

1989). Until now, the chemical composition appears to be only partly consistent with morphological classification.

References

- Julkunen-Tiitto, R. 1989. Phenolic constituents of *Salix*: a chemotaxonomic survey of further finnish species. *Phytochem* **28**, 2115.
- Lautenschlager-Fleury, D. and E.: Zur Abklärung der *Salix hegetschweileri* Heer. *Bauhinia* (in press).
- Meier, B. & Sticher, O. 1986. The use of a high speed spectrophotometric detector (diode-array) in the HPLC-analysis of medicinal plants. *Pharmazeutische Industrie* **48**, 87.
- Meier, B., Julkunen-Tiitto, R., Tahvanainen, J. & Sticher, O. 1988. Comparable HPLC and GLC of phenolic glucosides of *Salix* species. *Journal of Chromatography* **442**, 175.
- Meier, B., Bettschart, A., Shao, Y. & Lautenschlager, E. 1989. Einsatz der modernen HPLC für chemotaxonomische Untersuchungen morphologisch schwer zu differenzierender *Salix*-Hybriden. *Planta medica* **55**, 213.
- Shao, Y. 1991. Phytochemischer Atlas der Schweizer Weiden. Thesis No. 9532, ETH Zürich.

Natural hybrid *Salix alba* × *S. fragilis* × *S. caprea* (*S.* × *savensis* Trinajstić et Krstinić) – inheritance of some characters

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It is known that among most species of the genus *Salix* there are no genetic reproductive barriers. Absence of hybridisation between various species is most often caused by an isolation mechanism because of differences in the flowering time. Species with synchronised flowering generally hybridise easily.

In the populations of various species of willows along the River Sava near Zagreb, the spontaneous trispecies hybrid *S. alba* × *S. fragilis* × *S. caprea* has been found. The flowering of the species *S. alba* L. and *S. fragilis* L., on one side, and *S. caprea* L., on the other are asynchronous, with a significant time difference. Therefore the causes of hybridisation of the mentioned species are unknown to us. Since no case of the hybridisation of a species of the subgenus *Salix* from the section *Salix* with representatives of the subgenus *Vetrix*: section *Vetrix* is reported in the literature, this newly found hybrid is described under the name *S.* × *savensis* Trinajstić et Krstinić.

By the analysis of a large number of clearly noticeable morphologic and physiologic characteristics, it has been demonstrated that the hybrid *S.* × *savensis* unites the properties of three species: *S. alba*, *S. fragilis* and *S. caprea*.

From both *S. alba* and *S. fragilis*, the hybrid inherited the capability of rooting, from *S. alba* the red colour and tough branchlets and from *S. fragilis* the shape of buds and morphology of lateral, summer branchlets. From *S. caprea* an early flowering (pre-leafing), one nectary, pilosity of filaments, bracts, shoots and leaves have been inherited. Some properties such as leaf shape, dentate leaf blade are intermediary.

Under the experimental conditions of rooting, shoots of *S.* × *savensis* first developed branchlets and then roots, whilst the control *S. caprea* simultaneously

developed only runners and the control *S. alba* × *S. fragilis* first roots and later branchlets.

The creative, economic and environmental applications of willow

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Historically willow has played an important role in the development of creative traditions and practices serving to strengthen the bonds between people and the land. The wide range of creative and economic applications of willow has defined its usefulness to man, both as an environmental and as a cultural resource. Thus the development of human creativity is closely associated with willow; the tree has also been a seminal factor in providing cultural experience of the environment. This is exemplified by the rich folklore associations of willow trees, and in the variety of artistic and literary productions based on them.

The development of willow crafts such as basket making, furniture making, hurdles, and in other domestic and agricultural applications was an integral part of traditional land management practices and the rural economy. Willow coppicing for basket making, hurdling etc. was central to the health of the countryside and to the preservation of the character of rural landscapes. In the last ten years the growing consumer interest in natural products, and in supporting rural environments, has contributed to a resurgence of interest in environmental and craft uses of willow.

Landscape architects, craft workers, artists, farmers, and some environmental organisations have begun to experiment with economic and creative uses of willow, in response to the necessity for finding new uses and options for the land. Blending traditional practices, innovative ideas in art, and environmental concerns, they are exploring the use of willow in such areas as land reclamation, biotex, urban landscape projects, and in collaborations with sculptors and craft workers in the development of contemporary art forms for the environment. Environmental organisations, including the Groundwork Trusts, the Countryside Commission, and urban forestry initiatives, are also employing creative and artistic users of willow in support of environmental work with schools, and for community based environmental regeneration schemes.

In response to the major changes taking place in the countryside, and to the predicted shift in agriculture away from food production, willow has recently become the focus for interdisciplinary research combining science and the arts.