate resources and support initiatives that advance organic breeding techniques and facilitate their integration into mainstream agricultural practices.

Conclusion

Organic breeding is essential as it aligns with the principles of organic agriculture, promotes sustainability, reduces environmental impacts, preserves biodiversity, and offers solutions tailored to the needs of organic farmers and consumers seeking healthier and more environmentally friendly food options.

Throughout these steps, adherence to organic principles and standards is essential, including the exclusion of synthetic chemicals, GMOs, and adherence to organic practices outlined by certification bodies. Organic seed production plays a crucial role in supporting organic agriculture by providing farmers with high-quality seeds adapted to organic farming.