

***Pedicularis gracilis* Wall. ex Benth. (Scrophulariaceae) Complex in the Himalayas – A Taxonomic Reinvestigation**

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ABSTRACT: The paper highlights the complex nature of *Pedicularis gracilis* Wall. ex Benth. in the Himalayas and enumerates two subspecies and four varieties of this species. Morphological and distributional data have been appended to show that the subspecies – *gracilis* and *brunoniana* (Wall. ex Pennell) Husain & Garg and varieties – *gracilis* and *stricta* (Wall.) Husain & Garg (under subsp. *gracilis*) and *brunoniana* and *macrocarpa* (Prain) Husain & Garg (under subsp. *brunoniana*) are distinct.

KEY WORDS: *Pedicularis gracilis*, Subspecies, Varieties.

INTRODUCTION

Prain (1890) had placed *Pedicularis gracilis* under Division Longirostres, section Orthorrhynchae and subsection Euorthorrhynchae. He split the species *P. gracilis* into three varieties – var. *gracilis*, var. *macrocarpa* and var. *khasiana* and the variety *gracilis* into three forms – f. *prostrata*, f. *verae* and f. *strictae*. Pennell (1943) while revising the Scrophulariaceae of Western Himalayas created ambiguity as he separated the species *P. brunoniana* from *P. gracilis* and further divided *P. brunoniana* into two subspecies – subsp. *brunoniana* and subsp. *ctenodonta*. *Pedicularis gracilis* var. *khasiana* Hook. f. was suggested by Pennell (1943) to be a separate species confined to the Khasia hills of Meghalaya in N. E. Himalayas. *Pedicularis gracilis* var. *gracilis* f. *prostrata* Prain and *P. gracilis* var. *macrocarpa* Prain were considered synonyms of *P. brunoniana* by Pennell (1943) and *P. gracilis* var. *gracilis* f. *stricta* Prain was placed under *P. gracilis* var. *gracilis*. The species *Pedicularis khasiana* as considered by Pennell (1943) is supported by our studies as a distinct species having a confined geographical distribution to Khasia hills showing distinct morphological characters.

The species *Pedicularis gracilis* however, elicits a vast quantum of morpho-variations which qualifies the species as one of the most diverse and complex taxa of the genus *Pedicularis*. We have critically examined the specimens of all the variants of *P. gracilis* from BM, CAL, BSD, LWG and CDRI and thereafter, solved the taxonomic confusion prevailing in this complex group. The variations exhibited within the morphotypes of this species are not only limited to the vegetative structures alone, but are most pronounced in the floral structures, particularly in the galea type and are not of random occurrence but are also associated with calyx and bract structure in a manner portraying an evolutionary lineage within the complex: the long beaked, outcurved galea type is found to be associated with long, straight, dentate calyx lobes and long bracts whereas the short-beaked, incurved galea is associated with short,

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adentate, decurved calyx and a short, broad and spreading bract. The intermediate types are also well represented within the one and same species (Fig. 1a-l). These Himalayan taxa are described as follows.

Pedicularis gracilis Wall., Cat. 413. 1829 (*nom. nud.*); Benth., Scroph. Ind. 52. 1835; Hook. f., Fl. Brit. Ind. 4: 307. 1884; Prain in Ann. Royal Bot. Gard. Calcutta 3: 137 – 140. t. 20, D. 1890; Collett, Fl. Siml. 362. 1902; Bamber, Pl. Punj. 386. 1916; Pennell in Acad. Nat. Sci. Philadelphia, Monogr. 5: 131. 1943; Yamazaki in Ohashi, Fl. East. Himal. (third report) 99. 1975; Nair, Fl. Bash. Himal. 205. 1977; Chowdhery & Wadhwa, Fl. Himachal Pradesh 2: 525. 1984; Polunin & Stainton, Fl. Himalaya 303. 1984; Blatter, Beaut. Flowers Kash. 2: 99. 1984; Dhaliwal & Sharma, Fl. Kullu Dist. 483. 1999.

P. gracilis Wall. ex Benth. var. *gracilis* f. *verae* Prain in Ann. Royal Bot. Gard. Calcutta 3: 137. 1890.

Type: Nepalia, Gossain Than, 1821, *Wallich* 413 (holotype: K-not seen; isotype: CAL-seen).

Common name: Slender Lousewort.

Erect, tall, slender, branched herbs, 15-80 cm tall; stem slender, much branched, generally hollow, cylindrical, lightly pubescent below forming two rows of dense white hairs above, branched near the root in whorls, opposite above; internodes 1.8-5 cm. Leaves 1-5 x 0.5-2 cm, opposite or whorled, linear, lanceolate or ovate, glabrous or lightly and sparsely pubescent, lower leaves petiolate, upper sessile or sub-sessile, pinnatisect; pinnae 3-9 pairs; lobes toothed or deeply cut, teeth sharp or blunt; petiole 1-3 cm long. Inflorescence of lax, fasciculate clusters or axillary. Flowers pedicellate, bracteolate, pedicels 1-2 mm long; bracts 6-11 x 4-5 mm, broadly ovate, petiole thin to narrowly triangular and winged, pinnatifid or broadly lobed with dentate margins, foliaceous. Corolla purple, throat of labium white; tube often confined to the calyx but generally up to 1.5 cm long; galea sickle-shaped, swollen in the middle, sometimes incurved but mostly straight to out-curved, trumpet-shaped, sharply bent to almost 90 degrees or even more from the region of anther pouch, beak long with tip slightly expanded; labium 8-10 mm long, 3-lobed, median lobe longer than the lateral. Calyx 5-7 mm long, margin ciliated, 5-lobed, strongly 5-nerved; nerves generally branched with forking to parallel lateral veins; lobes variable, long or short with narrow or wide base, margin straight with long cilia or decurved to expose cilia of the inner surface, tips broadly ovate or acute, a-dentate or dentate with many, sharp, deep and pointed teeth. Stamens inserted in the middle of the tube or slightly higher up; anthers upto 2 mm long; filaments up to 1.5 cm long, glabrous. Stigma globose, protruding out of the galea; style up to 2 cm long, slender, glabrous. Ovary 3-3.5 x 2 mm.

Key to infraspecific taxa of *P. gracilis*

1. Calyx lobes a-dentate, short, margin outcurved or strongly decurved, tips acute, base of lobes wider than long; galea with short straight or incurved beak; bracts short and broad, pinnatifid 1. subsp. *gracilis*
 2. Galea small, beak incurved; calyx lobes short, broadly stretching, margin strongly decurved 1a. var. *gracilis*
 2. Galea long, beak straightened; calyx lobes longer, margin slightly outcurved 1b. var. *stricta*
1. Calyx lobes dentate, long, margin straight or slightly outcurved, tips sharp pointed, base of lobes narrower than wide or may be slightly broad, galea with long outcurved or straightened beak; bracts long and narrow, pinnatisect 2. subsp. *brunoniana*
 3. Galea outcurved; calyx lobes long, base narrow, margin hairy 2a. var. *brunoniana*
 3. Galea straightened; calyx lobes short, base broad, margin without hairs 2b. var. *macrocarpa*

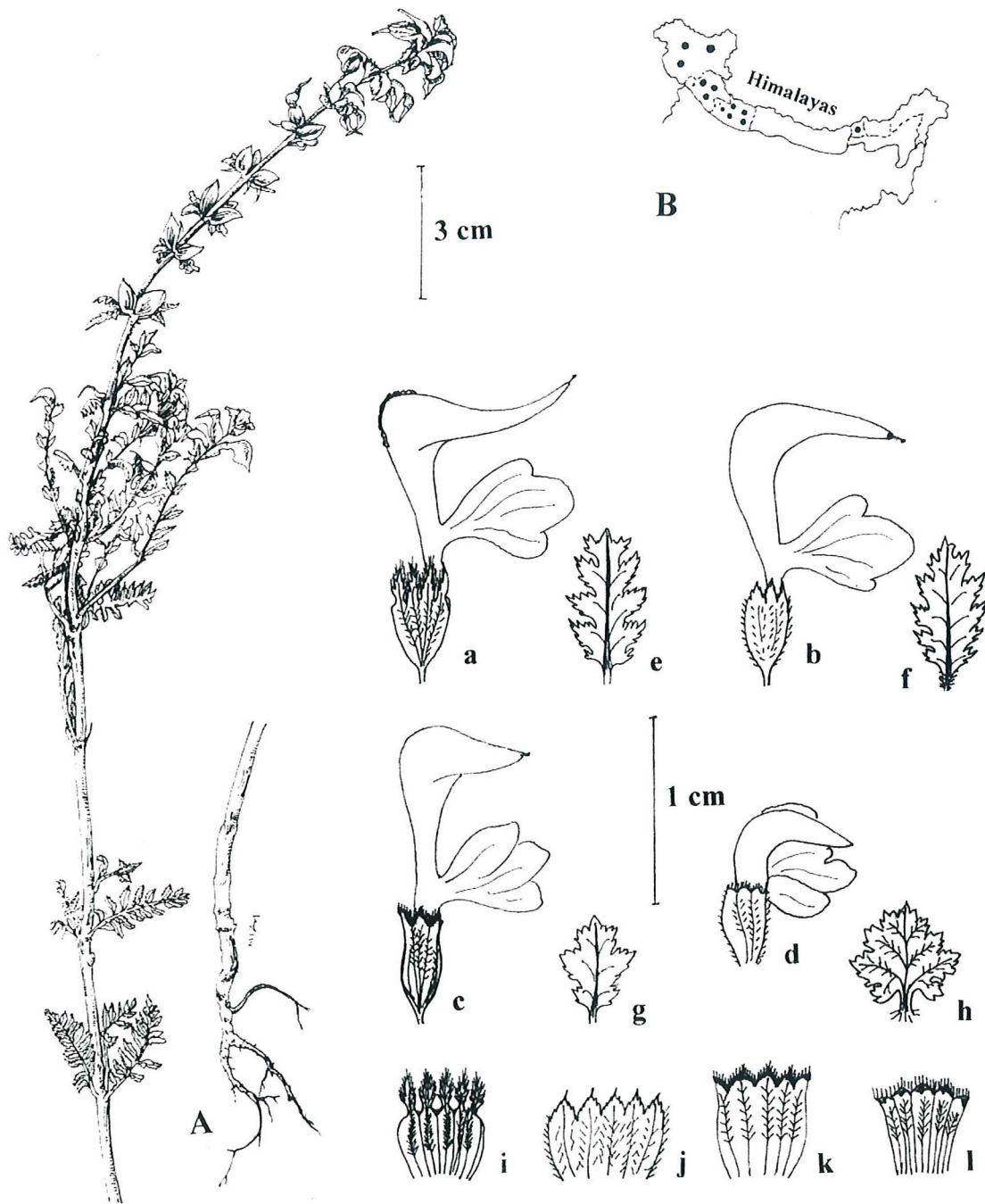


Fig. 1. Morphological variation and distribution of *Pedicularis gracilis* complex. A. Habit of *Pedicularis gracilis* Wall. ex Benth. subsp. *gracilis* var. *gracilis* (Tariq Husain 222134, LWG). B. Distribution in the Himalayan belt. a-l, Morphological variation in flower of *Pedicularis gracilis* complex. a, e, i. subsp. *brunoniana* var. *brunoniana* (Wallich 422, BM) a. flower showing long outcurved galea. e. bract. i. calyx with long dentate lobes. b, f, j. subsp. *brunoniana* var. *macrocarpa* (B. P. Uniyal 77404, BSD). b. flower with long straight galea. f. bract. j. calyx with short dentate lobes. c, g, k. subsp. *gracilis* var. *stricta* (R. H. Beddome 5752, BM). c. flower with short, straight galea. g. short bract. k. calyx with adentate conspicuous lobes. d, h, l. subsp. *gracilis* var. *gracilis* (Tariq Husain 222134, LWG). d. flower with short incurved galea. h. broad bract. l. calyx with reduced lobes.

1. subsp. *gracilis***1a. var. *gracilis*** (Fig. 1A, d, h, l).**Fl. & Fr.:** June – Sept.**Distribution:** Throughout the Himalayas (India: Kashmir to Sikkim and Assam) from Afghanistan to S. W. China.**Ecology:** Steep dry slopes, at altitudes of 1800 to 4300 m.

Notes: One sheet from BM has four specimens mounted. The upper left hand specimen *J. F. Duthie 3224* (referred to as A) and the upper right hand specimen *Wallich 422* (isotype-referred to as B) are quite similar except for a few characters which are underlined below – 1. Leaves of A are twice pinnatisect with sharp teeth whereas those of B are twice pinnatifid with blunt teeth. 2. Bract of A is as long as calyx, deeply twice pinnatisect just like leaf, with a broad and hairy base whereas bracts of B are almost twice as long as calyx and resembles the leaf. 3. Calyx lobes of A are sharply toothed, long and straight with ciliated margin whereas those of B are with margin somewhat recurving to expose the cilia of inner surface. Both the above mentioned specimens are of *P. gracilis* subsp. *brunoniana* var. *brunoniana*. The third specimen *Schlagintweit 10063* is entirely different from the above two (referred to as C) with bract equal to calyx (same as in B), calyx lobes triangular with a broad base and sharply recurved margin exposing ciliate inner surface, resembles *P. gracilis* subsp. *gracilis* var. *gracilis*. The fourth specimen *Schlagintweit 9240* (referred to as D) is incomplete.

Specimens examined: Jammu & Kashmir: Bhadrawaha, -Sevj, 2800 m, Aug. 1986, *J. N. Vohra & B.D. Naithani 83032* (BSD); **Himachal pradesh:** Dalhousie, 2333 m, 11. 9. 1874, *C. B. Clarke 22160 A* (BM); Dalhousie, 2333 m, 14. 9. 1874, *C. B. Clarke 22425A* (BM); Simla, 2300 m, August, *W. Schlich s. n.* (BM); Above Rahla, 2400 m, 2. 8. 1970, *U. C. Bhattacharyya 40419* (BSD); **Uttaranchal:** Garhwal: Chamoli, Valley of Flowers, 13. 9. 1982, *D. Basu 72012* (BSD); Tehri Garhwal, Panwali, 3700 m, 26. 6. 1981, *A. K. Goel 72839* (BSD); Chamoli Dist., Badni, 9. 1993, *Bipin Balodi 77169* (BSD); Uttarkashi Dist., on way to Barasu Pass, 21. 8. 1996, *Bipin Balodi 92211* (BSD); Chakrata, Kanasar, 2000 m, 27. 7. 1968, *O. P. Misra 38147* (BSD); On way to Deoban from Chakrata (1 Km from FRH Deaban), 3000 m, 12. 8. 2001, *Tariq Husain 222134* (LWG), Chamoli Dist., on way to Kedarnath, 22. 8. 1974, *s. l. 104539* (LWG); Badrinath, 3333 m, 1-31.8.1885, *Schlagintweit 10063* (BM); Chamoli Dist., DinaKhel, 2000 m, 18. 9. 1985, *H. J. Chowdhery 73166* (BSD); Chamoli Dist., On way to Brahmtal, 9. 1993, *Bipin 73644* (BSD); Uttarkashi Dist., Jankichatti, 2575 m, 4. 10. 1993, *S. C. Majumdar & R. S. Singh 86489* (BSD); Uttarkashi Dist., On way to Taluka, 19. 9. 1995, *Bipin Balodi 89346* (BSD); Chamoli Dist., Tapovan, 9. 1980, *B. D. Naithani 70975* (BSD); Kumaon: Girgam, 2000 m, *Strachey & Winterbottom 2* (BM); Lohar Khet, 2000-3200m, 20. 9. 1957, *T. A. Rao 4244* (BSD). **Arunachal pradesh:** Bomdi la-Saleri, 2000 m, 19. 10. 1955, *Rankin & Pretzlik 056* (BM); Bomdi la, 3000 m, 15. 10. 1955, *Rankin & Pretzlik 041* (BM).

1b. var. *stricta* (Wall.) Husain & Garg *stat. nov.* (Fig. 1 c, j, k).

P. stricta Wall., Cat. 414. 1828 (nom. nud.). **Type:** Kumaon, Wallich 414 (isotypes: CAL-seen; PH-not seen).

P. gracilis Wall. ex Benth. var. *gracilis* f. *strictae* (Wall.) Prain in Ann. Royal Bot. Gard. Calcutta 3: 137, 1890.

Fl. & Fr.: July-Sept.**Distribution:** From Kashmir to Sikkim.**Ecology:** On slopes, at altitudes of 2000 to 4500 m.

Specimens examined: Jammu & kashmir: Patani top, 2300-2500 m, 11. 9. 1958, *T. A. Rao 7457* (BSD). **Himachal pradesh:** Mahasu Dist., 2600 m, 22. 7. 1965, *N. C. Nair 30045* (BSD). **Uttaranchal:** Kumaon: Way to Ralam Glacier, 4000-4500 m, 15. 9. 1969, *Pant & Naithani 39686* (BSD). Garhwal: Chamoli Dist., Hemkund,

9. 1978, *B. M. Wadhwa 62647* (BSD); Tehri Dist., Gorgi bridge, 28. 9. 1991, *S. C. Majumdar & Bipin Balodi 83668* (BSD); Uttarkashi Dist., Kedar Ganga Valley, 3600 m, 30. 8. 1983, *U. C. Bhattacharyya 74637* (BSD); Uttarkashi Dist., Bhojbasa,-Chirbasa, 3600 m, 5. 9. 1983, *U. C. Bhattacharyya 74955* (BSD); Tehri Dist., Kalyani, 3000 m, 14. 9. 1979, *A. K. Goel 67796* (BSD); Uttarkashi Dist., Bhojbasa, 3600 m, 5. 9. 1983, *U. C. Bhattacharyya 74955* (BSD). **Sikkim:** 2000 m, *R. H. Beddome 5752* (BM).

2. subsp. *brunoniana* (Wall. ex Pennell) Husain & Garg *stat. nov.*

2a. var. *brunoniana* (Fig. 1a, e, i).

P. brunoniana Wall., Cat. 422. 1829 (*nom.nud.*); Pennell in Acad. Nat. Sci. Philadelphia, Monogr. 5: 129. 1943. **Type:** Kumaon, *Wallich 422* (isotypes: BM, CAL-seen).

P. brunoniana Wall. ex Pennell subsp. *ctenodonta* Pennell in Acad. Nat. Sci. Philadelphia, Monogr. 5: 130. t. 20 B. 1943. **Type:** Chamba, East of Brahmour, Kukti Pass, 4900 m, July 1936, *Walter Koelz 10180* (holotype: US; isotype: Gordon College, India-not seen).

P. gracilis Wall. ex Benth. var. *gracilis f. prostrata* Prain in Ann. Royal Bot. Gard. Calcutta 3: 138. 1890.

Fl. & Fr.: Aug.-Sept.

Distribution: From Himachal Pradesh to Sikkim.

Ecology: Moist open slopes, at altitudes ranging from 3000 to 4166 m.

Notes: While segregating two subspecies of *P. brunoniana* Pennell (1943) had considered the characters of calyx lobes as sharply lobulate toothed, margin not recurved and so appearing as ciliate, bracts doubly and sharply toothed as subsp. *ctenodonta* whereas calyx lobes usually less sharply or obscurely lobulate, margin recurved and ciliate, bracts similar or with incurved or with blunt teeth as subsp. *brunoniana*.

Pennell (1943) rightly pointed out that in subsp. *ctenodonta* the "toothed lobes are normally expanded, but in subsp. *brunoniana* they are so everted that the pubescent inner surface appears instead forming a seemingly ciliated profile; then, by actual reduction of the everted margin to a nearly or quite entire edge or eventually to its disappearance, the sepal becomes a simple rounded ciliate projection. Still further reduction has produced the mere low rounded calyx-lobes of *Pedicularis gracilis*." We are not sure whether Pennell (1943) had examined *Wallich 422* from BM which has calyx lobes similar to subsp. *ctenodonta*. Therefore, it is concluded that the two subsp. described by Pennell (1943) under *P. brunoniana* may be one and the same showing the two stages of evolution leading to reduction in calyx lobes. The authors therefore merge subsp. *ctenodonta* Pennell under subsp. *brunoniana* having dentate calyx lobes. Henceforth subsp. *ctenodonta* Pennell is now treated as a synonym of *P. gracilis* subsp. *brunoniana* var. *brunoniana*.

Specimens examined: Himachal pradesh: Moralkanda, 3000 m, 29. 9. 1970, *P. C. Sharma & D. P. Badola 880* (LWG); Rakeham, 4166 m, 13. 8. 1973, *K. P. Janardhanan 52678* (BSD); Haripurdhar, 15.9.1974, *J. N. Vohra & Bipin Balodi 54443* (BSD); **Uttaranchal:** Kumaon: Nainital, Way to Govt, House, 23. 10. 1963, *B. C. Kundru 83* (CDRI); Nainital, Snow view, 19. 10. 1963, *s. l. 59* (CDRI); Ralam Valley, 4000 m, 23. 8. 1884, *J. F. Duthie 3224* (BM); Pithoragarh Dist., Balanti farm, 13. 9. 1989, *Bipin Balodi 75165* (BSD); Garhwal: Amritganga Valley, 3000 m, 12. 10. 1970, *B. D. Naithani 37984* (BSD). **Unknown locality:** *W. Schlich s. n.* (BM).

2b. var. *macrocarpa* (Prain) Husain & Garg *comb. nov.* (Fig. 1b, f, j).

P. gracilis Wall. ex Benth. var. *macrocarpa* Prain in Ann. Royal Bot. Gard. Calcutta 3: 138. t. 21 A, C. 1890. **Type:** Darjeeling, Phullaloong, 10,000 ft., 6 Oct. 1870, *Clarke 13418* (syntype: CAL-seen); Sikkim, 7500 ft., 1862, *Anderson 982* (syntype: CAL-seen).

Fl. & Fr.: Aug.-Oct.

Distribution: Throughout the Himalayas from Kashmir to Sikkim.

Ecology: In boggy conditions, at altitudes ranging from 2000 to 4333 m.

Notes: Prain (1890) was of the opinion that the ovate serrate calyx-teeth, higher staminal insertion and a much larger capsule of var. *macrocarpa* are very important characters, which bring it close to *Pedicularis porrecta*.

Specimens examined: Jammu & Kashmir: Near Bhairon temple, 31. 8. 1989, *B. P. Uniyal 77404* (BSD). **Himachal Pradesh:** Moralkanda, 3660 m, 1. 10. 1970, *P. C. Sharma & Party 967* (LWG); Neerath, 21. 8. 1963, *N.C Nair 28842* (BSD); Sangla, 3666 m, 9. 8. 1973, *K. P. Janardhanan 52619* (BSD). **Uttaranchal:** Kumaon: Loharkhet, 2000-3220 m, 20. 9. 1957, *T. A. Rao 4244* (BSD). **Sikkim:** Changu, 4333 m, 9. 9. 1913, *R. E. Cooper 847* (BM).

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喜瑪拉雅山小馬先蒿 *Pedicularis gracilis* Wall. ex Benth. (玄參科)
種群之分類研究

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摘 要

本文著重在喜瑪拉雅山小馬先蒿(*Pedicularis gracilis*)種群之特性，同時列舉出二亞種及四變種。依據形態特徵及地理分佈資料來看，*Pedicularis gracilis* subsp. *gracilis* 及 subsp. *brunoniana* (Wall. ex Pennell) Husain & Garg 兩亞種是不同的；前一亞種之下的二變種—*gracilis* 及 *stricta* 以及後一亞種之下的二變種—*brunoniana* 及 *macrocarpa* (Prain) Husain & Garg 也各有所不同。

關鍵詞：小馬先蒿、亞種、變種。

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