

DOMESTICATION, DEVELOPMENT AND BREEDING OF AROMATIC PLANTS FOR TRADITIONAL AND NOVEL USES

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Medicinal and aromatic plants (MAP) breeding for the culinary use, phytotherapy and the cosmetics is characterized especially by the relatively great importance of values such as the secondary metabolites content and composition, aroma, flavour, or bioactivity. However, the MAP consumer market commonly rejects GM methods. However, modern genomic tools are important for the conventional breeding process. The main traditional tools to achieve this goal are: diversity and variation in the source germplasm and cross-breeding in order to either instil new traits into an existing variety or to achieve "Hybrid vigor" (Heterosis). To achieve variation, an important task preliminary to the breeding process is creation of a wide germ-plasm collection. Plant material of the target crop is collected systematically in order to represent its natural diversity. One excellent way to enhance the genetic variation is artificial crossing of distant genetic sources ("F1") and then either self-pollination of the hybrids ("F2"), what also enable building gene map. On the other hand, by open pollination in the experimental field where all of the genetic types are grown together we can get new combinations of traits that never could be found in nature. Moreover, in some cases interspecific crossing can be done, which may combine values desired by the consumer with those desired by the producer such as resistances or suitability to environmental conditions in the target cultivation area. For effective breeding program, the understanding of the mode of inheritance of the desired traits is also necessary. The whole genome assembling and sequencing is still not common in the case of aromatic plans, but can be effective tool for gene mapping, genetic makers. Examples of all those issues in the breeding process of oregano, rosemary and basil will be presented.

Biography

Nativ Dudai is a Principal Researcher and Breeder in the Unit of Medicinal and Aromatic Plants in the Newe Ya'ar Research Center of the Agricultural Research Organization, Israel. He works on acclimation, domestication and breeding of aromatic and medicinal plants and manages a big living gene bank for this goal. One of his main scopes is development and breeding elite varieties of aromatic plants for year round production. His sweet basil cultivars are leading and renowned in the production of the fresh cut herbs, and he was the first to sequence and assembly its whole genome. His breeding concentrate also in the improvement of the health values of herbs by using classical breeding methods to manipulate their secondary metabolites content and composition. This approach has led to development novel plants and varieties for the phyto-therapy, cosmetics and food industries, such as clary sage as new source of omega-3 oil and rosemary with very high content of carnosic acid for the natural preservative products. He is also involved in research on the bioactivity of plants and their secondary metabolites, mainly the inhibition of germination and growth of plants by essential oils and their anticancer activity.

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