

1-1-2010

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DİRMENÇİ, TUNCAY; YILDIZ, BAYRAM; HEDGE, IAN C.; and FIRAT, MEHMET (2010) "Lophanthus (Lamiaceae) in Turkey: a new generic record and a new species," *Turkish Journal of Botany*: Vol. 34: No. 2, Article 6. <https://doi.org/10.3906/bot-0907-74>

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Lophanthus (Lamiaceae) in Turkey: a new generic record and a new species

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Received: 06.07.2009

Accepted: 31.01.2010

Abstract: The genus *Lophanthus* Adans. is recorded for the first time from Turkey. Specimens collected from Van province, east Anatolia, are described here as the new species *Lophanthus turcicus* Dirmenci, Yıldız & Hedge. Diagnostic characteristics that distinguish it from allied species are presented; a description, distribution map, and taxonomic comments are given.

Key words: Endemic, Lamiaceae, *Lophanthus*, Van, Turkey

Lophanthus (Lamiaceae), Türkiye için yeni bir cins kaydı ve yeni bir tür

Özet: *Lophanthus* Adans. cinsi Türkiye'den ilk defa kaydedilmiştir. Bu cinse ait örnekler Doğu Anadolu'dan Van ilinden toplanmış ve burada *Lophanthus turcicus* Dirmenci, Yıldız & Hedge adıyla yeni bir tür olarak tanımlanmıştır. Yakın akraba türlerden ayırıcı karakterleri; betimi, yayılış haritası ve tür üzerinde taksonomik yorumlar verilmiştir.

Anahtar sözcükler: Endemik, Lamiaceae, *Lophanthus*, Van, Türkiye

Introduction

During an expedition to Van, Hakkari, Şırnak, and Siirt provinces in E and SE Turkey in August 2008, unusual specimens were collected by the Turkish authors at 2750 m on Kavuşşahap mountain between Çatak and Bahçesaray districts in Van province (Figure 1). Extensive herbarium (material at ANK, BM, E, G, HUB, ISTE, K, W, and WU) and literature

studies (Floras – Davis, 1982; Rechinger, 1982; other literature – Bentham, 1834; 1848; Boissier, 1879; Briquet, 1896; Levin, 1941; Pojarkova, 1954; Budantsev, 1992; 1993; Li His-wen & Hedge, 1994; Kaya & Dirmenci, 2008; Özhatay et al., 2009) revealed that the specimens belonged to *Lophanthus* Adans. (Lamiaceae, *Nepetoideae*, *Menthaeae*, *Nepetinae*) previously unknown from Turkey. The new species

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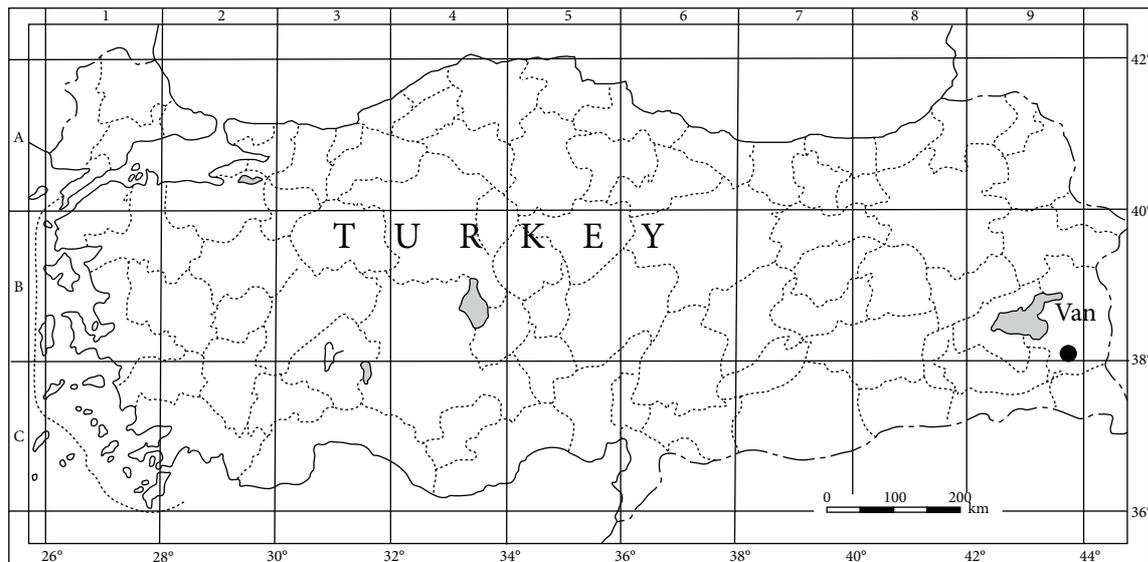


Figure 1. Distribution of *Lophanthus turcicus* (●) in Turkey.

has affinities with the geographically distant Iranian *Lophanthus archibaldii* (Rech.f.) A.L.Budantzev and *L. laxiflorus* (Benth.) Levin.

The genus was first described by Adanson (1763) and its type is the Chinese *Lophanthus chinensis* Benth. (*Hyssopus lophanthus* L.). In an earlier classification, *Lophanthus* was included in the tribe *Nepeteae* and divided into 2 sections: sect. *Chiastandra* Benth. and sect. *Resupinaria* Benth. by Bentham (1832-36; 1848). Later, the genus was classified under subfam. *Stachyoideae*, tribe *Nepeteae*, but the species of sect. *Chiastandra* were included in the American genus *Agastache* J.Clayton ex Gronov. by Briquet (1897).

The first comprehensive revisionary study of *Lophanthus* was published by Levin (1941). He recognised 15-17 species but did not divide the genus into sections. Ten species previously classified in *Nepeta* (sects. *Psilonepeta* and *Longiflorae*) were transferred into *Lophanthus*. In the accounts for *Flora URSS* and *Flora Iranica*, these latter species were again included in *Nepeta* by Pojarkova (1954) and Rechinger (1982). In *Flora URSS* 8 *Lophanthus* species were recognised by Pojarkova (1954) and in *Flora Iranica* (Rechinger 1982), Rechinger only recognised 2 species: *L. elegans* and *L. lipskyanus* Ik.-Gal. & Nevski– both from northern Afghanistan. In the *Flora*

of China (Li His-wen & Hedge, 1994), 4 species were recognised.

Phylogenetic relationships among species of *Nepeta* and some of their close generic allies (*Dracocephalum*, *Hymenocrater*, and *Agastache*) were examined using sequences of the internal transcribed spacers of nuclear ribosomal DNA (nrITS) by Jamzad et al. (2003). In that study, *Lophanthus laxiflorus* (sect. *Psilonepeta*) was subsumed into the genus *Nepeta* by the authors.

In the revisionary study carried out by Budantsev (1992), some *Nepeta* species previously classified (Rechinger, 1982) under *Nepeta* sects. *Capituliferae*, *Psilonepeta*, and *Schizocalyx* were transferred to *Lophanthus*. He recognised 2 sections: sect. *Lophanthus* and sect. *Psilonepeta* (Benth.) A.L.Budantzev (Syn.: *Nepeta* sect. *Psilonepeta* p.p.). The characteristics of the sections accepted by Budantsev (1992) and the species included in the sections (total 21 species) are given below:

Sect. *Lophanthus*: calyx obconical or campanulate, teeth triangular to triangular-lanceolate; corolla straight and c. 1.5 × calyx or shorter, and abruptly broadened towards the lips, lower (morphologically the upper lip) and upper lip (morphologically lower lip) clearly bifid. *L. chinensis* Benth., *L. krylovii* Lipsky, *L. schrenkii* Levin, *L. schtschurowskianus* (Regel)

Lipsky, *L. ouroumitanensis* (Franch.) Kochk. & Zuckererw., *L. tschimganicus* Lipsky, *L. allotrius* (Rech.f.) A.L.Budantzev, *L. subnivalis* Lipsky, *L. tibeticus* C.Y.Wu & Y.C.Huang, *L. dschuparensis* (Bornm.) Levin, *L. sessilifolius* (Bunge) Levin.

Sect. *Psilonepeta*: calyx tubular, teeth lanceolate, corolla tube weakly curved, 2-2.5 × calyx, slightly broadened towards lips or not, lower lip (morphologically upper lip) short. *L. laxiflorus* (Benth.) Levin, *L. michauxii* (Briq.) Levin, *L. depauperatus* (Boiss.) Levin, *L. adenocladus* (Bornm.) Levin, *L. archibaldii* (Rech.f.) A.L.Budantzev, *L. iranshahrii* (Rech.f.) A.L.Budantzev, *L. elegans* (Lipsky) Levin, *L. pinetorum* (Aitch. & Hemsl.) Levin, *L. hedgei* (Freitag) A.L.Budantzev., *L. varzobicus* Kochk.

Levin (1941) suggested that *Lophanthus* originated from *Nepeta* sect. *Longiflorae*. Similarly, Budantsev (1992) thought that *Nepeta* and *Lophanthus* species were closely related genera as they undoubtedly are.

According to the latest generic circumscription, the genus has c. 21 (or 22?) species and its characters were described by Harley et al. (2004) as follows: aromatic perennial herbs or sub-shrubs. Leaves simple; inflorescence thyrsoid, terminal, spike-like or in ovoid heads or paniculate. Calyx indistinctly 2-lipped, 5-toothed, throat open, tube annulate within. Corolla resupinate (twisted), strongly 2-lipped, blue-violet or pink. Stamens exserted or included, filaments parallel, thecae parallel or divergent at acute angle. $2n = 16$.

The genus is very closely related to *Nepeta* and distinguished from it by the combination of resupinate corollas (not readily discernible on dried specimens) and annulate calyces. Its species are all alpine or high alpine from 2000 to 4400 m and occur in Turkey, Iran, Afghanistan, C. Asia, Mongolia, and China.

Key to related genera

- 1. Plant stoloniferous; flowers in axils of middle and upper leaves; anther-thecae divergiate at 90°**Glechoma**
- 1. Plant not stoloniferous; flowers not in axils of leaves; anther-thecae parallel, divergent at acute angle, or at 180°

- 2. Calyx annulate within; corolla resupinate; anther-thecae parallel or divaricate at acute angle.....**Lophanthus**
- 2. Calyx hairy only at base of the teeth, tube exannulate; corolla not resupinate; anther-thecae divaricate at 180°.....**Nepeta**

Lophanthus turcicus Dirmenci, Yıldız & Hedge sp. nova (Figures 2, 3)

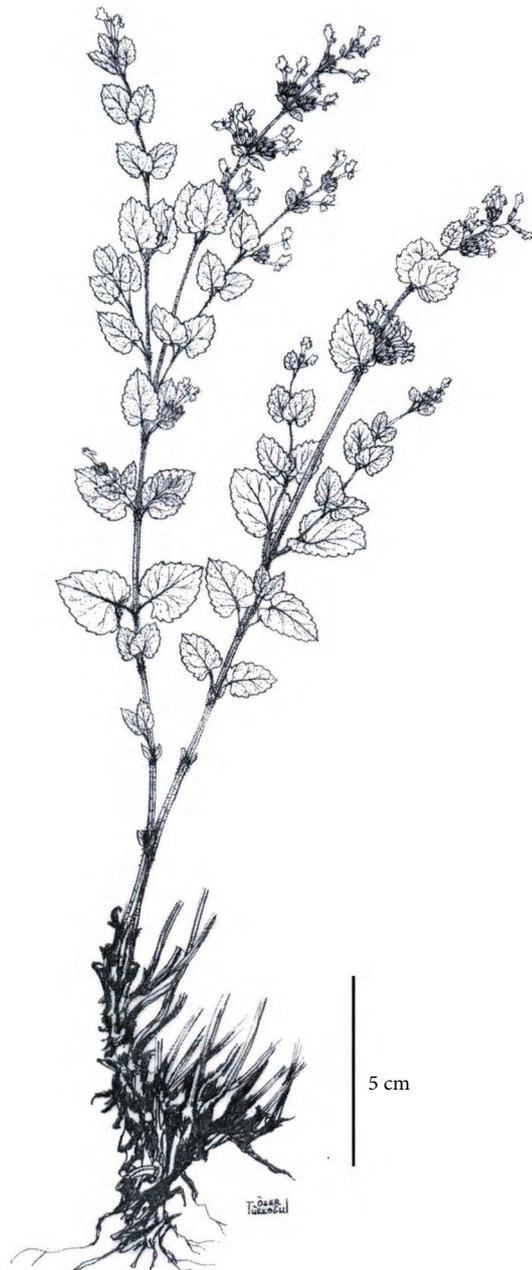


Figure 2. Habit of *Lophanthus turcicus*.

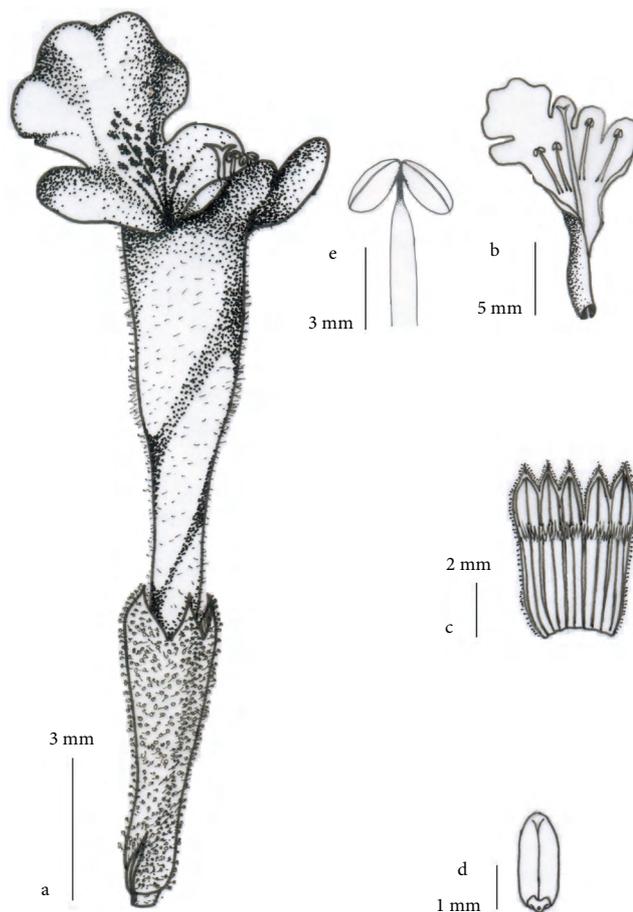


Figure 3. *Lophanthus turcicus*; a-flower, b-corolla, c-calyx, d-nutlet, e-anther.

Species *L. archibaldii* affinis, sed planta viscida ubique pilis glandulosis multicellularibus et unicellularibus, caulibus 30-45 cm (non 10-20 cm), foliis petiolatis (non sessilibus), petiolis ad 15 mm, verticillastris 3-6, 6-12- floribus, (non 1-3, 3-6 floribus) bracteis herbaceis, lineari-lanceolatis (non subulati-rigidis), calycibus 6-9 mm, dentibus 1.2-2 mm longis (non 9-11 mm, 4 mm) bene differt.

Description: Saxicolous perennial, woody at base, otherwise herbaceous, many-stemmed from a thick woody caudex, viscid, strongly aromatic. Stem 30-45 cm, ascending to erect, generally branched above, leafy from base to inflorescence, with numerous long capitate glandular hairs and glandular papillae, sparse long multicellular eglandular and densely multicellular glandular hairs. Lower and median leaves petiolate to 15 mm; upper leaves sessile, lamina 15-30 × 8-20 mm, diminishing in size from base to inflorescence, ovate, green, concolourous, densely

multicellular glandular hairy and papillose on both surfaces, cordate at base, margin denticulate, obtuse to acutish at apex; floral leaves similar to cauline leaves but smaller. Verticillasters 3-6, distant, 6-12-flowered, cymes with 3-10 mm peduncles. Bracts 3-3.5 mm, linear-lanceolate, shorter than cymes, herbaceous. Bracteoles 2-3 mm, linear, acuminate, not spinescent. Calyx 6-9 mm, tubular, sub-bilabiate, 15-veined, slightly constricted at the middle in flower and cylindrical at fruiting time, sparsely multicellular glandular hairy and densely glandular papillose, annulate at or above the middle of tube, hairs c. 1 mm, inner surface glandular papillose from annulus to teeth apices; teeth ± equal, 1.2-2 mm, lanceolate, shortly acuminate, not ciliate. Corolla 12-19 mm, c. 2-2.5 × calyx, tube narrow, exerted from calyx, slightly broadened towards the lips, violet-blue, resupinate (twisted), densely glandular papillose and sparsely multicellular glandular hairy; upper lip

(morphologically lower lip) bilobed, lobes equal; lower lip (morphologically upper lip) tri-lobed, middle lobe usually 3×4 mm, wider than long, emarginate, entire, or obscurely dentate, lateral lobes ovate. Stamens glabrous, generally included under lip or as long as lip, anthers lavender blue; thecae divergent at acute angle. Style bilobed, lobes ± 1 mm, equal, included in corolla or clearly exerted, glabrous, equal to long stamens. Nutlets $2-2.7 \times c. 1$ mm, oblong, glabrous, dark brown, not mucilaginous on wetting. Fl. and fr. August.

Type: Turkey, B9 Van: Çatak, Kavuşşahap mountain, Karapet pass, between Çatak and Bahçesaray, rocky and stony north slope, 2750 m, Yıldız (16959), Dirmenci & Firat (Holo GAZI; iso E, HUB, ISTE, K, M, W).

Other specimen: Turkey, B9 Van: Çatak, Kavuşşahap mountain, Karapet pass, between Çatak and Bahçesaray, rocky and stony north slope, 2750 m, 24.07.2009, Dirmenci (3707) & Akçiçek

Habitat and ecology: Growing on stony slopes over 2500 m; there were no other plants around it.

Distribution and proposed conservation status: *L. turcicus* is endemic to Van province and belongs to the Irano-Turanian geographical region. To date, it is only known from the type locality, where its distribution area is apparently less than 10 km^2 ; the total number of known individuals is c. 500 (B2abii). It should be regarded as belonging to the World Conservation Union (IUCN) Critically Endangered (CR) threat category (IUCN, 2001).

Discussion

The discovery of *Lophanthus turcicus* is a significant and disjunct extension of the range of the genus, and its most western locality. Geographically, the nearest species are in northern and western Iran. It is an isolated species (Figure 2) and clearly different from other species in *Lophanthus* sect. *Psilonepeta* (Table). Nonetheless, according to specimens

Table. Comparison of *L. turcicus* with related species.

	<i>L. turcicus</i>	<i>L. archibaldii</i>	<i>L. laxiflorus</i>
Stem	30-45 cm	10-20 cm	to 80 cm
indumentum	viscid, with numerous long capitate glandular hairs and glandular papillae, sparse long multicellular glandular and densely multicellular glandular hairs.	long pilose and minutely glandular papillose	subglabrous, minutely glandular papillose
leaves	$15-30 \times 8-20$ mm	$20-30 \times 15-25$ mm	$20-30 \times 15-20$ mm
petiole	to 15 mm	sessile	to 15 mm
cymes	verticillasters 3-6, 6-12 flowered	verticillasters 1-3, 3-6 flowered, lax	verticillasters lax, 3-6 flowered
peduncle	3-10 mm	20-40 mm	to 15 mm
bracts	3-3.5 mm, linear-lanceolate	5-6 mm, subulate, rigid	2-4 mm, subulate
calyx	6-9 mm, internally annulate at or above the middle of tube, sparse multicellular glandular hairy and densely glandular papillose	9-11 mm, externally long pilose, minutely glandular papillose	7-10 mm, minutely glandular papillose
teeth	1.2-2 mm, lanceolate	c. 4 mm, lanceolate-subulate	1-2 mm, ovate-lanceolate, triangular lanceolate
corolla	12-19 mm, violet-blue, densely glandular papillose and sparsely glandular hairy	16-18 mm violet-blue, sparsely pilose	14-20 mm, pinkish-purple, glabrous

examined and the key of sect. *Psilonepeta* (as *Nepeta*) in *Flora Iranica*, it has some similarities with 2 Iranian species, namely *L. laxiflorus* and *L. archibaldii*, in facies, leaves, calyx, and corolla size (Figure 3). The former is known from several gatherings; the latter is a poorly known species only known from a solitary very high altitude gathering and we have related our new species to it with some hesitation.

It differs from *L. archibaldii* by: its taller stems 30-45 cm (not 10-20 cm); an indumentum of viscid, multicellular glandular and eglandular hairs, long capitate glandular hairs and glandular papillose (not long pilose and minutely glandular papillate); petiolate leaves to 15 mm (not sessile); verticillasters 6-12 flowered (not 3-6 flowered); calyx 6-9 mm, densely glandular papillose and sparsely multicellular glandular hairy (not 9-11 mm, long pilose and minutely glandular papillose); teeth 1.2-2 mm (not c. 4 mm); corolla densely glandular papillose and sparsely glandular hairy (not sparsely pilose). It can be easily distinguished from *L. laxiflorus* by: its stem indumentum - viscid, multicellular glandular hairy, long capitate glandular hairy and glandular papillose (not sub-glabrous and minutely glandular papillose); verticillasters 6-12 flowered (not 3-6 flowered); calyx densely glandular papillose and sparsely glandular hairy (minutely glandular papillose); teeth linear-lanceolate (not ovate-lanceolate, triangular lanceolate); corolla densely glandular papillose and sparsely glandular hairy (not glabrous).

Examined Specimens:

Lophanthus laxiflorus (Benth.) Levin Iran: *Aucher-Eloy* 1745 (holo, G-BOIS). 14.07.1871, *Hausknecht* s.n.(G-BOIS). Iter Persicum, in agro

Ecbatanensi (Media), *Pichler* 1882 (W). Bakhtiari, Gahar, 01.07.1941, *Koelz* 17999-a (W). Isfahan: Balehsun-Kuh, between Demaneh and Khunsar, 2740 m, 13.07.1966, *Archibald* 2710 (W). Luristan: In saxosis calc. 30 km SE Khorramabad versus Safid Dahst, 1750 m, 12.06.1974, *Rechinger* 47782 (W). Slavatabad 25 km E Sanandaj, 2300 m, 03.07.1971, *Rechinger* 42798 (W). Qashqai, Bordekan a Kohrueh 40 km meridiem versus inter Shahreza et Semirom, 2700 m, 05.06.1974, *Rechinger* 4739 4 (W). Luristan: in convallibus borealibus montium Khali Kuh 50-60 km ab Aligudarz meridiem versus, 2300-2800 m, 12-14.06.1974, *Rechinger* 47967 (W). Kashan: in montibus a Muteh (Mooteh) septentriones versus, ad minas derelictas, 2100-2450 m, 31.05.1974, *Rechinger* 46965 (W).

L. archibaldii; Iran: Bakhtiari, the Laieh Sabz. in Zardeh Kuh, 4140 m, 05.08.1966, *Archibald* 2994 p.p. (holo-W!).

NOTE: in *Flora Iranica* (Rechinger 1982), the same collection – *Archibald* 2944 p.p. is also cited under *Nepeta sessilifolius* [= *Lophanthus sessilifolius* (Bunge) Levin.]

Acknowledgements

We thank the curators of Turkish and E, G, W, and WU herbaria for giving permission to examine specimens; and TÜBİTAK-TBAG (Project No: 106T167) for financial support. Also, our thanks to Prof. Dr. Danyal Israfilov (BAÜ) for translating A.L. Budantsev's articles from Russian to Turkish and Özer Türkoğlu for drawing the illustrations.

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