The Use of Wild Species for Increasing Apple Diversity and Genetic Found

Cătălin DAN¹, Adriana F. SESTRAS², Doru PAMFIL¹, Sorana D. BOLBOACĂ³, Lorentz JÄNTSCHI⁴, Radu E. SESTRAS¹

¹) University of Agricultural Sciences and Veterinary Medicine, 3-5 Manastur St., Cluj-Napoca 400372, Romania; catalina_dan@yahoo.com; rsestras@yahoo.co.uk
²) Fruit Research Station, 3-5 Horticultorilor St., Cluj-Napoca 400454, Romania
³) “Iuliu Hatieganu” Univ. Medicine and Pharmacy, 13 Emil Isac, 400023 Cluj-Napoca, Romania
⁴) Technical University of Cluj-Napoca, 103-105 Muncii Bvd, 400641 Cluj-Napoca, Romania

SUMMARY

In order to enlarge genetic diversity and increase the possibility to exploit useful variability for selecting new valuable apple genotypes, including resistance to apple scab (Venturia inaequalis) and powdery mildew attack (Podosphaera leucotricha), interspecific pollination was made. Consequently, five wild crab-apple species (Malus coronaria, M. floribunda, M. niedzwetzkyana, M. zumi and M. prunifolia) were crossed with several apple cultivars, including well-known ones like ‘Jonathan’ and ‘Golden Delicious’. 1650 F₁ hybrids of these combinations were studied, from which 53 elite were selected, on the base of acceptable quality of fruits for dessert apple; therefore, on the data mentioned, the intensity of selection was of only 2.42% (Sestras et al., 2010). Part of the elites were open pollinated on the hybrid field (intercross among all F₁ interspecific hybrids), while the others were artificial pollinated with valuable genitors, including ‘Prima’, ‘Rosu de Cluj’, ‘Ancuta’ in a “backcross modified” pattern, to obtain F₂ generation and apply recurrent selection (Crosby et al., 1992; Janick, 2002; Oraguzie, 2003). Inside the F₂ generation, represented by 1400 hybrids, the chances for identifying ornamental selections were higher likely elites to become dessert cultivars. Selection intensity was 2.7% for dessert selections and 5.9% for the ornamental ones. While some elites have the perspective to become directly cultivars, the biological material represent a valuable genetic found, useful to increase apple potential and genetic diversity for future recurrent selection and apple breeding programmes.

Keywords: crab apple, elites, generations, interspecific hybrids, selection, variability

Acknowledgements. This study was financed by the National Council for Higher Education Research (CNCSIS), UEFISCSU, Romania, project PCE-IDIE, no. 1105, code CNCSIS 1499.

REFERENCES