

NEW COMBINATIONS AND TAXA IN THE GENUS *GENTIANODES* (GENTIANACEAE) FROM PAKISTAN

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Abstract

The genus *Gentianodes* Löve et Löve is recognized in Pakistan. Two new species i.e. *G. alii* Omer & Qaiser and *G. nasirii* Omer, Ali & Qaiser and a new variety *G. marginata* (Griseb.) Omer, Ali & Qaiser var. *harrissii* Omer, Ali & Qaiser are described. In addition, 15 new combinations and 2 new states are also proposed.

Introduction

Kusnezov (1898) recognized a section *Frigida* Kusnezov under the genus *Gentiana* L. (s.l.) on the basis of morphological characters of the seed and style. Earlier, Grisebach (1839, 1845) placed five species of section *Frigida* Kusnezov under separate but heterogeneric section *Pneumonanthe* Griseb. alongwith some other taxa. Löve and Löve (1972) raised the section *Frigida* Kusnezov to the generic level and named it as *Gentianodes* Löve & Löve on the basis of adherence of stamens, plicate corolla and the uninerved basal leaves. They have also used the basic chromosome number ($x = 6$) as a distinct character of the new genus. They, however, excluded *Gentiana froelichii* Jan from the new genus on the basis of connate anthers, 3-nerved basal leaves, nonplicate corolla and different chromosome number ($x = 7$). This was accommodated under a separate genus *Favargera* Löve and Löve.

During the course of detailed studies of the genus *Gentiana* L. (s.l.) from Pakistan, the authors came across several taxa, which could not be accommodated under traditional *Gentiana* L. As they fully match with the generic description of *Gentianodes* Löve & Löve they are being placed in this genus. However the chromosome numbers could not be ascertained due to non-availability of fresh material.

A detailed generic description, key to the taxa in Pakistan, new combinations alongwith their synonymy, description of new taxa, a list of specimens examined, along with the information about the distribution, flowering and fruiting data is presented.

2. *GENTIANODES*

Löve et Löve in Bot. Not. 125: 256. 1972.

Mostly perennials (very rarely annuals), sometimes biennial herbs, erect or sometimes forming mats from a rootstock. Leaves basal as well as cauline; basal forming rosettes, conspicuously larger than cauline, uninerved, linear to lanceolate or ovate; cauline laxly-densely arranged, sometimes imbricate, opposite. Inflorescence usually single to few flowered umbels, umbels usually simple or racemose cymes. Flowers actinomorphic, bisexual, pentamerous. Calyx divided to various lengths either small or large; lobes linear, lanceolate or ovate, unequal or equal, often scabrously margined. Corolla tubular, infundibular or hypocrateriform, in shades of blue, purple, violet, red, pink, white or yellow, divided, provided with subsidiary lobes or plicae, plicae smaller than and alternating with corolla lobes, naked inside i.e. not provided with ciliae or fimbriae. Stamens corresponding the number of and alternating with corolla lobes and opposite the plicae, anthers dorsifixed or versatile with filaments inserted in the middle in the lower portion of the corolla tube. Ovary superior, unilocular, placentation parietal with numerous ovules; stigmas 2, coiled at apex, mostly with a style or sessile. Nectaries present at the base of the ovary. Capsule elliptic-oblong, large or short stalked or sessile, dehiscent septically from apex. Seeds light to dark brown, ellipsoidal, ovate or rounded, reticulate.

A genus of 40-60 species, distributed in Eurasia. Represented in Pakistan by 20 taxa.

Type species: *Gentianodes frigida* (Haenke) Löve et Löve, based on *Gentiana frigida* Haenke.

Key to the taxa

- | | |
|--|---------------------------|
| 1. +Plants biennial to perennial with rhizome.
Calyx lobes unequal (except in <i>G. olivieri</i>). | 2 |
| —Plants annual without rhizome. Calyx lobes
equal (except in <i>G. nasirii</i>). | 9 |
| 2. +Calyx tube longer than the lobes. Basal
leaves usually wanting (not in <i>G. kurroo</i>). | 3 |
| —Calyx tube shorter than the lobes. Basal
leaves distinct and in rosettes. | 5 |
| 3. +Seeds winged. Corolla tubular. | 12. <i>G. venusta</i> |
| —Seeds not winged. Corolla campanulate. | 4 |
| 4. +Cauline leaves ovate. Calyx lobes ovate-
obovate or lanceolate. | 14. <i>G. cachemirica</i> |

- Cauline leaves and calyx lobes linear. 15. *G. kurroo*
5. +Plicae prominent, acuminate. Inflorescence an umbel. Calyx lobes \pm equal. 18. *G. olivieri*
- Plicae not prominent, differently margined. Inflorescence a racemose cyme. Calyx lobes unequal. 6
6. +Calyx splitting on one side, membranous. 19. *G. tianschanica*
- Calyx not splitting on any side. 7
7. +Calyx 7-lobed. Plicae truncate. 16. *G. kaufmaniana*
- Calyx 5-lobed. Plicae not truncate. 8
8. +Cauline leaves connate at the base, forming a sheath-like structure around the stem. Corolla lobes lanceolate. 17. *G. lowndesii*
- Cauline leaves not connate. Corolla somewhat ovate. 13. *G. algida* var. *nubigena*
9. +Calyx lobes unequal, two longer and broader than the rest. Anthers versatile. Plicae slightly unequal. 7. *G. nasirii*
- Calyx lobes equal. Anthers dorsifixed. Plicae equal. 10
10. +Calyx lobes ovate. Plicae entire. Ovary ovate-obovate. 11
- Calyx lobes lanceolate. Plicae crenate-bilobed. Ovary lanceolate-broadly lanceolate. 14
11. +Flowers in terminal fascicles. 12
- Flowers solitary, terminal. 13

12. +Leaves broadly ovate. Plicae obtuse to acute. Corolla lobes obtuse-acute. 2. *G. huxleyi*
- Leaves narrowly lanceolate-lanceolate. Plicae acuminate. Corolla lobes acute-acuminate. 3. *G. argentea*
13. +Flowers sessile to subsessile, enveloped by the two upper leaves. Calyx lobes reflexed. Corolla lobes acuminate. 9. *G. pedicellata*
- Flowers long pedicellate, not enveloped by leaves. Calyx lobes erect. Corolla lobes acute. 5. *G. burkillii*
14. +Plants upto 30 (-35) cm high. Inflorescence a laxly arranged raceme. 15
- Plants never exceeding more than 8 (-10) cm. Inflorescence in terminal fascicles (except in *G. acuminata*). 16
15. +Calyx always more than half the size of corolla. Corolla lobes lanceolate. 10. *G. decemfida*
- Calyx less than half the size of the corolla. Corolla lobes ovate. 11. *G. aprica*
16. +Leaves conduplicate. Plants very stiff, puberulent-pubescent. 4. *G. alii*
- Leaves not so. Plants not stiff, glabrous. 17
17. +Plicae bilobed, each lobe unequal. Flowers sessile, tubular. 1. *G. acuminata*
- Plicae unilobed. Flower subsessile-pedicellate. campanulate or tubular. 18
18. +Corolla lobes and plicae lanceolate. 8. *G. intermedia*
- Corolla lobes and plicae ovate-obovate. 19

19. +Corolla lobes obtuse. 6a. *G. marginata*
var. *marginata*
- Corolla lobes acute. 6b. *G. marginata*
var. *harrissii*

1. *Gentianodes acuminata* (Clarke) Omer, Ali & Qaiser Comb. et stat. nov.

Gentiana pygmaea Clarke (non Reg. & Schmalh.) var. *acuminata* Clarke in Hook. f., Fl. Brit. Ind. 4: 111. 1883; *Gentiana clarkei* Kusn. var. *acuminata* (Clarke) Kusn., Etud. Monogr. Sous.-genera Eugentiana 276. 1894.

Type: Kashmir, Palgam, alt. 13500', Clarke (K, Photo!).

Specimens examined: Kashmir: Wet ground near the Yamharu Pass, 13-14000 ft., 13.8.1893, J.F. Duthie 13578 (K); above Gulmarg, 13000 ft., Aug. 1929, R.R. Stewart 12923 (K).

Distribution: Kashmir

Fl. Per.: July-August.

2. *Gentianodes huxleyi* (Kusn.) Omer, Ali & Qaiser Comb. nov.

Gentiana huxleyi Kusn. in Acta Horti.Petrop. 13: 64. 1893.

Type: Himalaya, Kumaon, Champwa 12000', R. Strachey & J.E. Winterbottom (LE).

Specimens examined: Chitral: Bombrat Gol, Kafiristan, c. 1800 m, sandy clay soil, 30.6.1987, A. Ghafoor & S. Omer 3296 (KUH); Gilgit: Rattu-Gurikot, ± 8000', dry pastures, 25.5.1954, Dr. F. Schmid 1780 (RAW); Rama, 6.5 miles from Astore, small herb, c. 3 cm, flrs. blue with yellow throat, 29.6.1982, Saood Omer 354 (KUH); Baltistan: Kachura Lake, c. 3 cm high, blue flrs. with fruits, 25.5.1983, Saood Omer, S. Nazimuddin & A. Wahid 1034, 1045 (KUH); Karakorum glaciers, near Gargo, Bagro valley, 1892, W.M. Conway s.n. (CAL); Swat: c. 1 Km from Gabral on way to Utröre, c. 3000 m, 3.7.1987, A. Ghafoor & S. Omer 3453 (KUH).

Distribution: Himalaya.

Fl. Per.: May-June. Fr. Per.: July.

3. *Gentianodes argentea* (Royle ex D. Don) Omer, Ali & Qaiser Comb. nov.

Ericala argentea Royle ex D. Don in Lond. Edinb. Phil. Mag. J. Sci. 8: 76. 1836; *Gentiana argentea* (Royle ex D. Don) Griseb. in DC. Prodr. 9: 107. 1845; *Gentiana huxleyi* auct. non Kusn.: Schim.-Czeika in Rech. f., Fl. Iran. 41: 15. 1967.

Type: Described from Himalaya, Royle.

Specimens examined: Chitral: Barum Gol, Shokor Shal, ca. 3500 m, 25.6.1950, *P. Wendelbo* s.n. (O); Hazara: Kaghan, c. 5 cm high, bluish flowers, not common, *Saood Omer, S. Nazimuddin & A. Wahid* 685 (KUH); Pabran, c. 3 miles from Shogran, c. 4 cm high herb, blue flrs., *Saood Omer, S. Nazimuddin & A. Wahid* 657 (KUH); About 3 Km from Shogran on way to Sari, c. 3 cm high, blue flrs. with whitish tinge and greenish throat, *Saood Omer, S. Nazimuddin & Abdul Wahid* 632, 641, 642 (KUH); Near Sunny bank, Murree, Alt. 3000', flrs. blue, tiny prostrate herb, *Jafri & Ali* 3074 (KUH); Mall Road hill area, Murree, c. 7 cm, flrs. blue, white below, *M. Qaiser & S. Abedin* 5606 (KUH); Poonch: Dhuli, *R.R. Stewart & E. Nasir* 23733 (RAW); Near Mingora, *Stewart, Nasir, Siddiqui* 177 (RAW); Shogran, Kaghan valley, c. 3 cm, flrs. blue, 9.5.1983, *Saood Omer, S. Nazimuddin & A. Wahid* s.n. (KUH); Changli Gali, c. 2800 m., common on forest floor, flrs. blue, *M.A. Siddiqui & Y. Nasir* 6800 (RAW); Murree hills, along roadside on way to Kashmir point, flrs. blue, upto 3.5 cm, 25.5.1968, *Saida Qureshi* s.n. (KUH); Azad Kashmir: Tarar Kheh, ± 6000', flrs. blue, *Zaffar Ali & Y. Nasir* 5428 (NA); Swat: Shangla, 2050m, in apertis cedetorum, 2. VI. 1965, *K.H. Rechinger* 30643 (K).

Distribution: Himalaya (Chitral to Nepal).

Fl.Per.: April-June.

4. *Gentianodes alii* Omer & Qaiser sp. nov. (Fig. 1).

Holotypus: Hazara, Saiful Maluk, 18.7.1954, *Ch. Shaukat Ali* 83 (RAW!).

Herba biennis, viridis, usque ad 6 cm alta. Caules numerosi, a basi ramosi, pubescentes. Folia basalia rigida, 1-1.7 x 0.3-0.5 cm, lanceolata, margine cartilaginea, integerrima, acuminata, uninervia. Folia caulina rigida, 0.75-1.75 x 0.3-0.6 cm, linearilanceolata, margine cartilaginea, integerrima, acuminata. Inflorescentia multiflora, cymis terminalibus subaxillaribus. Flores campanulati, sessiles, 0.8-1.2 cm longi. Calyx 0.5-1.0 cm longus; tubus quam lobi longior, 0.3-0.7 cm longus; lobi 0.25-0.5 x 0.1-0.175 cm, lanceolati, integri, cartilaginei, acuminati, reflexi. Corolla 0.8-1.2 cm longa, tubus quam lobi longior, 0.4-0.7 cm longus; lobi 0.15-0.3 x 0.1-0.15 (-0.2) cm, ovati, integri, obtusi; plicae quam lobi minores, 0.05-0.1 x 0.025-0.05 cm, ovatae, integri, obtuse; pli-

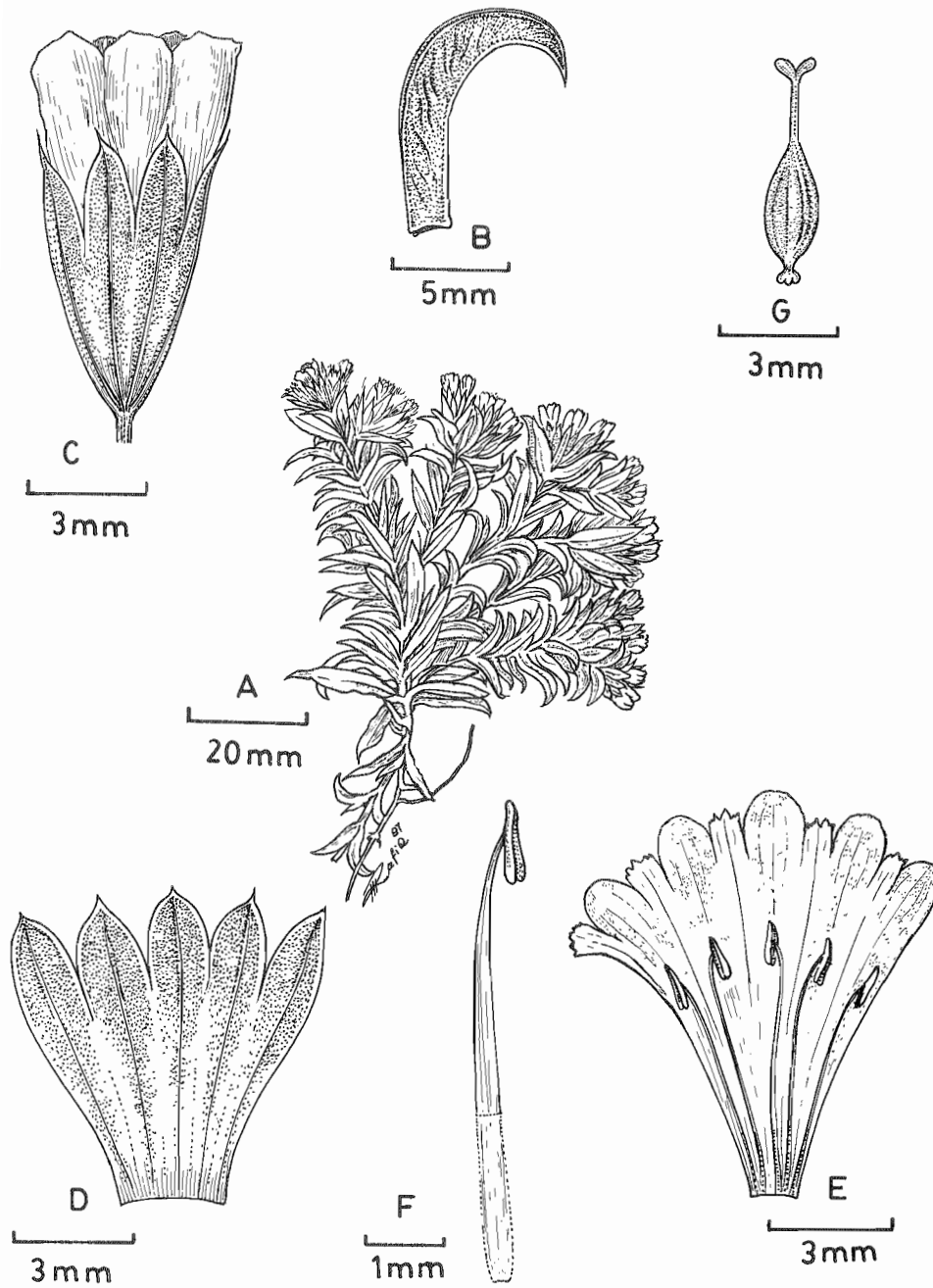


Fig. 1. *Gentianodes alii*: A, Habit; B, Leaf; C, Flower; D, Calyx; E, Corolla; F, Stamen; G, Ovary.

cae quam lobi minores, ovatae, acutae, crenatae. Stamina 5, filamenta filiformia, in media adnata; antherae dorsifixae, sagittatae, bilobae. Ovarium 0.2-0.5 x 0.1-0.2 cm, lanceolatum; stylus tenuis; stigma distinctum, bifidum, spirale. Nectaria ad basin ovarii sita. Capsula non visa.

Biennial, green, upto 6 cm high herb. Stem numerous, branched from base, puberulent-pubescent. Basal leaves stiff, 1.0-1.7 x 0.3-0.5 cm, lanceolate, margin cartilaginous, entire, \pm reflexed, acuminate, univeined. Cauline leaves stiff, 0.75-1.75 x 0.3-0.6 cm, loosely imbricate, linear-lanceolate, margin cartilaginous, entire, acuminate. Inflorescence many flowered, congested, terminal subaxillary cyme. Flowers campanulate, sessile, 0.8-1.2 cm long. Calyx 0.5-1 cm long, tube longer than lobes, 0.3-0.7 cm long; lobes 0.25-0.5 x 0.1-0.175 cm, lanceolate, entire, cartilaginous, acuminate, reflexed. Corolla 0.8-1.2 cm long, tube longer than lobes, 0.4-0.7 cm long; lobes 0.15-0.3 x 0.1-0.15 (-0.2) cm, ovate, entire, obtuse; plicae smaller than lobes 0.05-0.1 x 0.025-0.05 cm, ovate, crenate, acute. Stamens 5, filaments filiform, adnate at middle; anthers dorsifixed, sagittate, bilobed. Ovary 0.2-0.5 x 0.1-0.2 cm, lanceolate, style slender; stigma distinct, bifid, coiled. Nectaries at the base of ovary. Capsule not seen.

Distribution: Endemic. (Fig. 2).

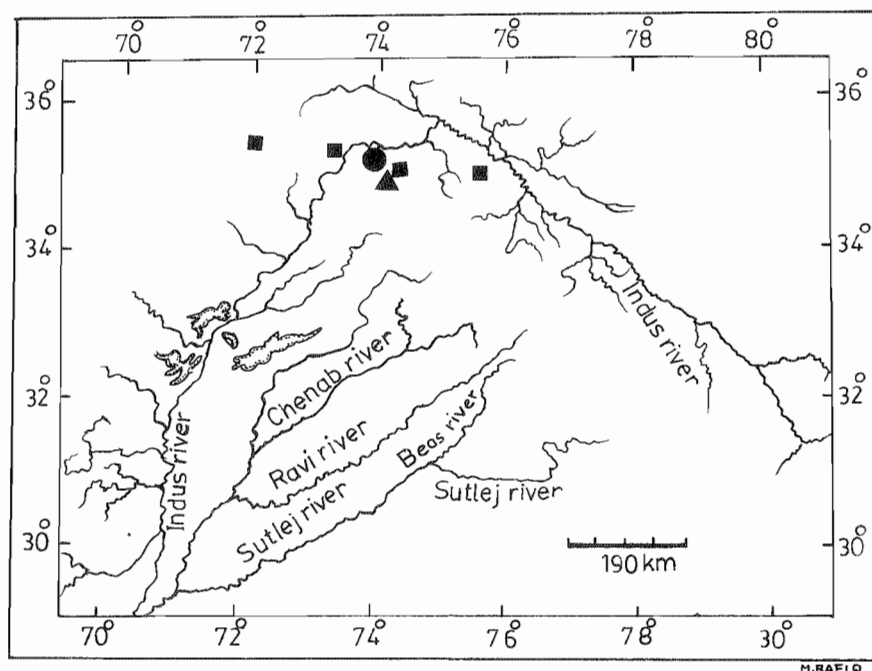


Fig. 2. Distribution of *Gentianodes alii* (●); *G. marginata* var. *hairrissii* (■) and *G. nasirii* (▲).

Fl. Per.: July-August.

The new species is named after *Professor S.I. Ali* (Karachi). Closely allied to *G. argentea* (Royle) Omer, Ali & Qaiser; *G. marginata* (Griseb.) Omer, Ali & Qaiser; and *G. huxleyi* (Kusn.) Omer, Ali & Qaiser, but could readily be distinguished on the basis of having conduplicate, linear-lanceolate, loosely imbricate leaves; calyx lobe apices reflexed; corolla lobes being obtuse, rotundate, and non fimbriate and stem being pubescent. Whereas corolla lobes are acuminate, stem being glabrous and smooth in *G. argentea* (Royle ex D. Don) Omer, Ali & Qaiser. Leaves are ovate-spathulate and densely imbricate in *G. huxleyi* (Kusn.) Omer, Ali & Qaiser. Leaves and calyx lobes apices are straight in *G. marginata* (Griseb.) Omer, Ali & Qaiser.

5. *Gentianodes burkillii* (H.Smith) Omer, Ali & Qaiser, Comb. nov.

Gentiana burkillii H. Smith in Hand.-Mazz., Symb. Sin. pt. 7:953. 1936; *Gentiana pseudo-humilis* Burkill in J. As. Soc. Beng., n. ser., 2: 313. 1906 non Makino 1904.

Syntypes: Several specimens from Himalaya and Siberia.

Specimens examined: Gligit agency: Hunza, Ulter nullah, \pm 10000', 12.8.1954, *R.R. Stewart* s.n. (RAW); Baltistan: Skardu, 8000', 24.6.1955, *E. Nasir & G.L. Webster* 5791 (RAW); c. 5 miles from Shigar on way to Alchuri, branched from base, 3-4 cm high, flrs. blue with yellowish throat, capsules present, 18.5.1983, *Saood Omer, S. Nazimuddin & A. Wahid* 893 (KUH); Khaplu, c. 3 cm high, blue flrs. with yellow throat, 21.5.1983, *Saood Omer, S. Nazimuddin & A. Wahid* 957 (KUH).

Distribution: Siberia (South) — Afghanistan, Pakistan, Kashmir, India, Tibet to Nepal (Himalaya).

Fl. Per.: May-August.

6a. *Gentianodes marginata* (G.Don) Omer, Ali & Qaiser, Comb. nov.

a. var. *marginata*

Ericala marginata G. Don, Gen. Syst. 4: 192. 1837; *Gentiana marginata* (G.Don) Griseb., Gent. 275. t. 1, f. 3. 1839; *G. carinata* (D.Don) Griseb. var. *marginata* (D. Don) C.B. Clarke in Fl. Brit. Ind. 4: 113. 1883.

Syntypes: Described from Nipal, Kumaon, Silhet etc.

Specimens examined: Chitral: Bombrat valley, c. 8 cm erect herb, flrs. blue, 26.7.1976, *M. Qaiser & A. Ghafoor* 6701 (KUH); Dir: Roshy Dub, Gumrat, flrs. blue, open grass lands, *Farrukh Hussain* 7180 (RAW); Baltistan: Deosai, \pm 13000', *R.R. Stewart* 19950 (RAW); Talala (Thalle La), 13000 ft., meadow; flrs. blue-purple, August 23, 1936, *W. Koelz* 9744 (NA); Kashmir: Above Gulmarg, 13200', *G.L.B. Fuller* 151 (K); Above Tarakbal, 10000 ft., August 1, 1936, *W. Koelz* 9214 (NA); Mt. Kolahoi, \pm 1000', Aug. 1925, *R.R. Stewart* 8279a (NA); Hazara: Shogran, Mt. Makra, c. 2700 m, in sub-alpine meadow, 17.5.1970, *F. Grohmann* 6997 (RAW).

Distribution: Pakistan (Chitral, Gilgit, Baltistan), Kashmir-Nepal.

Fl. Per.: May-July.

6b. var. *harrissii* Omer, Ali & Qaiser var. nov. (Fig.3).

Habitu varietati typicae similis, a qua corollae lobis acutis differt.

Similar in habit to the type variety, but differs in having corolla lobes apex being acute.

Type: Chitral: Lowari Pass, 11,500 ft., 21.6.1895, *Surg.-Lt. Harriss* 16370 (Holo. 0!, Iso. CAL!).

Specimens examined: Hazara: Kaghan, Sasri, \pm 10200', 6.7.1975, *Y. Nasir & E.J. Ecker* 7690 (RAW); Swat: Ushu valley, 2500 m, corolla lobes 10, dark blue, tube white, 2 stigmas, no hairs in throat, 2.9.1970, *F. Grohman* 6317 (RAW); Kashmir: Burzil Pass, 27.7.1940, *R.R. Stewart* 19868 (RAW).

Distribution: Chitral-Kashmir (Fig. 2).

Fl. Per.: July-September.

7. *Gentianodes nasirii* Omer, Ali & Qaiser Sp. nov. (Fig.4).

Holotypus: Hazara via ad Mount Makra, 11000', Kaghan, 24.6.1978, *Y. Nasir & W. Meijer* 8854 (KUH!).

Herba biennis vel perennis, usque ad 6 cm alta. Caulis evolutus, dense foliatus, inferne simplex, superne ramosus. Folia basalia 2.5-3.25 x 0.6-0.8 (-1) cm, lanceolata, margine cartilaginea, integra, acuminata, basi connata. Folia caulina 0.75-1.5 x 0.4-0.7 cm, lanceolata, margine hyalina, imprimis basi minutissime denticulata, \pm longe acuminata, basi connata. Inflorescentia terminalis, congeste cymosa, multiflora. Flores tubulosi, sessiles,

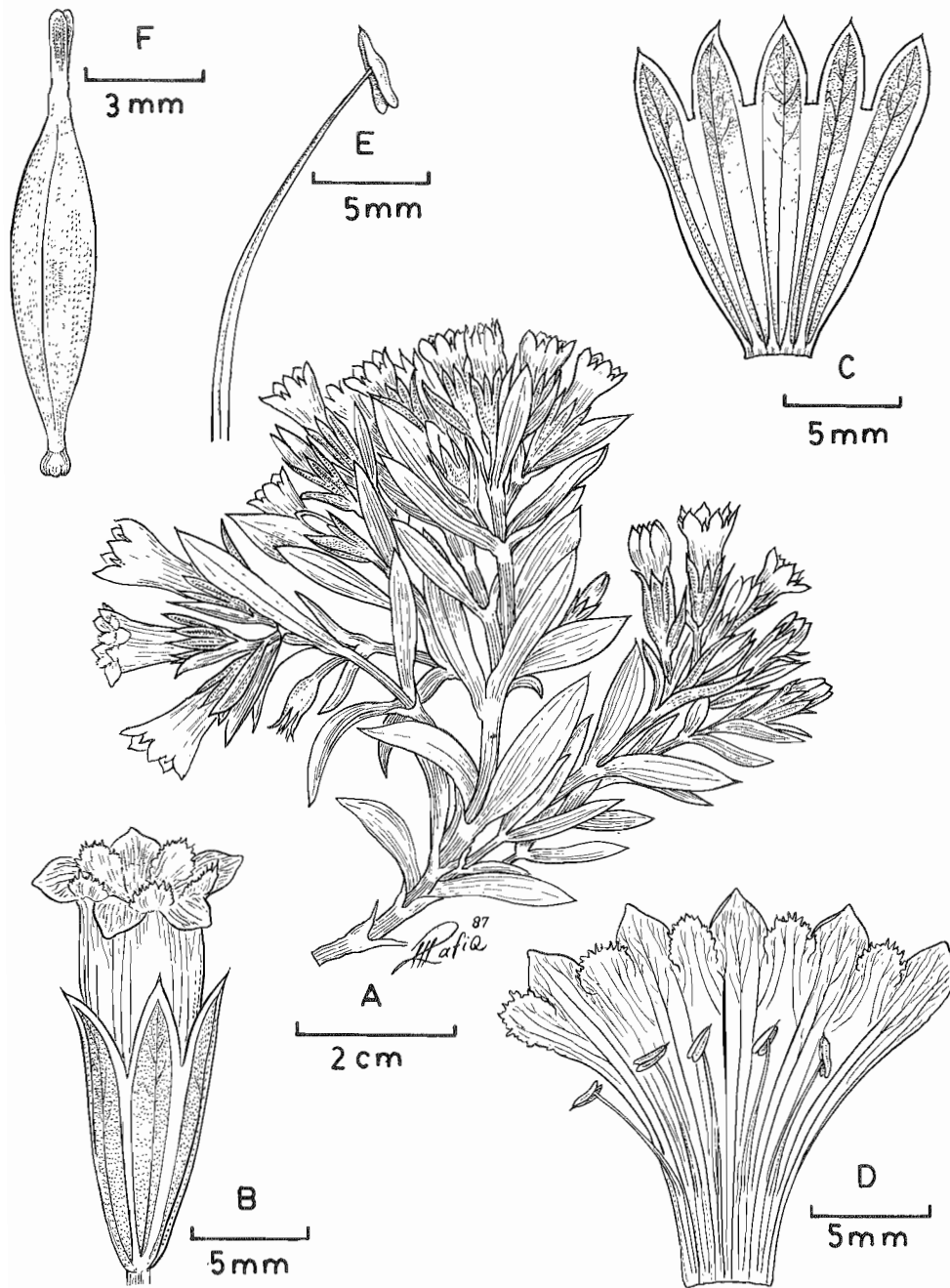


Fig. 3. *Gentianodes marginata* var. *harrissii*: A, Habit; B, Ovary; C, Calyx; D, Corolla; E, Stamen; F, Ovary.

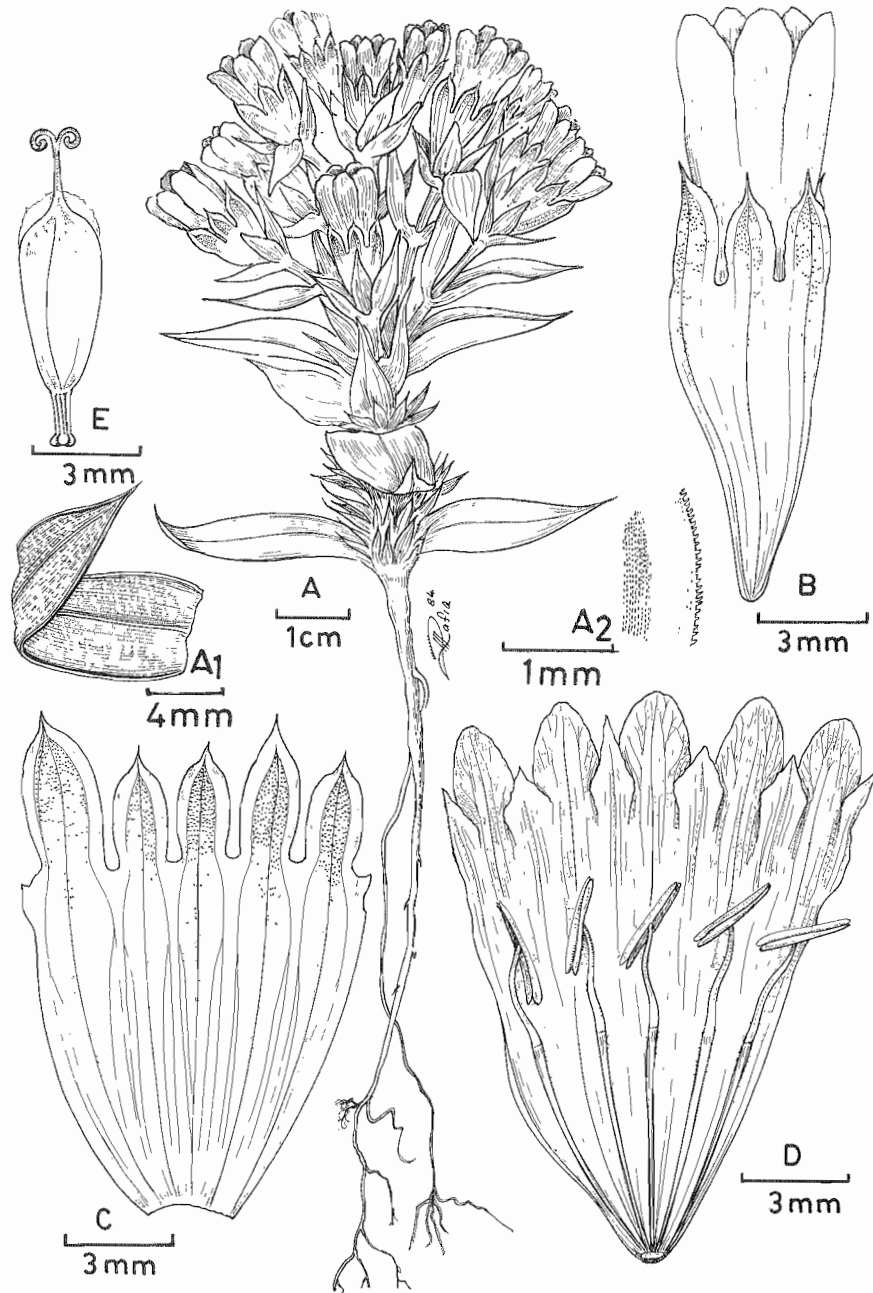


Fig. 4. *Gentianodes nasirii*: A, Habit; A1, Cauline leaf; A2, Margin of leaf; B, Flower; C, Calyx; D, Corolla; E, Ovary.

1.25-1.6 cm longi. Calyx 0.9-1.3 cm longus; tubus quam lobi longior 0.7-0.9 (-1) cm longus; lobi \pm inaequilongi, bini quam ceteri longiores: 0.3-0.6 x 0.15-0.25 cm, late lanceolato-ovati, margine hyalini, integri vel minutissime denticulati, acuminati; sinus inter lobos obtusi, parte mediana virides, nervis usque ad basin percurrentibus; breviores: 0.2-0.35 x 0.1-0.15 cm. Corolla 1.25-1.6 cm; tubus quam lobi longior; lobi 0.2-0.4 x 0.15-0.25 cm, obovati-ovati, integri, obtusi, plicae 0.1-0.2 x 0.075-0.125 cm, lanceolatae, integrae, acutae. Stamina 5, filamenta longa, filiformia, infra medium inserta, paulo ultra medium corollae attingentia; antherae dorsifixae et versatiles, sagittatae, bilobae. Ovarium 0.4-0.6 x 0.175-0.25 cm, oblanceolatum; stylus evolutus. Capsula non visa.

Biennial-perennial (?), upto 6 cm high herb. Stem present, densely clothed with leaves, simple at base, branched in upper portion. Basal leaves 2.5-3.25 x 0.6-0.8 (-1.0) cm, lanceolate, margin \pm cartilaginous, entire, acuminate, connate at base. Cauline leaves 0.75-1.5 x 0.4-0.7 cm, lanceolate, margin hyaline, denticulate or very finely so, especially at base, acuminate-long acuminate, connate at base. Inflorescence terminal, many - flowered, congested cymes. Flowers tubular, sessile, 1.25-1.6 cm long. Calyx 0.9-1.3 cm long; tube longer than lobes, 0.7-0.9 (-1.0) cm long; lobes unequal or so, two longer, rest smaller, longer: 0.3-0.6 x 0.15-0.25 cm, broadly lanceolate-ovate, margin hyaline, entire-very finely denticulate, acuminate, sinuses between lobes obtuse, middle portion green, with veins running down to base; smaller: 0.2-0.35 x 0.1-0.15 cm. Corolla 1.25-1.6 cm long, tube longer than lobes, 0.9-1.25 cm long; lobes 0.2-0.4 x 0.15-0.25 cm, obovate-ovate, entire, obtuse; plicae 0.1-0.2 x 0.075-0.125 cm, lanceolate, entire, acute. Stamens 5, filaments long, thread like, adnate below middle, reaching little more than middle of corolla; anthers dorsifixed and versatile, sagittate, bilobed. Ovary 0.4-0.6 x 0.175-0.25 cm, oblanceolate, style present; stigma bifid, coiled, \pm papillose. Nectaries at the base of ovary. Capsule not seen.

Distribution: Endemic (Fig. 2).

Nasir & Meijer 8854 is also present in RAW. But this specimen is a mixture of *Gentianodes marginata* (G. Don) Omer, Ali & Qaiser and *G. nasirii* Omer, Ali & Qaiser. However, the annotations of the two labels also differ in several respects i.e. altitude, habitat and flower colour.

Allied to *Gentianods marginata* (Griseb.) Omer, Ali & Qaiser but differs from it in having unequal calyx lobes, biennial to perennial (?) habit, cauline leaves provided in between by smaller leaves, corolla slightly swollen in the middle, filaments inserted slightly below the middle and anthers versatile.

8. *Gentianodes intermedia* (Clarke) Omer, Ali & Qaiser, Comb. et stat. nov.

Gentiana carinata Griseb. var. *intermedia* Clarke in Hook. f., Fl. Brit. Ind. 4; 113. 1883; Stewart in Nasir, E. & Ali, S.I. (eds.), Ann. Cat. Vasc. Pl. W. Pak.; Kashmir: 554. 1972.

Type: Kashmir, *Falconer* (K).

Specimens examined: Kashmir: Above Kainmul Lidder Valley, 11-12000', *J.F. Duthie* 13136 (O); Baltistan: Sapura to Deosai, ± 13000', *E. Nasir & G.L. Webster* 6360 (RAW).

Distribution: Kashmir and Baltistan (Pakistan).

Fl. Per.: July-August.

9. *Gentianodes pedicellata* (D. Don) Omer, Ali & Qaiser, Comb. nov.

Ericala pedicellata D. Don in Lond. Edinb. Phil. Mag. J. Sci. 8: 76. 1836; *Gentiana pedicellata* (D. Don) Griseb. in Gent. 273. t. 1, 3. 1839; *G. quadrifaria* auct. non Blume: Clarke in Hook. f., Fl. Brit. Ind. 4: 111. 1883.

Type: Wall. Cat. no. 4394a; IDC. no. 7394-454(!).

Specimens examined: Azad Kashmir: Kotli Dist., near Nakial, 4-5000', April 1954, *R.R. Stewart* 27347 (RAW); Baltistan: Doesai Plains, 20.8.1966, *M.A. Siddiqui, Y. Nasir & Zaffar Ali* 4248 (RAW); Hazara: Mansehra, ± 4000', an annual dwarf plant with beautiful blue flowers, 30.5.1967, *E. Nasir, Siddiqui & Zaffar* 4425 (RAW); Sind Valley, below Kangan, amongst grass on bank above stream at bottom of valley, *E. Barnes* s.n. (K).

Distribution: Himalaya, Burma & Sri Lanka.

Fl. Per.: April-August.

10. *Gentianodes decemfida* (Buch.-Ham. ex D. Don) Omer, Ali & Qaiser, Comb. nov.

Gentiana decemfida Buch.-Ham. ex D. Don, Prod. Fl. Nep. 127. 1825. *Ericala decemfida* (Buch.-Ham ex D. Don) D. Don in Lond. Edinb. Phil. Mag. J. Sci. 8: 76. 1836.

Type: Nepal, *Buchanan-Hamilton* s.n. (BM).

Specimens examined: Hazara: Mahandri, Kaghan Valley, 1960, *D. McVean* s.n. (E); Dardar, \pm 4500', 13.4.1959, *R.R. Stewart* 28808 (RAW); Rawalpindi Distt.: Kahuta, \pm 2000', 24.3.1940, *Mohindar Nath* 19347 (RAW); Punjab: Choti Dhar, Dalhousie Rd., cir. 2500', 16.2.1917, *R.R. Stewart* 1195 (K); N.W. Himalayas: locality unknown, *G. Watt* 4229 (E).

Distribution: Himalayas (Pakistan, Kashmir-Nepal).

Fl. Per.: February-April.

11. *Gentianodes aprica* (Decne.) Omer, Ali & Qaiser, Comb. nov.

Gentiana aprica Decne. in Jacq., Voy. Ind. 4: 112, t. 118. 1844; *G. decemfida* Buch.-Ham. ex D. Don var. *aprica* (Decne.) Clarke in Hook. f., Fl. Brit. Ind. 4: 112. 1883.

Type: In locis humidis apricis Keyri-Pass, prope Hazronbag. Floral fructumque profert ineunte Aprili, *Jacquemont* (P, Iso. K).

It is not certain yet, whether the above species exists in our area or not. We have not seen any specimen from our area. Most of the specimens cited by Stewart (l.c.) belong to *G. decemfida* (Ham.) Omer, Ali & Qaiser.

Very closely allied to *G. decemfida* (Ham.) Omer, Ali & Qaiser; but differs from it in having calyx almost half the length of corolla, whereas, the calyx is more than half or \pm slightly shorter than corolla in *G. aprica* (Decne.) Omer, Ali & Qaiser.

12. *Gentianodes venusta* (G. Don) Love & Love in Bot. Notis.125(3): 258. 1972.

Ericala venusta G. Don, Syst. 4: 189. 1837. *Gentiana venusta* Wall. ex Griseb. Gent. 276. 1839.

Type: Wall. Cat. 4389, IDC. no. 7394-453(!).

Specimens examined: Kashmir: Yamhar Pass, \pm 14000', Sept. 1913, *R.R. Stewart* 12915 (NA, NY, RAW); Mt. Apharwat, 14000', *R.R. Stewart* 8845 (NA); Sonamarg, \pm 13000', 18.8.1928, *R.R. Stewart* 9897 (NY, RAW).

Distribution: Kashmir-Nepal.

Fl. Per.: August-September.

13. *Gentianodes algida* (Pallas) Love et Love l.c. 256.

var. *nubigena* (Edgew.) Omer, Ali & Qaiser, Comb. nov.

Gentiana nubigena Edgew. in Trans. Linn. Soc. 20: 85. 1846; *Gentiana algida* Pallas var. *nubigena* (Edgew.) Kusn. in Acta Horti Petrop. 15: 266. 1885.

Type: Himala, ad alt. ped. 16000-17000, prope portum Mana. *Edgeworth* (K).

Specimens examined: N.W. India: *J.L. Stewart* s.n. (E); Tibet Occidentalis, 16000 ped., *T.T.* s.n (O).

Distribution: Himalaya (Kashmir-Neal, Sikkim) and Tibet.

Fl. Per.: July-September.

Differs from var. *algida* in having corolla lobes obtuse, calyx tube being smaller; calycine lobes obtuse.

14. *Gentianodes cachemirica* (Decne.) Omer, Ali & Qaiser, Comb. nov.

Gentiana cachemirica Decne. in Jacq. Voy. Ind. Bot. 4: 111, t. 117. 1844.

Type: In rupestribus et locis lapidosis inter Gounnedeh-Seursing et Sounnemeurgue, alt. 2600 m. *Jacquemont* (P, Iso. K).

Specimens examined: Dir: Dir, 13.8.1969, *M. Alam Khan* 45 (RAW); Hazara: Musa-ka-Massalah, 13875', 22.9.1955, *M.A. Rathor* 41 (RAW); Kashmir: Kuthnar, 9-10000', 30.6.1952, *R.R. Stewart & E. Nasir* 23898 (RAW); Pahlgam, ± 8000', Sept. 1927, *Col. Houston* 12921 (NA); Aru to Nafran, Lidder valley, ± 8500', blue, Sept. 1931, *R.R. Stewart* 12919 (NA).

Distribution: Himalays (Hazara, Kashmir-Nepal).

Fl. Per.: June-September.

15. *Gentianodes kurroo* (Royle) Omer, Ali & Qaiser, Comb. nov.

Gentiana kurroo Royle, Ill. Bot. Himal. 278, t. 68, f. 2. 1835.

Type: Kuerkoollee, Mussoorree, Budraj, Simla, *Royle* (LIV).

Specimens examined: Kashmir: Near Rawalakot on way to Bagh, 18.9.1987, *T. Ali, M. Qaiser & M.A. Khan* 325 (KUH); Hazara: Kaghan, N.W.F.P., Oct. 1926, *V. Petts* s.n. (RAW); Kaghan valley, 1896, *Inayat* 19958 (CAL); Punjab: Murree, 6500', *R.R. Stewart* 12920 (RAW); Balakot, 8.11.1954, *Collector unknown* s.n. (KUH); Rawalpindi Dist.: Bunn, Karor-Murree Road, ± 6000', *Y. Nasir & Zaffar Ali* 7867 (KUH); Abbottabad, Hill tops, among rocks, common, flrs. bluish or violaceous, 4500', 3.11.1951, *S.M.H. Jafri* s.n. (KUH); Changa Gali, 800', Oct. 2., 1936, *Mohinder Nath* s.n. (RAW); Himalaya boreo occidentalis, 6-8000 ped., *T. Thomson* s.n. (O).

Distribution: Himalayas.

Fl. Per.: September-November.

16a. *Gentianodes kaufmaniana* (Reg. & Schmalh.) Omer, Ali & Qaiser Comb. nov.

a. subsp. *kaufmaniana*

Gentiana kaufmaniana Reg. & Schmalh. in Acta Horti. Petrop. 6: 331. 1879.

Syntypes: From several specimens of Turkestan, Tien-schian, Alatai belonging to *Semenow, Regel, Fetisow, Kuschakewics* and *Fedtschenko* (LE).

16b. subsp. *affghanica* (Kusn.) Omer, Ali & Qaiser, Comb. Nov.

Gentiana kaufmaniana Reg. & Schmalh., var. *affghanica* Kusn. in Acta Horti. Petrop. 13: 62. 1893; *Gentiana kaufmaniana* Reg. & Schmalh. subsp. *affghanica* (Kusn.) Schm.-Czeika in Rech. f., Fl. Iran. 41: 14. 1967.

Type: Afghanistan, Herb. *Griffith* 5817 (LE).

Distribution: Afghanistan & Pakistan (?)

Schiman-Czeika (1967) reported this taxon from S. Waziristan but we have not seen any specimen from our area.

17. *Gentianodes lowndesii* (Blatter) Omer, Ali & Qaiser, Comb. nov.

Gentiana lowndesii Blatter in J. Bomb. Nat. Hist. Soc. 35: 861. 1933.

Type: N. Waziristan: Alexandra Ridge, 7800 ft., *Capt. D. G. Lowndes* 2430 (BLAT).

Specimens examined: South Waziristan: Badder, Oct. 1978, *Syed Ayub Shah Gaillani* s.n. (KUH).

Distribution: Endemic to Waziristan in Pakistan and Afghanistan.

Fl. Per.: September-October.

18. *Gentianodes olivieri* (Griseb.) Omer, Ali & Qaiser, Comb. nov.

Gentiana olivieri Griseb., *Gent.* 278. 1839.

Type: Persia. Hab. Inter Kermanschah et Amadan, *Olivier* (GOET).

Specimens examined: Chitral: Shoghor Gol, Karimabad village, W. of Tirich Mir, c. 3200 m, 22.6.1987, *A. Ghafoor & S. Omer* 2900 (KUH); Quetta: Hazarganji, c. 13 miles from Quetta on way to Naushki, 20-30 cm, herb, flrs. blue, bluish inside towards the base, soil gravel, sandy clay, *Sultanul Abedin* 4954 (KUH); Hazarganji, 10.5.1983, *Rasool Baksh* s.n. (KUH); id., 4.5.1985, *A. Ghafoor and Rizwan Yusuf* 1254 (KUH); Ziarat, May 1962, *R.R. Stewart* s.n. (RAW).

Distribution: Central Asia to Baluchistan.

Fl. Per.: April-June.

19. *Gentianodes tianschanica* (Rupr. ex Kusn.) Omer, Ali & Qaiser, Comb. nov.

Gentiana tianschanica Rupr. ex Kusn. in *Mem. Acad. Sc. Petersb. ser. 7.* 19(4): 61. 1869.

Syntypes: Described from several specimens collected from Tschatyr-kul, Tasch robot, and Karakoin-Thal on 3, 4 & 6 August, 1867 by, *Baron V.D. Osten-Sacken* (LE).

Specimens examined: Gilgit agency: Niltar (Naltar) Valley, 9-10000', 4.8.1892, *J.F. Duthie* s.n. (O); Rama, + 10000', *E. Nasir & G.L. Webster* 6430 (RAW); Astor, Gudhai Valley, 11-12000, 22.7.1892, *J.F. Duthie* 12201 (O); Baltistan: Deosai plains, ± 14000', *M.A. Siddiqui, Y. Nasir & Zaffar Ali* 4247 (RAW); Satpura to Deosai, ± 12000', *E. Nasir & G. L. Webster* 6337 (RAW); Baltistan: Above Skardo, 10000 ft., dry mountain, flr. deep sky blue, *W. Koelz* 9639 (NA); Kashmir: Burzil, 11000 ft., *W. Koelz* 9393 (NA); Battal, Sind valley, + 10000', *R.R. Stewart* 9926 (NA); Burabai, 9500', 16.7.1953, *S.M.A. Kazmi* s.n. (KUH).

Distribution: Central Asia, Afghanistan, Pakistan and India.

Fl.Per.: July-September.

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