

## **CHESNEYA BALTISTANICA (CHESNEYINAE: CARAGANEAE: FABOIDEAE: FABACEAE) A NEW SPECIES FROM GILGIT-BALTISTAN, PAKISTAN**

**AMIR SULTAN<sup>1\*</sup>, KAMRAN ISHAQ<sup>2</sup>, SHAKEEL AHMAD JATOI<sup>3</sup> AND MUHAMMAD AYUB<sup>4</sup>**

<sup>1</sup>National Herbarium of Pakistan (Stewart Collection), Plant Genetic Resources Institute, PARC-National Agricultural Research Centre, Islamabad, Pakistan

<sup>2</sup>Department of Agricultural Extension, Zhob, Balochistan, Pakistan

<sup>3</sup>Plant Genetic Resources Program, Plant Genetic Resources Institute, PARC-National Agricultural Research Centre, Islamabad, Pakistan

<sup>4</sup>PARC- Agricultural Research Station, Skardu, Gilgit-Baltistan, Pakistan

\*Corresponding author's email: [amirsultan\\_2000@yahoo.com](mailto:amirsultan_2000@yahoo.com)

### **Abstract**

*Chesneya* is a genus in the tribe Caraganeae (Faboideae: Fabaceae) represented in Pakistan by 7 species. The genus is mainly distributed in Gilgit-Baltistan, Kashmir, Khyber Pakhtunkhwa and Balochistan. A new species of *Chesneya* from section *Chesneya*, *C. baltistanica* is described and illustrated from Baltistan, Pakistan. The new species is characterized by axillary one-flowered inflorescence with pedicel smaller than leaves, 10 mm long mauve vexillum, c. 8 mm long calyx and unequal stipules. *Chesneya baltistanica* is compared with *C. depressa* (Oliver) Pop., which has shorter calyx, corolla, fruits and longer branches and with *C. parviflora* Jaub. & Spach which has relatively larger calyx and corolla and bears flowers in peduncled compact racemes.

**Key words:** *Chesneya baltistanica*, Section *Chesneya*, Caraganeae, Baltistan, Pakistan.

### **Introduction**

Genus *Chesneya* is distributed from the Himalayan region to northwestern China and Mongolia, through central and western Asia, westward to Turkey and Armenia (Duan *et al.*, 2016). *Chesneya* species mainly occur at 37-43°N and 60-80°E, which encompasses the Pamir-Alai, Tianshan, Himalayan, and Hindukush mountains (Zhang *et al.*, 2015). *Chesneya* is type genus of subtribe Chesneyinae in the tribe Caraganeae (Papilionideae:Fabaceae) which is characterized by oblique attachment of slightly gibbous calyx to the pedicel, bilabiate calyx, upper lip composed of two fused sepals, lower lip trifid, vexillum externally pubescent, longer than the keel and the wing, dehiscent pods (Ali, 1977; Duan *et al.*, 2016). Genus *Chesneya* comprises c. 35 (Duan *et al.*, 2016) to 47 species (Anon., 2022). *Chesneya* species are adapted to xerophytic and psychrophytic habitats (Duan *et al.*, 2016) and are generally herbaceous or shrubby plants, inhabiting grasslands, deserts and montane valleys and meadows (Zhang *et al.*, 2015). Himalayas is the ancestral area of *Chesneya* and *Chesniella*, while within Central Asia, the western lowlands, can be inferred as the cradle of most dispersal (Zhang *et al.*, 2015). *Chesneya* differs from *Chesniella* in having abbreviated stem, plants appearing acaulescent, herbaceous stipules, adnate to petiole, calyx tubular opposed to obvious stem, membranous stipules, separated from petiole and campanulate calyx in the latter (Langran *et al.*, 2010). Three monophyletic sections were recognized by Duan *et al.*, (2016) in the genus viz., *Chesneya*, *Pulvinatae* and *Spinosaes*. Section *Chesneya* is characterized by non-pulvinate plants, caducous petiole and rachis, truncate or emarginate leaflet apices. Sections *Spinosaes* and *Pulvinatae* both have pulvinate plants,

persistent petiole and rachis, acute leaflet apices. Petiole and rachis are hardened and spiny, leaflet apices have short spines in section *Spinosaes*, while, petiole and rachis are blackened and curved, leaflet apices lack short spines in section *Pulvinatae*. Some *Chesneya* species have value as ornamental plants (Anon., 2022). Five *Chesneya* species were recorded in Flora of Pakistan (Ali, 1977), later two more species *C. staintonii* R. Kam. et Yakovl. from Chitral and *C. popovii* R. Kam. et Yakovl. from Kashmir were described by Kamelin & Yakovlev (1980). The genus is mainly distributed in Gilgit-Baltistan, Kashmir, Khyber Pakhtunkhwa and Balochistan. In this study, we describe a new species, *Chesneya baltistanica* sp. nov. from Skardu district, Baltistan. With the addition of this species, this genus is now represented by eight species in the country.

### **Materials and Methods**

During exploratory field expeditions to Baltistan by the first author, specimens of a *Chesneya* species were collected from Skardu district of Gilgit-Baltistan near Baghicha, at an altitude of c. 1997 m. a.s.l. Baltistan is among areas, which are yet to be explored thoroughly from a botanical standpoint (Ali, 2008). In order to accommodate these unidentified specimens a new species viz. *Chesneya baltistanica* A. Sultan et. K. Ishaq is described and illustrated here. The specimens were studied using the identification keys in the Flora of Pakistan (Ali, 1977), Flora of China (Xiangyun & Larsen, 2010) and Flora Iranica (Rechinger, 1984). The type specimens of the close relatives were examined in virtual herbaria ([www.eFloras.org](http://www.eFloras.org) and [www.gbif.org](http://www.gbif.org)). The holotype of the new species has been deposited in the National Herbarium of Pakistan, National Agricultural Research Centre, Islamabad.

## Results

*Chesneya baltistanica* A. Sultan et K. Ishaq sp. nov.  
(Figs. 1-8).

**Type:** Skardu road, Baghicha, near Indus river in sandy-gravelly soil, 35°35.461'N, 75°19.620'E, 1997 m, *Amir Sultan*, 1 October, 2016 (RAW102000).

**Diagnosis:** *Chesneya baltistanica* has larger calyx, larger mauve coloured corolla, larger leaves, fruits and smaller branches compared to *C. depressa* (Oliver) Pop. which has c. 5 mm long calyx, yellow or mauve corolla not exceeding 7-8 mm and 9-11 mm long fruit. While compared to *C. parviflora* Jaub. & Spach, *C. baltistanica* has smaller calyx and corolla (8 mm long calyx and 10 mm long vexillum opposed to c. 11-12 mm long calyx and 15-18 mm long vexillum in *C. parviflora*). Stipules in *C. baltistanica* are unequal, 2-5 mm long, opposed to c. 3 mm long stipules in *C. depressa* and c. 5-7 mm long stipules in *C. parviflora*. While *C. baltistanica* bears single axillary flowers whereas in *C. parviflora* peduncled compact racemes are present.

**Description:** Prostrate-ascending perennial, branches spreading upto c. 5 cm. Stem with an indumentum of dense white appressed hairs. Stipules unequal, smaller stipules lanceolate, acute, 2-5 x 1-2 mm, larger ones triangular, ovate, auriculate, dotted with black glands, 3-5 x 2-3 mm, densely appressed white-pubescent. Leaves imparipinnate, c. 4.5-7.5 cm, rachis c. 2-4 cm. Petiole 2-6 cm, leaflets 9-17, 6-10 x 3-5 mm, alternate to sub-opposite, oblong-obovate, base cuneate, or rounded, apex truncate or emarginate, emarginate-mucronulate, densely appressed white-pubescent on both surfaces, more

densely pubescent on under surface, gland dotted, glands black, petiolule 0.5-0.75 mm. Inflorescence axillary, one-flowered, pedicel c. 2 cm, smaller than leaves, appressed hairy, bracts and bracteoles 1-2 mm, subulate, caducous. Calyx c. 8 mm, appressed white-pubescent, calyx tube 5-6 mm, calyx teeth linear, upper lip teeth 2.5-3 mm (5 mm in fruiting), lower lip teeth 2.5-3.5 mm (4-6 mm in fruiting), teeth bearing reddish-brown glands on apices. Corolla purplish, vexillum 10 x 5.5, limb 8 mm, claw 2 mm, obovate, externally hairy, wing c. 8-10 x 2 mm, limb 3.5-4.5, claw c. 5 mm, keel c. 9.5 x 2.5 mm, limb 4.5, claw 5 mm. Fused filaments c. 9 mm, free part of filaments c. 1 mm, anther c. 0.5 mm, anthers alternating long and short. Ovary c. 8 mm, style c. 2.25 mm, stigma 0.5 mm. Fruit 4.3-4.5 x 0.6 cm, marked with reddish brown spots, appressed pilose, fruiting calyx 10 mm, fruiting pedicel 4-5.2 cm, seed pale brown-grayish, 3.5 x 2.75 mm, rugose.

**Other specimens examined:** Skardu road, Baghicha, near Indus river in sandy-gravelly soil, *Amir Sultan, Shakeel Ahmad & Haseeb ur Rehman*, 26 November, 2021.

**Distribution:** Known from type locality in Gilgit-Baltistan, Pakistan so far.

**Habitat:** *Chesneya baltistanica* grows in sandy/gravelly soil in association with *Perovskia atriplicifolia* Benth., *Astragalus bicuspidis* Fischer, *Ephedra* sp., mosses, *Rumex hastatus* D. Don, *Isodon rugosus* (Wall. ex Benth.) Codd, *Seriphidium* sp. and *Rosa webbiana* Wall. ex Royle at elevation of c. 2000 m a.s.l.

**Etymology:** The specific epithet is based on the Baltistan region where it has been collected.

### Amended key to species

1. + Flower up to 1 cm long ..... 2
  - Flower longer than 1 cm ..... 3
2. + Flower up to 8 mm, leaflets 2-4.5 × 1.5-2.5 mm, fruits c. 9-11 × 3.5-4.0 mm ..... *C. depressa*
  - Flower up to 1 cm, leaflets 6-10 × 3-5 mm, fruits 4.3-4.5 × c. 0.6 cm ..... *C. baltistanica* sp. nov.
3. + Flowers solitary ..... 4
  - Racemes more than 1-flowered ..... 6
4. + Pedicels as long as or slightly longer than leaves, stem base woody, calyx 13-16(- 19) mm, standard 25-29 (-32 mm), leaflets 5-7 × 3-5 mm ..... *C. crassipes*
  - Pedicels ca. as long as or shorter than leaves, stem base not woody ..... 5
- 5.+ Calyx 17-19 mm, standard c. 30-31 mm, leaflets 7-15 × 4-10 mm ..... *C. acaulis*
  - Calyx 23-24 mm long, corolla [standard] 30-37 mm long, leaflets c. 5-11 × 4-10 mm ..... *C. staintonii*
- 6.+ Standard 15-18 mm long, calyx 11-12 mm long [Balochistan] ..... *C. parviflora*
  - Standard exceeding 2 cm, calyx and corolla larger ..... 7
7. + Calyx (16-)17-23 mm long, corolla [standard] 25-33 mm long, leaflets (8-)10-13 × 7-11(-13) mm [Kashmir] ..... *C. popovii*
  - Calyx 15-17 mm long, standard 21-32 mm long, leaflets 4-16 × 2-13 mm [Khyber Pakhtunkhwa, Kashmir] ..... *C. cuneata*



Fig. 1a & b. *Chesneya baltistanica* habit.



Fig. 2. *Chesneya baltistanica* variation in leaves.

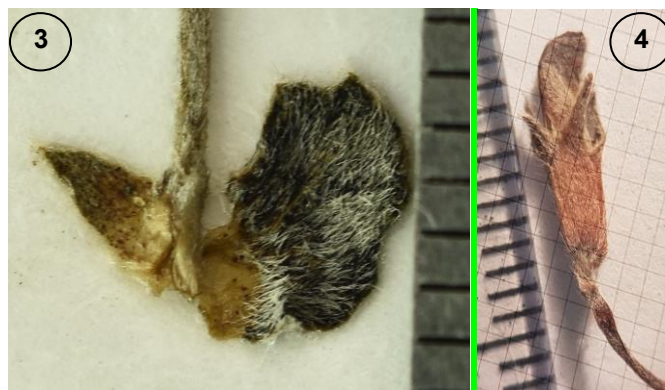


Fig. 3. *Chesneya baltistanica* stipules; Fig. 4. *Chesneya baltistanica* flower.

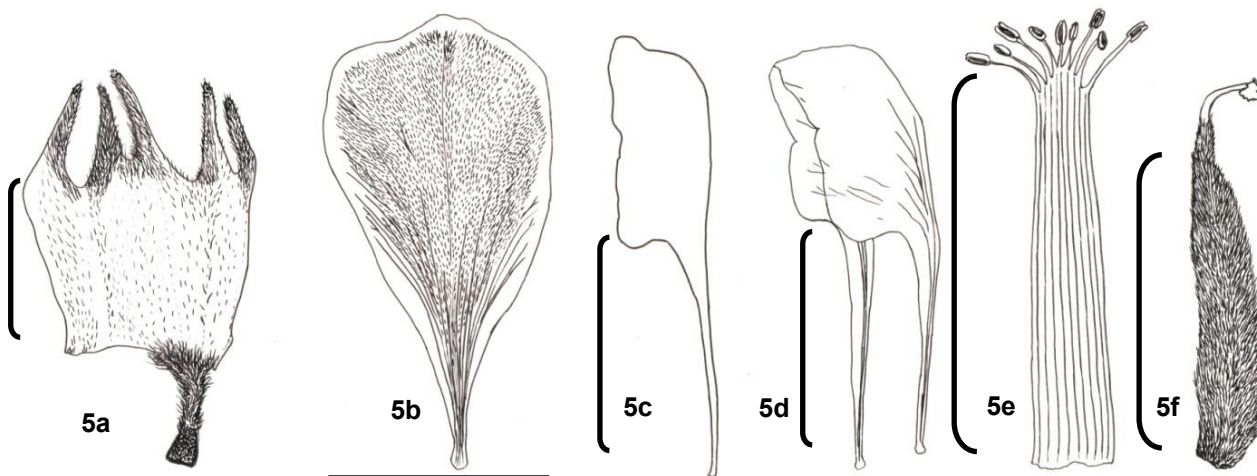


Fig. 5a. *Chesneya baltistanica* calyx (scale bar: c. 5 mm), b. vexillum (scale bar: c. 5.5 mm), c. wing petal (scale bar: c. 5 mm), d. keel (scale bar: c. 5 mm), e. anthers (scale bar: c. 9 mm), f. carpel (scale bar: c. 8 mm).



Fig. 6. *Chesneya baltistanica* fruit.



Fig. 7. *Chesneya baltistanica* seed.

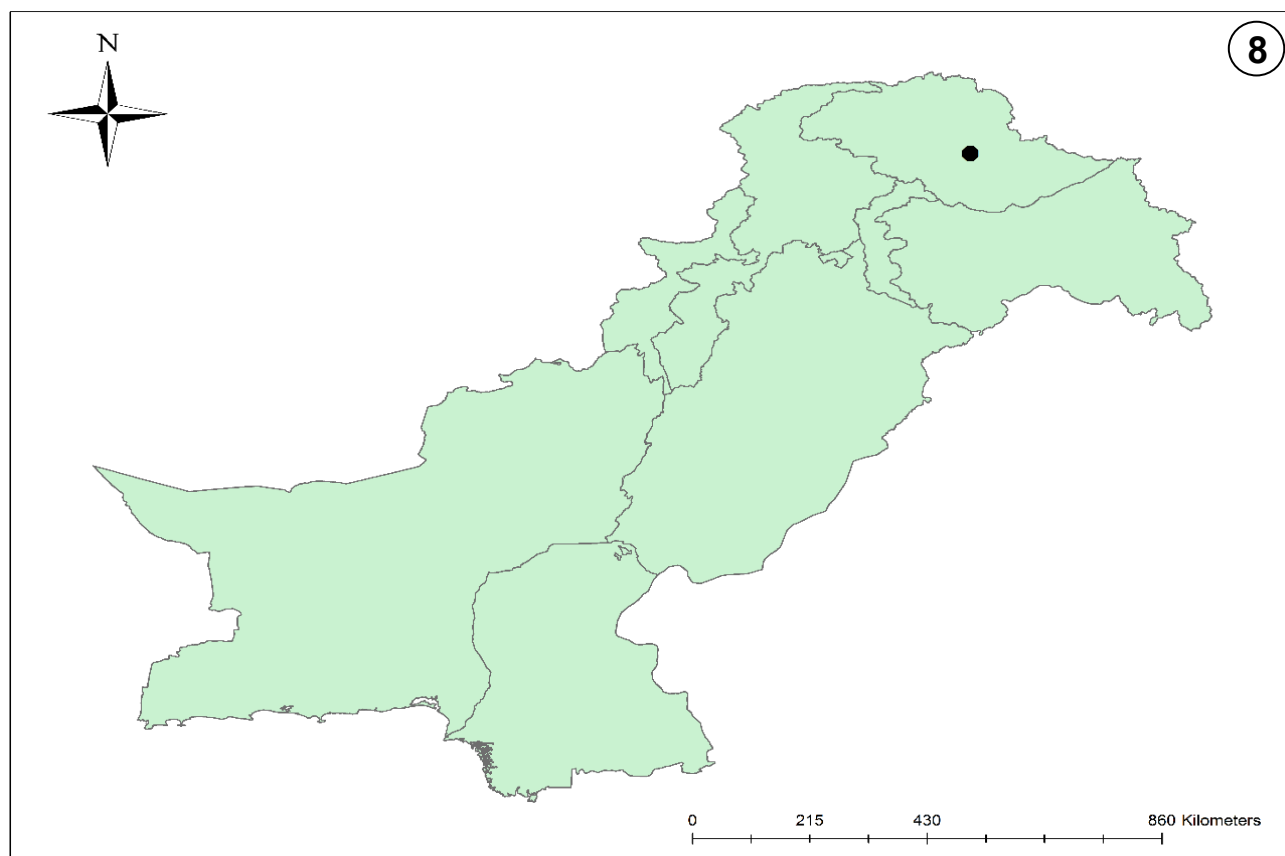


Fig. 8. Distribution of *Chesneya baltistanica*.

(Photo credits: Habit (Fig. 1b), leaf variation, stipules, fruit & seed photos by Faraz Ahmad, line drawing by Muhammad Saleem, distribution map by Sayed Afzal Shah).

### Acknowledgements

Authors are thankful to Mr. Saleem and Mr. Faraz Ahmad for illustrating the plant. Authors are thankful to Dr. Sayed Afzal Shah for help with drawing the distribution map. Authors are also indebted to Mr. Haseeb ur Rehman for assistance in the field.

### References

- Ali, S.I. 1977. Flora of West-Pakistan. Papilionaceae. No. 100. Department of Botany, University of Karachi, Pakistan, pp. 1-389.
- Ali, S.I. 2008. Significance of flora with special reference to Pakistan. *Pak. J. Bot.*, 40(3): 967-971.
- Anonymous. 2022. Legumes of the World Online. Accessed 17 January, 2022.
- Anonymous. 2022. Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew. Published on the Internet; <http://www.plantsoftheworldonline.org/> Accessed 11 January, 2022.
- Duan, L., X. Yang, P. Liu, G. Johnson, J. Wen and Z. Chang. 2016. A molecular phylogeny of Caraganeae (Leguminosae, Papilionoideae) reveals insights into new generic and infrageneric delimitations, *Phytokeys*, 70: 111-137. doi:10.3897/phytokeys.70.9641.
- Kamelin, R.V. and G.P. Yakovlev. 1980. New taxa of the genus *Chesneya* from Pakistan and India. *Bot. Zhurn. (Moscow & Leningrad)*, 65: 870-872.
- Langran, X., Z. Xiangyun, B. Bojian, Z. Mingli, S. Hang, D. Podlech, S.L. Welsh, H. Ohashi, K. Larsen and A.R. Brach. 2010. Galegeae in Flora of China, Fabaceae, 10: 322-511.
- Rechinger, K.H. 1984. *Chesneya* in Flora Iranica, Papilionaceae II, 157: 88-100.
- Xiangyun, Z. and K. Larsen. 2010. *Chesneya* in Flora of China, Fabaceae, 10: 500-502.
- Zhang, M.L., Z.B. Wen, X.L. Hao, V.V. Byalt, A.P. Sukhorukov and S.C. Sanderson. 2015. Taxonomy, phylogenetics and biogeography of *Chesneya* (Fabaceae), evidenced from data of three sequences, ITS, trnS-trnG, and rbcL. *Biochem. System. & Ecol.*, 63: 80-89.

(Received for publication 25 December 2021)