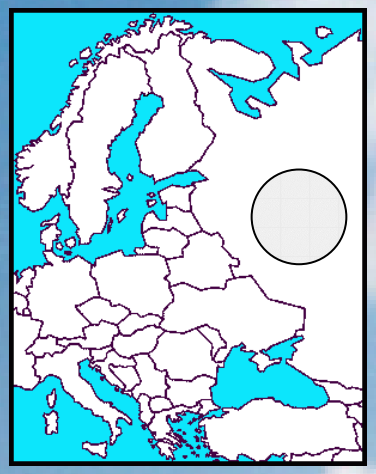
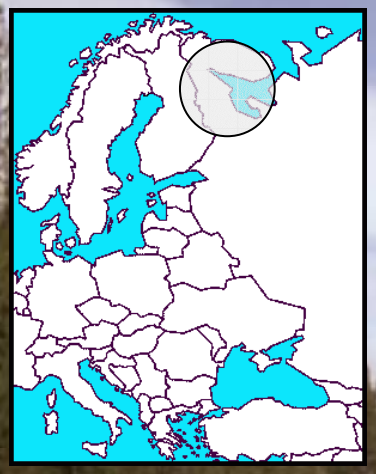
Middle Russia: Moscow region

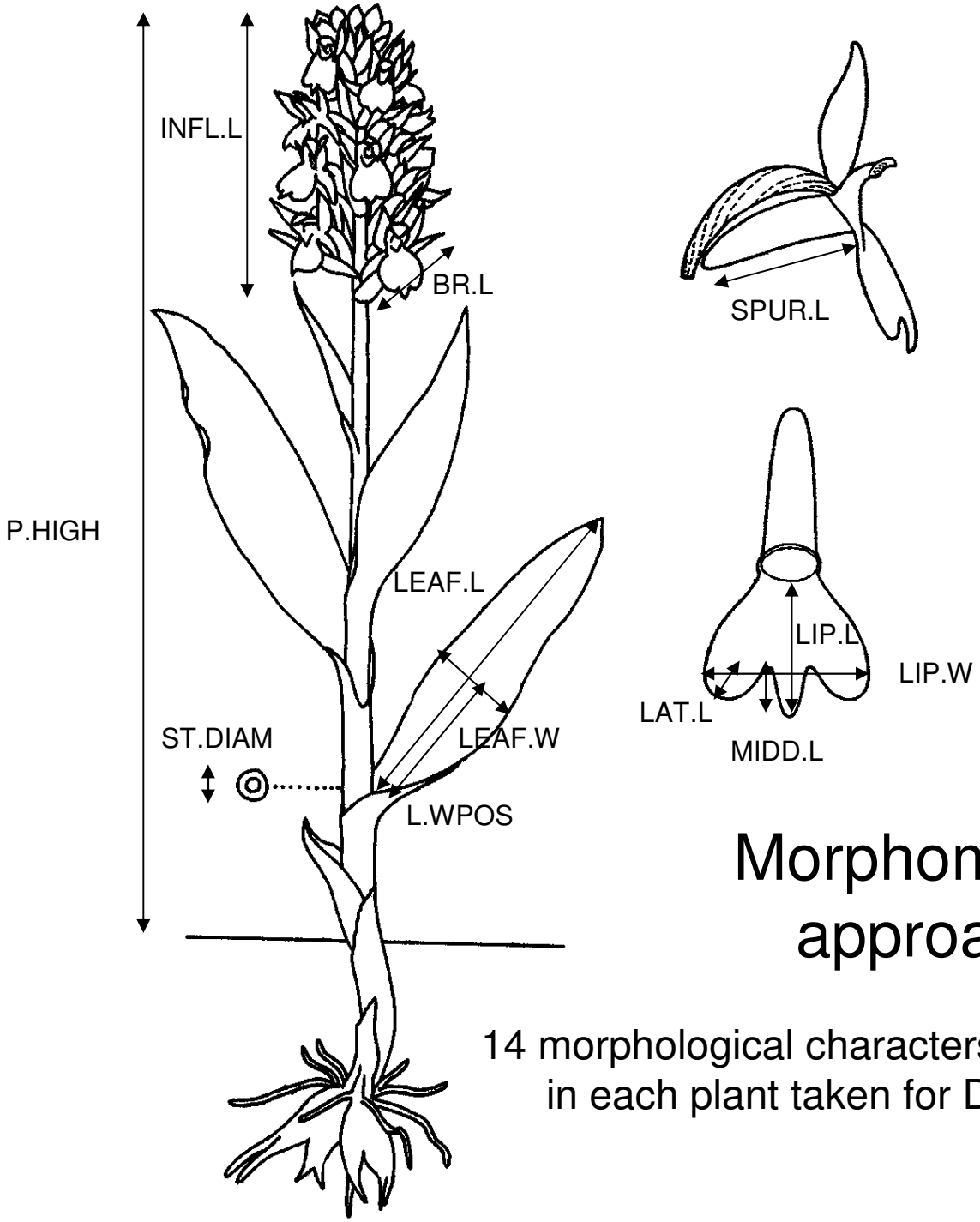


Dactylorhiza baltica



Russian Arctic:
1200 km from Moscow

“Northern tetraploids”:
D. fuchsii* × *D. maculata

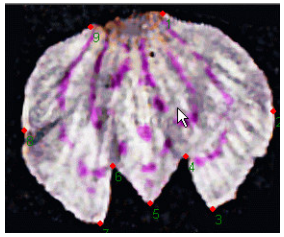


Morphometric approach

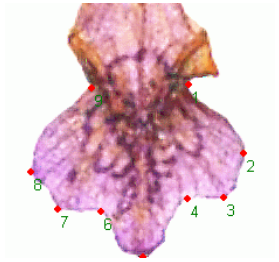
14 morphological characters were measured in each plant taken for DNA extraction

Geometric morphometrics approach (Thin Plate Splines)

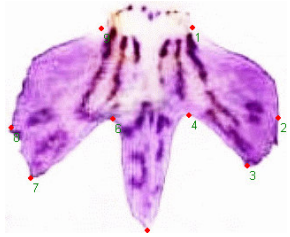
Landmarks



D. maculata

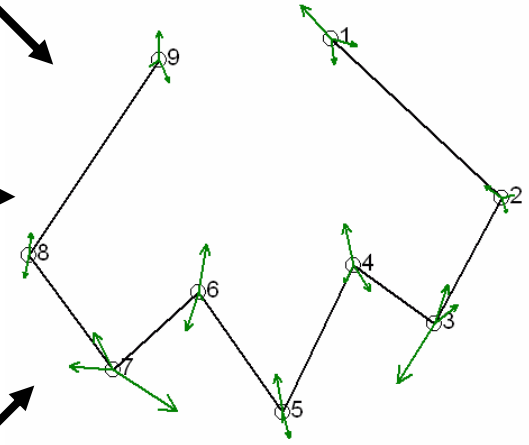


D. incarnata

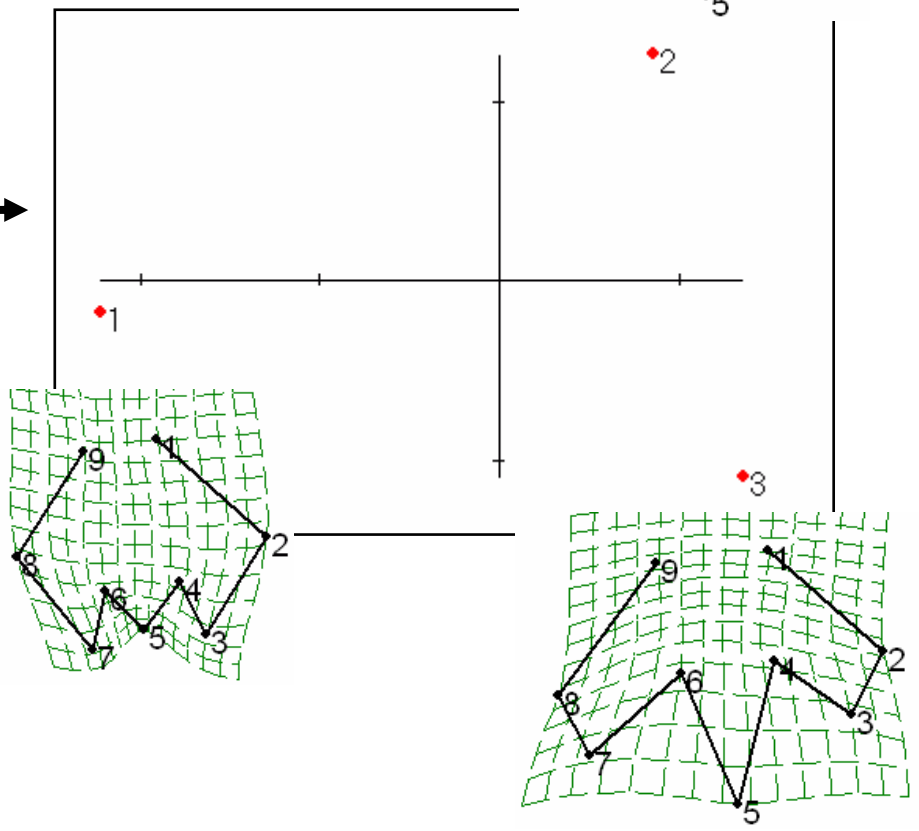


D. fuchsii

Consensus configuration

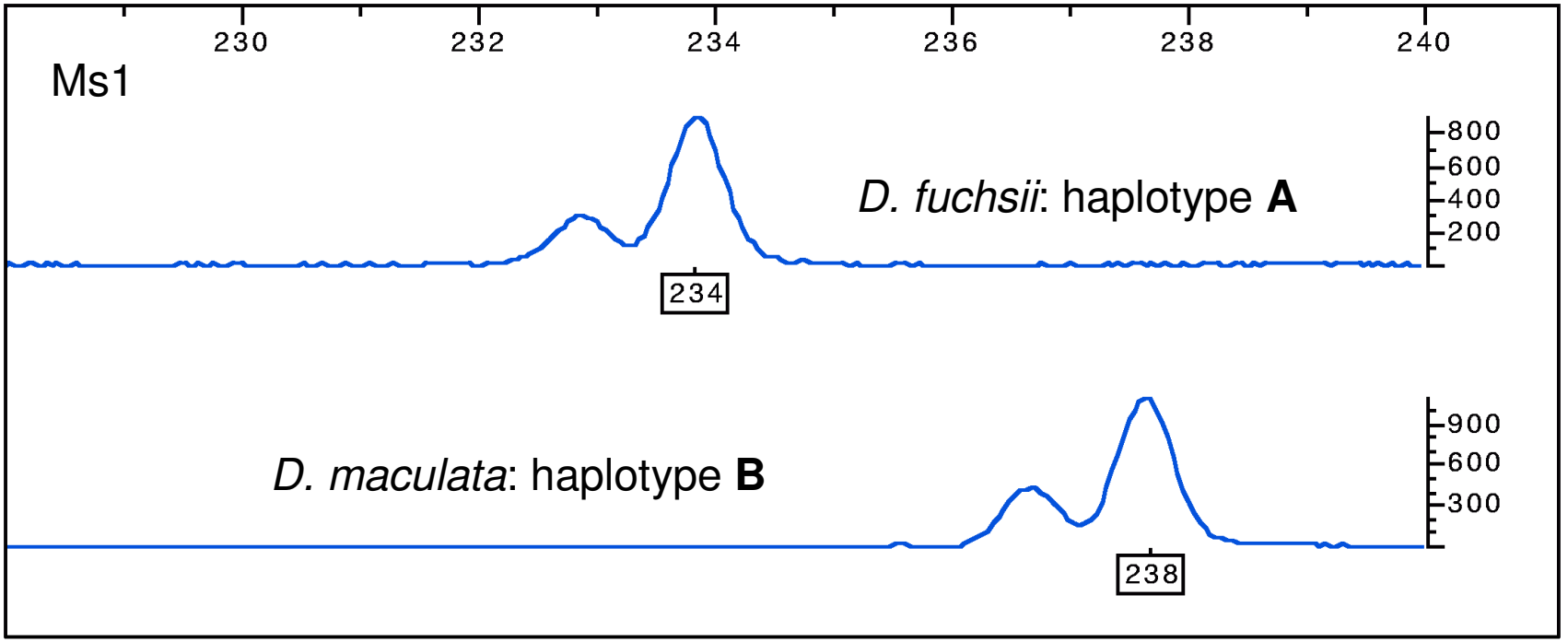


Principal warps analysis



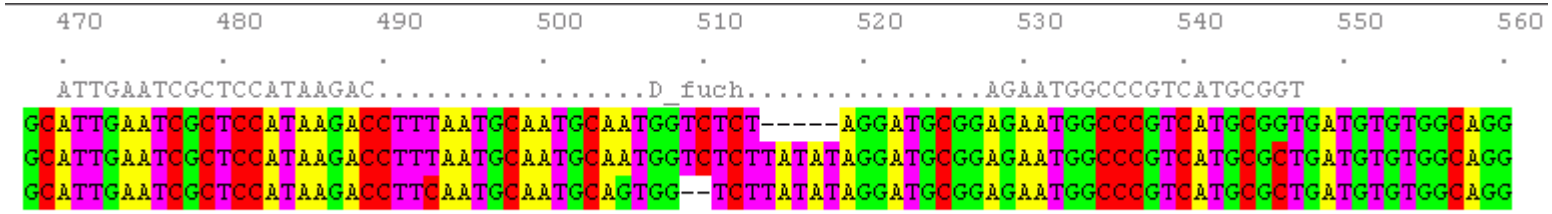
Molecular approach: plastid markers,

Name	Locus	Typical length (base pairs)	
		D. incarnata	***D. fuchsii***
Orch1 microsatellite	*trnL* intron	84	85
Msf polymorphic fragment	*trnL-trnF* spacer	163	159
Ms1 polymorphic fragment	*trnS-trnG* spacer 5' region	232	234
Ms2 microsatellite	*trnS-trnG* spacer 3' region	226	236

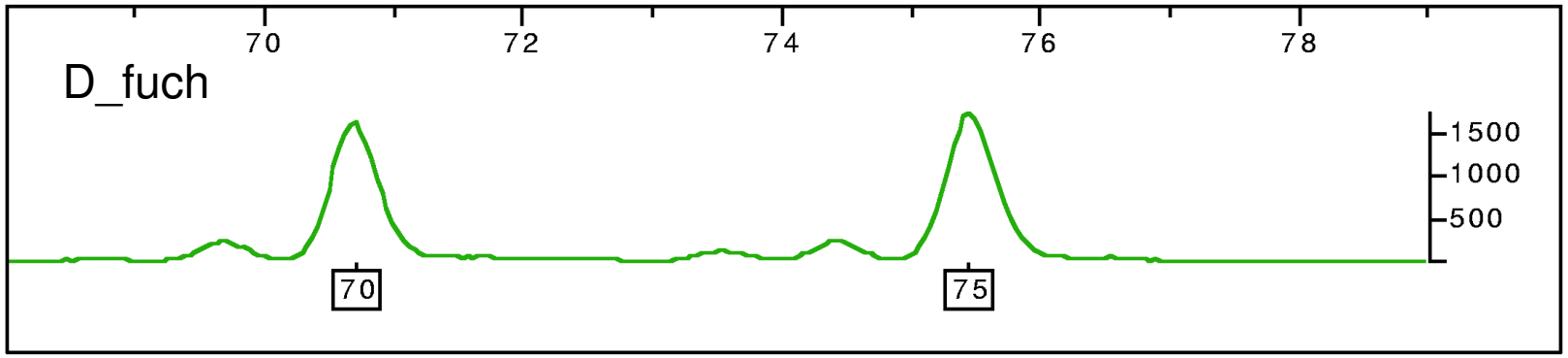


ITS alleles,

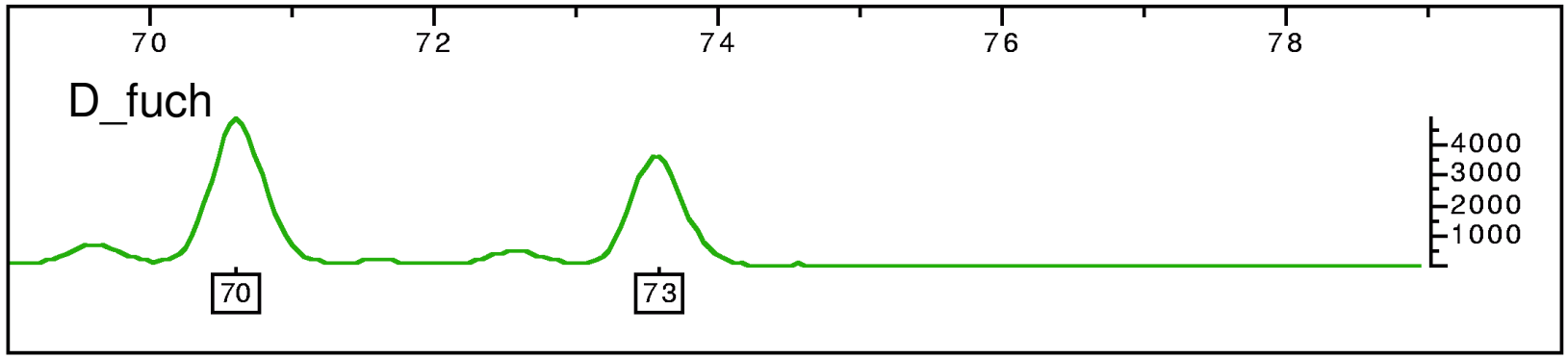
ITS indels characterising *D. fuchsii*, *D. maculata* and *D. incarnata*



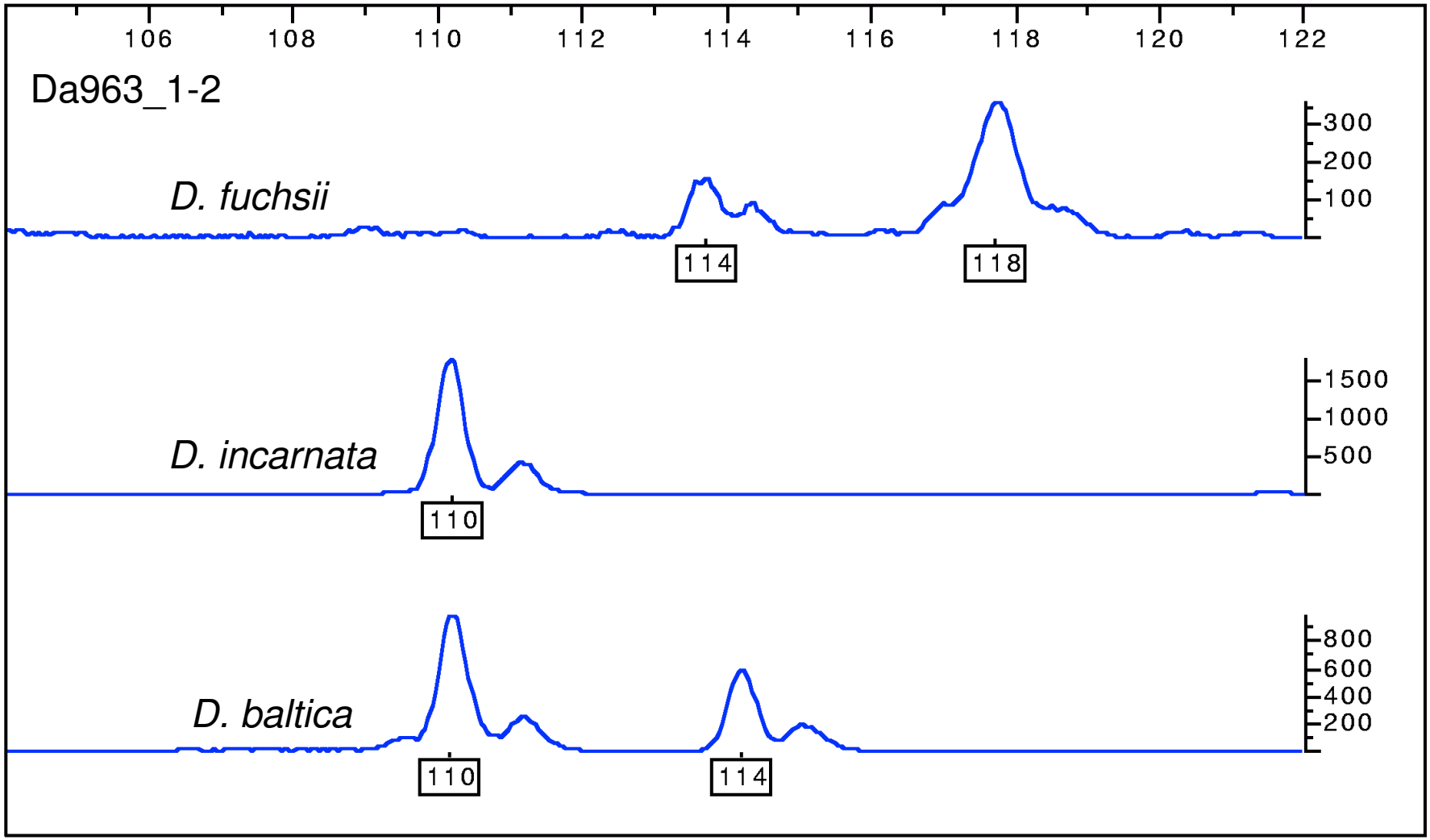
"**Northern tetraploids**": plants with *D. fuchsii* (70) and *D. maculata* (75) ITS alleles



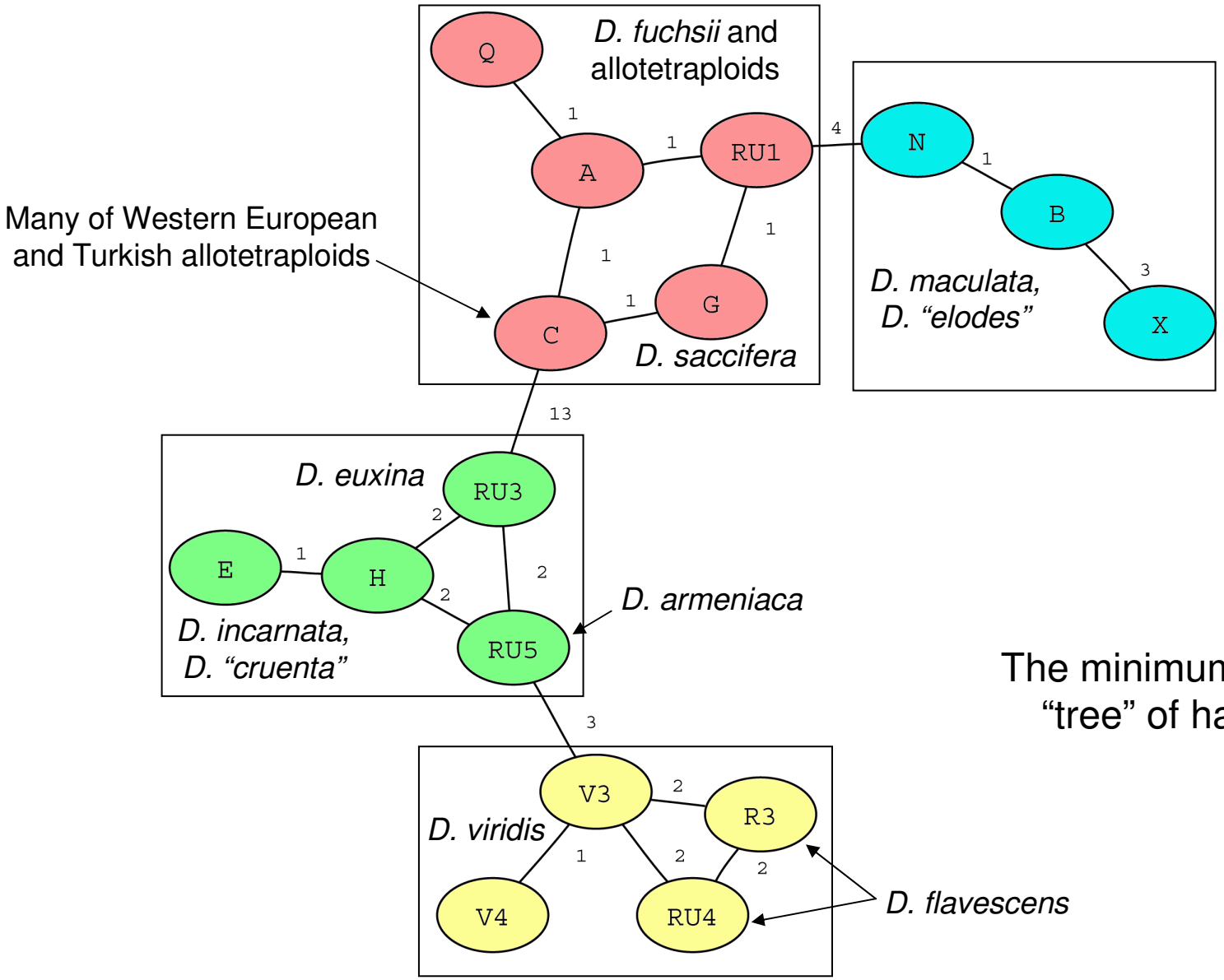
D. baltica with *D. fuchsii* and *D. incarnata* (73) ITS alleles



nuclear microsatellites

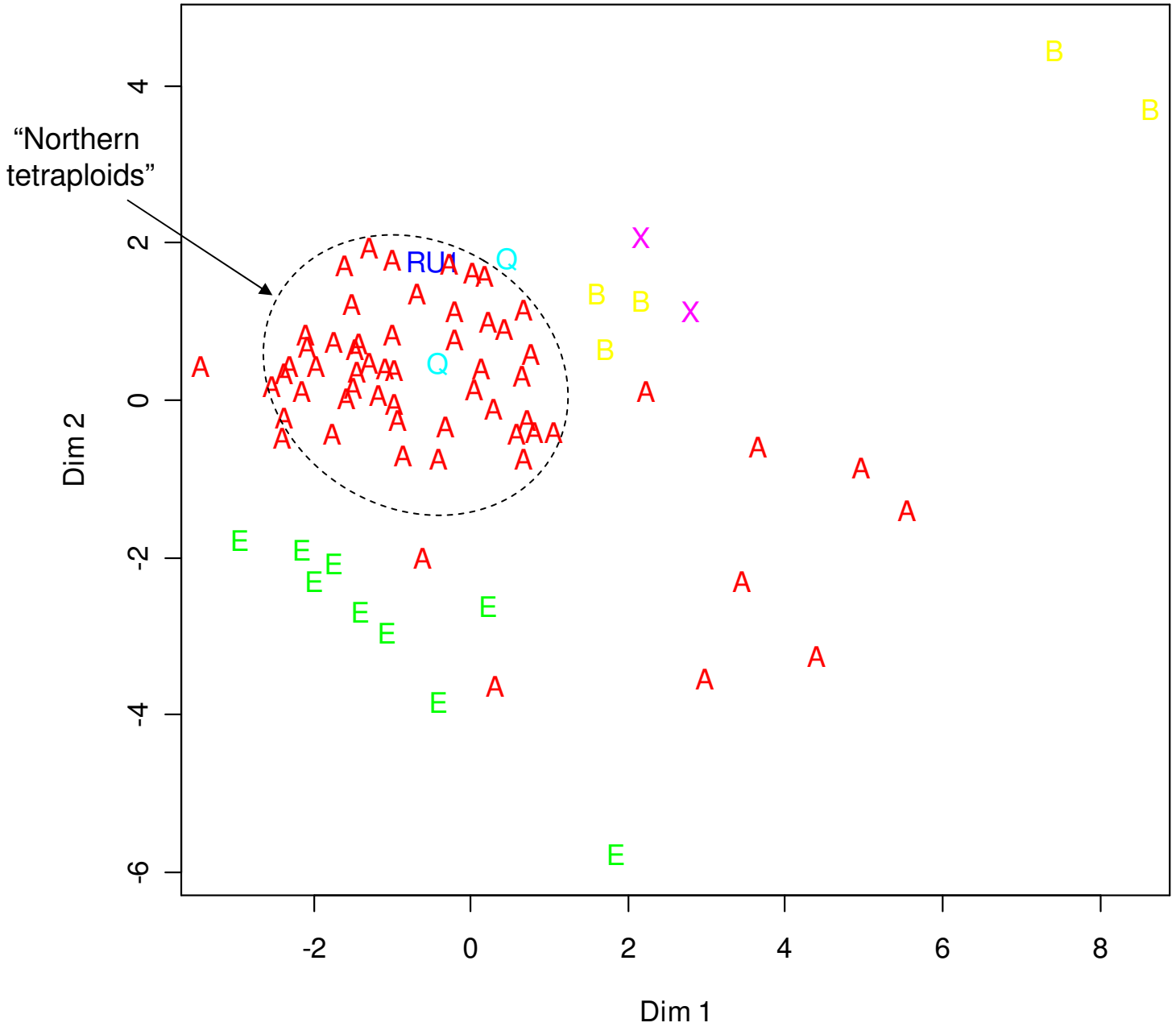


Haplotypes diversity accords with species

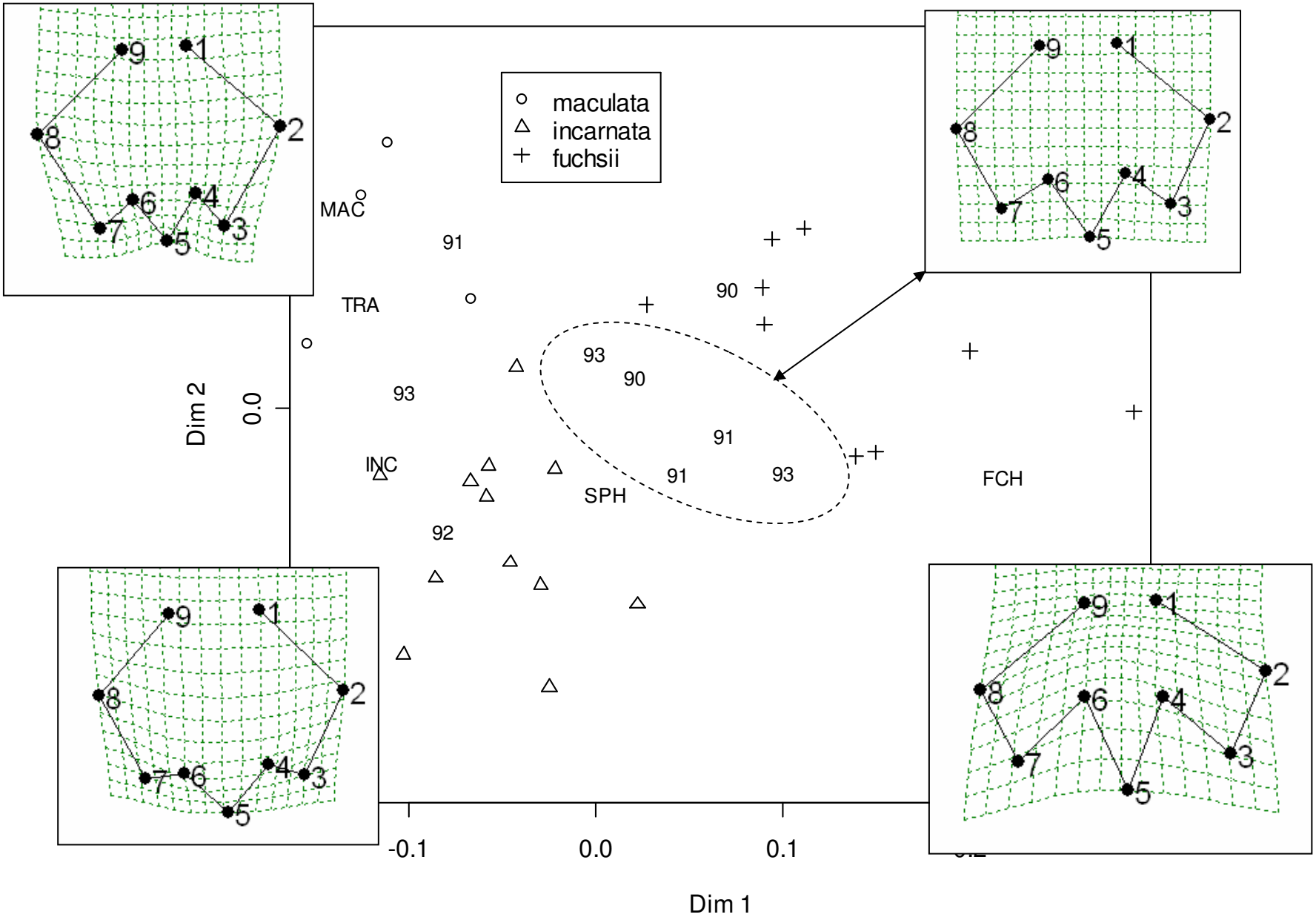


The minimum spanning "tree" of haplotypes

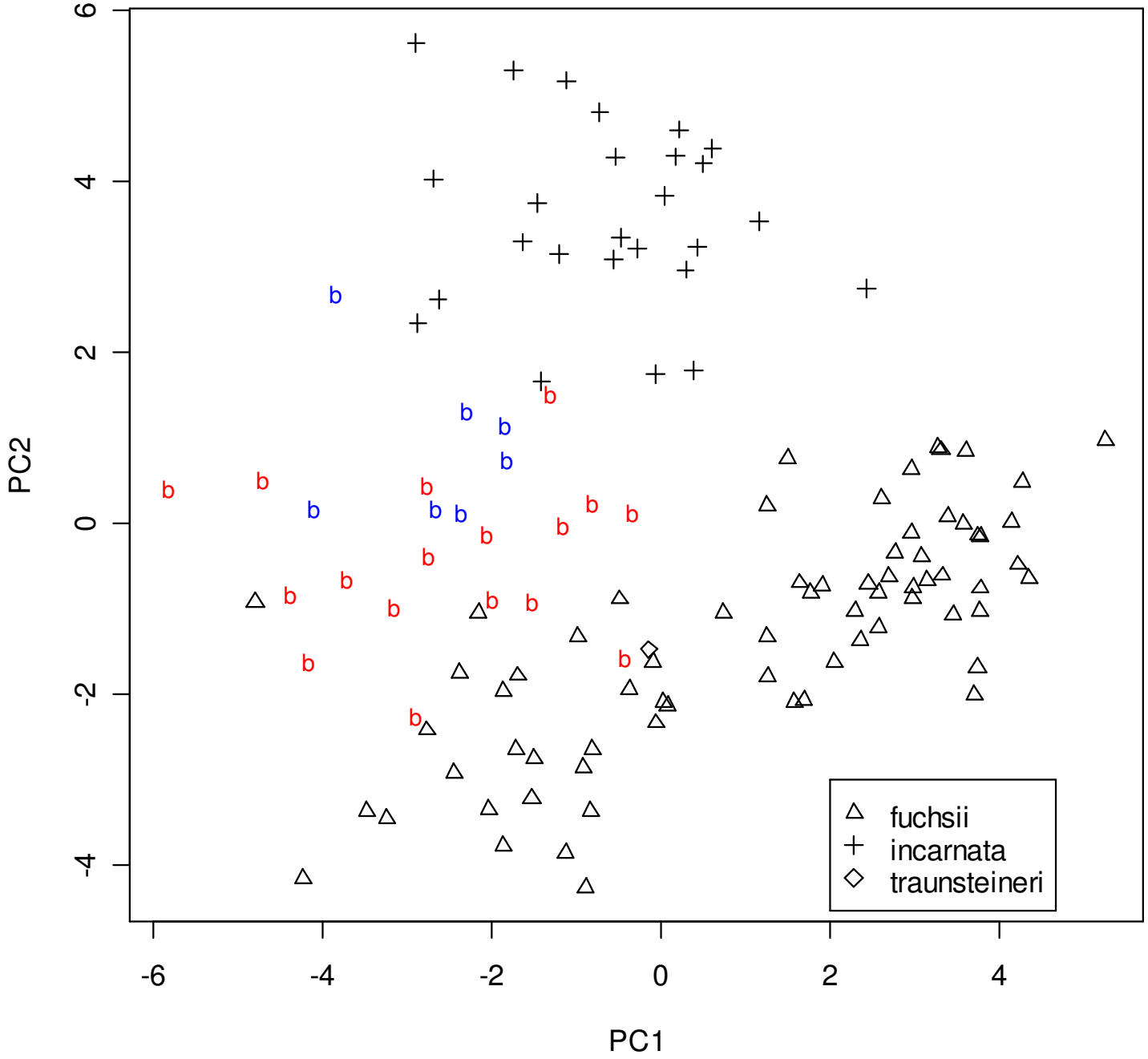
Haplotype diversity accords with morphometric data



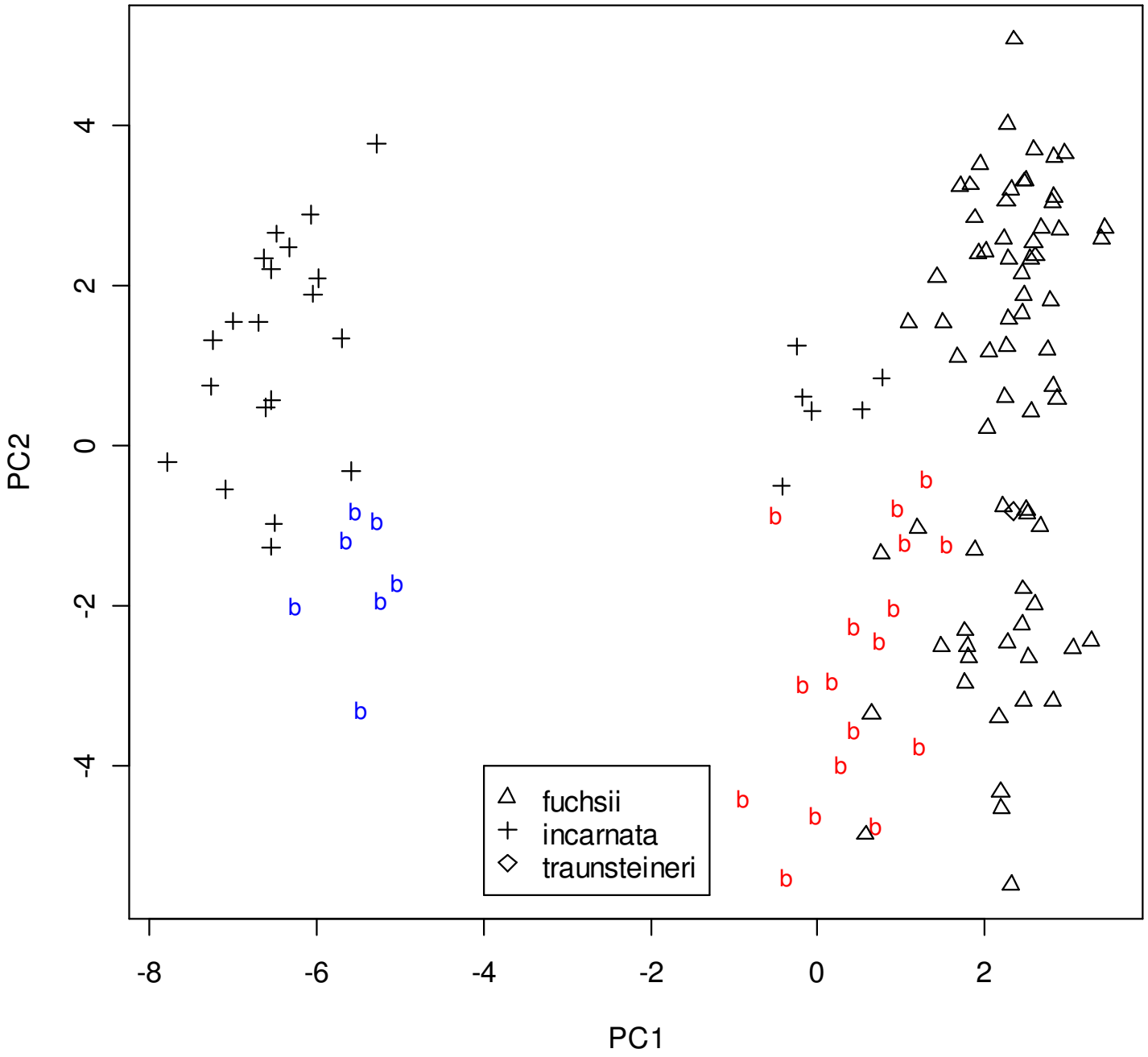
“Northern tetraploids” from geometric morphometrics point



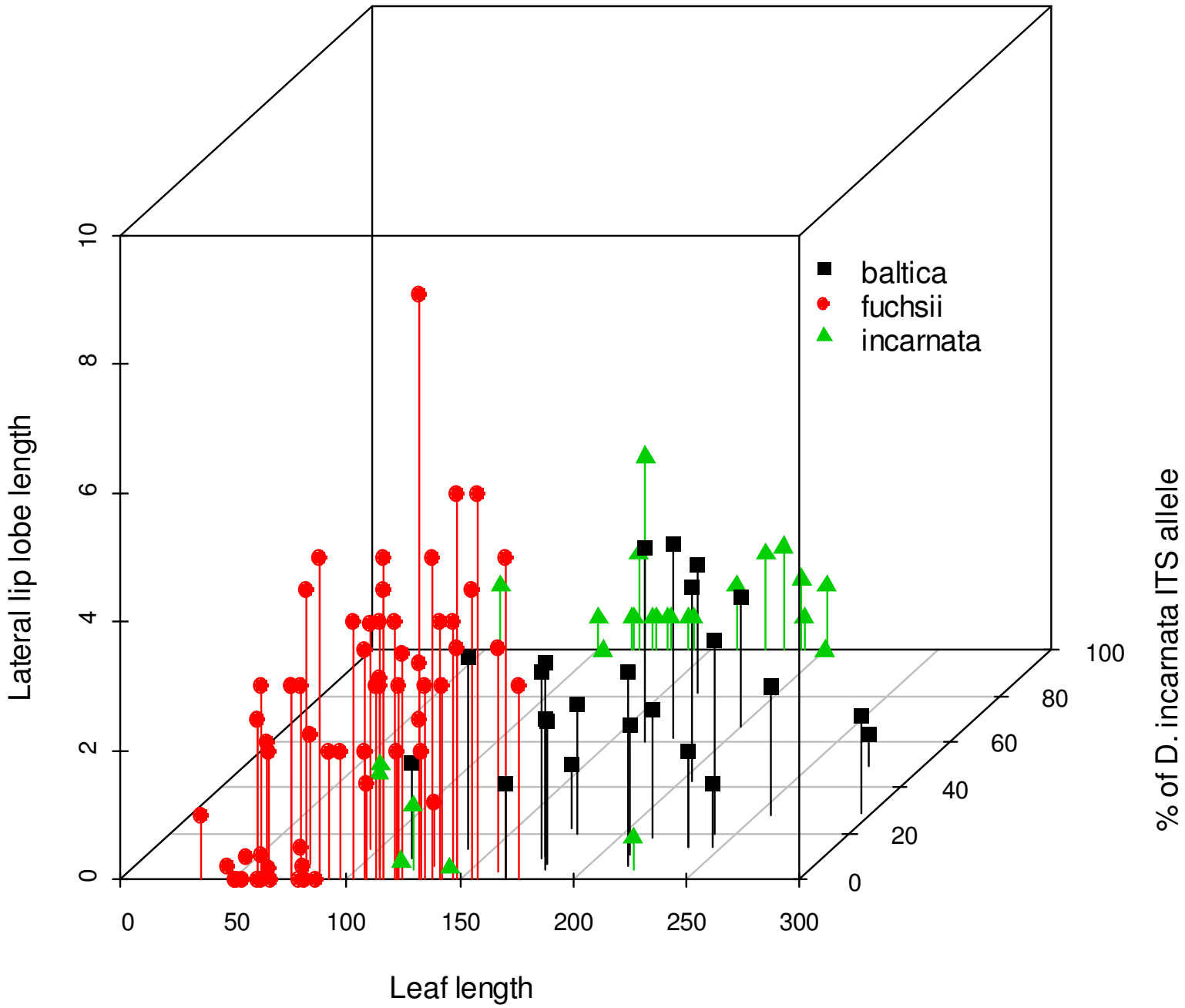
D. baltica: morphology + nuclear markers versus…



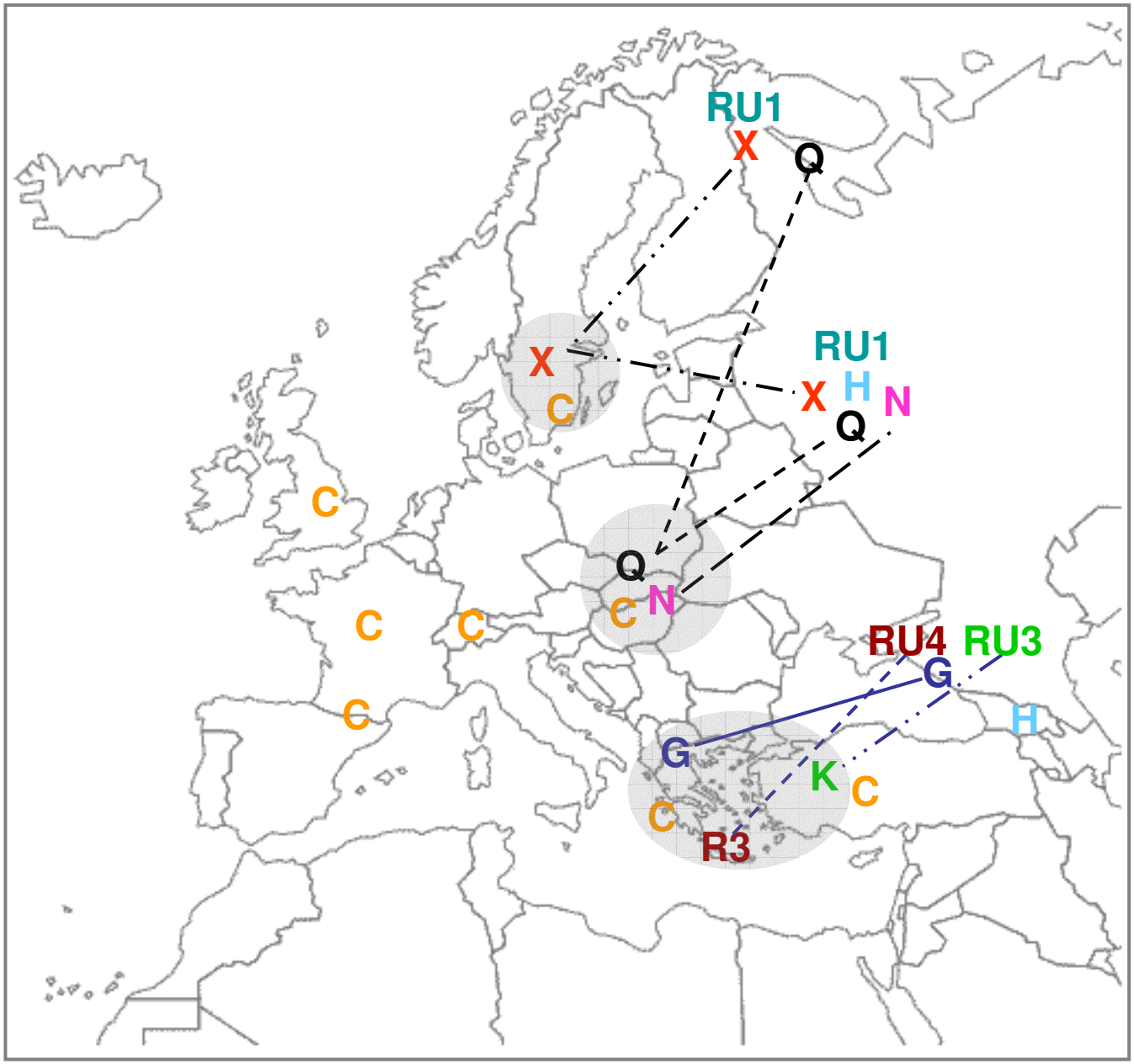
…morphology + nuclear markers + plastid markers



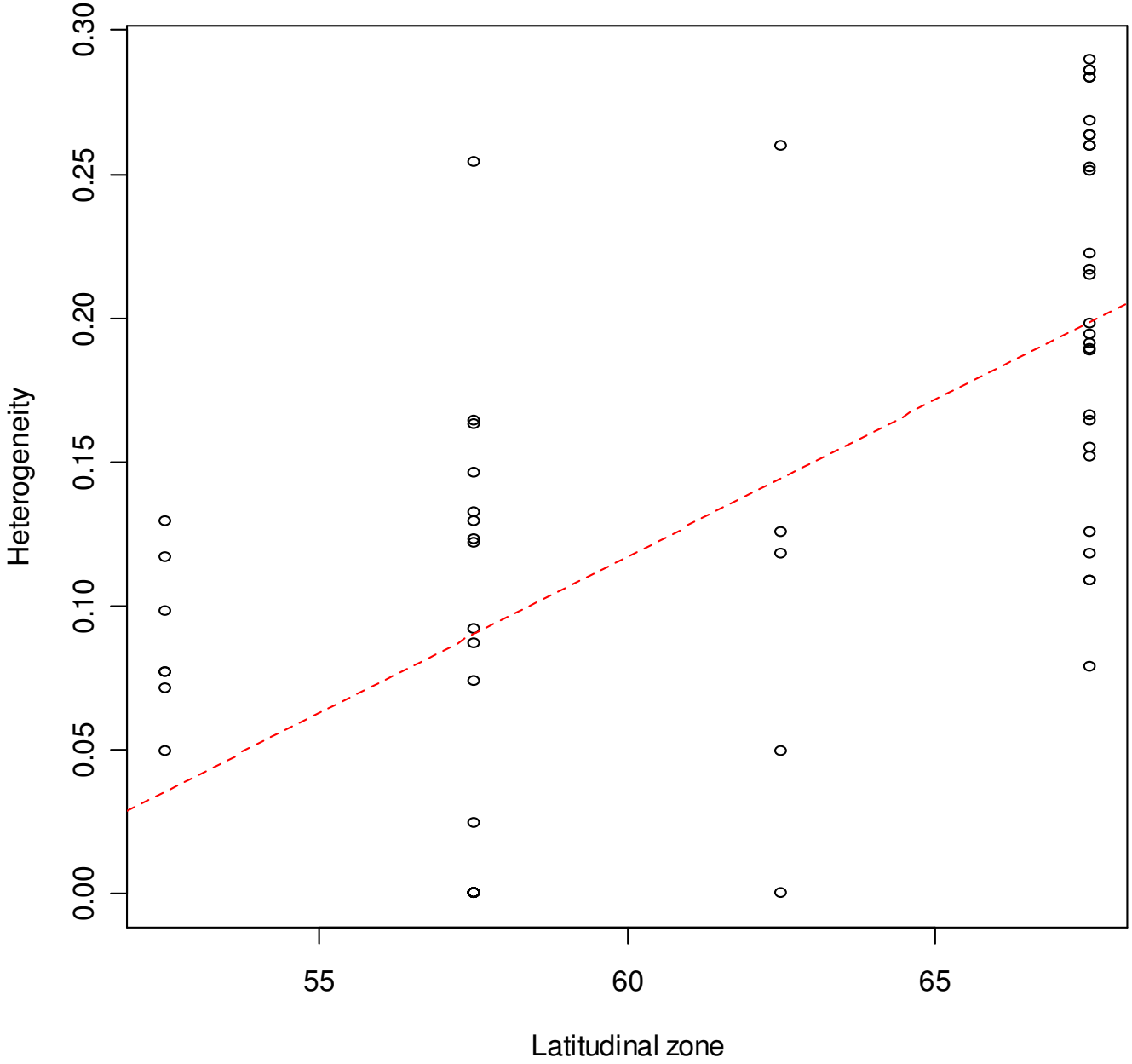
Morphological and DNA characters work together



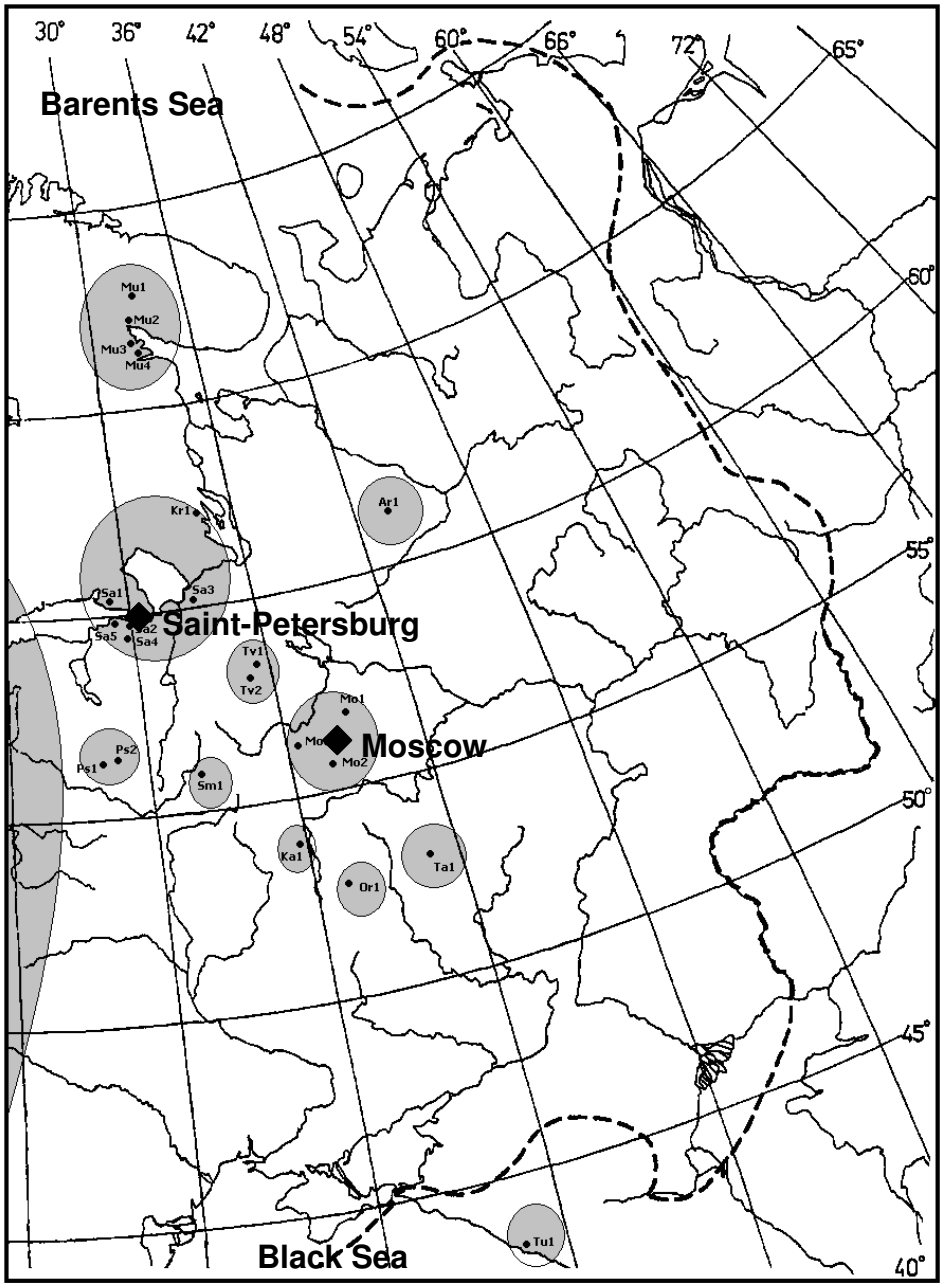
Haplotypes and geography

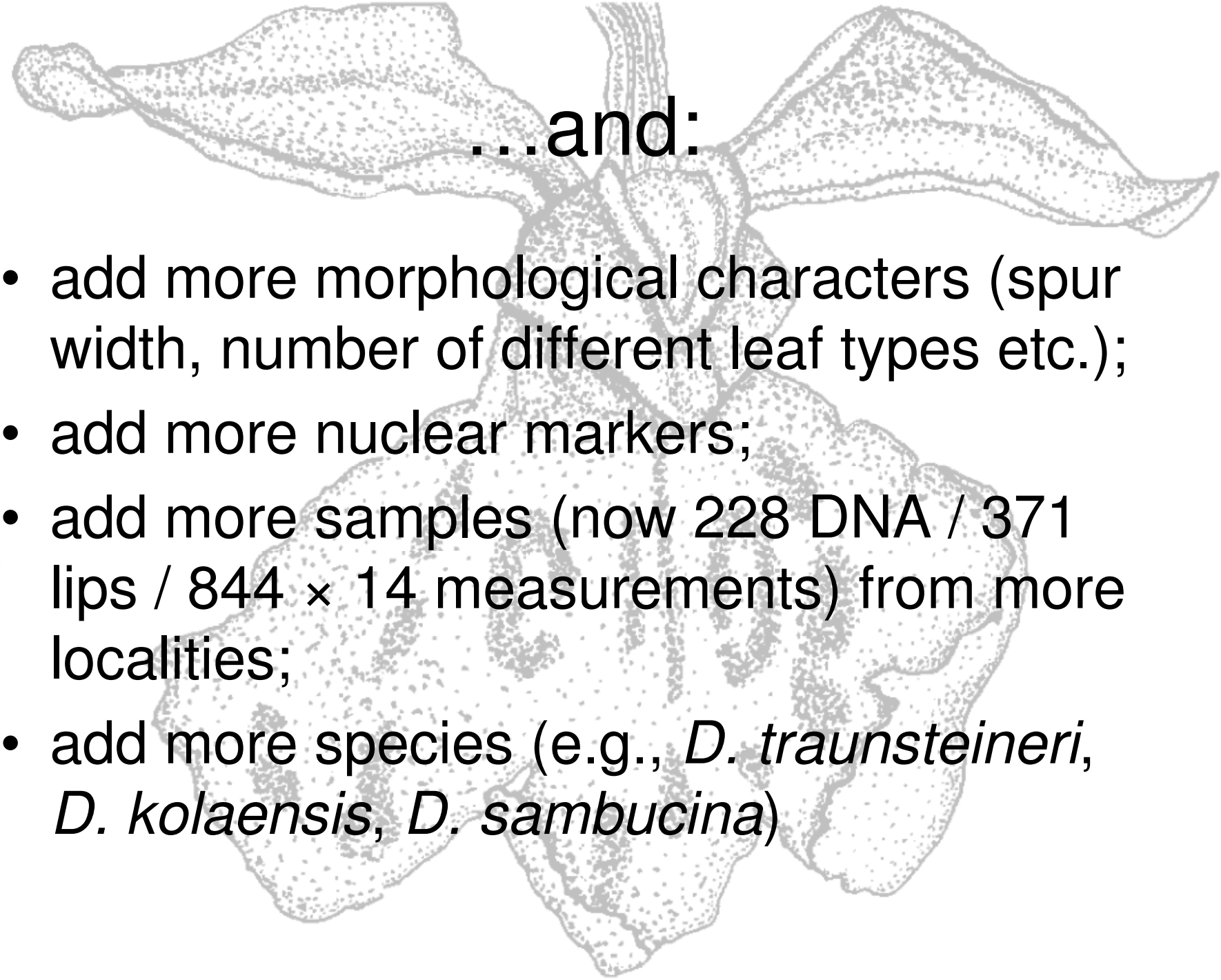


Population ITS heterogeneity and latitude



The future: consider the unsampled areas…





…and:

- add more morphological characters (spur width, number of different leaf types etc.);
- add more nuclear markers;
- add more samples (now 228 DNA / 371 lips / 844 × 14 measurements) from more localities;
- add more species (e.g., *D. traunsteineri*, *D. kolaensis*, *D. sambucina*)

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