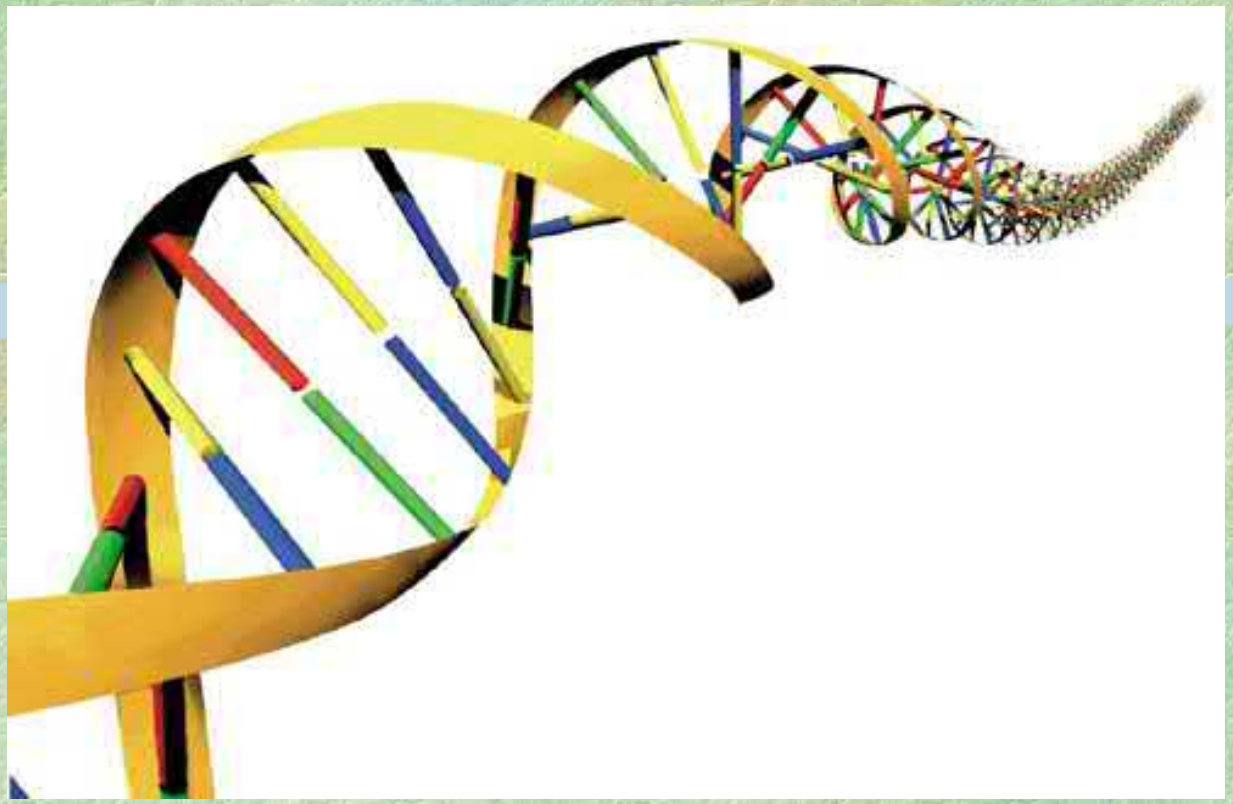
Molecular markers in plums



Balsgård-SLU

2020

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Jasna Sehic

The very best lab technician in the world!

SSR

1. **Multilocus fingerprints** (e.g. AFLP)

2. **Single-locus fingerprints** (e.g. SSR; used for plums in around 20 studies, mainly across Europe; different loci used in many studies)

3. **Large panel of SNPs** (Fruitbreedomics: array with 480.000 [*253.000 in Urrestarazu et al. 2020*] SNPs used in apples)

4. **Diversity Array Technology (DArT) markers** (Brogdale collections: array with 2,688 [*562 in Ordidge et al. 2018*] polymorphic markers in apple)

5. **Re-sequencing**

8 (9) SSR loci used in our plum study

"Genetic assessment of the pomological classification of plum *Prunus domestica* accessions sampled across Europe" by Gasi et al., to appear in GRACE (Genetic Resources and Crop Evolution)

Much information due to polyploidy

Few loci but 17–47 alleles/locus
and 30–35 different alleles/genotype

Serious problems due to polyploidy

In each plant, usually only 1 or 2 loci with all 6 bands
23 genotypes with maximum 5 bands, 2 genotypes with maximum 4 bands, 1 genotype with maximum 3 bands and 1 with maximum 2 bands – both are most likely diploid

Lack of bands due to several copies of the same allele OR because of poor amplifiction?

Synonyms, i.e. > S = 0.88–0.97

Two accessions of Prune de Chien

Mpardaki Circular = Helgøyplomme = RC Souffriau (=RC d'Oullins in previous study)

Besztercei = Pozegaca = Bistrica ≈ Tölcsér Koronájú

D'Ente Double = Double Robe

Prunella = RC Violette

Synonyms or closely related, S = 0.78–0.86

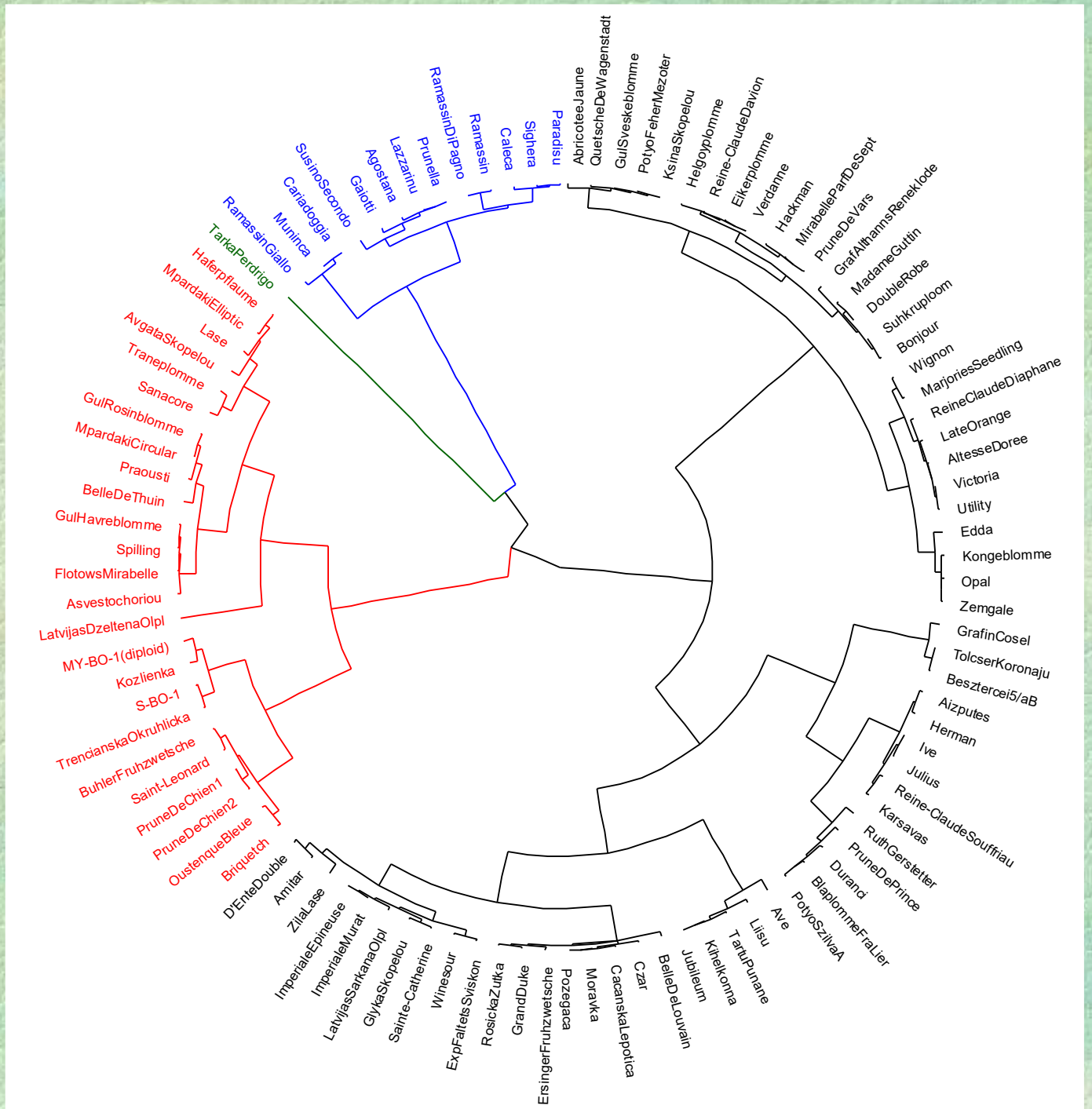
Ramassin Ramassin = Ramassin di Pagno

Cariadoggia = Muninca

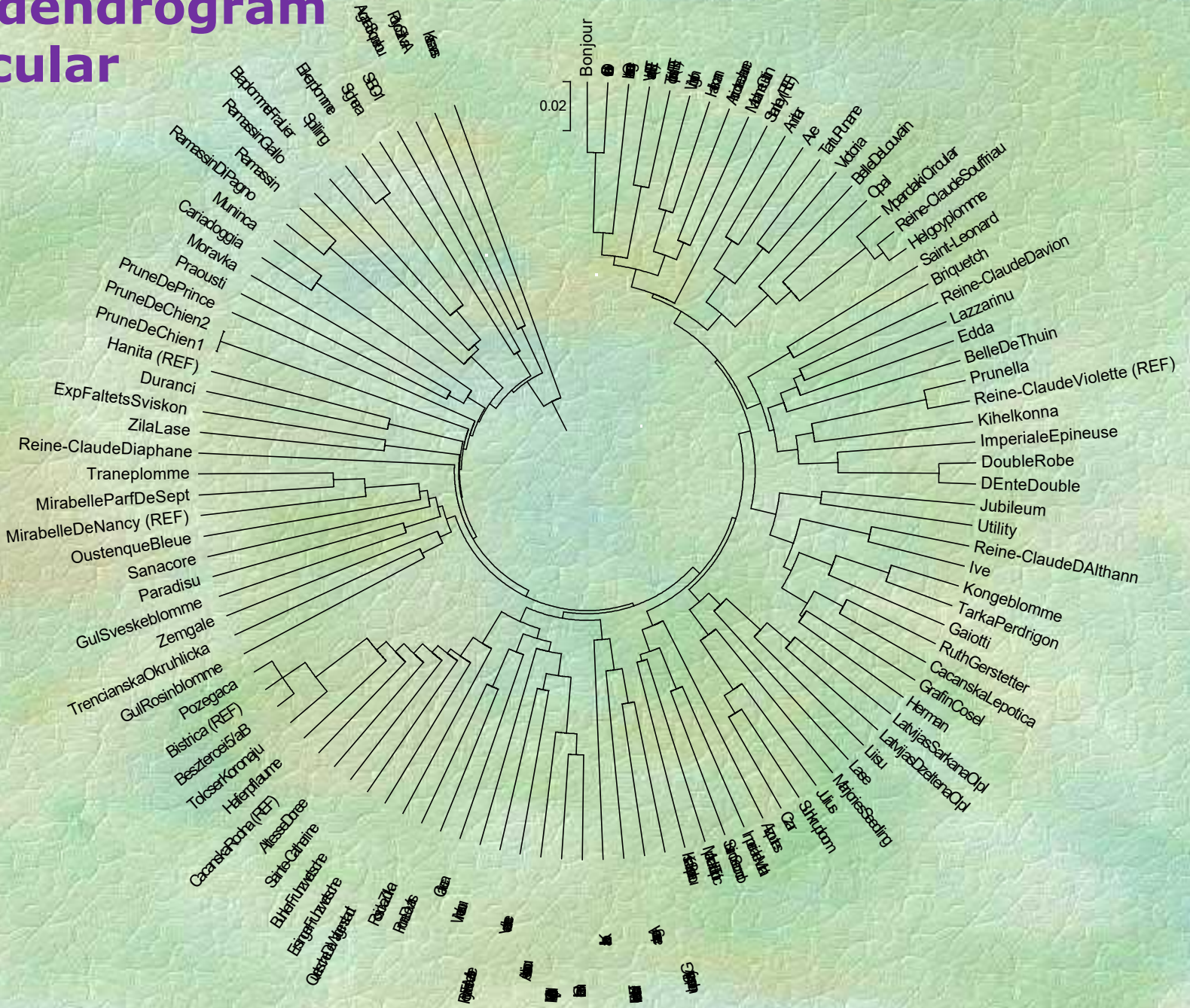
Spilling = Eikerplomme

Tarka Perdrigon = Kongeblomme

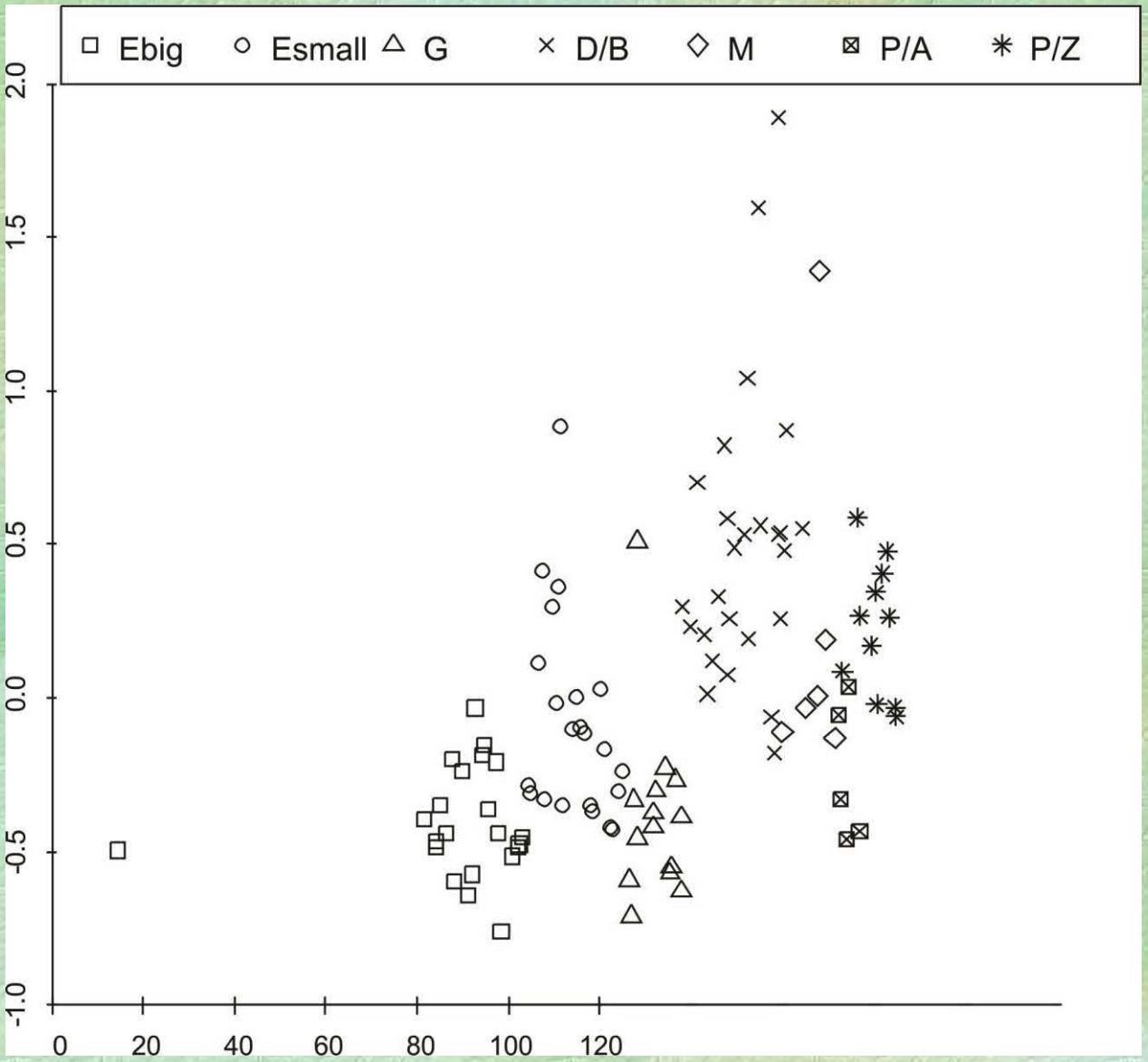
Factorial Analysis of Mixed Data using 20 descriptors



UPGMA dendrogram of molecular data



Factorial Correspondence Analysis of molecular data
grouped according to pomological group



Ebig: eggplums >40 g

Esmall: eggplums <40 g

G: greengages

D/B: damsons and bullaces

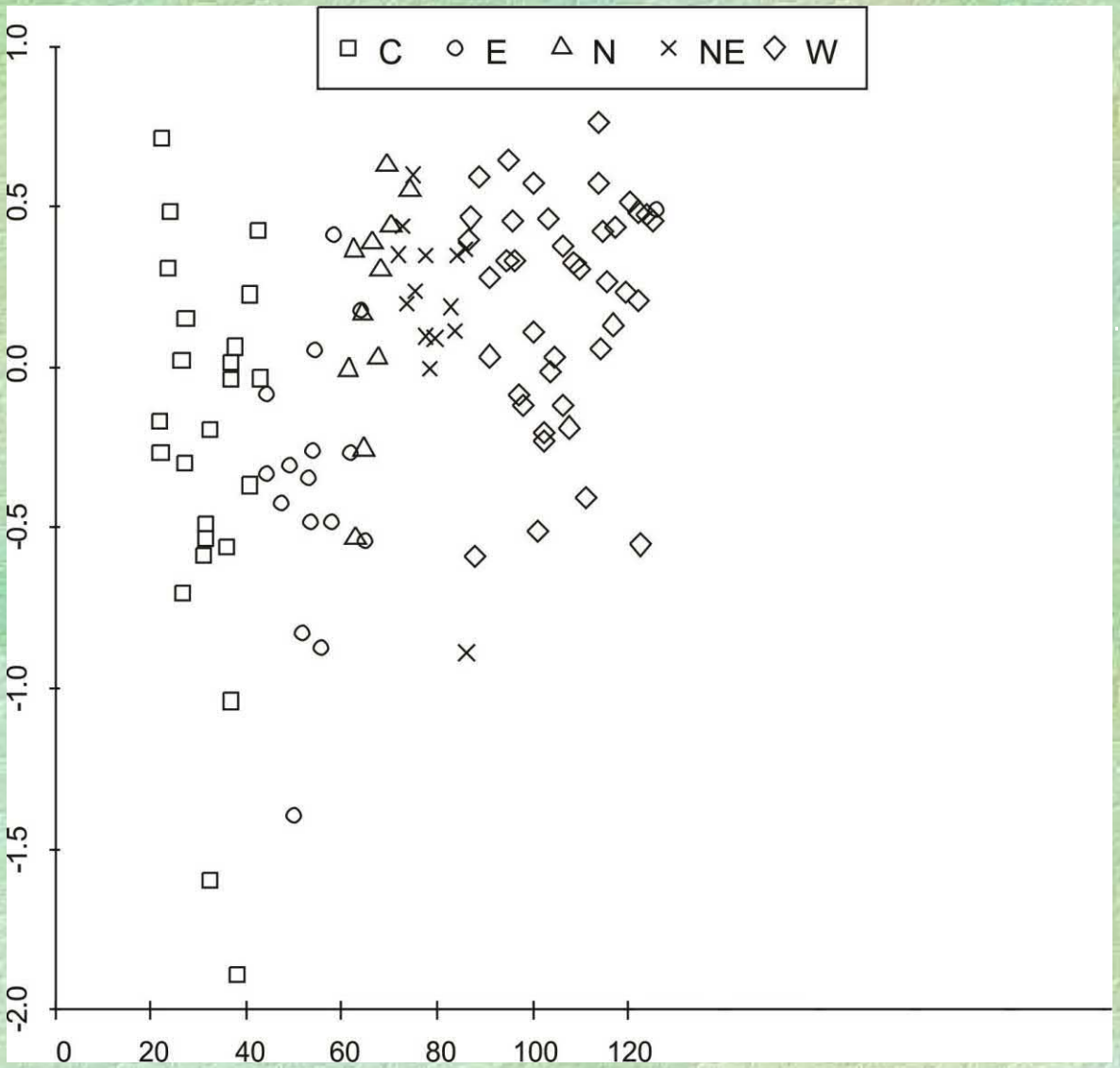
M: mirabelles

P/A: prunes of French Agen type

P/Z: prunes of C and E European Zwetsche type

Factorial Correspondence Analysis of molecular data

grouped according to geographic origin



Central Europe

Eastern Europe

Northern Europe

Northeastern Europe

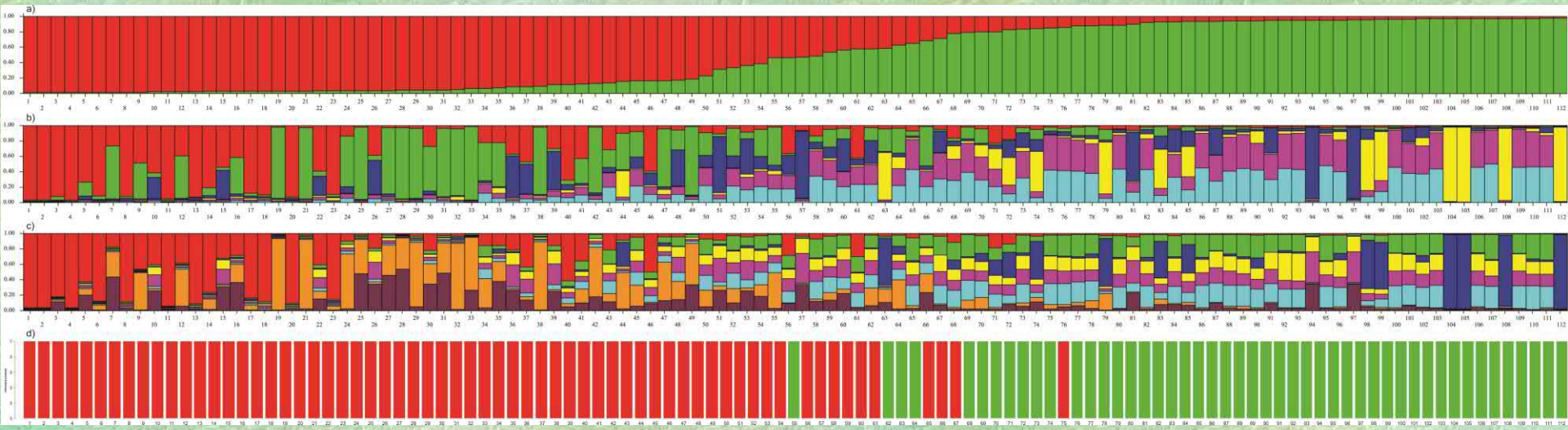
Western Europe

Effects of geographic origin confounded by uneven representation of Pomological groups

Bayesian Genetic Structure Analysis

with 2, 6 and 8 groups

P. domestica ***P. insititia***



Discriminant Analysis of Principal Components

with 2 groups