TAXONOMIC STATUS OF GENUS NEPETA L. (LAMIACEAE) IN KASHMIR HIMALAYA, INDIA

T. Hassan, G. H. Dar & A. A. Khuroo

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The present communication pertains to twenty two species of Nepeta recorded from the Kashmir Himalaya. Out of these twelve species were recorded from Kashmir region and eleven from Ladakh region. One species i.e. N. salviaefolia is common to both the regions. All the species are perennial but for N. annua, which is an annual. A taxonomic account of all the species, following recent nomenclature has been presented herewith.

INTRODUCTION

The main aim of the present paper is to provide a thorough insight into and documentation of the overall floristic diversity of the Kashmir Himalaya with reference to genus Nepeta L. The floras of several important regions/areas in the Kashmir Himalaya have been consulted. Some of the important floristic works include: Coventry (1923), Blatter (1928), Stewart (1972), Singh and Kachroo (1976), Kachroo et al. (1977), Dhar and Kachroo (1983), Polunin and Stainton (1984), Singh and Kachroo (1994), Sharma and Jamwal (1998).

Nepeta L. with approximately 300 species, most of which are herbaceous perennials, is one of the largest genera in the family Lamiaceae, subfamily Nepetoideae, tribe Mentheae (Pojarkova, 1954; Başer et al., 2000; Jamzad et al., 2003; Jamzad et al., 2005). Its species are distributed throughout Southwest and Central Asia, Europe, North Africa, North and Central America, Japan, Korea, China, and the Canary Islands (Pojarkova, 1954; Jamzad et al., 2000). Most of the species are found in Southwestern Asia, especially Iran, Central Asia and Trans-Caucasia. Rechinger (1982) recognized 63 species in the Flora Iranica, but this has now increased to 75 (Jamzad and Assadi, 1984; Jamzad, 1991, 1992, 1998, 1999, 2001; Delghandi, 1993). Nepeta is the second largest genus of the Indian labiates, with 41 species in all, 37 of which occur in the Western Himalaya (Mukerjee, 1940). N. campestris and N. eriostachya were observed to be endemic to India (Hedge, 1990).

In the Kashmir Himalaya, about 27 species have been reported (Stewart, 1972), but some of them are now considered as synonyms to other species. As part of our Centre program to screen the rich flora of the region, and to solve the taxonomic complexity, we for the first time recorded the exact number of species of Nepeta through extensive survey of Kashmir Himalaya and consultation of literature as well as specimens preserved in different herbaria. N. elata, N. royleana, N. pamirensis and N. vakanica recorded previously from the study area are actually the synonyms of N. laevigata, N. salviaefolia, N. kokanica and N. floccosa respectively. Another species i.e., N. tibetica syn. of Glechoma tibetica has not been found anywhere from our area. Only two collections of N. leucophylla have been made from Pakistan Administered Kashmir which were placed tentatively there (Stewart, 1972), and after that there was no record of the specimen. There was no specimen in Pakistan which matches this eastern Himalayan species; it is a close ally of N. ciliaris (Hedge, 1990). The present study therefore, records only twenty two species of Nepeta from the entire Kashmir Himalayan region.
MATERIAL AND METHODS
Collection and Preservation
The study area was thoroughly surveyed, ensuring collection of the \textit{Nepeta} L. plant material, in the flowering, as well as fruiting. For each plant species, 5-7 specimens were collected from a particular population at a particular time; and their field information was recorded under a specific collection number. The collected specimens were dried and preserved following usual taxonomic methods.

Identification
Fresh, or dried and pressed plant specimens were identified and described in the laboratory of the Centre for Biodiversity and Taxonomy. All the available floras, such as Flora of Pakistan, Flora of China, Flora of British India, Flora Europaea, Flora of Turkey, Flora of Ladakh and Flora of Pir Panjal Range were consulted for identification. Besides, the specimens were matched with the authentically identified specimens in the Herbarium, Centre of Plant Taxonomy, University of Kashmir (KASH), Herbarium Northern Circle of BSI, DehraDun (BSD), and the Herbarium of Forest Research Institute, Dehradun (DD).

All the specimens examined have been deposited in the Kashmir University Herbarium (KASH), and the germ plasm of some species has also been raised \textit{ex situ} in the Kashmir University Botanical Garden (KUBG).

RESULTS

Key to the species of \textit{Nepeta} in the Kashmir Himalaya based on floral characters

1. +Verticillasters forming elongated \pm continuous spikes or ovoid heads, sometimes the lowermost verticillasters distant
   2. Verticillasters \pm clearly separated from each other, or the uppermost loosely congested
   17
   2. +Pedicels 2mm or less long
   3
   -Pedicels more than 2mm long
   15
3. +Verticillasters crowded in axils of the uppermost leaves; peduncle present
   5. \textit{N. coerulescens}
   Verticillasters forming terminal or lateral spikes; peduncle absent
   4
   4. + Paniculate inflorescence; corolla less than 10 mm long
   \textit{2. N. cataria}
   -Inflorescence condensed not forming panicles; corolla more than 10 mm long
   5
5. +Calyx 10 mm or more in length
   6
   - Calyx less than 10 mm in length
   8
6. + Inflorescence an ovoid head; calyx-teeth \frac{1}{2} to as long as tube
   \textit{12. N. linearis}
   - Inflorescence a slenderer spike; calyx-teeth \frac{1}{2} to as long as tube
   7
7. +Bracts 6-10 mm long, as long as calyx; nutlets 1.4-1.5 mm long, ellipsoid
   \textit{13. N. nervosa}
   - Bracts 4-5 mm long, \frac{1}{2} to as long as calyx; nutlets 1.9-2 mm long, irregular-oblance
   \textit{3. N. campestris}
8. +Corolla 15 mm or more long
   9
   - Corolla 7-15 mm long
   10
9. +Bracts as long as calyx or longer than flowers; pedicels 1-1.5 mm long
   \textit{18. N. longibracteata}
   -Bracts shorter than calyx; pedicels less than 1 mm long
   \textit{10. N. kokanica}
10. +Verticillasters up to 30 mm long, forming globose-ovoid heads
   \textit{16. N. raphanorhiza}
   - Verticillasters elongated, 30-90 mm long, not forming heads
   11
11. + Spikes 70 mm or more long; outer bracts broad
   \textit{11. N. laevigata}
   - Spikes less than 70 mm long; outer bracts narrow if present
   12
12. + Pedicels absent; calyx 9 mm or more in length
   \textit{14. N. paulsenii}
   Pedicels present (0.07-2 mm long); calyx up to 8 mm in length
   13
13. +Bracts 9 mm or more long; calyx teeth \frac{1}{2} to as long as tube
   \textit{15. N. podostachys}
   - Bracts less than 9 mm long; calyx teeth ca. as long as tube
   14
14. +Bracts 6 mm or more long; nutlets broad-ellipsoid
   \textit{9. N. eriostachya}
   - Bracts less than 6 mm long; nutlets oblong
   \textit{7. N. discolor}
15. + Calyx 11-15 mm long, with tube measuring 5-6 mm
   \textit{6. N. connata}
   - Calyx 5-6 mm long, with tube measuring 4-4.5 mm
   16
16. + Calyx-teeth as long as the tube; corolla 10-17 mm long
   \textit{8. N. elliptica}
   - Calyx-teeth \frac{1}{2} to as long as the tube; corolla 6.5-8 mm long;
   \textit{1. N. annua}
   17. + Verticillasters forming loose panicles; peduncle more than 3 cm in length; two lips of corolla equal
   \textit{20. N. govaniana}
   - Verticillasters forming dense panicles; peduncle 3 cm or less in length; two lips of corolla not equal
   18
18. + Corolla 18-25 mm in length, deep violet-blue or purple
   \textit{21. N. erecta}
   - Corolla 8-17 mm in length, pale lilac to pale violet
   20
19. + Calyx 8-9 mm long, with tube measuring 6-7 mm
   \textit{21. N. glutinosa}
   - Calyx 8-12 mm, with tube measuring 8 mm
   \textit{19. N. salviaefolia}
   20. + Bracts 5-6 mm long; pedicels 3 mm long
21. +Cymes mostly on long horizontally-spreading peduncles; corolla 8-13 mm in length  
   **17. N. floccosa**  
   -Cymes erect, not horizontally-spreading; corolla 14-15 mm in length  
   **4. N. clarkei**


Annual herb. Stem erect, tufted, leafy, 20-30 cm tall, branched from the base, white-pilose. Leaves petiolate; petiole on lower leaves as long as lamina; lamina bipinnatisect, broad-ovate, 10-15 × 7-13 mm, white pilose, abaxially dense; lobes or segments linear-oblong to ovate-oblong, margin entire, apex obtuse to rounded. Inflorescence a terminal spike, 2-6 × 1-1.4 cm, subtended by uppermost stem leaves, white pilose; verticillasters numerous, up to 10-flowered, widely-spaced basally. Bracts linear-lanceolate as long as calyx, margin entire, apex acuminate. Pedicel up to 3.5 mm. Calyx 4-6 × 3.5-4 mm; throat straight; teeth unequal, straight, ovate-oblong. Corolla white, 6-8 mm; tube dilated upward; lower lip longer than the upper.

Type: Described from central Siberia, between the Yus and Yenisei rivers (type in P).

Global distribution: Russia, Mongolia, China, India.

Specimens examined: India, J & K, Leh (Hemis Gompa), Tauheeda & Dar 2798, 2799 (KASH).

Fl: July-August; Fr: August-September.

Habitat: Grows along river terraces or wet places.

Altitudinal range: 3500-4000 m.


Perennial herb. Stems 50-80 cm in height, branched. Leaves petiolate; petiole 1-2.5 cm; lamina triangular-ovate, 1.5-6.6 × 2-5 cm, margin crenate-serrate, base truncate, apex acute. Cymes axillary at base, mostly pedunculate, loose or compact panicles, with separated terminal one. Bracts linear, shorter than calyx. Calyx green, 5-7 mm, curved, oblique at throat; teeth subequal, narrow-triangular, 2.3-3.5 mm, ciliate. Corolla white.

Type: Europe (LINN-726/1-microfiche).

Global distribution: Europe, Asia.

Specimens examined: India, J & K, Kashmir University Campus, Tauheeda & Dar 2791, 2792 (KASH); Anantnag, Tauheeda & Dar 2793 (KASH); Srinagar, Rafiq 9341 (DD).

Fl: May - August; Fr: August-September.

Habitat: Grows along river terraces or wet places.

Altitudinal range: 3500-4000 m.


Perennial herb. Stem erect, 30-60 cm tall, quadrangular, little-branched. Leaves petiolate; petiole 3.5-10 mm; lamina oblong-lanceolate, 2.5-5 × 1.2-2 cm, margin serrate, base truncate to asymmetric, apex acute. Inflorescence an elongated slender spike, often interrupted basally, 2.5-7.5 × 2.0-2.5 cm. Outer bracts broadly ovate; inner bracts linear, ciliate, as long as calyx. Pedicel absent. Calyx thin-textured, 6-10 mm long, narrow-obtriangular, eglantular; throat slightly oblique; teeth linear-subulate, shorter than or equaling the calyx-tube. Corolla blue, 12-15 mm; tube curved, exserted from calyx.

Holotype: Kashmir, Jacquemont (P- n. v.).

Global distribution: India.

Specimens examined: India, J & K, Gulmarg, Tauheeda & Dar 2791, 2792 (KASH); Baramulla (Kashmir), Qr. Osmaston 415, 417 (DD).

Fl: May - August; Fr: June - September.

Habitat: Grows in open slopes along hills.

Altitudinal range: 2600-3000 m.


Perennial herb with a woody rhizome. Stem 45-90 cm tall, erect, branched. Leaves petiolate; petiole on lower leaves up to 3 cm, less above; lamina narrow to broad-ovate, 1.5-6 × 1-5 cm, base broad cuneate to cordate, margin serrate, apex acute. Inflorescence of separated many-flowered verticillasters forming whorls, 1-2.1 cm long; lowermost verticillaster pedunculate; upper sessile. Calyx 7-9 mm, straight, purplish; throat slightly oblique; teeth unequal, triangular, longest up to 4 mm. Corolla pink-purple, 1.4-1.5 cm; tube curved, exserted from calyx.

Types: Kashmir, Tilail, 3350 m, Clarke (K); Kanylwan, 2280 m, Clarke (K).

Global distribution: Pakistan, India, China.

Specimens examined: India, J & K, Gureis, Tauheeda & Dar 2753, 2754 (KASH); Anantnag (Kashmir), Qr. Osmaston 13928, 13930 (DD).

Fl: May - July; Fr: July - September.

Habitat: Grows on grassy slopes and open ground, or alpine wet places.

Altitudinal range: 2000-2650 m.


Vernacular name (Ladakhi): ‘Neimlo’ or ‘Khora’.

Perennial aromatic herb. Stem 24-52 cm tall, pubescent. Leaves petiolate; petiole on basal leaves up to 6 mm, decreasing in upper ones; lamina ovate-elliptic, 2-5.3 × 0.8-2.1 cm, densely pubescent, margin crenate-serrate or serrate, base truncate to cordate or cuneate, apex acute. Inflorescence in verticillasters on the apical 4-6 stem nodes, in oblong or ovoid spikes, 3-11 cm long; verticillasters crowded in axils of upper
leaves. Calyx 6-7 mm, throat very oblique; teeth linear, shorter than half to as long as tube. Corolla blue, 11-13 mm, tube exserted.

Type: [China] Kansu occidentale alpina, ad Hoango superiorum, ann. 1880, Przewalski s. n. (LE).

Global distribution: China, India, Nepal.

Specimens examined: India, J & K, Between Kargil to Zanskar, Bashir Ahmad and Hiratal 146 (KASH); Zanskar, Tauheeda & Dar 2776, 2777 (KASH); Zanskar (Kashmir), Razdan & Govind 8446, 8447 (DD).

Fl: June - August; Fl: August - September.

Habitat: Grows on grassy open slopes, gravelly and rocky outcrops in alpines.

Altitudinal range: 3050-4600 m.


Perennial herb. Stems 35-70 cm tall, branched, quadrangular, leafy. Leaves sessile or with a very short petiole to 0.6 mm long; lamina narrowly- or broadly-elliptic, 1-3.5 × 0.7-1.7 cm, margin pectinate-serrate, ciliate, apex acuminate. Cymes condensed, terminal and lateral, 10-11 mm × 1.6 cm. Bracts ovate-lanceolate, 2-5 × 2.4 mm. Pedicels 3-4.3 mm long. Calyx tubular; throat oblique; teeth unequal, linear, ciliate. Corolla white, 1-1.7 cm.

Type: [NW India] Syen range, Royle (LIV).

Global distribution: Pakistan, India and Nepal.

Specimens examined: India, J & K, Yusmarg, Tauheeda & Dar 2737, 2748 (KASH); Banihal, Qr. Osmaston 3212, 3411 (DD).

Fl: June - August; Fl: July - August.

Habitat: Grows on open slopes.

Altitudinal range: 2600-2800 m.


Vernacular name (Ladakhi): ’Zim-thik-le’.

Perennial herb with a woody rootstock. Stems 20-30 cm long, little branched, leafy. Leaves petiolate; petiole 3.8-4.5 mm long; lamina broadly ovate-triangular to oblong, thick textured, up to 3.4 × 2.3 cm, greenish, margin entire to serrulate, apex ± acute. Inflorescence a terminal congested spikes, oblong up to 4.5-5.1 × 2.5 cm. Bracts elliptic, green, ciliate. Calyx tubular, 7-10 mm long, ± membranous, eglanudlar pilose; throat oblique; teeth unequal, linear to filiform, ciliate, as long as or longer than tube. Corolla pale - lilac, 10-13 mm long; tube curved, exserted from calyx.

Type: [Astor, Duthie 12488 (E); Sangam above Lidarwat, 3500 m, Duthie 13534 (E); above Shankargarh, R. R. Stewart 22759 (RAW); Yamhar Pass, R. R. Stewart 12739 (RAW); Kostorkut, 12 km NW Visakensar, 3350 m, O. Polunin 56/709 (BM, E)] In Cashmeriae vallibus Baspa et Paber, in herbosis editoribus, admargines sylvarum etc., Jacquemont (P-n.v.).
   Synonym. N. pamirensis Franch.
   Perennial herb. Stems ascending, 20-30 cm tall, little branched, with creeping sterile short shoots, rhizome basally purplish with scale-like leaves. Leaves petiolate; petiole 2-8 mm long; lamina circular-ovate, green, 3-25 x 4-25 mm, margin crenate, apically rounded; clusters of young leaves often present in leaf axils. Inflorescence a terminal congested ovoid head, 1.7-3.5 cm long. Bracts 7-9.5 mm long, long-elliptic. Calyx up to 11 mm long, obtriangular tubular; throat oblique; teeth unequal. Corolla 1.1-1.6 cm, blue; tube included within calyx.
   Type: [USSR, Pamir Alai] Kavuk, 8-13,000 ped., ad glaciers Schtschurowski et in trajectu Dschiptik [Dzhiptik], 0. Fedtschenko (LE).
   Global distribution: Russia, Uzbekistan, Tajikistan, Afghanistan, Pakistan, India.
   Specimens examined: India, J & K, Leh (Hemis), Tauheeda & Dar 2794, 2796 (KASH).
   Fl: July - August; Fr: August - September.
   Habitat: Grows in rock crevices in alpine areas.
   Altitudinal range: 3050-3500 m.

   Synonym. N. elata Benth.
   Perennial herb. Stem up to 30-85 cm tall, branched, quadrangular, white pubescent. Leaves petiolate; petioles 3.8-4 cm on lowermost leaves; lamina triangular-ovate, green 3.0-6.5 x 2.0-3.5 cm, margin regularly crenate to serrate, base sub-truncate to cordate, apex acute. Cymes oblong, terminal, continuous, congested, 8.9-5 x 2 cm. Outer bracts 6-8 mm, broad; innermost bracts linear-lineariform as long as calyx. Calyx up to 8 mm, slender; throat oblique; teeth unequal, linear triangular, hispid, sharply long pointed as long as tube. Corolla lilac-blue or white, 1.2-1.4 cm. Type: [NW India, Garwhal] Siranagar [Srinagar], Kamroop.
   Global distribution: Afghanistan, Pakistan, India, Nepal, China.
   Specimens examined: India, J & K, Dachigam National Park, Tauheeda & Dar 2794, 2796 (KASH); Pahalgam (Aru), Tauheeda & Dar 2708 (KASH).
   Fl: May - June; Fr: June - July.
   Habitat: Grows in grassy slopes.
   Altitudinal range: 2000-2500 m.

   Perennial herb. Stem 25-70 cm tall, arising from a tuberous rootstock, branched. Leaves sessile; lamina linear, 3-8 x 1.5-6 mm, margin entire, apex acute. Spike an ovoid head, continuous or interrupted, 4-5 cm long. Inner bracts linear-subulate, ciliate. Flowers congested in spikes. Pedicels 1-2 mm long. Calyx 8-10 mm, tubular; throat straight; teeth subequal, acuminate. Corolla lilac, 1-1.5 cm. Type: Kashmir. Sonamarg, 2740 m, Ludlow & Sheriff 8301 (BM, E), R. R. Stewart 6439 (RAW).
   Global distribution: Pakistan, India.
   Specimens examined: India, J & K, Dachigam National Park, Tauheeda, Bilal & Dar 2707 (KASH); Pahalgam (Aru), Tauheeda & Dar 2708 (KASH).
   Fl: May - June; Fr: August - October.
   Habitat: Grows in grassy slopes.
   Altitudinal range: 2200-2800 m.

   Perennial herb. Stem 30-70 cm tall, erect or ascending, quadrangular, little branched. Leaves sessile or short petiolate; lamina linear-lanceolate, 5-9 x 0.8-1.6 cm, thick-textured, green or abaxially gray, base rounded or cordate, margin serrate, apex acuminate. Spikes short or elongated, cylindrical, 2.7-1.5 x 3-3 cm. Outer bracts purplish-bluish, 6-10 mm, longer than calyx, ovate or lanceolate, apex acuminate or apiculate; inner bracts linear, ciliate, as long as calyx. Flowers sessile. Calyx thin-textured, 5-10 mm long. Corolla blue, 1.5 cm; tube curved, slightly exserted from calyx.
   Type: Kashmir. Royle (LIV).
   Global distribution: Pakistan, India.
   Specimens examined: India, J & K, Dachigam National Park (Grettnar) Tauheeda, Dar & Khuroo 2755, 2797 (KASH).
   Fl: July - September; Fr: August - October.
   Habitat: Grows in sub-alpine and alpine grasslands.
   Altitudinal range: 2300-3500 m.

   Perennial, clump-forming herb. Stem 30-90 cm tall, erect or ascending, quadrangular, branched. Leaves petiolate; petiole on lower leaves up to 9 mm decreasing above; lamina linear-elliptic, 1-2 x 3-4 mm, margin subentire to crenate, cuneate, apex acute; clusters of young leaves often present in leaf axils. Inflorescence a terminal congested oblong spike,
lowermost verticillasters distant, 1.5-6 cm long. Bracts linear, 6-9 mm, ca. as long as calyx. Calyx 6-9 mm, obtriangular tubular. Corolla white, 12.5-13 mm; tube exserted from calyx.

Type: [Soviet C Asia] Pamir, Jashil Kul, 3900 m, 28. 7. 1898, Paulsen 970 (C, G).
Global distribution: Afghanistan, Pakistan, India, Central Asia.
Specimens examined: India, J & K, Drass, Hemis, Tauheeda & Dar 2756, 2757 (KASH).
Fl: June - August; Fr: July - September.
Habitat: Grows on grassy or gravelly slopes.
Altitudinal range: 3000-3600 m.

Vernacular name (Ladakhi): ‘Shangukaram’.
Perennial herb. Stem 10-45 cm tall, erect, branched. Leaves petiolate; petiole 7-10 mm on lower leaves, shortening above; lamina oblong, oblong-triangular, green, thick-textured, 1.5-2.5 × 0.8-1.3 cm, base broad truncate, margin crenulate or crenate, apex acute. Spikes congested, ovoid to oblong, 3-4.5 cm long, usually distant from the upper leaves. Bracts filiform 8-11 mm long. Calyx 5-8 mm, green, tubular-obtriangular. Corolla white, 1.1-1.4 cm.

Type: [Afghanistan, Bamian, Kaloo] In regno Cabulico, Griffith (holo-K).
Global distribution: Russia, Central Asia, Afghanistan, Pakistan, India.
Specimens examined: India, J & K, Ladakh (Hemis), Tauheeda 2791, 2792 (KASH); Ladakh, Raina & Mehta 8443, 1241 (BSD).
Fl: June - August; Fr: August - October.
Habitat: Grows along the roadsides or open dry slopes.
Altitudinal range: 3200-4200 m.

Vernacular name (Ladakhi): ‘Prianku’.
Perennial tuberous herb. Stems numerous, ascending, 10-30 cm tall, forming loose mats. Leaves petiolate; petiole 5-17 mm on lower leaves; lamina broad triangular-ovate, green, 0.5-2.5 × 0.5-2 cm, base truncate to cordate, margin serrate, apex acute. Spike a terminal compact ovoid head, ± interrupted. Bracts linear, as long as calyx. Calyx purplish, up to 7 mm long, usually from the upper leaves. Bracts filiform 1.6-1.9 cm × 0.5-0.6 mm linear, as long as calyx or longer than flowers. Calyx straight, 7.8-8.3 mm long; throat oblanceolate; teeth narrow, lanate, apex acuminate, unequal. Corolla blue-violet, 1.5-1.8 cm.

Type: [Kashmir] Between Nako and Chango, Jacquemont 1921 (K, P).
Global distribution: Russia, Central Asia, Afghanistan, Pakistan, India.
Specimens examined: India, J & K, Kargil (Khalsi), Uppeandhar Dhar 153 (KASH); Kargil to Leh (Ladakh), H. Tauheeda & G. H. Dar 2745, 2749 (KASH).
Fl: May - August; Fr: August - September.
Habitat: Grows on stony alpine and gravelly slopes, valleys.
Altitudinal range: 3000-4200 m.

Vernacular name (Ladakhi): ‘Shangukaram or Shamalolo’.
Synonym: N. vakanica Pojark.
Perennial herb. Stem several and clump-forming, ascending, quadrangular, branched, purplish basally, 3-12 cm long, with whitish floccose-tomentose hairs. Leaves long petiolate; petiole 1-12.5 cm long; lamina cordate to triangular-cordate or ovate, 1-3.5 × 1-4 cm, rigid, thick, white-tomentose to lanate-floccose, margin crenulate or lobed, apex obtuse. Inflorescence paniculate, condensed, ± ovoid capitata. Bracts lanceolate, filiform, ca. half as long as calyx. Pedicels absent. Calyx tubular, curved, purplish, 6-9 mm long, densely floccose-villous when young, eglandular; throat very oblique; teeth unequal. Corolla blue-violet, 8-13 mm long.

Type: [Kashmir] Between Nako and Chango, Jacquemont (K, P).
Global distribution: Russia, Central Asia, Afghanistan, Pakistan, India.
Specimens examined: India, J & K, Pulwama (Khrew), Tauheeda & Dar 2705, 2731 (KASH).
Fl: April - June; Fr: June - July.
Habitat: Grows in dry open slopes or ravine sides.
Altitudinal range: 1600-2300 m.

Vernacular name (Ladakhi): ‘Prianku’.
Perennial herb. Stem 9-13 cm tall, slender, prostrate or ascending, purplish, with an eglandular pilose indumentum. Leaves long petiolate; petiole 5-17 mm long; leaves obovate-cuneate or ovate-rhombic, 0.8-1.5 cm × 5-12 mm. Inflorescence globose or ovoid, densely congested terminal head, 1.5-3.5 cm long subtended by uppermost leaves. Bracts purplish, 1.6-1.9 cm × 0.5-0.6 mm linear, as long as calyx or longer than flowers. Calyx straight, 7.8-8.3 mm long; throat oblique; teeth narrow, lanate, apex acuminate, unequal. Corolla blue-violet, 1.5-1.8 cm.

Type: [Himachal Pradesh] In lapidosismobilibus prope Kang-Rang Ghan-Ti, Jacquemont 1665 (K, P).
Global distribution: Russia, Central Asia, Afghanistan, Pakistan, India, China.
Specimens examined: India, J & K, Leh (Khardungla), Tauheeda & Dar 2739 (KASH); Bara Lacha, Duthie 176, 178 (DD).
Fl: June - August; Fr: July - August.
Habitat: Grows in grassy or gravelly alpine slopes.
Altitudinal range: 4000-5300 m.

Vernacular name (Ladakhi): ‘Jatukpa’.
Perennial tufted herb. Stems several, 40-70 cm, at base with scale - like leaves. Leaves sessile; lamina cordate-ovate, 1.3-3 × 0.8-2.2 cm, viscid, semi-amplexicaul, margin deeply incised-serrate. Spikes numerous, ± distant, many-flowered, shortly pedunculate.
Verticillasters borne in the axils of upper leaves. Bracts 8-10 mm, linear-lanceolate, as long as calyx. Pedicels 1-2.5 mm. Calyx narrow tubular, 8-12 × 2-3 mm, straight; teeth unequal, ovate-triangular. Corolla bluish or purplish, 1.8-2.2 cm.
Global distribution: Russia, Afghanistan, Pakistan, India, China.
Specimens examined: India, J & K, Ladakh (Zanaskar), Tauheeda & Dar 2787, 2817 (KASH); Ladakh, Osmaston 9471, 9510 (DD).
Fl: July - August; Fr: August - September.
Habitat: Stony or gravelly alpine slopes.
Altitudinal range: 3000-4000 m.

Perennial herb, 45-100 cm tall. Stems quadrangular, much branched, leafy. Leaves petiolate; petiole 1.6-3.5 cm long; lamina ovate, 12-12.5 × 5.8-6.3 cm, margin crenate to serrate, apex acute. Inflorescence paniculate, pedunculate cymes borne in axils of uppermost leaves, 17-17.4 cm long. Peduncle 2-6 cm long. Bracts much smaller than calyx. Calyx 6-8 mm long, tubular; throat oblique; teeth unequal, triangular, 1/3 to as long as calyx tube. Corolla 2.3-2.6 cm, pale yellow; tube exserted; upper lip deeply bifid; lower lip as long as upper.
Type: [NW India, Himachal Pradesh, Kinnaur] Kanaor, Royle.
Global distribution: Pakistan, India.
Specimens examined: India, J & K, Shopian (Aharbal), Tauheeda & Dar 2710 (KASH); Gulmarg, H. Tauheeda & G. H. Dar 2702, 2703 (KASH).
Fl: June - August; Fr: July - September.
Habitat: Grows on humus-rich soils.
Altitudinal range: 2000-2700 m.

Perennial herb. Stems erect, 65-120 cm tall. Leaves petiolate; petiole in lower leaves 1.9-2.6 cm long, decreasing above; lamina ovate, green above, paler below, 4-9.5 × 2-3 cm, base cordate, margin ± serrate, apex acute. Cymes separate borne in leaf axils, 5.2-9.7 cm long, upper ones ± sessile. Peduncle 2-2.5 cm long. Bracts linear, longer than pedicels, 5-6.2 mm long. Calyx 8-9.2 mm long, almost straight, tubular; throat oblique; teeth somewhat unequal, broad to triangular. Corolla 1.9-2.6 cm long, deep violet-blue, tube curved, exserted; upper lip deeply bilobed; lower lip spreading, longer than upper.
Type: [NW India, Himachal Pradesh, Kinnaur] Kanaor, Royle.
Global distribution: India, China.
Specimens examined: India, J & K, Shopian (Aharbal), Tauheeda & Dar 2702, 2703 (KASH).
Fl: June - August; Fr: August - September.
Habitat: Grows in gravelly and stony alpine slopes.
Altitudinal range: 2000-3400 m.

Vernacular name (Ladakhi): ‘Bukhsukh’.
Perennial herb. Stem 50-90 cm tall, erect, rather slender, branched, white stellate dendroid hairs. Leaves petiolate; petiole up to 10 mm on lower cauline leaves, less above; lamina ovate, 5-2.7 cm, thick, grey-white on both surfaces with a dense covering of stellate-dendroid hairs, base rounded to cordate, margin crenate, apex acute to obtuse. Verticillasters few flowered borne in the axils of upper leaves and leaf like bracts, widely spaced, in interrupted terminal spikes, short pedunculate basally. Innerbracts lanceolate, much shorter than calyx. pedicel 2-3 mm long. Corolla 1.5-1.7 cm, lavender; tube slender much exserted.
Holotype: [Kashmir, Baltistan, Kuru to Daghori, E. Nasir and Webster; Hasora, Astor valley, [Schlagintweit] Zanskar and Ladak {Hanupatta}, 12-13, 000 ft, T. Thomson (K).
Global distribution: India, China.
Specimens examined: India, J & K, Leh (Hemis Nullah), Bilal A. Bhat 2712, 2713, 2717 (KASH); Shankaracharya, H. Tauheed & G. H. Dar 2723, 2726 (KASH).
Fl: June - August; Fr: August - September.
Habitat: Grows in gravelly and stony slopes, ravine sides.
Altitudinal range: 2000-3400 m.
DISCUSSION AND CONCLUSIONS

Based on the present study, it can be concluded that the genus Nepeta in Kashmir Himalaya is represented by 22 species. These species include: N. annua, N. cataria, N. campestris, N. clarkei, N. coerulescens, N. connata, N. discolor, N. elliptica, N. erostachya, N. kokanica, N. laevigata, N. linearis, N. nervosa, N. paulsenii, N. podostachys, N. raphanorhiza, N. floccosa, N. longibracteata, N. glutinosa, N. govaniana, N. erecta and N. salviaefolia. The species previously recorded under the scientific names N. elata, N. royleana, N. pamirensis and N. vakanica from the Kashmir Himalaya are actually the synonyms of N. laevigata, N. salviaefolia, N. kokanica and N. floccosa, respectively. The previous species record of N. tibetica (synonym of Glechoma tibetica) has not been found anywhere from the study area. Also only two collections of N. leucophylla - a typical Eastern Himalayan species - have been cited by Stewart (1972) from the area of Kashmir Himalaya presently under the control of Pakistan. However, afterwards, there has been no record of this species; and perhaps, it seems that Stewart (1972) might have misidentified the two specimens for another well-represented species in our area, i.e. N. salviaefolia. Hedge (1990) also could not locate any specimen in Pakistan which matches this Eastern Himalayan species. Therefore, the present study excludes this species record from the region.

REFERENCES

Delghandi, M. 1993: Nepeta leucostegia (Labiatae), a new record for the flora of Iran. -Iranian J. Bot. 6: 149-151.