WOOD ANATOMY OF RIBES MAGELLANICUM (GROSSULARIACEAE)

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Summary: Wood anatomy description of Ribes magellanicum Poir. is given including specimens of its two subspecies. This is the first detailed secondary xylem study of a species included in the South and Central American subgenus Parilla Jancz. Wood anatomy of R. magellanicum shows the following typical anatomical features cited for northern hemisphere Ribes L.: small vessels, rays of two distinct sizes and scalariform perforation plates.

Key words: Ribes magellanicum, wood anatomy, secondary xylem, Grossulariaceae, Patagonia.

INTRODUCTION

Ribes magellanicum Poir. is an erect shrub of the Grossulariaceae family that inhabits the subantarctic forests of Patagonia, in Argentina and Chile. It can reach up to 4 m high, showing reddish brown fissured bark on older branches, racemes with yellow to reddish flowers and globose berries purple at maturity (Moore 1983 in Arena et al. 2007). According to the classification of Janczewski (1907 in Weigend et al. 2002) this species was placed in the subgenus Parilla Jancz., that has functionally dioecious species, and in the section Parilla jancz (Weigend et al. 2002), that includes the four species native to Argentine Patagonia (Sparre 1984) as well as others from Chile. Weigend et al. (op. cit.) in their molecular analysis of the genus, confirm the placement of the section Parilla and the section Andina jancz, that includes the rest of Southamerican species, in the subgenus Parilla.

Several authors have described, mostly superficially, the wood anatomy of the genus Ribes L. (Tippo 1938; Record & Hess 1943; Metcalfe & Chalk 1950; Stern et al. 1971; Schweingruber 1978; Schoch et al. 2004) and even a fossil wood with possible affinity to Ribes has been mentioned by Page (1970). In spite of the abundance of R. magellanicum in Patagonia, the wood anatomy of neither this species, nor any of the subgenus Parilla, have ever been described in detail. Regarding all the Argentinian species, only some aspects of the wood anatomy of Ribes cucullatum Hook. & Arn. have been mentioned by Cozzo (1946).

This contribution makes a detailed description of the secondary xylem anatomy of R. magellanicum, including its two subspecies: R. magellanicum subspecies magellanicum and R. magellanicum subspecies parviflorum (Phil.) Sparre. The two subspecies have been considered at species level by some authors (i.e. Reiche 1898). It is compared with known woods of northern species of the same genus. Wood anatomy of this species can be useful as a taxonomic tool, as well as for determination of archaeological and fossil woods.
The two studied plants have been collected at two different localities of Argentinian Patagonia. Both are permanently housed at the herbarium of the Museo Argentino de Ciencias Naturales (MACN), under reference numbers BA 53057 and BA 91927. The specimen of *R. magellanicum magellanicum* (BA 53057) was collected by Cozzo in Bahía Aguirre, Puerto Español, Ushuaia department, Tierra del Fuego province in 1949. The specimen of *R. magellanicum parviflorum* (BA 91927) was collected by one of the authors (RRP) in Lago Fontana, Río Senguerr department, Chubut province in 2007 at a height of 950 metres above sea level and was compared with herbarium specimens of the MACN for determination.

For the study of the woods, slides have been made following standard techniques (O’Brien & McCully 1981; D’Ambrogio de Argüeso 1986). Macerations were also made to complement the study, following the procedures of Boodle (1916). The anatomy description was made following the I.A.W.A. list of microscopic features for hardwoods identification (I.A.W.A. 1989). The measures are given by the mean followed by the range between parentheses and were calculated by observing both specimens.

The microscopic slides were observed under optical microscopes (Olympus BX51) and small fragments of the specimen BA 91927 were observed under a Philips XL30 scanning electron microscope (SEM).

### Materials and Methods

Studied stems have a diameter of up to 25 mm. Growth ring boundaries are delimited by 3 to 8 rows of radially flattened latewood tracheids and by the slightly decrease of vessel diameter (Fig. 2: B). Wood is diffuse to semi ring porous. Vessels are grouped in tangential series in the earlywood and with a slight tendency to show diagonal patterns in the latewood (Fig. 2: A). Vessels exhibit angular outline and very thin walls. They have a tangential diameter of 29 (17-49) μm and a density of 220 (155-350) vessels per mm² (Fig. 2: A, B). Vessel elements are 402 (284-496) μm in length. Perforation plates are oblique and scalariform, with 8 to 19 bars, occasionally branched (Fig. 2: C, D). Intervessel pits are elliptic to oval in shape and show a scalariform to alternate arrangement (Fig. 1, 2: E, F). Vessel-ray pits are circular in shape and crowded (Fig. 2: J). Libriform lignified fibres are abundant and constitute the main mass of the wood, they are sometimes septated, thin to thick walled, with simple pits of ca. 1 μm in diameter and 518 (434-646) μm in length. Scarcely gelatinous fibres from reaction wood are present. Fibres with bordered pits (fibretracheids) are also present, sometimes with expanded inner aperture (Fig. 1) and ca. 445 μm in length. Vasicentric tracheids show bordered pits ca. 4-5 μm in diameter, and the length is similar to the fibretracheids (Fig. 1). Rays are of two distinct sizes (Fig. 2: G). Uniseriate rays are 1 to 6 cells high and with a size similar to...
those of the sheath cells of the multiseriate rays. Multiseriate rays up to 19 cells in width, show a distinct sheath of 1 to 3 layer cells (Fig. 2: I), rarely have uniseriate extensions, can sometimes reach more than 1 mm in height and are in a frequency of 1 or 2 per mm. Heterocellular rays are composed of procumbent, square and upright cells. Upright marginal cells are observed in 1 to 4 rows (Fig. 2: H). Parenchymatic ray cells are conspicuously pitted in transverse, tangential and radial walls; pits are minute, ca. 2-3 μm in diameter (Fig. 1).

**Discussion**

Previous works on Ribes wood anatomy have showed that no significant anatomic variability occurs in the genus. In particular, R. magallanicum shows all the usual characters assigned to the genus: rays of two distinct sizes, multiseriate rays with sheath cells, small vessels with a tendency to form tangential series, scalariform perforation plates and vasicentric tracheids.

This species is very similar to northern species. Characters than can vary, compared with northern species, are mostly quantitative. The vessel diameter is slightly smaller, perforation plates have more bars and multiseriate rays seem to be shorter for patagonian R. magallanicum. Other conspicuous characters that vary from other described species of the genus are: the absence of axial parenchyma, rare in some northern species (Stern et al. 1971; Schoch et al. 2004), and the presence of pronounced angular vessel outline, because of the thin wall, especially in the specimen of the subspecies parviflorum. Vasicentric tracheids were previously cited for Ribes (Metcalfe & Chalk 1950; Stern et al. 1971). Because of the abundance of bordered pits and the disposition of them near to the vessels, they are considered vasicentric tracheids. The two specimens do not show significant variations in the anatomy, except for the increase of the angularity of the vessels of the specimen of subspecies parviflorum and higher density of vessels.

**Conclusions**

This is the first detailed description of the wood anatomy of a species of genus Ribes subgenus Parilla, including macerations and SEM images. Comparisons with other species of the genus suggest very low variations on the secondary xylem anatomy inside the genus. Although wood anatomy of other species of the subgenus Parilla remain unknown, they are expected to be very much alike to the one here described.

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**Bibliography**


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