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OBSERVATION UPON ESSENTIAL OILS SECRETIVE STRUCTURES ON *THYMUS PANNONICUS* ALL. AND *THYMUS PULEGIOIDES* L.

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ABSTRACT

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The authors analyze the structure of the aerial vegetative organs on two *Thymus* species (*T. pannonicus* All. and *T. pulegioides* L.). It is underlined the presence of glandular trichomes which are always multicellular having a basal cell, a unicellular stalk and 1, 2 or 8 cells gland. It is underlined as well the early becoming from the stem's primary to the secondary structure but only on cambium activity.

Key words: anatomy, glandular trichomes, *Thymus*

Introduction

Thymus gender (*Lamiaceae*) is made of around 350 species in Europe, Northern Africa, Asia, Canary Islands. In flora of Romania are 16 species and 12 hybrids (A. Oprea, 2005). Different *Thymus* species are used around the world as medicinal, ornamental and spicy plants and are a source for essential oils.

Thymus pannonicus All. presents vigorous stems, branched, and covered by hairs with the same length of the axis diameter. The leaves are elliptic or prolonged, 6-12 mm in length and 3-5 mm width, green in color, both faces are covered with hairs, nervures little proeminent. The inflorescence is capitate. The calyx is 3-4 mm long, the corolla is lilac-red, 6-7 mm long (M. Guşuleac, 1961).

Thymus pulegioides L. has a thick rhizome. The aerial steam is strong, highly branched. The floral branches are serially disposed, being covered with little hairs only on the sides. The leaves are ovoid to semi-round or elliptical.

This paper is a first stage of research regarding the structure of glandular trichomes and the essential oils extracted from the two species, for the purpose of eventually linking the cyto-histological information with the biochemical data.

Material and methods

The biological material studied is represented by two *Thymus* species: *T. pannonicus* All., a species collected in august 2006 from the reservation Valea lui David (Iaşi) and *T. pulegioides* L., species collected in June 2006 from Neagra Şarului (Vatra Dornei).

For histo-anatomical research the vegetal material was firstly fixed and preserved in ethylic alcohol 70%. We have made cross sections at the aerial vegetative organs (stem – the superior, medium and inferior level; lamina, sections lately colored by iodine-green and carmine-red.

Results and Disscusions

Stem

At *Thymus pannonicus* the epidermis cells are isodiametric or slowly tangentially prolonged, having the external wall thickened, but covered by an extremely thin cuticle. Here and there, all over the stem's circumference there are tector and glandular trichomes. The tector trichomes are very frequently met, being mostly multicellular than unicellular, the terminal cell having a sharp, pointed pick. The glandular trichomes are always multicellular having a basal cell, smaller than the epidemical ones between which it is situated, and unicellular short stalk and a gland made of 1, 2 or 8 cells, all covered with a common, waved cuticle (fig.9). Still of the epidemical level there are stomata, whose cells are little prominent over the level of the protective cells. In the inferior level of the stem we notice that the frequency of the tector trichomes and both the glandular ones is reduced.

The cortex is relatively thin, parenchymatous assimilator, of meatic type between the ribs and predominantly of colenchymatical type inside the ribs. At the interior side of the collenchymatous

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strings there are 2-3 layers of parenchymatous cells, without chloroplasts or having just a few. The cortex ends in a Casparyan type endoderma, having tangentially prolonged cells of different size.

At the stele from the bottom of the stem (fig. 3), the structure is of a secondary type, resulting from the activity of the cambium: a very thin ring of phloem and a thick ring of xylem completely lignified. In the superior level of the stem (fig. 1), the stele has many conductive phloemic bundles of opened collateral type, from which those facing the ribs are much bigger; the meristematical tissue also produced some phloemic elements to the exterior and some xylemic vessels to the inside.

The pith is thick, with a large central aeriferal cavity.

At *Thymus pulegioides*, the epidermis has izodiametric cells, with the external walls thicker than the others and covered with a stripped-crenulated cuticle.

The leaf

At *Thymus pannonicus*, in cross section of the lamina, we noticed that the midrib is a little prominent at the inferior side of the lamina and has only one big bundle of conductive xylem-floem, which has a very thick string of sclerenchymatical fibres, coming from the phloem and going up to the epidermis of the abaxial face. Both epidermis are made of small tangentially prolonged cells having the external wall much thicker than the others (fig. 7).

From place to place, especially on the margins of the lamina, there are differently lengthed tector trichomes, the short ones being unicellular. On both sides of the epidermis we can notice also glandular trichomes, placed more oftenly in little epidermis depressions, being structurally similar to those observed on the stem.

The mesophyll consists of palisadic tissue at the upper epidermis and lacunous tissue at the lower one, so the limb has a bifacially- heterofacially structure.

At *Thymus pulegioides* , the upper epidermis is smooth having stomata from place to place and also very short tector trichomes with pointed pick; the epidermical cells have the external wall thicker than the others, and also covered with a thin cuticle (fig. 8). At the lower epidermis, in the holes, there are glandular trichomes having tetra- or octocellular glands. Still at this level, the stomata appear frequently and the tector trichomes are missing.

Conclusions

- Both species have two trichomes types: tector and glandular, and the first being multicellular.
- The glandular trichomes are always multicellular, having instead an unicellular basal, an unicellular stalk and the gland made of 1, 2 or 8 cells.
- The stomata are diacytic type, appearing in both epidermis, so the lamina is of amphystomatic type.
- The secondary structure of the stem appears early, only because of the cambium activity.

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Fig. 1-*Thymus pannonicus* stem – the superior level

Fig. 2 -*Thymus pannonicus* stem – the medium level

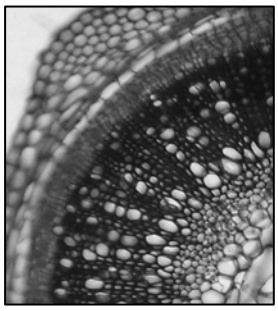

Fig. 3-*Thymus pannonicus* stem – the inferior level

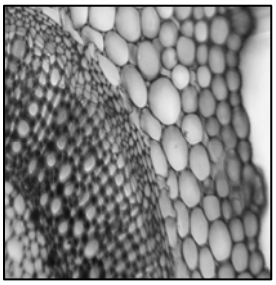

Fig. 4-*Thymus pulegioides*
stem – the superior level

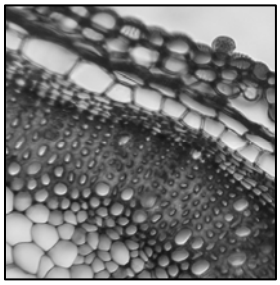

Fig. 5 -*Thymus pulegioides*
stem – the medium level

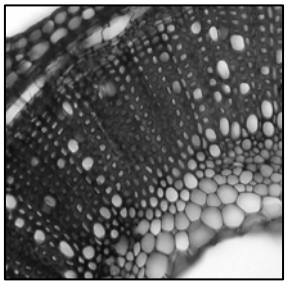

Fig. 6-*Thymus pulegioides*
stem – the inferior level

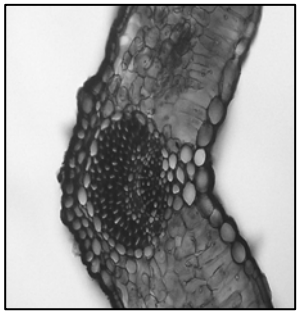

Fig.7 - *Thymus pannonicus* –lamina

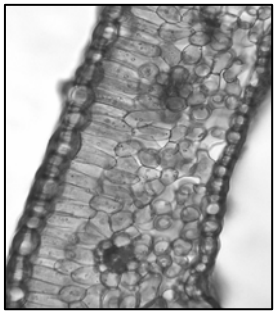

Fig. 8 - *Thymus pulegioides*- lamina

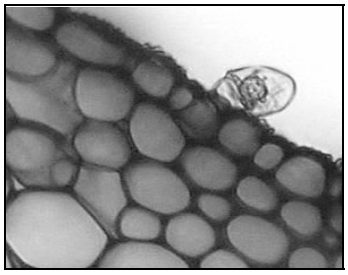

Fig. 9 - *Thymus pannonicus*- glandular trichome

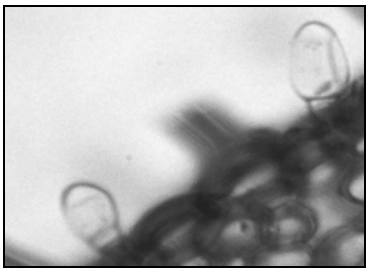

Fig.10 - *Thymus pulegioides*- glandular trichomes