Unlocking the Potential of Underutilized Horticultural Crops

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Underutilized horticultural crops, often referred to as neglected or minor crops, are a diverse group of plant species that have the potential to significantly contribute to global food security, nutrition, and sustainable agriculture. These crops, which are not widely traded or grown on a large scale, are rich in nutrients, adaptable to various agroecological conditions, and can help improve the resilience of farming systems in the face of climate change.

Nutritional and Economic Benefits

Underutilized crops are valued for their high content of vitamins, minerals, and proteins, making them important components of a balanced diet. They are also tolerant to harsh environmental conditions, which can make them more resilient to climate change. By incorporating these crops into farming systems, rural communities can improve their food security and nutrition, while also generating income from the sale of these crops.

Research and Development

Recent years have seen a shift in policy and research efforts towards harnessing the benefits of underutilized horticultural crops. The use of omics approaches, such as genomics, proteomics, and metabolomics, has provided valuable insights into the biology of these crops, helping to improve their production and nutritional qualities.

Challenges and Opportunities

Despite their potential, underutilized horticultural crops face several challenges, including a lack of availability of planting material, limited awareness of their nutritional and medicinal importance, and a lack of information on production techniques. However, these challenges also present opportunities for research, development, and policy interventions to promote the cultivation and consumption of these crops.

Government Initiatives

Governments around the world are taking steps to address the challenges associated with underutilized horticultural crops. For example, the Indian government has launched initiatives such as MIDH (Mission for Integrated Development of Horticulture), MEIS (Merchandize Export from India Scheme), and a national coordinated project to promote research on underutilized crops.

Some other important highlights on Underutilized Horticultural Crops

Underutilized horticultural crops offer numerous benefits and play an important role in global food security, nutrition, and sustainable agriculture. Some of the key importance of underutilized crops include:

1. Nutritional value: Underutilized crops are rich in vitamins, minerals, and proteins, making them important components of a balanced diet.

2. Adaptability: These crops are often adapted to harsh agro-climatic conditions, making them more resilient to climate change.

3. Diversification: Underutilized crops can help diversify crop rotation, improving soil health and reducing the incidence of pests and diseases.

4. Food security: By expanding the range of crops grown, underutilized crops can contribute to food security, particularly in regions where traditional crops are not sufficient.

5. Income generation: Underutilized crops can provide income for rural communities, helping to alleviate poverty.

6. Cultural biodiversity: These crops are linked to the cultural heritage of their places of origin, and their cultivation helps to preserve cultural biodiversity.**7. Medicinal properties:** Many underutilized crops have medicinal properties, making them valuable for traditional medicine and pharmaceutical industries.

8. Environmental services: Underutilized crops are adapted to marginal soil and climate conditions, and their cultivation can help to mitigate environmental problems.

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By addressing the challenges associated with underutilized horticultural crops, researchers, policymakers, and farmers can work together to unlock their full potential and contribute to a more resilient and equitable global food system.

Characteristics and Potential Uses of Indigenous Underutilized Fruit Crops

Abiotic stresses caused by environmental factors are the most common yield-limiting factors globally, and they cause up to 70% of the yield losses in major fruit crops. In order to cope with abiotic stresses, the arid-zone underutilized fruit crops, such as ber (*Zizyphus spp.*), aonla (*Emblica officinalis*), bael (*Aegle marmelos*), jamun (*Syzigium spp.*) and wood apple (*Feronia limonia*), have modified and/or developed their organs to assure vital morpho-physiological functions (i.e., strong deep root system, a high root-to-shoot ratio for reaching into deeper moist soil layers and uptake more water and nutrients.

Similarly, crops such asber, bael, lasora (*Cordia mixa*) and pilu (*Salvadora persica*) have round, thick and barked stems for easier water storage and reduced cuticle transpiration.

Some crops such as kair (*Capparis decidua*), lasora, aonla and pilu have synchronized flowering and fast fruit development during the season characterized by larger moisture availability. Crops such as ber, phalsa and bael exhibit leaf shedding/dormancy for reducing water loss in summer and for protecting the plants from frost in winter.

Similarly, other underutilized crops possess numerous morphological characters, such as spines instead of leaves (ber), scanty foliage (kair), spiny cladodes (prickly pear), mucilaginous sap for reduced transpiration loss (kair, lasora, pilu, bael, etc.), small-sized and thick leaves, fur/hairiness and waxy coating on the leaf surface and sunken and deep stomata, for water saving through the reduction in transpiration rate and heat shocks (ber, phalsa, lasora, fig), and selective or reduced absorption of cation and anions. These characteristics are also associated with the accumulation of osmolytes, compatible organic and inorganic solutes (proline, phenolics, flavonoids, soluble sugars, glycine, betaine, etc.), and biosynthesis of enzymatic and non-enzymatic antioxidants, heat shock proteins and drought-responsive genes to maintain cell turgor, allowing better survival under the adverse conditions of arid and semi-arid environments.

In addition, the genetic basis of the adaptive traits deserves to be studied because this information could be used in future breeding programs that may also involve novel tools, such as genome editing. These underutilized fruit crops may represent the next generation of futuristic crops, which could enhance the farmer's income through sustainable production systems even under a climate-change scenario.

Some examples of underutilized horticultural crops include

Fruits and Nuts

Citrus grandis	Pummelo
Cornus mas	Cornelian Cherry
Anacardium occidentale	Cashew
Annona cherimola	Cherimoya
Annona muricata	Soursop
Annona squamosa	Sugar apple
Artocarpus heterophyllus	Jackfruit
Averrhoa carambola	Star Fruit

Kair

Wood apple

Aonla

Ber

Bael

Vegetable Crops

Amaranthus spp.	Amaranth
Asparagus officinalis	Asparagus
Lactuca sativa	Lettuce
Apium graveolens	Celery
Allium porrum	Leek
Cynara scolymus	Globe Artichoke
Amorphophallus campanulatus	Elephant Foot Yam
Brassica oleracea var. gemmifera	Brussels Sprouts
Brassica oleracea var. gemmifera	Brussels Sprouts
Brassica oleracea var. acephala	Kale
- Brassica compestris spp.	Chinese Cabbage
- Psophocarpus tetragonolobus	Winged Bean
- Canavalia ensiformis	Jack Bean
Cucumis anguria	Pointed Gourd

Kale

Pointed gourd

Winged bean

Brussels Sprouts

These crops are considered underutilized due to a variety of reasons, including lack of availability of planting material, limited awareness of their nutritional and medicinal importance, and lack of information on production techniques. By addressing these challenges, researchers, policymakers, and farmers can work together to unlock the full potential of underutilized horticultural crops and contribute to a more resilient and equitable global food system.

Conclusion

Underutilized horticultural crops offer a wealth of opportunities for improving food security, nutrition, and sustainable agriculture. By addressing the challenges associated with these crops, researchers, policymakers, and farmers can work together to unlock their full potential and contribute to a more resilient and equitable global food system.

Underutilized horticultural crops are a diverse group of plant species that have the potential to contribute significantly to global food security, nutrition, and sustainable agriculture. While they are not widely traded or grown on a large scale, they offer valuable nutritional and medicinal benefits, as well as adaptability to various agroecological conditions.

Underutilized horticultural crops offer a wealth of opportunities for industrial applications, as well as for improving food security, nutrition, and sustainable agriculture. By addressing the challenges associated with these crops, researchers, policymakers, and farmers can work together to unlock their full potential and contribute to a more resilient and equitable global food system.

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