

Chapter 3

Summary – shrnutí

English and Czech summaries (abstracts) of the thesis.

3.1 English abstract

Genus *Taraxacum* (Asteraceae), having ~60 sections and 2,800 species, is known for its complicated evolutionary relationships and taxonomy due to processes like frequent hybridization, polyploidization, asexual reproduction, clonality and low structural morphological variability. Various taxonomical concepts and approaches are reviewed, evaluated and discussed from point of view of their ability to deal with such a complicated genera as is *Taraxacum*. Various processes responsible for the complicated situation within *Taraxacum* are discussed and reviewed.

Section *Dioszegia*, comprising *T. serotinum* and its allies, are an exception because only sexuals are reported for all the members of this group. On the basis of the analysis of microsatellite (SSRs) variation, distribution and morphology, we addressed problems related to their mode of reproduction, among-population relationships, taxonomy and within-population variation. As a rule, outcrossing was the dominant mode of reproduction, with one notable exception: *T. serotinum* subsp. *tomentosum* (= *T. pyrrhopappum*) was autogamous and not heterozygous. A taxonomic revision of sect. *Dioszegia* recognizes *T. serotinum* subsp. *serotinum* (including an aberrant taxon, newly described as var. *iranicum*), *T. serotinum* subsp. *tomentosum* and *T. haussknechtii*.

There has been a decrease in the ability of biologists to identify their material correctly, particularly plants of complicated genera with common agamospermy, where old clonal entities are accorded the rank of species (microspecies), like *Taraxacum*. Agamospermous microspecies are taxonomic entities recognizable from one another by a set of minute morphological features. The knowledge of microspecies is confined to a few specialists. A selection of nine widespread, generally recognized agamospermous microspecies of *Taraxacum* sect. *Taraxacum*, which are characterized by means of eight microsatellite loci, were used to evaluate the ability of four European *Taraxacum* specialists to identify these microspecies consistently. With two exceptions (and one unclear result) for 125 plants coming from an area extending from Finland to central Europe, the experts identified the microspecies

consistently, exclusively on the basis of morphological differences. The within-species microsatellite variation corresponded to the mutational clone cluster hypothesis, with a single unclear result. Each microspecies consisted of one, more or less dominant, clone and several minority clones, each usually confined to a single plant.

The *Taraxacum* flora of the West Himalaya represents one of the dandelion diversity hotspots, with at least 17 sections and about 150 known species. A number of names published from that region were referred to *T. sect. Orientalia* Handel-Mazzetti in the literature. All these names are revised and newly interpreted, with emphasis on plants erroneously determined as *T. stenolepium*. An nrDNA ITS sequence analysis including the only sexual member of *T. section Squamulosa* and the other sexual taxa known in *Taraxacum* shows a separate position of *T. sect. Squamulosa*. The new section is compared with sections *Primigenia*, *Coronata* and *Orientalia*.

Taraxacum koksaghyz, dandelion from steppes of Kazakhstan, has been known for long time as potential rubber producer, possibly replacing currently the most popular rubber producing tropical tree *Hevea brasiliensis*. We evaluate its closely related congener, *Taraxacum bicornis*. Its taxonomy is reviewed, population genetic characteristic evaluated, and rubber content of the two species is compared. For the rubber extraction we modified existing method to require minimal amount of material. *Taraxacum bicornis* is shown to be outcrossing sexual diploid and its rubber content is about half of that of *T. koksaghyz* (~3.2% vs. ~7.2%), but because of relatively robust constitution of *T. bicornis* in comparison to *T. koksaghyz*, *T. bicornis* could be used as potential rubber source.

The taxonomy, micromorphology, karyology and evolutionary relationships of *Taraxacum bithynicum* DC. were studied using the original material and new samples from the summit area of Mt. Uludağ, Bursa Province, Turkey. It is sexual with $2n = 16$, considerably isolated in outer phyllary and achene characters. The nrDNA ITS NeighborNet analysis shows relationships of *T. bithynicum* with members of sect. *Scariosa*. *Taraxacum bithynicum* is considered as a taxon endemic to the summit area of Uludağ.

All these case studies shed more light on the taxonomy, population genetics and undergoing mechanisms within genus *Taraxacum* – real touchstone of plenty of biological concepts, theories and methods.

Keywords: agamospermy, autogamy, clonality, Europe, evolution, Iran, isolation by distance, microsatellites, natural rubber, new section and species, nrDNA ITS, plant identification, population genetics, population variation, reproduction, reproductive systems, systematics, *Taraxacum*, *Taraxacum* sect. *Dioszegia*, *Taraxacum* sect. *Orientalia*, *Taraxacum* sect. *Squamulosa*, taxonomy, the West Himalaya.

3.2 Český abstrakt

Rod *Taraxacum* (pampeliška, hvězdnicovité), mající ~60 sekcí a 2 druhů, je známý pro své komplikované evoluční vztahy a taxonomii díky procesům jako je častá hybridizace, polyploidizace, nepohlavní rozmnožování, klonalita a nízká strukturální morfologická va-