

**GLANDULAR AND EGLANDULAR HAIRS OF *SALVIA RECOGNITA*
FISCH. & MEY. (LAMIACEAE) IN TURKEY**

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Abstract

Distribution of glandular and e glandular hairs on the aerial organs of *Salvia recognita* Fisch. & Mey. has been investigated. Glandular hairs of *S. recognita* have consisted of capitate and peltate hairs. Capitate hairs were present abundantly on all aerial parts of *S. recognita* while peltate hairs were only present on stem, leaf, bract and calyx. E glandular hairs were also widespread on all aerial parts.

A chief characteristic of the family Lamiaceae is the essential oil produced by glandular hairs (Ascensao *et al.* 1995). Volatile oil produced from glandular hairs is important for pesticide, pharmaceutical, flavouring, perfumery, fragrance and cosmetic industries (Zeybek and Zeybek 2002). The genus *Salvia* with over 900 species is probably the largest member of the family and there are 90 species in Turkey (Davis 1982, Güner *et al.* 2000). *Salvia recognita* are endemic and Irano-Turanien element. Glandular hairs are the primary secretory parts of these plants and their structures can vary widely among species (Serrato-Valenti *et al.* 1997). In Lamiaceae, the morphology, distribution and frequency of glandular hairs are used as determinative characters at sub-family level (Ascensao *et al.* 1995). In almost all species studied, two main types of glandular hair, peltate and capitate, occur which can be distinguished by their head size and stalk length. Capitate hairs are very variable in stalk length, head shape and secretion process and can be subdivided into various types, as type I, type II and type III (Werker *et al.* 1985).

It is stated that the structure and morphology of hairs can be used to determine taxonomic relationship of many *Salvia* species (Isakova 1972). For this reason, the author aimed to present the morphology, cell number and distribution of glandular and e glandular hairs on *S. recognita* belonging to Lamiaceae. Plant samples were collected from B5 Nevşehir: 15 km North of Ürgüp, at 1100 m on 6.7.2004. The paraffin method was applied for preparing cross-sections of the plant organs. The classification of glandular and e glandular hairs was made according to Werker *et al.* (1985) and Özdemir and Şenel (2001). The author observed two different types of glandular hairs such as capitate and peltate. Capitate hairs consisted of a base including epidermis cells, a stalk and a head. Some of the capitate hairs had a round head cell and droplets on the cuticle and had no clear subcuticular space. These capitate hairs corresponded type I (Figs. 1A-E). Some of them formed a two celled head (Figs. 1F-I). Some of them had a pear shaped head and a large subcuticular space filled with secreted material. These capitate hairs corresponded type II (Figs. 1J-L). Some of them formed a cup-like head cell and a broken cuticle. Those corresponded type III (Fig. 1M-P). Some of type III capitate hairs were in early stage of secretion so that their head cell was not collapsed and the cuticle was not broken yet (Figs. 1Q-T). Type I, II and III capitate hairs were all together on stem, leaf, petiole, pedicel and corolla. Type III capitate hairs were not observed on calyx. Capitate hairs had 1-2 head cells and 1-5 stalk cells or no stalk cell and 1-3 base cells. There were some capitate hairs whose base cells were elevated from the epidermis level, appearing like a stalk cell at the same time. Peltate glandular hairs had a base including epidermis cells and a very short stalk cell and a large secretory head forming the central and peripheral cells. Leaf was the richest part with peltate hairs. They had 1-2, 4, 6 central and 4, 6, 8 peripheral cells.

Eglandular hairs were uni- or multicellular and had a base including epidermal cells and a uniseriate hair. They had 1-5 base cells and 1-5, 7 hair cells. Calyx was the richest part with this type of hair.

Many researchers examined the glandular hairs and they found two main types, peltate and capitate hairs on some *Salvia* species (Werker *et al.* 1985, Kesercioğlu and Nakipoğlu 1992, Özdemir and Şenel 2001). Werker *et al.* (1985) for the first time classified capitate hairs as type I, II and III according to their secretion mode. Following Werker *et al.* (1985), type IV capitate hairs were described on *S. officinalis* L. by Corsi and Bottega (1999). The present author pointed out that *S. recognita* had both peltate and capitate glandular hairs. He observed three different types of capitate hairs (Types I, II and III) on *S. recognita*. Type IV capitate hairs have not been found on *S. recognita*.

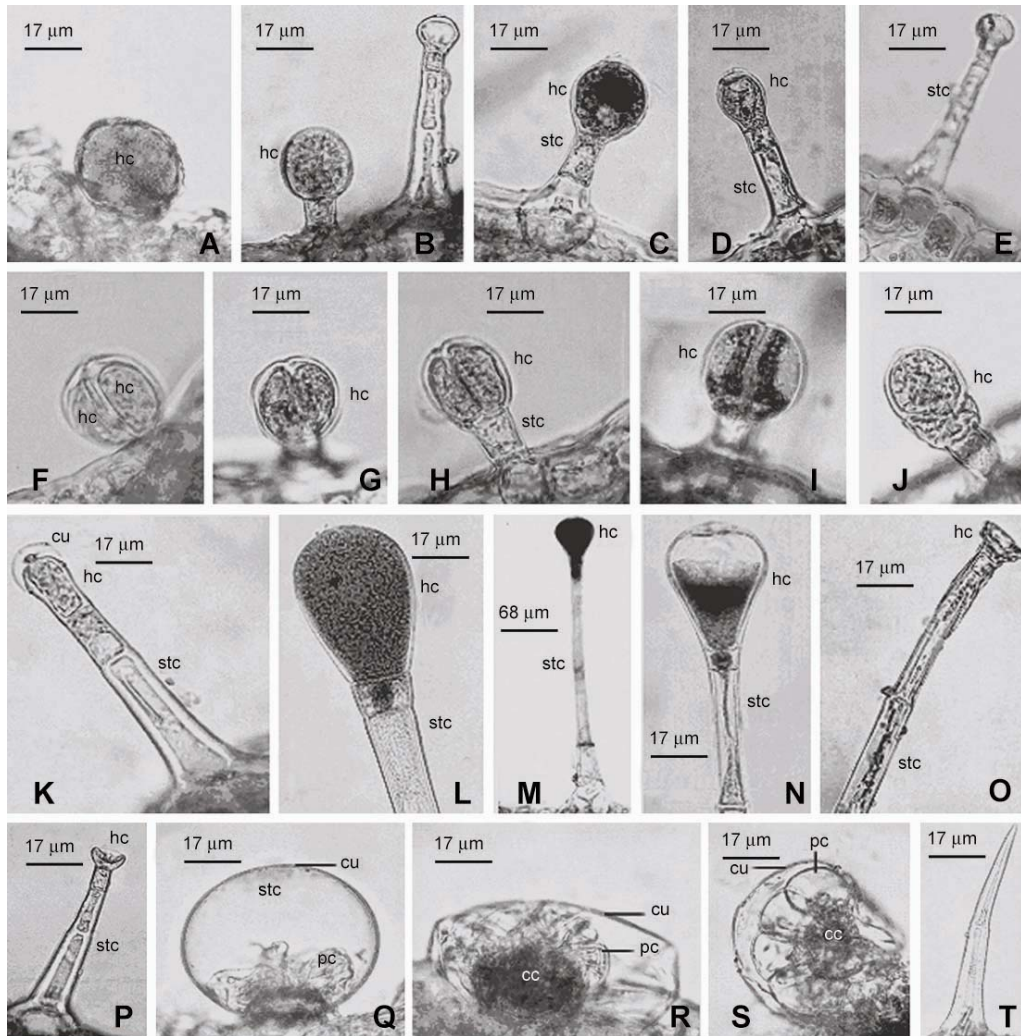


Fig. 1. Photographs of glandular and eglandular hairs found at *Salvia recognita*. A-E: Type I capitate glandular hairs with one head cell. F-I: Type I capitate glandular with two head cells J-L: Type II capitate glandular hairs. M-P: Type III capitate glandular hairs. Q-S: Peltate glandular hairs T: Eglandular hair hc: head cell, stc: stalk cell, bc: base cell, cu: cuticle, sc: secretory cavity, cc: central cell, pc: peripheral cell.

Peltate hairs on some *Salvia* species usually form 4 or sometimes 2 central and 7-12 peripheral cells. Capitate hairs form 1-2 head cells and 1-5 stalk cells (Werker *et al.* 1985). In the present study, peltate hairs of *S. recognita* had 1-2, 4, 6, 8 central and 4, 6, 8 peripheral cells. Capitate hairs of *S. recognita* formed a 1-2 celled head and a 1-5 celled stalk or sometimes no stalk cell and a 1-3 celled base. It is reported that eglandular hairs of *S. sclarea* and *S. forskahlei* form a 1-3 celled base and 1-8 celled hair (Özdemir and Şenel 2001). The author found that eglandular hairs of *S. recognita* formed a 1-5 celled base and 1-5, 7 celled hair. Investigations showed that *S. recognita* was rich in case of glandular hair diversity and also cell numbers of eglandular hairs.

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