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## Distribution and significance of *Hyssopus officinalis* (Labiatae) in Bulgaria

### Abstract

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The contradictory data on the distribution of *Hyssopus* taxa in Bulgaria are reviewed. *H. officinalis* subsp. *pilifer* is the wild plant growing in stony places with a temperate-continental climate. Its occurrence in two regions (Znepole and Mt Vitoša) is confirmed, and its alleged presence in the Predbalkan, W. Stara planina, and Mt Rila is discussed. The wild plants contain camphor, but not as much pinocamphone as the cultivated ones (*H. officinalis* subsp. *officinalis*), which is why the native populations cannot be used for perfumery purposes.

### Introduction

The general aim of our investigations is to find Bulgarian plant taxa that can be used as new sources of essential oils, and to review their distribution in the country. In the years 1989-1992, the distribution and characteristics of *Hyssopus officinalis* L. have thus been investigated.

The essential oil of *Hyssopus officinalis* subsp. *officinalis*, distilled from the fresh dried plant material, is widely used in perfumery and cosmetics industry, in Bulgaria and elsewhere in the world.

The distribution of *Hyssopus* in Bulgaria has been recorded by many authors (Velenovský 1891, 1898; Hayek 1931; Stojanov & Stefanov 1924-1925, 1933, 1948; Stojanov & al. 1967). Ančev (1989) accepts *Hyssopus officinalis* subsp. *aristatus* (Godr.) Briq. as the single Bulgarian taxon, given as being present in two floristic regions: Znepole (Golo Bărdo, Mt Konjavaska, Čepăn, and Ruj) and the Vitoša Mts (southern slopes). He also cites former records from two other regions: the W. Predbalkan (Belogradčik, from Velenovský 1898) and the W. Stara planina (Sofijsko, Berkovica, from Velenovský 1891; and Kurilo, from Davidov 1903), for which he saw no material.

Ančev (1989) equated *Hyssopus officinalis* subsp. *aristatus* with “var. *angustifolius* auct. bulg. non M. B.”, but gave no other synonyms. According to DeFilipps (1972), *H. officinalis* subsp. *aristatus* (under which he cites the correct, older name *H. officinalis*

subsp. *pilifer* (Griseb. ex Pant.) Murb. in synonymy) grows in France, Spain, and the Balkan Peninsula. Hayek (1928-1931: 333) recorded subsp. *pilifer* from elsewhere in the Balkan countries, but only subsp. *angustifolius* (M. Bieb.) Arcang. from Bulgaria.

According to Mill (1982), *Hyssopus officinalis* subsp. *angustifolius* extends from Anatolia to Caucasia and N. Iran and differs from the European plants by its narrower, more strongly revolute leaves, declinate (not erect) inflorescences and second, only 6-flowered verticillasters. A Turkish specimen (Köse, 2 Aug. 1957, Davis & Hedge 31949, SOM No. 143794) corroborates these differences.

Greuter & al. (1986) do not accept *Hyssopus officinalis* subsp. *angustifolius* as distinct from subsp. *officinalis*. They therefore list the Turkish and (following Hayek) the Bulgarian plants under subsp. *officinalis* but those from Albania and (former) Yugoslavia under subsp. *pilifer*, ignoring the occurrence of the species in Greece. Earlier Greek records include those of *H. officinalis* subsp. *pilifer* from E. Makedonia by Goulimês (1956) and Quézel & Contandriopoulos (1968, as "subsp. *angustifolius*"), to which the cursory indication of a second (?) taxon from Ipiros by Kokkini & al. (1988) may be added.

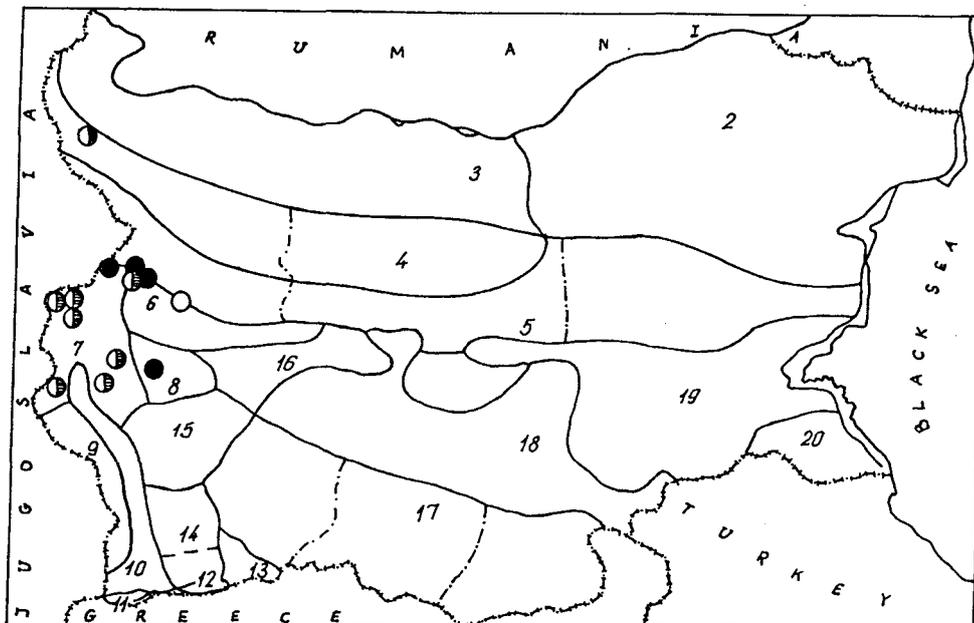


Fig. 1. Map showing the Bulgarian distribution of *Hyssopus officinalis* subsp. *pilifer*. – The floristic regions concerned are: 4, Predbalkan; 5, Stara planina; 6, Sofija; 7, Znepole; 8, Mt Vitoša. – ○ = unconfirmed locality; ◐ = confirmed localities from literature and herbaria; ● = localities of investigated populations.

### Materials and methods

The distribution has been mapped on the basis of field work, herbarium studies, and literature data. The Bulgarian plants studied here originated from Bosnek (Mt Vitoša), Belediehan, Bučin prohod, and Kalotina (Znepole region). Voucher specimens were deposited at SOM.

Dried and live plant material was compared with herbarium specimens in SOM, SO, SOA, and from LE. Plants from the four above-mentioned Bulgarian localities were cultivated in experimental plots at the Institute of Botany in Sofija. The Bulgarian plants of *Hyssopus officinalis* subsp. *pilifer* and those of subsp. *officinalis* raised from seeds sent by the Main Botanic Garden in Moscow (MHA) were grown side by side.

Measurements of morphological features were made on 10 plants from each locality in the experimental plots, and on 50 plants in nature. Essential oils were distilled from dried plants in a Clevenger apparatus and analysed by InPaCo Ltd. in Sofija.

### Results and discussion

*Hyssopus officinalis* subsp. *pilifer* [= *H. officinalis* subsp. *aristatus*] is a 30-40 cm tall, rhizomatous shrub. Its 2-15 flowering stems are virgate, sometimes woody at the base, and show secondary branching under humid conditions. The leaves are green, 2-3 mm wide and 25-30(-35) mm long, linear, acute. The inflorescences are 5-6 cm long in the wild (7-8 cm in cultivation). The bracts are linear, each terminating in a long (2-3 mm), sometimes curved arista. The calyx teeth are triangular, long, acute. The corolla tube is blue. The dark chestnut-brown nutlets mature in September-October and have an average weight of 0.892 mg. The fresh weight of individual plants is 10-120 g in the wild, 40-1200 g in cultivation. The range of this subspecies extends from Bulgaria and N. Greece north-westwards to Croatia ("Kvarner supra Bakar", 22 Sep. 1964, E. Mayer, SOM No. 113569).

*Hyssopus officinalis* subsp. *officinalis* is 50-60 cm tall and has 40-50 erect flowering stems that are woody and 4-6(-8) mm thick at the base. The leaves are dark green, 4-5 mm wide and 35-40 mm long, linear-lanceolate. The inflorescences are 6 - 8 cm long. The bracts lack an apical arista. The corolla tube is dark blue, pink or white. The fresh weight of an individual plant is 400-1300 g.

There is a phenological difference between the two subspecies, both in their natural habitat and in the experimental plot. Cultivated *Hyssopus officinalis* subsp. *officinalis* was first to bloom (5-15 July), followed by cultivated subsp. *pilifer* (15-25 July), and last by its populations in nature (15 August to 20 September).

Essential oil content is less (0.4-0.5 %) in samples from the natural populations of *Hyssopus officinalis* subsp. *pilifer* than in cultivated material of that subspecies (0.6 %) or of subsp. *officinalis* (0.6-0.8 %). The main component in the wild subspecies is camphor, not pinocamphone as in *H. officinalis* subsp. *officinalis*. For this reason, plants of wild origin are useless for perfumery purposes.

In Bulgaria, *Hyssopus officinalis* subsp. *pilifer* covers large surfaces (more than 5000 m<sup>2</sup>), at altitudes between 200 and 720 m a.s.l., in the Znepole region. Three of its known localities (Fig. 1) are situated close to the boundary between the Stara planina

range and the districts of Sofija and Znepole. All populations consist of numerous individuals, growing mainly in the xerothermic oak belt (Ančev 1989) in association with *Satureja montana* subsp. *kitaibelii* (Wierzb. ex Heuff.) P. W. Ball and *Artemisia alba* L. The same association is found in the Mt Vitoša region, where the *Hyssopus* population is smaller.

In Bulgarian herbaria there are 29 sheets of *Hyssopus officinalis*, not all of which had been critically identified. The result of the present revision is that the herbarium specimens (with the exceptions detailed below) and the plants observed in nature all have bracts tipped by long aristae (2-3 mm) and can thus be identified as *H. officinalis* subsp. *pilifer*.

Of the undocumented earlier literature records, Velenovsk's (1891) *Hyssopus officinalis* localities "infra Berkovce" and "in declivibus m. Balkan versus Sofia" coincide in my opinion with the documented locality of Belediehan. Davidov's (1903) record from Kurilo has not been confirmed in more recent times and is shown as an open circle on the map (Fig. 1).

Velenovsk's (1898) record "Ad Belogradčik (Šk[orpil])" is corroborated by a recent specimen "in saxosis urb. Belogradchik", 23 Nov. 1963, B. Kitanov (SO No. 63238). This adds the W. Predbalkan to the wild distributional range of *Hyssopus* in Bulgaria and, unless the population has meanwhile been destroyed by human action, corresponds to the northernmost *Hyssopus* Bulgarian locality.

The plants on three herbarium sheets (SOA No. 16929, 16930, and 16931, all from the "Rila monastery") are cultivated *Hyssopus officinalis* subsp. *officinalis*. The same apparently applies in the case of a specimen (SOM No. L 181) collected from Mt Rila above Samokov in 1969, which also lacks aristae to the bracts. This specimen vouchers the chromosome count of  $2n = 12$  published by Markova & Goranova (in Kamari & al. 1994) for "*Hyssopus officinalis* subsp. *aristatus*". The plants from the cited locality may well be naturalized leftovers from former cultivation at the experimental station of the Institute of Plant Resources. It is therefore premature, pending further field studies, to include the Mt Rila area in the range of native Bulgarian distribution of *Hyssopus*, or to count *H. officinalis* subsp. *officinalis* among the members of the native Bulgarian flora.

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