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EDITORIAL

Promoting orphan crops research and development

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Orphan crops are crops with little significance at the global scale but they play a vital role in the food and nutrition security as well as the livelihood of resource-poor farmers and consumers in the developing world. The term 'orphan' refers to the neglect of the crop by the international research community. Orphan crops are also known as indigenous-, lost-, minor-, promising-, and underutilized-crops, among other names (Tadele 2019). Although little scientific research has been done on most orphan crops, a limited number of them have enjoyed advanced studies. This has mainly been due to committed scientists and institutions in developing countries as well as financial and technical support from developed nations.

Most orphan crops are resilient to extreme environmental conditions. Due to this adaptability to marginal and low input environments, orphan crops offer opportunities for low greenhouse gas emissions (Mabhaudhi et al. 2019). In addition, these indigenous crops provide nutrient-rich biodiversity and healthier diets to resource-poor consumers (Hunter et al. 2019). Due to multiple dietary benefits and their tolerance to extreme environmental conditions, some orphan crops are considered to be crops for the future.

In this issue, orphan crops from different crop types are represented. Cereals and pseudo-cereals are represented by finger millet (*Eleusine coracana*) (Sood et al. 2019), tef (*Eragrostis tef*) (Chanyalew et al. 2019; Bachewe et al. 2019) and buckwheat (*Fagopyrum esculentum*) (Joshi et al. 2019). Similarly, legumes which are a rich source of protein for the poor are represented by bambara groundnut (*Vigna subterranea*) (Mayes et al. 2019), grass pea (*Lathyrus sativus*) (Lambein et al. 2019; Rathi et al. 2019a, b), rice bean (*Vigna umbellata*) (Pattanayak et al. 2019), horsegram (*Macrotyloma uniflorum*) (Aditya et al. 2019) and winged bean (*Psophocarpus tetragonolobus*) (Tanzi et al. 2019). In addition, leafy vegetable (*Gynandropsis gynandra*) (Sogbohossou et al. 2019) and Cinderella species (Leakey 2019) are also included in the issue.

While conventional breeding techniques have been extensively employed in the improvement of the majority of orphan crops, marker-assisted techniques particularly the use of microsatellites have already been implemented in some of them (Chanyalew et al. 2019; Tanzi et al. 2019; Pattanayak et al. 2019; Aditya et al. 2019). Advanced tools such as genomics, transcriptomics and metabolomics have been applied to a limited number of orphan crops (Rathi et al. 2019b, a; Sood et al. 2019; Joshi et al. 2019). Innovative cropping systems (Leakey 2019) and value-chain approaches involving social scientists (Bachewe et al. 2019) are also being reported.

Among institutions or platforms dedicated to research on orphan crops the activities and progresses are reported for three examples. These are Modern Plant Breeding Platform (Ribaut and Ragot 2019), Crops for the Future (CFF) (Gregory et al. 2019) and the African Orphan Crops Consortium (AOCC) (Hendre et al. 2019). The latter is committed to sequence the genome of 101 African orphan crops. Awareness and promotion of orphan crops have been done at different forums; the most recent was at the International Food for Future Conference held in Cologne, Germany (Succurro et al. 2019).

This issue does not cover the complete spectrum of orphan crops and hopefully this series can be continued and reports can be included on cowpea (*Vigna unguiculata*), enset (*Ensete ventricosum*), minor fruits, quinoa (*Chenopodium quinoa*), sesame (*Sesamum indicum*) and yam (*Dioscorea species*).

In general, papers in this issue provide information related to the improvement of diverse orphan crops. Advances on these largely neglected crops have been made using very limited resources but dedicated researchers and institutions made very respectable progress.

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Board for its decision to promote the awareness of orphan crops through dedicating an entire issue to this topic. To our knowledge, this is the first time an entire issue of a journal has been devoted to *Orphan Crops*.

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