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APPLE MEETS SUGAR BEET – SWEET, RESISTANT AND PRODUCTIVE – A CHALLENGE FOR BREEDING

La pomme à la rencontre de la betterave sucrière – sucré, résistant et productif – un défi à la sélection / Apfel trifft Zuckerrübe – süß, resistent und produktiv – eine Herausforderung für die Züchtung

ABSTRACT

The core competence of the institute in Dresden is focused on collection, conservation and evaluation and documentation of fruit genetic resources as well as on breeding of top and soft fruit cultivars and rootstocks. Research is based on the exploitation of genetic resources and the development of innovative breeding methods in order to improve the efficiency of selection and to increase the gene pool available for the breeder. The institute is the coordination center of the German National Gene Bank. The institute maintains field collections for fruit species, altogether 1,800 different cultivars of domesticated fruit species as well as around 1,000 accessions of related wild species. Fruit breeding is especially focused on resistance breeding to improve health and productivity of fruit plants, and to decrease the demand on plant protection in the sense of a sustainable and environmentally friendly production. In addition, important breeding aims are improvement of fruit quality for fresh market and processing industry as well as high and stable cropping. Breeding is performed in apple, sweet and sour cherries, strawberry and raspberry. The success of fruit breeding depends more and more on the application of molecular and biotechnological breeding methods. Especially marker assisted selection (MAS) has become an essential technology. Moreover, molecular markers are indispensable for pyramidizing resistance genes to increase the stability of resistance in progenies. The present research program is focused on the utilization of new sources for resistance genes, especially in wild species of cultivated forms. On this background, research is covering identification, mapping, functional characterization and isolation of resistance genes. Genetic engineering (cisgenetics) has been used to describe gene functions. Recently, a Fastbreeding Technology in apple was published based on genetically engineered early flowering plants showing a reduced juvenile phase.