

### Trichome micromorphology in *Filipendula* L. (Rosaceae) from Iran and its taxonomic significance

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In the current research, trichome micromorphology of the genus *Filipendula* from Iran, including seven populations of two species (*F. ulmaria* and *F. vulgaris*) and two subspecies (*F. ulmaria* subsp. *ulmaria* and *F. ulmaria* subsp. *denudata*) were examined using Electron Scanning Microscopy (SEM). To do this, primarily, plant samples were collected and identified. Then parts of healthy leaves were selected and washed in a solution of water and were selected and washed in a solution of water and detergent. For SEM observation, the dried specimens were mounted on aluminum stubs covered with double-sided cellophane tape and then sputter coated with gold. The result of leaf micromorphological analysis revealed two types of trichome: A) straight appressed-subappressed hairs and b) crispate - floccose or woolly trichome. Based on the current findings leaves of the studied populations are diverse in terms of the hair density and distribution pattern. Straight hairs were observed in leaf adaxial surface of *F. ulmaria* subsp. *ulmaria*; leaf margin and midrib of *F. ulmaria* subsp. *denudata* and midrib of *F. vulgaris*. While, dense crispate - floccose hairs were present in the leaf abaxial surface of *F. ulmaria* subsp. *ulmaria*; midrib of *F. ulmaria* subsp. *denudata* and *F. vulgaris*. Indumentum types, their density and distribution have taxonomic value and are useful for inter and intraspecific identification. Based on trichome micromorphology, a key for Iranian species of the genus is provided.

**Keywords:** Taxonomy, Micromorphology, Leaf, Trichome, *Filipendula*, Rosaceae, Iran

### Study of species diversity of ferns and microrelief plants along altitudinal gradients in central Hyrcanian forests

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In this investigation, ferns and plants growing on microrelief were studied along a different altitudinal gradient in the forests of Noor and Nowshahr, Mazandaran province. Up to now, no coherent study has been carried out on biodiversity changes of microrelief and ferns along the elevation gradients of the Hyrcanian forests. Therefore, this study will address the main distribution sites and species diversity of ferns and microrelief plants. In the first year of sampling, using the map, the study area was

delimited, and the collection of plants and plots were carried out. Re-assembling and more complete identification of plants in the laboratory will continue with the use of available resources in the second year. The plot of 400 m<sup>2</sup> size throughout the altitude gradient (200 meters) are allocated in two forest sites, Noor and Nowshahr, up to 2000 meters high. Sampling was conducted in the summer and autumn of 96 and spring 97. Finally, the impact of ecological factors (climate and canopy) on the composition of microrelief and ferns is estimated. Species richness has been largely dependent on climate variables, especially humidity and temperature. Species richness generally increases with altitude. Among the identified species growing on microrelief, the highest number of species belonged to the Rosaceae and Violaceae (12%) and *Rubus hirtus* and *Viola alba* were the most frequent species. Geophytes with 31% was the most important life form according to Raunkiaer classification. Microrelief plants, according to phytogeographical distribution, mainly belong to the European-Siberian elements with 78%. Of the identified ferns, the most species belonged to families Aspleniaceae and Dryopteridaceae (14%), and the most important species are *Asplenium Scolopendrium* and *Polystichum aculeatum*. Hemicryptophytes with 70% were the most important structure groups of the local biological spectrum according to Raunkiaer Method. The phytogeographical distribution of ferns is predominantly multi-zonal (PL) with 50%.

**Keywords:** Mazandaran, Ferns, Microrelief