

LONICERA PALLIDA HOST. STEM AND LEAF ANATOMY

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ABSTRACT. The article comprises histoanatomical characteristics of the stem and leaf in the woody climber species *Lonicera pallida* Host (family Caprifoliaceae). The results revealed that the anatomical structure of this plants justify it climbing nature, especially the mechanical tissue which is poorly represented in the stem and leaf. The strengthening of the stem is made up of a sclerenchymatous ring and some phloem fibers. The stele covers the most part of the stem structure. In the leaf the vascular bundle is protected by any bundles sheaths. Remarkable is the abundance of druses and the protected hairs in both vegetative organs. *L. pallida* anatomical characteristics of the root, stem and leaf of has been described and discussed.

Keywords: anatomy, stem, leaf, woody climber, *Lonicera pallida*

INTRODUCTION

Lonicera pallida Host., known as honeysuckle is a vigorous ornamental deciduous popular woody climber 3m (1m of annual growth). The leaves are obovate and deep green in color green. The upper perfoliate pair, form a disc subtending the inflorescence. The leaves are oval, with whitish-blue undersides (Savulescu 1961, Willis 1985). It has large clusters of bright coppery golden-orange tubular flowers, tipped with red from May to July (Pratt, 1846; Sheat, 1948; Bean, 1981). Well suited for scrambling over arbors, pergolas and other supports. It doesn't have any special soil requirements (Rowald, 1963). Knowledge on the *Lonicera* genus vegetative organs anatomy is quite limited (Davis, 1990; Batanouny, 1992) and that of *L. pallida* is almost lacking. In literature are mentioned the morphological aspects of this plants but an anatomical study almost lack. The goal of the research was to examine the anatomy of the stem and leaf of this species and to show that exhibit certain anatomical features of anatomical interest, in accordance with their climbing nature.

MATERIALS AND METHODS

Cross sections of the stem and leaf (including the petiole) were obtained using a rotary microtome. The sections were stained with alum-carmin and iodine green. The samples were embedded in glycerine gelatine (Bercu & Jianu, 2003). Observations and micrographs were made with a BIOROM-T bright field microscope, equipped with a TOPICA 6001A video camera. The microphotographs were obtained from the video camera through a computer.

RESULTS AND DISCUSSION

Cross section of *L. pallida* stem reveals an epidermis, a cortex and a stele. Epidermis consists of a single layer of regularly arranged small cutinized cells, being interrupted by the presence of simple, long one-

celled hairs. Bellow the epidermis is a ring of sclerenchymatous cells in an irregularly arrangement. At places the sclerenchymatous ring is interrupted by the presence of one or two parenchymatous cells. The parenchyma cortex is poorly developed, it cells consisting druses. It is followed by the central cylinder. The stele occupies almost the entire centre of the stem. It possesses compactly radial arranged elements of xylem and phloem, such as in other woody climbing dicots stems (Bailey, 1947; Batanouny, 1992; Toma & Rugină, 1998; Bavaru & Bercu, 2002) (Fig. 1). Cambium is not distinct. However, it generates more secondary xylem less secondary phloem. The secondary phloem is represented by sieve cells, companion cells, phloem parenchyma. At places, a group of three small linear sclerenchyma cells of phloem fibers and druses as well.

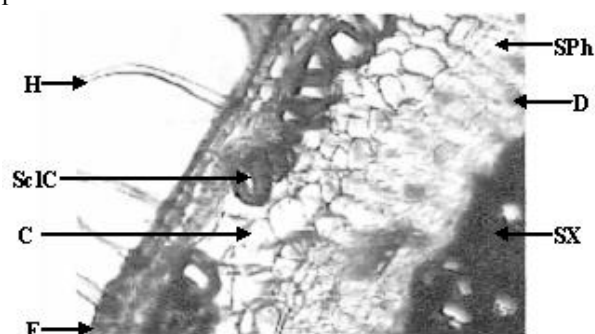


Fig. 1. Portion of a cross section of the stem. x 220: C- cortex, D- druse, E- epidermis, H- hairs, SclC- sclerenchymatous cells, SPH- secondary phloem, SX- secondary xylem (orig.)

Between xylem and phloem three layers of cambium cells are present. Xylem consists of xylem vessels, arranged in a sclerenchymatous parenchyma. Primary xylem elements toward the center of stem are present. The centrally located pith is made up of few

cells, some of them possessing druses and a large lacuna (Fig. 2).

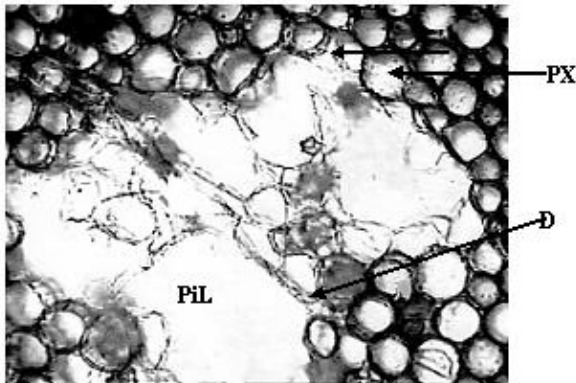


Fig. 2. Portion of a cross section of the stem. x 220: D- druse, PiL- pith lacuna, PX- primary xylem (orig.)

The leaf petiole exhibits in cross section a circular arrangement of its histological elements. Externally is the epidermis (one-celled) covered by a thick cuticle, followed by a collenchyma tissue (5-6 layers of cells). The most part of the petiole is occupied by the inner parenchyma cortex with numerous druses of calcium oxalate. In the centre is the petiole close and collateral vascular bundle, with xylem elements in a radial arrangement (Fig. 3, A)

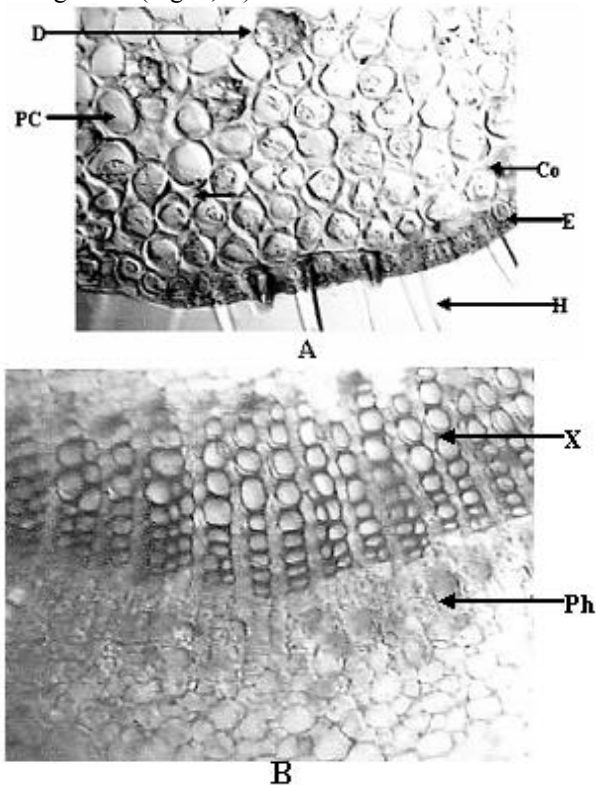


Fig. 3. Cross section of the petiole. Portion with epidermis and cortex. (A). Portion of the stele vascular bundle (B). x 220: Co- collenchyma, D- druses, E- epidermis, H- hair, PC- parenchyma cortex, Ph- phloem, X- xylem (orig.)

The phloem tissue possesses numerous druses. As Bailey in 1947 reported, remarkable is the presence of long one-celled protective hairs for the plant defence (Fig. 3, B).

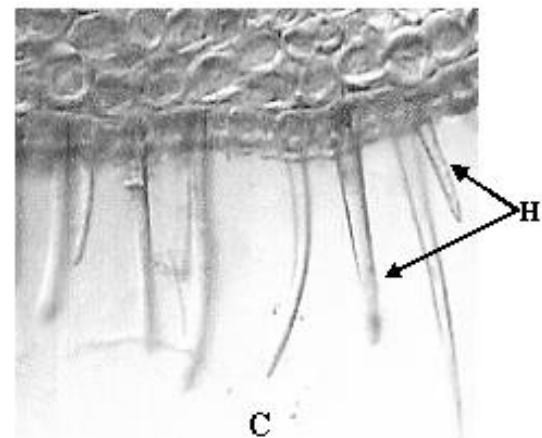
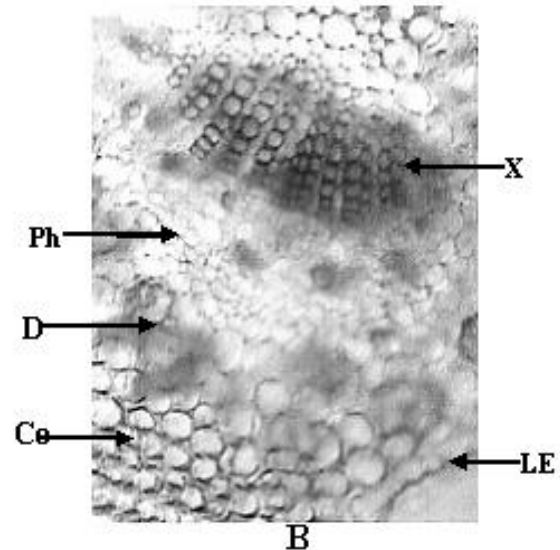
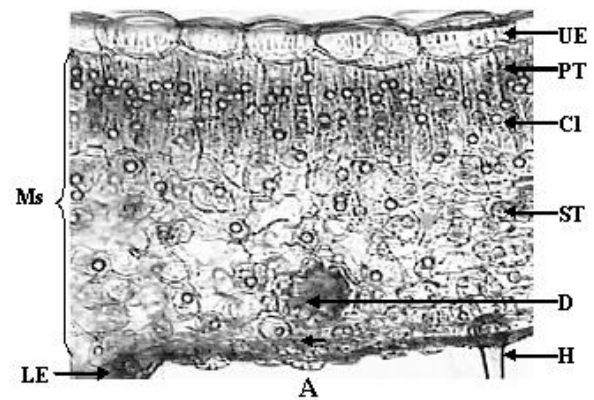


Fig. 4. Cross section of the lamina (A) x 330. The mid rib (B) x 220. Epidermal hairs (C) x 200: Cl- chloroplasts, Co- collenchyma, D- druses, H- hairs, LE- lower epidermis, Ms- mesophyll, Ph- phloem, PT- palisade tissue, ST- spongy tissue, UE- upper epidermis, X- xylem (orig.)

The blade, in transversal sections, exhibits an upper epidermis, a mesophyll and a lower epidermis. The upper epidermis, as the lower one, is made up of a single layer of cells. The upper epidermal cells are larger than the lower one. Both epidermises are covered by cuticle. The mesophyll lies beneath the upper and lower epidermis. It is differentiated into palisade tissue (two layers of cells) and spongy tissue, the later composed of loosely arranged parenchyma cells (mostly lobed cells) with intercellular spaces.

Druses of calcium oxalate are present in the spongy tissue. Remarkable is the abundance of chloroplasts in the mesophyll (Fig. 4, A). The lower epidermis continuity is broken by the presence of stomata. The mid rib consists of a close collateral bundle with radial arranged xylem elements (toward the upper epidermis) and phloem to the lower epidermis. Numerous druses of calcium oxalate are present in between phloem and lower epidermis. Beneath the mid-rib vein and both epidermis a collenchymatous tissue with mechanical role is present (Fig. 4, B). The same long simple one-celled hairs as in the stem and petiole, on upper and lower epidermis are present (Fig. 4, C).

CONCLUSIONS

Results indicate that the stem and leaf gets specific structure of anatomical interest in accordance with their climbing nature. Epidermis has cells with highly cutinized walls, covered by a thick cuticle. The cortex is extremely reduced, consisting of 2-3 layers of parenchyma cells. The stem has a secondary structure. The stem mechanical tissue is poorly developed. It is made up of a ring of sclerenchymatous cells and few phloem fibers. The stele occupies the most part of the stem structure. The mechanical tissue of the petiole is well developed, represented by 5 layers of collenchymatous cells. The stele possesses one vascular bundle. The blade has a heterogeneous mesophyll with druses of calcium oxalate. The blade strength is represented by few collenchymatous cells, located in between the midrib and epidermis. A number of druses of calcium oxalate are present in the stem cortex and in the blade (especially around the midrib vascular bundle). The mid rib consists of collateral bundle without bundle sheath. Long simple one-celled hairs for the plant clamping are present in the stem and blade of *Lonicera pallida*.

REFERENCES

- Bailey LH, Species studies in (*Lonicera*) Gentes Herb., 9, pp. 124-193, 1947.
- Bean W, Trees and Shrubs Hardy in Great Britain. Supplement Murray, Vol 1-4, 1981.
- Batanouny KH, Plant Anatomy. University Press, Cairo, 1992.
- Bavaru A, Bercu R, Morfologia și anatomia plantelor. Ex Ponto, Constanta, 2002.
- Bercu R, Jianu LD, Practicum de Morfologia și anatomia plantelor. "Ovidius" University Press, Constanta, 2003.
- Davis HA, Studies in *Lonicera*. Castanea, 57, pp. 32-43, 1990.
- Pratt A, Flowers and their Associations, C. Knight Publ., London, 1846.
- Rowald W, Planta, mediul și natura, Ed. Științifică, București, 1963.
- Săvulescu, T (Editor-in Chief), Flora R.S.R. vol. VIII, Ed. Acad. R. S.R, București, 1961.
- Sheat WG, Propagation of Trees, Shrubs and Conifers. MacMillan and Co, New-York, 1948.
- Toma C, Rugina R, Anatomia plantelor medicinale. Ed. Academiei Romane, Bucuresti. 1998.
- Willis JC, A Dictionary of the Flowering Plants and Ferns. (8th ed.), Cambridge University Press. 1985.

