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On unusual wood structures in Scrophulariaceae*

The Scrophulariaceae, though chiefly a family of herbaceous plants, contain also a number of genera with trees (*Paulownia* and *Wightia*) and genera with species of suffruticose and fruticose habit.

My colleague Mr. A. M. Cleef, who is studying the vegetation of the high Andean parts of Colombia collected material of the small genus *Aragoa*, endemic in the paramos of the Colombian and Venezuelan Andes. Though this genus consists in the main of small broom-like shrubs, a new species, *Aragoa perez-arbelaeziana* Romero, discovered by him, is a small tree, of which the stem reaches a diameter of 8 cm. The wood of *Aragoa* of which the structure was so far unknown, proved to be noteworthy because of the complete absence of rays and parenchyma. There was no indication at all of growth rings, and the vessels can not be distinguished from the fibres as seen on a cross section, as both are of equal width. In longitudinal sections vessels become recognizable by their simple perforations, their spiral thickenings and the presence of a few simple pits; whereas the fibre tracheids lack the spiral thickenings, and possess numerous bordered pits on both the radial and tangential walls. The diameter of the vessels and fibres varies in the 5 species investigated by me between 16 and 24 μm ; the length of the vessel members is on the average 260 (185–370) μm and that of the fibre tracheids 310 (220–450) μm . This unusual wood structure was found not only in the small stems with a diameter of 4–8 mm, but also in the stem of the only arboreous species.

In the literature already several genera of Scrophulariaceae have been mentioned of which the species possess wood without rays (cf. BORN 1886, SOLEREDER 1899). All these genera belong to the subfamily Rhinanthoideae. In Wettstein's treatment of the family in Engler & Prantl these genera, among which *Veronica* and *Digitalis* may be mentioned, are referred to the tribe Digitalinae, in which is also included *Capraria*, a shrub from the coast of Florida. An investigation of the wood of *Veronica* (*Hebe*) species and of the suffruticose *Digitalis obscura* from southern Spain revealed the presence of an almost identical wood structure, though the *Digitalis* species appeared to possess a few one to two cells wide rays and vessels which were easily distinguishable from the smaller-sized fibres. In *Capraria*, on the other hand, the wood appeared to possess an entirely normal structure with rays which are two cells wide, marginal parenchyma and vessels with small bordered pits and without helical thickenings.

From the point of view of the wood anatomist the classification proposed by PENNELL (1935) for the North American Scrophulariaceae, in which the genera of the Rhinanthoideae are distributed over twelve tribes, is preferable to that of Wettstein (1895), as in this classification *Capraria* is referred to tribe I and *Digitalis* and *Veronica* respectively to tribe VII and tribe VIII. *Aragoa* is not mentioned by him, as this genus is not represented in North America. It is generally referred to the Digitalinae, but in my opinion it fits better into the tribe Veroniceae.

BARGHOORN's findings (1941) of a similar rayless type of wood in the New Zealand shrub *Alseuosmia* (Caprifoliaceae) should be recorded here too. The absence of rays is considered by him to be a very strongly specialized condition. My own findings in the species of the genus *Aragoa* seem to confirm this view.

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