

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

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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.

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موقعیت تاکسونومیک جنس *Nepeta* L. (Lamiaceae) در کشمیر هیمالیا، هندوستان

توحید حسنی، غلام حسن دار و انظر احمد خورو، اعضای هیئت علمی دپارتمان گیاهشناسی دانشگاه کشمیر.

در این مقاله ۲۲ گونه از جنس *Nepeta* از کشمیر هیمالیا گزارش می‌شود. جدای از این، تعداد ۱۲ گونه از منطقه کشمیر و تعداد ۱۱ گونه از منطقه لاداخ گزارش داده شد. یک گونه به نام *N. salviaefolia* در هر دو منطقه مشترک است. تمامی گونه‌ها چندساله اند ولی گونه *N. annua* یکساله است. شرح تاکسونومیک همه گونه‌ها و سیستم جدید نامگذاری آنها در مقاله ارائه می‌گردد.

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 *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 *ex situ* in the Kashmir University Botanical Garden (KUBG).

RESULTS

Nepeta L., Sp. Pl. 2: 570. 1753.

Key to the species of *Nepeta* in the Kashmir Himalaya based on floral characters

- 1. +Verticillasters forming elongated ± continuous spikes or ovoid heads, sometimes the lowermost verticillasters distant 2
- Verticillasters ± 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. *N. coerulescens*
- Verticillasters forming terminal or lateral spikes; peduncle absent 4
- 4. + Paniculate inflorescence; corolla less than 10 mm long 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 ½ to as long as tube 12. *N. linearis*
- Inflorescence a slender spike; calyx-teeth ¾ to as long as tube 7

- 7. +Bracts 6-10 mm long, as long as calyx; nutlets 1.4-1.5 mm long, ellipsoid 13. *N. nervosa*
- Bracts 4-5 mm long, ½ to as long as calyx; nutlets 1.9-2 mm long, irregular-oblong 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 18. *N. longibracteata*
- Bracts shorter than calyx; pedicels less than 1 mm long 10. *N. kokanica*
- 10. +Verticillasters up to 30 mm long, forming globose-ovoid heads 16. *N. raphanorhiza*
- Verticillasters elongated, 30-90 mm long, not forming heads 11
- 11. + Spikes 70 mm or more long; outer bracts broad 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 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 ½ to as long as tube 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 9. *N. eriostachya*
- Bracts less than 6 mm long; nutlets oblong 7. *N. discolor*
- 15. + Calyx 11-15 mm long, with tube measuring 5-6 mm 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 8. *N. elliptica*
- Calyx-teeth ½ to as long as the tube; corolla 6.5-8 mm long; 1. *N. annua*
- 17. + Verticillasters forming loose panicles; peduncle more than 3 cm in length; two lips of corolla equal 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 19
- Corolla 8-17 mm in length, pale lilac to pale violet 20
- 19.+ Calyx 8-9 mm long, with tube measuring 6-7 mm 21. *N. erecta*
- Calyx 8-12 mm, with tube measuring 8 mm 19. *N. glutinosa*
- 20. + Bracts 5-6 mm long; pedicels 3 mm long 22. *N. salviaefolia*
- Bracts 3-5 mm long; pedicels less than 3 mm long 21

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***

1. *Nepeta annua* Pallas, Acta Acad. Sci. Imp. Petrop. 2: 263, f. 12. 1783.

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.

2. *Nepeta cataria* L., Sp. Pl. 570. 1753.

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 2701 (KASH); Anantnag, Tauheeda & Dar 2793 (KASH); Srinagar, Rafiq 9341 (DD).

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

Habitat: Grows in dry habitats along habitations, waste places.

Altitudinal range: 1600-2000 m.

3. *Nepeta campestris* Benth., Lab. Gen. et Sp. 734. 1835.

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, eglandular; throat slightly oblique; teeth linear-subulate, shorter than or equalling the calyx-tube. Corolla blue, 12-15 mm; tube curved, exerted from calyx.

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

Global distribution: India.

Specimens examined: India, J & K, Gurais, 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.

4. *Nepeta clarkei* Hook. f., Fl. Brit. Ind. 4: 663. 1885.

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, exerted from calyx.

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

Global distribution: Pakistan, India, China.

Specimens examined: India, J & K, Gulmarg, Tauheeda & Dar 2753, 2754 (KASH); Anantnag (Kashmir), Gadsar 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.

5. *Nepeta coerulescens* Maxim., Bull. Acad. Imp. Sci. St. Petersb. Ser. 3. 27: 529. 1881.

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 exerted.

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 Hiralal 146 (KASH); Zanskar, Tauheeda & Dar 2776, 2777 (KASH); Zanskar (Kashmir), Razdan & Govind 8446, 8447 (DD).

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

Habitat: Grows on grassy dry slopes, river sides, grassy river banks.

Altitudinal range: 3000-3800 m.

6. *Nepeta connata* Royle ex Benth. in Hook., Bot. Misc. 3: 378. 1833.

Perennial tuberous herb. Stem 15-87cm tall, mostly unbranched and solitary, glabrous, leafy. Leaves sessile; lamina linear to linear-lanceolate, 8-17 × 0.3-2.5 cm, thick-textured with a prominent mid-vein, margin entire, base cordate, semi-amplexicaul or connate, apex acuminate. Inflorescence an elongated, ± continuous spike, terminal as well as borne in axils of lower leaves, 4-14.5 cm long. Inner bracts 11-15 mm, linear, membranous, as long as calyx. Flowers numerous, congested. Pedicels up to 1.1 cm. Calyx 1.1-1.5 cm, thin-textured with short hairs; throat straight; teeth subequal, as long as tube. Corolla blue-violet, 2.5-2.6 cm; tube exerted from calyx.

Type: Kashmir, Royle (LIV).

Global distribution: Pakistan, India.

Specimens examined: India, J & K, Baltal to Sonamarg, Tauheeda & Dar 2779, 2781 (KASH).

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

Habitat: Grows along foothills, on exposed slopes of hills, and in grasslands.

Altitudinal range: 2600-3000 m.

7. *Nepeta discolor* Royle ex Benth. in Hook., Bot. Misc. 3: 378. 1833.

Vernacular name (Ladakhi): 'Shamalolo'.

Perennial herb. Stem 10-30 cm tall, slender, ascending, gray-pubescent. Leaves short-petiolate; petiole 2-11 mm long; lamina broadly ovate to ovate-cordate, 6-20 × 5-12 mm, adaxially green, abaxially gray, broadly cuneate, margin crenate-serrate, apex obtuse. Inflorescence a congested oblong spike, continuous or interrupted near the base, 3.0-5.5 cm long. Outer bracts elliptic, ovate-lanceolate, green, acuminate; inner bracts linear-lanceolate, spiny, as long as calyx, ciliate. Pedicels absent to 3 mm long. Calyx 7-8 mm long, narrow tubular. Corolla white, glabrous or slightly villous, 1.2-1.3 cm long.

Holotype: NW Himalaya, Syen range and Mussorie, Ann. 1832, Royle (K).

Global distribution: Afghanistan, Pakistan, China, India, Nepal.

Specimens examined: India, J & K, Rajdani Pass, Naqshi, Showkat and Kachroo 1521 (KASH); Ladakh (Hemis Nullah), Tauheeda & Dar 2706 (KASH).

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

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

Altitudinal range: 3050-4600 m.

8. *Nepeta elliptica* Royle ex Benth. in Hook., Bot. Misc. 3: 378. 1833.

Perennial herb. Stems 35-70 cm tall, branched, quadrangular, leafy. Leaves sessile or with a very short petiole to 0.6mm long; lamina narrowly- or broadly-elliptic, 1-3.5 × 0.7-1.7 cm, margin pectinate-serrate, cordate, apically rounded. Cymes condensed, terminal and lateral, 10-11mm × 1-1.6 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, Yumarg, Tauheeda & Dar 2737, 2748 (KASH); Banihal, Qr. Osmaston 3212, 3411 (DD).

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

Habitat: Grows on open slopes.

Altitudinal range: 2600-2800 m.

9. *Nepeta eriostachya* Benth., Lab. Gen. et Sp. 734. 1835.

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 broad ovate-triangular to oblong, thick textured, up to 3-4.3 × 2-3 cm, greenish, margin entire to serrulate, apex ± acute. Inflorescence a terminal congested spikes, oblong up to 4-5.1 × 2.5 cm. Bracts elliptic, green, acuminate. Calyx tubular, 7-10 mm long, ± membranous, eglandular 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, exerted 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 editioribus, admargines sylvarum etc., Jacquemont (P-n.v.).

Global distribution: India.

Specimens examined: India, J & K, Zojila, Tauheeda & Dar 2785, 2786 (KASH); Drass (Kashmir), G. A. Khan 414, 418 (DD).

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

Habitat: Grows on open grassy slopes.

Altitudinal range: 3000-3200 m.

10. *Nepeta kokanica* Regel, *Izv. Obsch. Lyub.est. antr. etnogr.* 34, 2: 65. 1882.

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, linear-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], O. 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.

11. *Nepeta laevigata* (D. Don) Hand.-Mazz., *Symb. Sin.* 7: 916. 1936.

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-filiform 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] Siranagur [Srinagar], *Kamroop*.

Global distribution: Afghanistan, Pakistan, India, Nepal, China.

Specimens examined: India, J & K, Pahalgam (Aru), *Tauheeda & Dar* 2768, 2769 (KASH); Aharbal (Kashmir), Qaiser 26711, 267113 (BSD).

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

Habitat: Grows in open slopes, gravelly slopes, grasslands, grassy slopes, coniferous forests.

Altitudinal range: 2200-3000 m.

12. *Nepeta linearis* Royle ex Benth. in Hook., *Bot. Misc.* 3: 377. 1833.

Perennial herb. Stem 25-70 cm tall, arising from a tuberous rootstock, branched. Leaves sessile; lamina linear, 3-8 cm 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: June - July.

Habitat: Grows in grassy slopes.

Altitudinal range: 2200-2800 m.

13. *Nepeta nervosa* Royle ex Benth. in Hook., *Bot. Misc.* 3: 378. 1833.

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 x 1.5-3 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 exerted from calyx.

Type: Kashmir, Royle (LIV).

Global distribution: Pakistan, India.

Specimens examined: India, J & K, Dachigam National Park (Gretnar) 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.

14. *Nepeta paulsenii* Briquet in *Bot. Tidsskr.* 28: 235. 1908.

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 cm x 3-8 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 exerted 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.

15. *Nepeta podostachys* Benth in DC., Prodr. 12: 372. 1848.

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.

16. *Nepeta raphanorhiza* Benth., Lab. Gen. et Sp. 734. 1835.

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, tubular; throat straight, teeth unequal, narrow triangular, 1/2 to as long as tube.

Type: Kashmir [Kashmir valley, 1670 m, Stainton 8629 (BM, E); Anantnag, Chamberlain 178 (E); Srinagar, above Dal lake, Chamberlain 166 (E); Jhelum valley, Baramula to Setoune, 7 May] Jacquemont (K, P).

Global distribution: 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.

17. *Nepeta floccosa* Benth., Lab. Gen. et Sp. 736. 1835.

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 capitate. 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 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.

18. *Nepeta longibracteata* Benth., Lab. Gen. et Sp. 737. 1835.

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 7.8-8.3 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, lanceolate, 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.

19. *Nepeta glutinosa* Benth., Lab. Gen. et Sp. 735.1835.

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.

Holotype: [W Himalaya] Between Poye and Rici, Jacquemont 1713 (P, K).

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.

20. *Nepeta govaniana* (Wall. ex Benth.) Benth., Lab. Gen. et Sp. 482. 1834.

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] Sirmore et Kamaon, Govan (K).

Global distribution: Pakistan, India.

Specimens examined: India, J & K, Gulmarg, Tauheeda & Dar 2729, 2722 (KASH); Gurais, Tauheeda & Dar 2730, 2732 (KASH); Sonamarg, Kashmir, C. L. Mehta 2314 (BSD).

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

Habitat: Grows in humus-rich soils.

Altitudinal range: 2600-3000 m.

21. *Nepeta erecta* (Royle ex Benth.) Benth., Lab. Gen. et Sp. 482. 1834.

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: 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.

22. *Nepeta salviaefolia* Royle ex Benth. in Hook., Bot. Misc. 3: 379. 1833.

Vernacular name (Ladakhi): 'Bukhsukh'.

Synonyms: *N. royleana*. R. R. Stewart.

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 and H. Tauheeda 2712, 2713, 2717 (KASH); Shankaracharya, H. Tauheeda & 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. eriostachya*, *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.

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