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Staphylea pinnata and *S. colchica*, the two European bladdernuts: Insights in chorology, population genetic aspects and growthforms

Staphylea pinnata und *S. colchica:* Einblicke in Chorologie, Populationsaspekte und Wuchsform

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Chronology

Staphylea pinnata is distributed across a broad area from Western Europe, Central and Southern Europe and the Balkan Peninsula. It then occurs again north-east and south of the Black Sea near to the coast and farther to the east to Aserbajdjan. *Staphylea colchica* is only distributed in the Colchic Region (MEUSEL & JÄGER 1992). The fermented inflorescences of both species serve as a vegetable -called "džondžoli"- in Georgia, and rosaries were made out of the seeds of *Staphylea pinnata* in catholic countries. Therefore synanthropic dispersal by cultivation is supposable.

Fieldtrips showed, that both species seem to have no overlapping distributional area in Georgia. *Staphylea colchica* prefers limestone from lowlands up to 1300 m s. m. in typical Colchic Climate north and west of the river Rioni respectively, avoiding the formerly swampy area of the delta of this river. On the other hand, *S. pinnata* can be found in Georgia colonizing similar altitudes as *S. colchica* in the area of Batumi, along the northern border of the Small Caucasus facing the Rioni valley, besides in Bordžomi, then east of the river Rioni in the regions of Tqibuli, Zestaponi and Tčiatura and again in the east of Georgia in Kakheti, avoiding the continental climate of Central Georgia. In Central Europe *S.pinnata* prefers limestone, which is very rare in Georgia except for the northwestern part. The distribution of *S. pinnata* in Georgia is therefore dependent on good drained soils and not on the type of rock in the underground - and Georgia's limestone is the domain of *S. colchica.*

My results show, that although the occurrence of *S. Colchica* was described in the Colchic Climate of Batumi as well as in Bordžomi (e.g. GULISASHVILI 1970,

DMITRIEWA 1990) these plants are *S. pinnata.* Some morphological characters (e.g. the tips of the styles of the fruits face outwards in some cases) remind on *S. colchica*, but the flowers, the form of the capsules and the size of the seeds are typical for *S. pinnata.*

Populationsgenetic approach

Employing investigations using AFLP fingerprinting, populations of *S. pinnata* in Bavaria and Austria were compared with Georgian populations that had been partly declared as *S. colchica* (see above), and with populations of doubtlessly real *S. colchica.*

The investigations showed distinct delimitation of three groups, of *S. pinnata* in Central Europe, *S. pinnata* in Georgia and *S. colchica* based on a neighbour-joining tree (NEI & LI 1979) of 113 scored and analysed AFLP- fragments.

Out of 113 markers *S. pinnata* had 70 in common with *S. colchica*, which showed 35 markers additionally. In contrast to that exhibited *S. pinnata* only 8 particular markers. As *S. pinnata* is diploid (2n=26) and *S. colchica* is tetraploid (2n=52) (FOSTER 1933) *S. colchica* is likely allotetraploid containing an Asian species. On the other hand *S. pinnata* of Georgia shares 18 markers with *S. colchica,* but not with *S. pinnata* of Central Europe. So either introgressions of *S. colchica* may have taken place or genetic depletion at the western edge of the area could have happened. To answer this question additional investigations of Balkan populations, of the geografical center of the species, would be needed.

Growthforms

About 100 seedlings of *S. pinnata* (seeds collected in Salzburg and Bavaria) were observed for seven years in the Botanical Garden of the University of Salzburg. Additionally some seedlings of *S. colchica* brought from Georgia, as well as different stages of development up to adult plants were observed.

Some of the seedlings of *S. pinnata* germinated in the first year after sowing, but most of them in the second year. Depending on the month of germination (April-October) they develop a primary shoot with the cotyledons and the first foliage leaf node, finishing their first year of age with buds in the axils of the cotyledons and one terminal bud, or they continue in the same year with one or two nodes (simulating an age of two years), or die if the buds of the primary shoot cannot ripen before winter.

Except for the first foliage leaf node ramification goes on sympodially. Robust long shoots form the framework of the shrubs and shorter shoots with one to three nodes provide a basis for blossoms on their apex and for enlarging the area of photosynthesis. At the age of seven years one seedling did develop its first inflorescences. Both species produce stolons and creeping shoots that develop adventitious roots, but no root suckers. They show a high ability of

regeneration out of sleeping buds. Depending on the soil and on the light conditions both species form shrubs (or trees) up to a height of 7-8 meters.

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