Rev. Mus. Argentino Cienc. Nat., n.s.
2(1): 23-26, 2000
Buenos Aires. ISSN 1514-5158

Wood anatomy of six species of *Lycium*, with comments on fibriform vessel elements

Carlos Alejandro NORVERTO

Proyecto Forestal de Desarrollo (SAGPyA/BIRF). Av. Paseo Colón 922, 1063 Buenos Aires, Argentina

Abstract: The study of wood anatomy of 6 species of *Lycium* L. was made. These species share an homogeneous structure. The essential wood characteristics are: dendritic distribution, presence of spiral thickness in the secondary wall of vascular elements and tracheids, apotracheal and paratracheal axial parenchyma, radial heterogeneous, and libriform fibres. The presence of fibriform vessel elements is described in six species of *Lycium* for the first time.

Key words: vessel tracheids, wood anatomy, *Lycium*, Solanaceae.

This paper is a further contribution to a series describing the wood anatomy of *Lycium* indigenous to Argentina (Norverto, 1988; 1989). *Lycium* comprises 75 – 80 species of shrubs and small trees widely distributed in all the world (Hunziker, 1979; Bernardello, 1986). From the 22 species of Argentina only *L. ciliatum* Schlecht., *L. elongatum* Miers, *L. chilense* Miers, *L. gilliesianum* Miers, *L. infaustum* Miers and *L. tenuispinosum* Miers were studied, belonging to arid and semiarid regions (Cabrera, 1971).

MATERIALS AND METHODS

Wood samples have been obtained from the following Argentine Herbaria:

BAw: Museo Argentino de Ciencias Naturales "B. Rivadavia".

MERL: Herbario "Ruíz Leal", Mendoza.

SL: Universidad Nacional de San Luis.

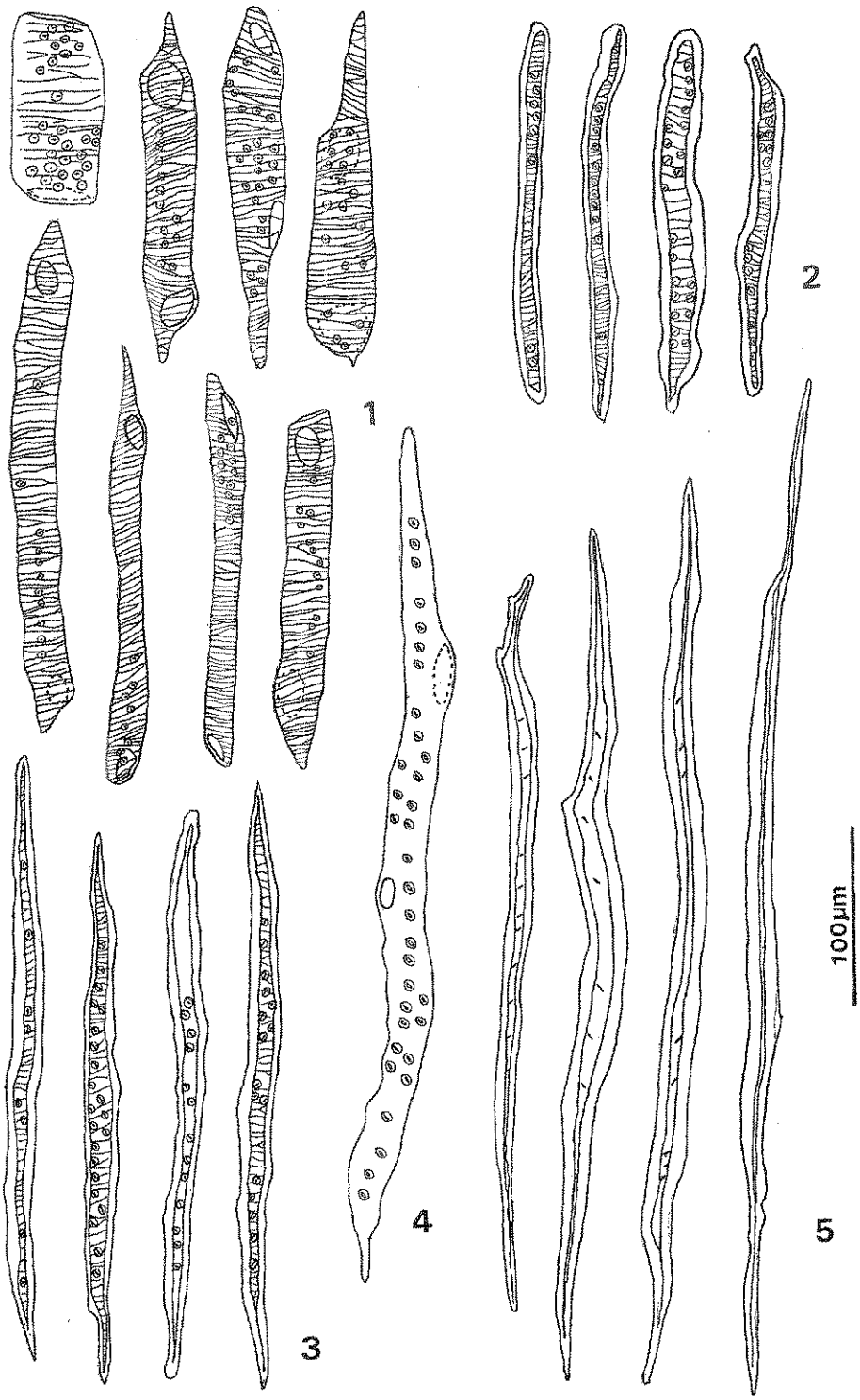
SRFA: Universidad Nacional de La Pampa, Facultad de Agronomía de Santa Rosa.

Lycium cestroides. Cozzo (BAw 52297), Córdoba Prov.; Patridge (BAw 68440), Corrientes Prov. –*Lycium ciliatum*. Cozzo (BAw 52295), Córdoba Prov.; Troiani & Prina (SRFA 9734), La Pampa Prov. –*Lycium chilense var. chilense*. Troiani & Prina (SRFA 9732). La Pampa Prov. –*Lycium chilense var. minutifolium* Troiani & Prina (SRFA 9733), La Pampa Prov. –*Lycium chilense var. glaberrinum*. Del Vitto (SL 2269), San Luis Prov.; Roig (MERL 12499), Mendoza Prov. –*Lycium elongatum*. Castellanos (BAw 11697), Córdoba Prov.; Luna Ruíz (BAw 53405), Santiago del Estero Prov. –*Lycium gilliesianum*. Norverto (BAw 74970); 75015), La Pampa Prov. –*Lycium infaustum*. Lorentz (BAw 41223), Santiago del Estero Prov. –*Lycium tenuispinosum*. Troiani, Prina & Alfonso (SRFA 9617), La Pampa Prov.

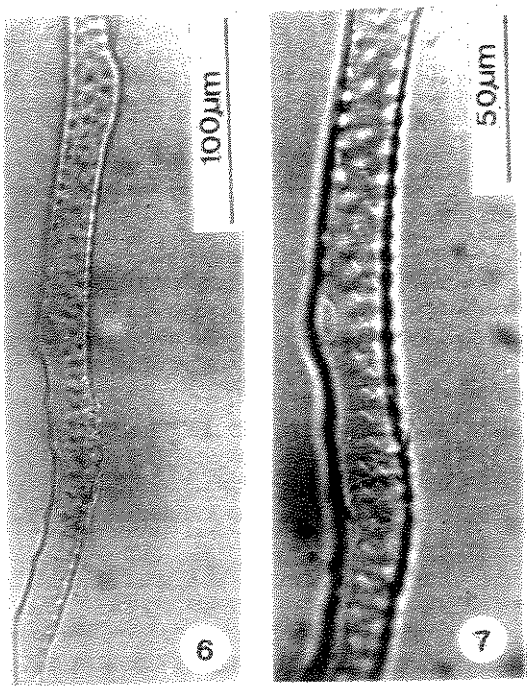
The samples in dried conditions were boiled in water and stored in 50% aqueous ethyl alcohol. With a sliding microtome, transversal, longitudinal tangential and radial sections of approximately 13 µm thick were prepared. Thicker sections were out only in order to reduce tearing. Maceration's were prepared with Boodle' s method (1916). Sections and maceration's were stained with safranin-fast green combination and made into permanent slides. All quantitative data are based upon 25 measurements per feature. Terminology follows that of the IAWA Committee on Nomenclature (1964) and IAWA list of microscopic features for hardwood identification (Wheeler *et. al.*, 1989). Of the mentioned codes for the materials, only BAw is included in the Stern's Index Xilariorum (1991).

RESULTS

Wood semi-ring porous. Vessels in dendritic pattern, solitary, in clusters or radial and tangential short multiples; oval or angular in transverse section; average tangential diameter 47 µm. Simple perforation plates in obliques to lightly obliques end walls. Tails present on vessel elements (Fig. 1). Intervessel pits alternate; inner apertures included. Vessel-ray and vessel-



Figs. 1–5. Graphics of cells from macerated wood of *Lycium chilense*. 1, Vessels elements. 2, Tracheids. 3, Fibre - tracheids. 4, Fibriform vessel element. 5, Libriform fibres.



Figs. 6–7. Photomicrographs of *Lycium cestroides*: fibriform vessel elements, lateral perforation plates.

parenchyma pits with distinct borders, similar in size and shape. Walls with helical thickenings (Fig. 1). Tyloses and gummy deposits absent. Tracheids with helical thickenings in the walls and bordered pits (Fig. 2). Fibre-tracheids with distinctly bordered pits in tangential and radial walls, inner apertures included; on average 344 µm long; spiral thickenings present (Fig. 3). Libriform fibres with simple pits; on average 583 µm long (Fig 5). Fibriform vessel elements present (Fig. 4), perforation plates are lateral and tend to be vertically oriented (Figs. 6, 7), they may very much like fibres; tend to be longer than the ordinary vessel elements that they accompany, on average 430 µm long. Axial parenchyma scanty paratracheal and diffuse apotracheal. *L. gilliesianum* also with axial parenchyma in marginal bands. Rays uniseriate or partially biseriate; homocellular and heterocellular; ray cells square, upright and procumbent. Disjunctive parenchyma present. Calcium oxalate crystals in axial parenchyma and sometimes in radial parenchyma.

DISCUSSION

Certain groups of dicotyledons have fibriform vessel elements (Woodworth, 1935; Carlquist, 1988). In the present study fibriform vessel elements were found for the first time in the Solanaceae. *Lycium* has fibriform vessel elements of fusiform shape, the tips of witch extend well beyond perforation plates. It also has been reported the presence of fibriform vessel elements in other families of Tubiflorales (Melchior, 1964); Convolvulaceae (Mennega, 1969); Hydrophyllaceae (Carlquist *et al.*, 1983; Carlquist and Eckhart, 1984); and Polemoniaceae (Carlquist *et al.*, 1984).

Since the present, Tubiflorales is the group with major number of species characterised by the presence of fibriform vessel elements.

Vessels in dendritic pattern and helical thickenings in the walls of vessel elements, tracheids and fibre-tracheids are indicative features of wood xeromorphy (Norverto, 1989; Carlquist, 1992).

ACKNOWLEDGEMENTS

I thank Dr. Sherwin Carlquist for his critical reading of the manuscript. I thank also the curators for the herbarium samples received.

BIBLIOGRAPHY

Bernardello, L.M. 1986. Revisión taxonómica de las especies sudamericanas de *Lycium* (Solanaceae. *Bol. Acad. Nac. Ci. Córdoba* 57 (3–4): 173–356.

Boodle, L. A. 1916. A method of macerating fibres. *Kew Bull. Misc. Inf.* 4: 108–110.

Cabrera, A.L. 1971. Fitogeografía de la República Argentina. *Bol. Soc. Argent. Bot.* 14 (1–2): 1–42.

Carlquist, S. 1988. *Comparative wood anatomy*. Springer – Verlag. Berlin & Heidelberg.

— 1992. Wood anatomy of Solanaceae: a survey. *Allertonia*, 6 (4): 279–326.

Carlquist, S., V. M. Eckhart & D. C. Michener. 1983. Wood anatomy of Hydrophyllaceae. I *Eriodictyon. Aliso* 11:317-335.

— 1984. Wood anatomy of Polemoniaceae. *Aliso* 102: 547-572.

Carlquist, S. & V. M. Eckhart. 1984. Wood anatomy of Hydrophyllaceae II. Genera other than *Eriodictyon*, with comments on parenchyma bands containing vessels with large pits. *Aliso* 10: 397–412.

Hunziker, A.T. 1979. South American Solanaceae: a synoptic survey. In J. C. Hawkes, R. N. Lester a A. D. Skelding (eds.). the Biology and Taxonomy of the Solanaceae. *Linnean Soc.. Symp.* Ser. 7: 49–85.

IAWA Committee on Nomenclature. 1964. *Multilingual glossary of terms used in wood anatomy*. Konkordia. Winterthur.

Melchior, H. 1964. *Engler's Syllabus der Pflanzenfamilien*. 12. Ed. Berlin, Nikolasse.

Mennega A. M. W. 1969. The wood structure of *Dicranostyles* (Convolvulaceae). *Acta Bot. Neerl.* 18: 173–179.

Norverto, C. A. 1988. Nota preliminar sobre la estructura de la madera de *Lycium gilliesianum* Miers (Solanaceae). *Rev. Cs. Agrarias y Tecnología de los Alimentos (UCA)* 9 (1–4): 63–67.

— 1989. Estudio comparativo de la estructura de la madera de *Lycium cestroides* y *L. elongatum* (Solanaceae). *Bol. Soc. Argent. Bot.* 26 (1–2): 45–52.

Stern, W. L. 1991. Index Xylariorum, institutional wood collections of world. Addendum. *IAWA Bull.* 12 (1): 99.

Wheeler, E. A., P. Baas and P. E. Gasson. 1989. IAWA list of microscopic features for hardwood identification (new series) 10 (3): 219–332. Leiden The Netherlands.

Woodworth, R.H. 1935. Fibriform vessel members in *Passiflora*. *Tropical Woods* 41: 8–16.

Recibido: 15-XI-1998
Aceptado: 27-XII-1999