



Abb. 10: *Pulsatilla vernalis*

isolated parts of species distribution (Pyrenees, Central Massif, Alps, Rila Mts., Western Carpathians, northern Poland lowlands, Finland lowlands, Norway lowlands and mountains – Jotunheimen massif).

Basing on appropriate molecular AFLP markers, genetic variability of species will be estimated and a molecular variability pattern will be established. Research should permit a verification of several hypotheses concerning: (1) the primary centre of the species' origin; (2) probable routes of its migration and presumable history of the forming of its present range; (3) relations between single mountain parts of the distribution area; (4) history of the lowland part of the total range.

Circumpolar cpDNA phylogeography of the diploid *Cassiope tetragona* – a new project Anne-Cathrine Scheen¹, Ulf Molau², Inger Nordal³ and Christian Brochmann¹

The diploid, woody perennial *Cassiope tetragona* has a circumpolar distribution. The species is an important component of arctic vegetation and has been investigated in global change programs in connection with the International Tundra Experiment (ITEX), by experimental manipulations as well as by retrospective analyses. We presently initiate a study of molecular variation in *C. tetragona* on a circumpolar scale. Silica-dried leaf material has so far been collected from arctic Canada (extensive sampling made possible by participation in the Swedish Tundra Northwest '99 expedition), Greenland, Svalbard, Scandinavia, and one site in arctic Russia; additional field-collections as well as herbarium material will be used to cover the entire geographic distribution of the species. We plan to do (1) initial, complete sequencing of a series of non-coding cpDNA regions of a few field-collected plants from different geographic main regions, in order to identify small parts (<300 bp) with high level of variation and with sufficiently conserved flanking regions to allow for design of new internal primer pairs; and (2) full analysis of all material including partly degraded DNA from herbarium specimens, based on complete sequencing of small regions and/or fragment analysis to identify particular single- or few-nucleotide polymorphisms. Preliminary results will be presented.

Phylogeography of the high alpine cushion-plant *Androsace alpina* (Primulaceae) in the Alps Peter Schönswitter and Andreas Tribsch

Androsace alpina is a perennial cushion plant endemic to high alpine to nival habitats in siliceous mountain ranges of the European Alps where it ascends up to 4200 m. The plant can be found in major portions of the Alps, but although the distribution is rather continuous, *A. alpina* does not occur in postulated major refugial areas in the Southwestern Alps or the Eastern Alps. This distribution pattern might be interpreted as an indication for in situ survival on nunataks during the ice ages. To test this hypothesis, we investigated 259 individuals from 53 populations covering the entire distribution area of *A. alpina* using AFLP-fingerprinting. With three primer combinations used, 218 unambiguously scorable fragments were generated, 177 of which (81.2%) were polymorphic. The FST-value under the random-mating-hypothesis among all populations was 0.8 (95% CI 0.45–0.51), the Shannon-Index ranged from 4.26–4.50. Both a UPGMA clustering of the populations and a Principal Coordinate Analysis between pairs of individuals revealed a relatively high geographical structuring between groups of populations. An AMOVA conducted on those groups partitioned the overall variation into 57.7% variation within populations, 19.7% among populations and the comparatively high value of 22.6% among regions.

Five geographic regions were clearly separable: (1) the south-western-most part of the distribution area (Cottic and Grajic Alps), (2) the Western Alps from Mont Blanc to Splügenpass, (3) the southern part of the middle Alps from Splügenpass to the Dolomites, (4) the Eastern Alps ± east of Mt. Grossglockner and (5) one population in the Dolomites (Pordoi). The northern part of the



Abb. 11: *Androsace alpina*