

Genetic identity of the endangered Wild apple (*Malus sylvestris* Mill.) in Belgium as revealed by AFLP and microsatellite markers

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Has hybridisation with cultivated apples caused irreversible damage to the genetic identity of the endangered Wild apple in Belgium?

- Phenotypic intermediates between *Malus sylvestris* and *Malus x domestica* are present
- Need for discrimination between 'genuine' wild genotypes and genotypes related to apple cultivars in order to devise a conservation program

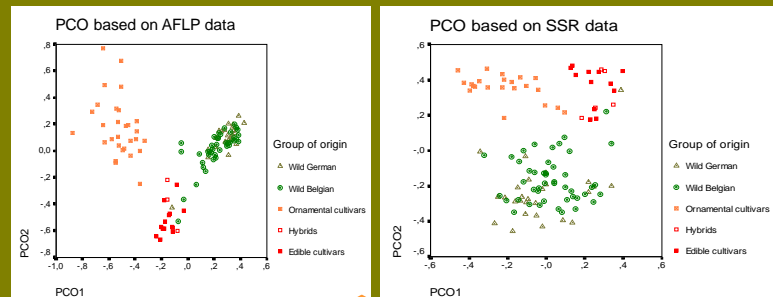
Study based on molecular markers

In total 74 putative wild apples (45 Belgian and 29 German genotypes), 6 presumed hybrids (sampled in the wild) and 39 cultivars (11 edible cultivars, 28 ornamental cultivars) were typed at 12 SSR and 139 AFLP loci.

➤ A model-based clustering method was applied on multilocus SSR data (<http://pritch.bsd.uchicago.edu/>)

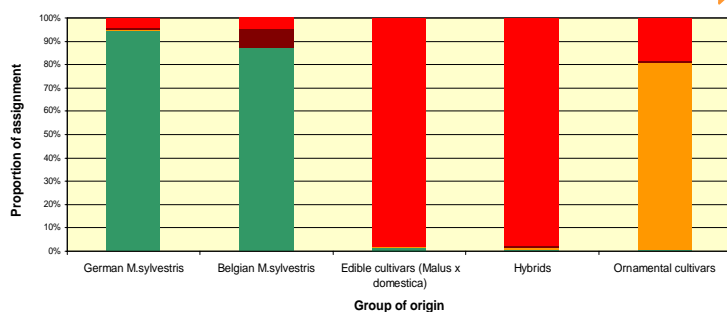
➤ the presence of 4 gene pools was inferred:

- I. All edible cultivars, all presumed hybrids, 2 'wild' genotypes (1 Belgian, 1 German)
- II. The majority of both Belgian and German wild genotypes
- III. All ornamental cultivar
- IV. Three presumed wild genotypes (Belgian)



Principal coordinate analysis on data from both marker systems clustered the apples in three major groups: wild genotypes, edible cultivars and ornamental cultivars.

Assignment of genotypes to four inferred gene pools



All six presumed hybrids and two 'wild' apple trees merged completely into the edible cultivar gene pool and did not form an intermediate hybrid group. No explanation can be given for the classification of three Belgian genotypes in a separate gene pool. All but three genotypes from the wild gene pool were assigned completely to this gene pool. Three Belgian genotypes showed evidence of admixture between *M. sylvestris* and *M. x domestica* with respectively 38%, 24% and 23% of their genes assigned to the edible cultivar gene pool.

Conclusions

- ➔ *M. sylvestris* has not lost its genetic identity, although a very low admixture of wild and cultivated apple gene pools was detected
- ➔ Cultivated genotypes are present in the wild



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