

**LECTOTYPIFICATION AND STATUS OF
PEDICULARIS OEDERI VAHL VAR.
HETEROGLOSSA PRAIN (OROBANCHACEAE)**

P. K. PUSALKAR¹ & D. K. SINGH²

Pedicularis oederi Vahl var. *heteroglossa* Prain (Orobanchaceae) is raised to species rank and lectotyped, and an emended description provided. This taxon has pink or purple-pink corollas rather than the yellow colour otherwise typical for the *Pedicularis oederi* group of taxa.

Keywords. Himalaya, India, lectotypification, Nepal, new status, Orobanchaceae, *Pedicularis oederi* var. *heteroglossa*, Prain.

INTRODUCTION

Prain (1889, 1890) described *Pedicularis oederi* var. *heteroglossa* (Orobanchaceae) from specimens collected in the Himalayan mountains of Kumaon (India) and Nepal. He distinguished it from the typical variety by floral characters, namely galea as long as corolla tube, median lobe of lower lip of corolla prominent, calyx lobes linear-lanceolate and expanded terminally with elliptic lamina and curved margins. Later Pennell (1943), after studying more material of the taxon from Garhwal and Kumaon Himalaya, Uttarakhand (India), in the herbarium of the Forest Research Institute, Dehradun (DD), raised it to subspecific rank and provided some additional distinguishing characters. Later taxonomists have placed it at either varietal or subspecific rank (Hara *et al.*, 1982; Yamazaki, 1988; Yang *et al.*, 1998; Khanna *et al.*, 1999; Uniyal *et al.*, 2007). The characters used by Pennell to distinguish *Pedicularis oederi* subsp. *heteroglossa* from the typical subspecies are as follows (Pennell, 1943: 140):

- ‘1a. Calyx-lobes attenuate, entire or distally dentate; galea 7–9 mm long, at apex rounded, so that the most distal point is near the posterior bend; capsule 15 mm long; leaf-blades 2–6 cm long; pinnae plane, evidently dentate with rounded lobules _____ *P. oederi* subsp. *typica*
- 1b. Calyx-lobes with spatulate, dentate-lobulate tips; galea 9–11 mm long, at apex with the most distal point frequently toward anterior side; capsule 13 mm long;

¹ Botanical Survey of India, Northern Circle, 192 Kaulagarh Road, Dehradun 248 195, India. E-mail: lecyth@yahoo.com

² Botanical Survey of India, CGO Complex, 3rd MSO Building, Block F (5th floor), Salt Lake Sector I, Kolkata 700 064, India. E-mail: singh_drkd@rediffmail.com

leaf-blades 3–9 cm long, the pinnae with the dentate-lobulate margin so incurved as to appear superficially triangular-acute _____
 _____ *P. oederi* subsp. *heteroglossa*?

TYPIFICATION

Pennell (1943), while discussing the typification of *Pedicularis oederi* subsp. *heteroglossa*, mentioned that although Prain (1890) selected *Duthie* 232 from Damdar Valley, Tehri Garhwal for illustration, that specimen was not included in the protologue (Prain, 1889). Of the specimens studied by Prain (1889, 1890), he himself made it clear in both works that Dr Scully's Nepal specimen differed considerably from the Kumaon (typical) specimens and could form a distinct variety. As for the four Kumaon collections, the specimens of Royle and Wallich were without precise localities, so Pennell shortlisted the choice of lectotype to Collett's collection at Pindar, Kumaon, 14,000 ft and Duthie's collection at Bidang in Dhauli Valley, Kumaon, 14–15,000 ft. As none of the specimens could be located by Pennell in DD, he thought the specimens must be in the Calcutta herbarium (CAL), where Prain worked, and hence left the choice for researchers who could examine that material. During the present study none of this material could be located in CAL. However, Duthie's specimen collected at Bidang in Dhauli Valley has been found at DD. Even though Prain (1890) highlighted Wallich's collection from Kumaon, we find it preferable to choose a specimen with precise locality information, which could easily be recollected from the type locality. In view of this *Duthie* 3228 (DD) is here selected as the lectotype.

STATUS

Based on a study of a large number of fresh and dried herbarium specimens, including the lectotype and other material studied by Prain, it was observed that *Pedicularis oederi* var. *oederi* and *Pedicularis oederi* var. *heteroglossa* differ in many important morphological characters (see Table 1). Some of the distinguishing characters listed by Prain (1889, 1890) and Pennell (1943) were found not to be exclusive, and are therefore not included. Many of the characters in Table 1 were not noted by Prain (1890) and the flower colour previously given is erroneous (see note below). Therefore, an emended description of *Pedicularis oederi* var. *heteroglossa* is provided here. At the same time we believe that the distinguishing characters of these two taxa are enough to raise the variety to species rank, as suggested but not implemented by Prain (1890).

Pedicularis heteroglossa (Prain) Pusalkar & D.K.Singh, **comb. et stat. nov.** – *Pedicularis oederi* Vahl var. *heteroglossa* Prain, J. Asiat. Soc. Bengal 58: 276 (1889); Prain, Ann. Roy. Bot. Gard. Calcutta 3: 182, pl. 34B (1890). – *Pedicularis oederi*

TABLE 1. Comparison of diagnostic characters of *Pedicularis oederi* and *P. heteroglossa*

<i>Pedicularis oederi</i>	<i>Pedicularis heteroglossa</i>
Leaf pinnules oblong or oblong-rounded, margins dentate, flat or plane	Leaf pinnules apparently triangular-acute due to incurved, dentate-lobulate margins
Bracteoles ciliate	Bracteoles glabrescent or with sparsely ciliate margins
Calyx lobes lanceolate, acute, margins entire or dentate, flat	Calyx lobes spoon-shaped, apex expanded, dentate with curved margins
Calyx tube moderately to densely pubescent	Calyx tube glabrescent to sparsely ciliate
Densely ciliate nature of inflorescence conferred by cilia on calyx and bracteoles	Sparsely ciliate nature of inflorescence due to ciliate margin of calyx lobes
Corolla yellow	Corolla pink or purple-pink
Corolla tube yellow	Corolla tube white or pinkish with white at throat
Galea brown, yellow with brown tip or yellow with purple spots	Galea deep purple
Galea shorter than or equal to the width of lower lip	Galea longer (usually 2–3 times longer) than the width of lower lip
Galea shorter than corolla tube	Galea as long as corolla tube
Median lobe of lower lip of corolla sessile or with stalk-like base much shorter than median lobe lamina	Median lobe of lower lip of corolla with stalk-like base as long as or longer than median lobe lamina

Vahl subsp. *heteroglossa* (Prain) Pennell, Scroph. W. Himal. 140 (1943). – Type: Bidang in Dhauli Valley, Kumaon, 14–15,000 ft, 4 ix 1884, *Duthie* 3228 (lecto DD!, designated here). **Fig. 1.**

Perennial herb, 3–18 cm high; rootstock with many fusiform branches fused apically; stems erect, solitary or many from rootstock; base covered with purplish scales or sometimes with remains of petiole bases. *Leaves* basal and cauline; basal leaves rosulate, spreading, 2–13 cm long, petiolate; petiole 1–5 cm long, glabrous or sparsely ciliate; lamina narrowly elliptic in outline, 1–10 × 0.3–1.2 cm, pinnatisect; pinnae apparently triangular due to curved margins, opposite to alternate, up to 7 mm long, up to 3 mm broad, toothed, crenate or lobed, downcurved, surface glabrous above, pustulate, glabrous to ciliate beneath; rachis channelled/grooved above, narrowly winged beneath; cauline leaves few, alternate, similar, smaller upwards. *Flowers* pink or purple-pink with deep purple galea and white or pinkish corolla tube with white throat, 18–25 mm long, in moderately dense racemes with lower flowers distantly arranged; lower bracteoles like reduced upper leaves; upper bracteoles smaller, somewhat spoon-shaped, with linear-lanceolate stalk and terminal expanded oblong lamina, often with lobed and curved margin, bracteoles smaller upwards, glabrous or sparsely ciliate along margins; pedicels 2–5 mm long, glabrous or sparsely ciliate. *Calyx* tubular, linear-cylindric, 9–15 mm long; tube 7–10 mm long, glabrous or rarely with sparse cilia; lobes unequal to subequal, 2–5 mm long,

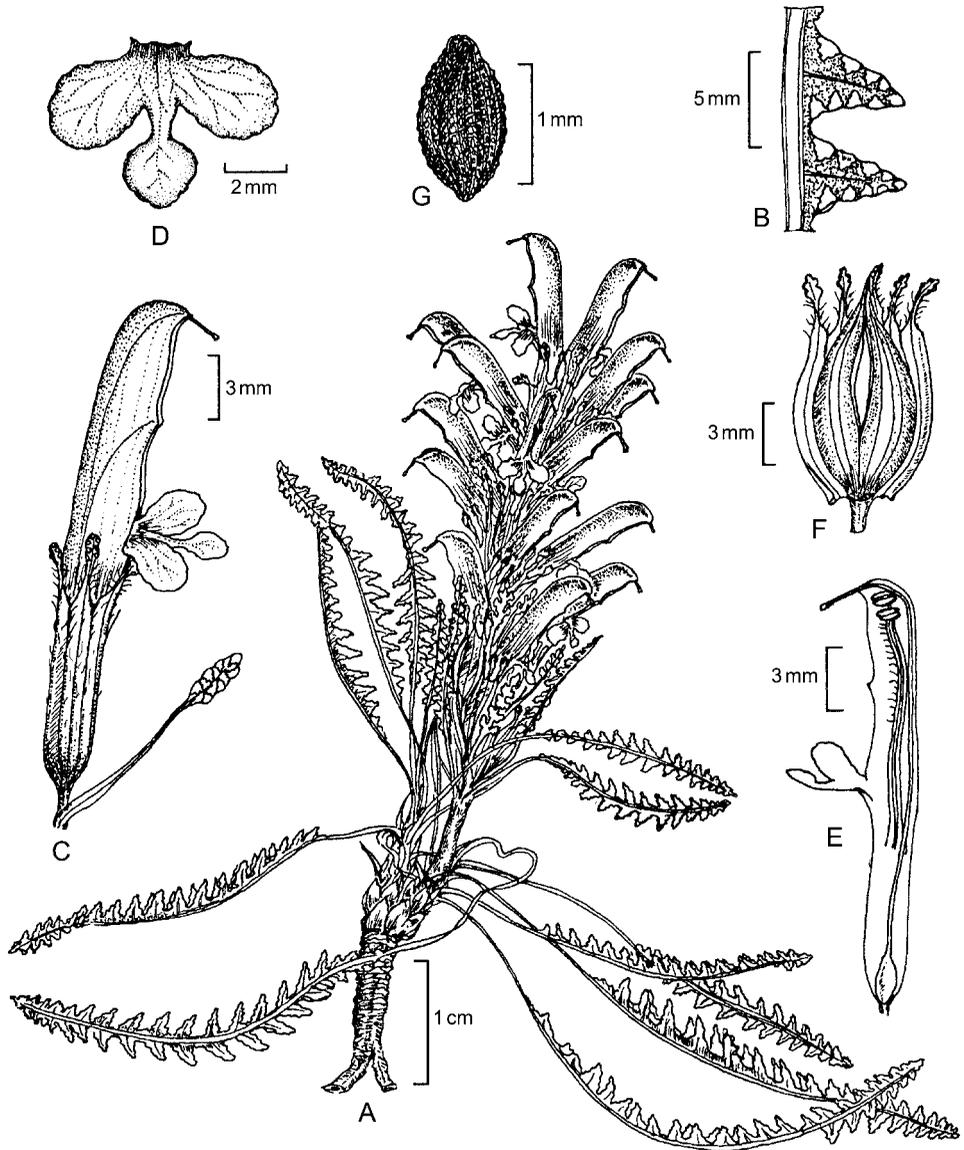


FIG. 1. *Pedicularis heteroglossa* (Prain) Pusalkar & D.K.Singh. A, habit; B, lower leaf surface showing recurved lobules; C, flower; D, lower petal lip; E, flower (vertical section) showing stamens and carpel; F, capsule with calyx cut open; G, seed.

somewhat spoon-shaped, 1.5–3.5 mm long, margins ciliate with linear-lanceolate base terminating into expanded, oblong, 0.5–1.2 mm long lamina with toothed, curved margins, sometimes one of the calyx lobes (usually the shortest one) simple, lanceolate, without expanded terminal lamina. *Corolla* 18–29 mm long; tube 7–14 mm long, equally broad throughout or somewhat broadened at throat, glabrous,

equalling or slightly exceeding the calyx; galea (compressed upper lip) 8–14 mm long, 2–3 mm broad, glabrous, apex acute or subacute, sometimes somewhat mucronate, longer (usually 2–3 times) than the width of the lower lip; in a straight line with the tube or not, somewhat obliquely curved forward, nearly as long as tube; lower lip 3-lobed, 4–5 × 4–6.2 mm; median lobe orbicular, oblong-elliptic or obovate, 2–4 × 2.5–4 mm, apex acute to rounded, margins entire or undulate, prominent with stalk-like base as long as or longer than lamina; lateral lobes suborbicular to obovate, 2–3 × 2.5–4 mm with rounded or undulate margins, larger than mid-lobe. *Filaments* inserted at the middle or slightly above the middle of corolla tube, anterior pair ciliate, posterior glabrous; anthers (in galea hood) horizontally placed, yellow, oblong, 1.2–2 mm long. *Ovary* elliptic, style slender, glabrous, exerted from galea tip; stigma punctate. *Capsule* ovate or ovate-lanceolate, 9–18 mm long, acuminate or apiculate at top, slightly exceeding the calyx, glabrous; seeds many, brown or black, elliptic, 1.5–2.2 mm long, reticulate.

Distribution. India (Uttarakhand: Garhwal and Kumaon Himalaya), Nepal.

Habitat and ecology. Locally common in moist places along streams, grassy slopes and alpine meadows at 3000–4573 m altitude. Flowering and fruiting May–September.

Additional specimens examined. INDIA. **Uttarakhand:** Garhwal: Uttarkashi, Har ki Dun, 12,000 ft, 13 vi 1891, *C.G. Rogers* s.n. (DD×2); Har ki Dun, 14,000 ft, vi 1893, *J.S. Gamble* s.n. (DD); Tehri Garhwal, Damdar Valley, 13–14,000 ft, 3 vii 1883, *Duthie* 232 (DD); Tehri Garhwal, Dudu Gad under Srikanta, 15–16,000 ft, 9 viii 1883, *Duthie* 563 (DD); Jamna-Bhagirathi watershed, 13–14,000 ft, 28 vi 1949, *A.C. Joshi* s.n. (DD); Har ki Dun, 12,000 ft, 1 vii 1955, *R.B. Mathur* s.n. (CAL); Uttarkashi Forest Division, 12,000 ft, 30 v 1956, *K.C. Sahni* 24910, acc. no. 140056 (DD); Jamuna Forest Division, Digdara, 12,500 ft, 5 viii 1960, *K.C. Sahni* 26926 (DD); Uttarkashi, Barasu Pass, 20 viii 1996, *B. Balodi* 92194 (BSD); Uttarkashi, Deokyar, May–June 1997, *B. Balodi* 86526 (BSD); Uttarkashi, on way to Saptarishi Kund, Kalindi Base, 4200 m, 10 viii 2007, *Pusalkar* 110113 (BSD). Kumaon: Shaba Udiyar, Ralam Valley, 16 viii 1900, *Inayat* 24791 (DD); Palang Garh, Byans, 21 vii 1886, *Duthie* 5838A (DD); Almora, Laptal, Head of Ganges, 14,750 ft, 16 vii 1924, *H.G. Champion* 68 (DD); Ralam Valley, 13,000 ft, 24 viii 1884, *Duthie* 3225, p.p. (DD); East Almora, Primula Valley, 10–14,000 ft, *A. Charlton Thomas* 20767 (DD); East Almora, Balate glacier, 12,500 ft, *A. Charlton Thomas* 20928 (DD).

NEPAL. Opposite Budhi Village, 10–11,000 ft, 18 vii 1886, *Duthie* 5838 (DD).

Prain's (1890) statement that the flowers in *Pedicularis oederi* var. *heteroglossa* are uniformly yellow was undoubtedly based on his assumption that the illustration of *P. versicolor* in Royle (1839), with yellow flowers, was drawn from a Kumaon collection, named *P. versicolor* by Royle, but which Prain referred to *Pedicularis oederi* var. *heteroglossa*. Pennell (1943) correctly stated that no note of flower colour accompanied any of the collections of *Pedicularis oederi* var. *heteroglossa* seen by him and relied on Prain's observation regarding the flower colour. During a recent study in Garhwal and Kumaon Himalaya, the first author collected specimens referable to what we shall now call *Pedicularis heteroglossa*, but with pink or purple-

pink flowers with a deep purple galea and a pinkish or white tube. Herbarium material of *Pedicularis heteroglossa* in BSD, CAL and DD (*Index Herbariorum*: <http://sweetgum.nybg.org/ih/>) also had label data referring to purple-pink flowers. All collections from Garhwal and Kumaon referable to *Pedicularis heteroglossa* have pink or purple-pink flowers and none have yellow flowers. The pink or purple-pink flowers in *Pedicularis heteroglossa* usually become brown with the deep purple galea turning purplish-black or maroon-tinged black after drying. They are never yellow. The flowers of *Pedicularis oederi* var. *oederi*, however, remain more or less yellow even after drying. The herbarium specimens studied by Prain, including the lectotype, have flowers which are brownish with a purplish-black galea. This would suggest that the fresh flowers in these specimens must have been pink or purple-pink and not yellow. It is thus clear that Prain's statement that the flowers in his *Pedicularis oederi* var. *heteroglossa* were uniformly yellow was not correct. Other authors such as Li (1949), Yamazaki (1988) and Yang *et al.* (1998), attributing yellow flowers to this taxon, have clearly misapplied the name or relied on previous descriptions.

The clarification of the flower colour in *Pedicularis heteroglossa* is all the more significant in view of the fact that this is only the second taxon in the *P. oederi* complex with non-yellow flowers. Yang *et al.* (1998), in the *Flora of China*, mention a red-flowered taxon within the *Pedicularis oederi* complex, which in the original Chinese version of the Flora (Tsoong, 1963) was called *P. oederi* var. *oederi* f. *rubra* (Maxim.) P.C.Tsoong, based upon *P. versicolor* Wahlenb. var. *rubra* Maxim. (Maximowicz, 1888). It differs from the Kumaon plants (*Pedicularis heteroglossa*) in having red flowers and entire (not dentate) calyx lobes (Li, 1949). This Sino-Russian taxon should be the focus of further attention, as suggested by Vvedenskii (1955), and might deserve species rank, as suggested by Li (1949), although it does not appear to have been raised so far.

Under *Pedicularis oederi* var. *heteroglossa* Prain cited *P. versicolor* Royle (non Wahlenb.) as a synonym. Royle's illustration of *Pedicularis versicolor* was based upon a specimen collected in Pir Panjal, Kashmir (Royle, 1839). However, Prain suggested that Royle's illustration could have been based upon a specimen collected in Kumaon and not Pir Panjal. The reason behind Prain's suggestion was the shorter lower lip of the corolla in Royle's illustration, which is too small even for *Pedicularis oederi* var. *heteroglossa*, but which Prain still considered could be conspecific with his new variety. From the flower colour and the oblong, flat leaf lobes Royle's illustration is clearly not of *Pedicularis oederi* var. *heteroglossa* but of the typical variety. The unusual smaller lower petal lip, however, is surprising and must have been an unintended error. It is smaller than the size reported for both *Pedicularis oederi* var. *oederi* and *P. var. heteroglossa*. Thus it is clear that *Pedicularis versicolor sensu* Royle is not conspecific with *Pedicularis heteroglossa* and was correctly excluded from synonymy by Pennell (1943).

Based on recent molecular evidence (Olmstead *et al.*, 2001; Bennett & Mathews, 2006) *Pedicularis* and the other 'hemiparasitic scrophs', which were previously

included in the family Scrophulariaceae, are now to be placed in the family Orobanchaceae.

ACKNOWLEDGEMENTS

We are grateful to the Director, Botanical Survey of India for providing facilities, the Chief Wildlife Warden, Uttarakhand State, India for permitting floristic explorations in Upper Yamuna Valley, Uttarkashi District, and the authority of the herbarium of the Forest Research Institute, Dehradun (ICFRE) for permitting the study of the specimens housed in DD. We are also grateful to the anonymous reviewer for critical comments, important suggestions and significant input. The first author also thanks the Additional Director, Northern Circle, BSI, Dehradun for encouragement and facilities.

REFERENCES

- BENNETT, J. R. & MATHEWS, S. (2006). Phylogeny of the parasitic plant family Orobanchaceae inferred from phytochrome A. *Amer. J. Bot.* 93: 1039–1051.
- HARA, H., CHATER, A. O. & WILLIAMS, L. H. J. (1982). *An Enumeration of the Flowering Plants of Nepal 2*: 124. London: British Museum (Natural History).
- KHANNA, K. K., MUDGAL, V., UNIYAL, B. P. & SHARMA, J. R. (1999). *Dicotyledonous Plants of Uttar Pradesh – A checklist*, p. 275. Dehradun: Bishen Singh Mahendra Pal Singh.
- LI, H. L. (1949). A revision of the genus *Pedicularis* in China. Part II. *Proc. Acad. Nat. Sci. Philadelphia* 101: 1–214 and pl. 1–16.
- MAXIMOWICZ, C. J. (1888). Diagnoses des plantes nouvelles asiatiques. VII. *Bull. Acad. Imp. Sci. Saint-Petersbourg* 32: cols. 477–629. [*Pedicularis* L., Synopsis generis nova, cols. 516–620.]
- OLMSTEAD, R. G., DEPAMPHILIS, C. W., WOLFE, A. D., YOUNG, N. D., ELISONS, W. J. & REEVES, P. A. (2001). Disintegration of the *Scrophulariaceae*. *Amer. J. Bot.* 88: 348–361.
- PENNELL, F. W. (1943). *Scrophulariaceae* of the Western Himalayas. *Monogr. Acad. Nat. Sci. Philadelphia* 5: 113–157. Philadelphia: Academy of Natural Sciences.
- PRAIN, D. (1889). Noviciae Indiciae. I. Some additional species of *Pedicularis*. *J. Asiat. Soc. Bengal* 58: 255–258.
- PRAIN, D. (1890). Species of *Pedicularis* of the Indian Empire and its frontiers. *Ann. Roy. Bot. Gard. Calcutta* 3: 1–196, t. 1–37. Calcutta: Bengal Secretariat Press. [Reprinted (1982) by Bishen Singh Mahendra Pal Singh, Dehradun.]
- ROYLE, J. F. (1839). *Illustrations of the Botany and other branches of the Natural History of the Himalayan mountains and of the flora of Cashmere*, Vol. I: p. 291, Vol. II: t. 72, fig. 2. London.
- TSOONG, P. C. (1963). *Flora Reipublicae Popularis Sinicae. Tomus LXVIII. Angiospermae Dicotyledonae. Scrophulariaceae (Pars II)*. Beijing. [*Pedicularis*, pp. 1–378.]
- UNIYAL, B. P., SHARMA, J. R., CHOUDHARY, U. & SINGH, D. K. (2007). *Flowering Plants of Uttarakhand [A Checklist]*, p. 188. Dehradun: Bishen Singh Mahendra Pal Singh.
- VVEDENSKII, A. I. (1955). *Pedicularis*. In: SHISHKIN, B. K. & BOBROV, E. G. (eds) *Flora of the USSR* 22: 763–885. [English translation (1994): Bishen Singh Mahendra Pal Singh, Dehradun, India and Koeltz Scientific Books, Germany.]

- YAMAZAKI, T. (1988). A revision of the genus *Pedicularis* in Nepal. In: OHBA, H. & MALLA, S. B. (eds) *The Himalayan Plants* 1: 91–161. Bulletin No. 31. Tokyo: The University Museum, University of Tokyo.
- YANG, H. B., HOLMGREN, N. H. & MILL, R. R. (1998). *Pedicularis*. In: WU, Z.-Y. & RAVEN, P. H. (eds) *Flora of China* 18: 97–209. Beijing: Science Press and St Louis: Missouri Botanical Garden.

Received 13 January 2009; accepted for publication 12 August 2009