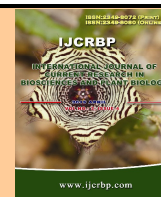




International Journal of Current Research in Biosciences and Plant Biology

ISSN: 2349-8080 Volume 2 Number 4 (April-2015) pp. 33-44

www.ijcrbp.com



Original Research Article

A Complete List of the Species of *Astragalus* L. (Fabaceae) of Nepal with Three New Records

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Abstract	Keywords
<p>The paper enumerates 49 species of <i>Astragalus</i> from Nepal including three new records, <i>A. lachungensis</i>, <i>A. pindreensis</i> and <i>A. tenuicaulis</i> and also reconfirms the occurrence of <i>A. grahamianus</i>, <i>A. multiceps</i>, <i>A. oplites</i>, <i>A. rhizanthus</i> and <i>A. tribulifolius</i> in Nepal. The study reveals that 10 species of <i>Astragalus</i> are endemic to the country as they found nowhere else on the Earth. Majority of the species occur at high reaches in the Himalaya between (1500-2100) 2800 - 5400 m altitudes. Each species is provided with first citation followed by some relevant references pertaining to Nepal and world distribution. For some of the species, especially for new records and where there is doubt about the occurrence of the species in Nepal, seen specimens and photographs have also been provided. The study reveals that out of 49 species occurring in Nepal, only for about 25 species, specimens are available at country's national herbarium (KATH) and Central University Herbarium (TUCH) and the specimens for remaining species are located at different herbaria outside the country. Hence, the genus needs extensive exploration from throughout the Nepal Himalaya (central Himalaya) to know the correct number of species within the genus and their current conservation status in the country.</p>	<p><i>Astragalus</i> Distribution Nepal New records Species list</p>

Introduction

Astragalus L. with about 2900 species is chiefly distributed in the cold to warm arid and semiarid mountainous regions throughout the world (Wojciechowski, 2005; Lock and Schrire, 2005; Podlech and Zarre, 2013; Zarre and Azani, 2013).

However, the Himalaya, south-western and south-central Asia are considered chief centres of the origin of the genus. The first comprehensive account of the Himalayan species of the genus starting from Pakistan to Bhutan has been produced by Baker (1876) in the

monumental work of J. D. Hooker 'The Flora of British India'. Afterwards, several regional works have come out dealing with the genus *Astragalus* [Pakistan: Ali (1961, 1977); India: Sanjappa (1992), Chaudhary (2006a,b, 2007), Chaudhary and Khan (2005, 2006), Chaudhary et al. (2007a, 2007b), Chaudhary and Srivastava (2007), Chaudhary et al. (2008); Bhutan: Grierson and Long (1987)] including Nepal (Chater, 1979; Press et al., 2000) and its adjacent country China (Xu and Podlech, 2010) which have substantially increased our knowledge on the genus by adding more number and providing correct range of distribution of the species. In addition, a checklist of legumes of whole south Asia has also been published by Kumar and Sane (2003). Although, no separate taxonomic study on *Astragalus* of Nepal has been brought out, however, about 25 species have been recorded in its two published checklists (Chater, 1979; Press et al., 2000) from the country. Kumar and Sane (2003) have included about 33 species from Nepal in their checklist. In subsequent years many species of the genus have also been described or recorded from Nepal by Podlech (1999, 2001, 2009), Podlech and Xu (2004), Chaudhary and Khan (2005), Chaudhary (2006b) and Xu and Podlech (2006, 2010) in different works. The main aim of the present work is to bring out all scattered information on *Astragalus* of Nepal at one place including some new findings and records.

While working on *Astragalus* from India and Nepal the present authors realised that many species such as *A. braclayanus* Podlech, *A. heydei* Baker, *A. grahamianus* Royle ex Benth., *A. jumlaensis* Podlech, *A. langtangensis* Podlech, *A. lobbichleri* Podlech, *A. nepalensis* Podlech, *A. notablis* Podlech, *A. poluninii* Podlech, *A. pseudorigidulus* Podlech, *A. sanjappae* Chaudhary and Khan, *A. rhizanthus* Royle ex Benth., *A. tribulifolius* Bunge, *A. webbianus* Grah. ex Benth. known from Nepal have not been included in the existing checklists (Chater, 1979; Press et al., 2000) from Nepal. During the course of examination of the specimens of Nepalese *Astragalus* at KATH and TUCH (herbarium acronym according to Thiers, 2012) the authors also encountered another three species (i. e. *A. lachungensis* Chaudhary, *A. pindreensis* (Benth. ex Baker) Ali, *A. tenuicaulis* Benth. ex Bunge) from Nepal which have not been reported so far in any work, hence they form new record for Nepal. In addition, the occurrence of *A. grahamianus* Royle ex Benth., *A. multiceps* Wall. ex Benth., *A. oplites* Benth.

ex Parker, *A. rhizanthus* Royle ex Benth. and *A. tribulifolius* Bunge in Nepal has also been authenticated in the present study as they have been variously treated in previous works. Therefore, a complete checklist of all species of *Astragalus* including three new records occurring in Nepal is presented here.

A total of 49 species of *Astragalus* L. are listed here from Nepal, of which 10 species (i. e. *A. braclayanus* Podlech, *A. chateri* Vassilcz., *A. jumlaensis* Podlech, *A. lobbichleri* Podlech, *A. nakaoui* Kitam., *A. nepalensis* Podlech, *A. notablis* Podlech, *A. poluninii* Podlech, *A. pseudorigidulus* Podlech, *A. stipulatus* var. *phulchokiensis* Ohashi) are endemic as they do not occur in other parts of the world. The species are found at high reaches of the Himalaya at altitudes ranging from (1500-2200) 2800-5400 m. Recently, some of the species of *Astragalus* such as *A. donianus* DC., *A. heydei* Baker, *A. lachungensis* Chaudhary and *A. tribulifolius* Bunge have been treated under another genus *Phyllolobium* Fisch. (Zhang and Podlech, 2006; Podlech, 2009), however, they are treated here in their original genus *Astragalus* only for sake of convenience. They may be treated under *Phyllolobium* Fisch. in the Flora of Nepal. All species have been provided with their correct name along with the relevant references pertaining to Nepal followed by distribution and taxonomic notes wherever found necessary. The seen specimens and some relevant photographs, especially for new records as well as for those species whose occurrence in Nepal was doubtful, have also been included to authenticate the findings. The present work will be quite helpful in the preparation of Flora of Nepal (legumes volume) which is yet to come and also knowing the correct distribution of species.

Results

Astragalus amherstianus Royle ex Benth. in Royle, *Illust. Bot. Himal.* 199. 1835; Baker in Hook. f., *Fl. Brit. India* 2: 119. 1876; Chater in Hara & Williams, *Enum. Fl. Pl. Nepal* 2: 106. 1979; Sanjappa, *Legum. India* 84. 1992; Press et al., *Annot. Checkl. Fl. Nepal.* 166. 2000; Kumar & Sane, *Legum. South Asia: Checkl.* 222. 2003.
A. lowarensis Ali, *Kew Bull.* 28: 299. 1973.
 Distribution: Afghanistan, India, Nepal (2100-3700 m), Pakistan.

- Astragalus arnoldii** Hemsley & H. Pearson, J. Linn. Soc. Bot. 35: 172. 1902; Xu & Podlech in Wu et al., Fl. China 10: 422, f. 480. 11-19. 2010.
Distribution: China, India, Nepal. Alt. 4000 - 5500 m.
Note : Recorded after Xu and Podlech (2010).
- Astragalus braclayanus** Podlech, Novon 14 (2): 217. 2004.
Distribution: Nepal (Tilicho Pass, 4820 m) - Endemic.
Note: Recently described by Podlech and Xu (2004) from Nepal.
- Astragalus candolleanus** Royle ex Benth. in Royle, Illust. Bot. Himal. 199. 1835, non Boiss. 1872; Baker in Hook. f., Fl. Brit. India 2: 132. 1876; Chater in Hara & Williams, Enum. Fl. Pl. Nepal 2: 106. 1979; Sanjappa, Legum. India 85. 1992; Press et al., Annot. Checkl. Fl. Pl. Nepal. 166. 2000.
- A. *rhizanthus* ssp. *candolleanus* (Royle ex Benth.) Podlech in Mitt. Bot. Staatss. München 25: 184. 1988; Kumar & Sane, Legum. South Asia: Checkl. 239. 2003.
Distribution: India, Nepal (2700–4500 m), Pakistan.
Note: Although Podlech (1988) has reduced *A. candolleanus* Royle ex Benth. as subspecies under *A. rhizanthus* Royle ex Benth., however, Anand et al. (2010) have treated it at species level based on morphological and molecular markers.
- Astragalus chateri** Vassilcz., Novosti Sist. Vyssh. Rast. 16: 140 1979; Press et al., Annot. Checkl. Fl. Pl. Nepal. 166. 2000; Kumar & Sane, Legum. South Asia: Checkl. 224. 2003.
Distribution: Nepal (3800 m) - Endemic.
- Astragalus chlorostachys** Lindl. in Trans. Hort. Soc. 7: 249. 1830; Baker in Hook. f., Fl. Brit. India 2: 128. 1876; Chater in Hara & Williams, Enum. Fl. Pl. Nepal 2: 106. 1979; Sanjappa, Legum. India 85. 1992; Wenninger in Mitt. Bot. Staats. München 30: 42. 1992; Press et al., Annot. Checkl. Fl. Pl. Nepal. 166. 2000; Kumar & Sane, Legum. South Asia: Checkl. 225. 2003.
- Hedysarum strobiliferum* Baker in Hook. f., Fl. Brit. India 2: 146. 1876.
- Astragalus microdontus* Baker in J. Linn. Soc. Bot. 18: 46. 1880.
Distribution: Afghanistan, China, India, Nepal (2100-3700 m), Pakistan.
- Astragalus concretus** Benth. in Royle, Illust. Bot. Himal. 199. 1835; Chater in Hara & Williams, Enum. Fl. Pl. Nepal 2: 106. 1979; Sanjappa, Legum. India 86. 1992 pp. (excluding *A. isabellae* Dunn); Press et al., Annot. Checkl. Fl. Pl. Nepal. 166. 2000; Kumar & Sane, Legum. South Asia: Checkl. 226. 2003.
- A. *vicioides* Grah. ex Baker in Hook. f., Fl. Brit. India 2: 131. 1876, non Ledeb. 1831.
- A. *xiphocarpus* Benth. ex Bunge, Mem. Acad. Sci. St. - Pet. ser. 7, 11: 27. 1868; Baker in Hook. F., Fl. Brit. India 2: 129. 1876; Sanjappa, Legum. India 96. 1992; Chaudhary & Khan, Rheedeia 13. 75, f. 2. 2003.
Distribution: Bhutan, China, India, Nepal (2340-3500 m).
- Astragalus confertus** Benth. ex Bunge in Mem. Acad. Imp. Sci. St. Petersburg 16 (11): 23. 1868 & 15 (1): 27. 1869; Baker in Hook. f., Fl. Brit. India 2: 123. 1876; Chater in Hara & Williams, Enum. Fl. Pl. Nepal 2: 106. 1979; Sanjappa, Legum. India 86. 1992; Press et al., Annot. Checkl. Fl. Pl. Nepal. 166. 2000; Kumar & Sane, Legum. South Asia: Checkl. 226. 2003; Xu & Podlech in Wu et al., Fl. China 10: 360, f. 422. 14-20. 2010.
Distribution: China, India, Nepal (4200-4800 m).
- Astragalus donianus** DC., Prod. 2: 283. 1825; Baker in Hook. f., Fl. Brit. India 2: 119. 1876; Chater in Hara & Williams, Enum. Fl. Pl. Nepal 2: 106. 1979; Sanjappa, Legum. India 87. 1992; Press et al., Annot. Checkl. Fl. Nepal. 166. 2000; Kumar & Sane, Legum. South Asia: Checkl. 227. 2003.
- A. *pyncnorhizus* Wall. ex Benth. in Royle, Illust. Bot. Himal. 199. 1835; Baker in Hook. f., Fl. Brit. India 2: 119. 1876; Ali in Biologia 7: 10. 1961.
- A. *macrorhizus* D. Don, Fl. Nepal. 245. 1825.
Distribution: Bhutan, China, India, Nepal (2900-4500).
Note: This species has recently been transferred to the genus *Phyllolobium* Fisch. [*P. donianus* (DC.) M. L. Zhang & Podlech] by Zhang and Podlech (2006).
- Astragalus emodi** Steud., Nom. Bot. ed. 2, 1: 161. 1840; Baker in Hook. f., Fl. Brit. India. 2: 130. 1876; Chater in Hara & Williams, Enum. Fl. Pl. Nepal 2: 106. 1979; Sanjappa, Legum. India 87. 1992; Press et al., Annot. Checkl. Fl. Pl. Nepal 166. 2000; Chaudhary & Khan in Phytotaxonomy 4: 60, f. 3 & 4 G-R. 2004.

A. podocarpus Grah. ex Benth. in Royle, *Illust. Bot. Himal.* 199. 1835, non C. A. Mey. (1831).

Distribution: India, Nepal (3200-3600 m).

Note: In Kumar and Sane (2003) this species has been treated as synonym under *A. maxwellii* Benth., however, treated separately by Chaudhary and Khan (2004).

Astragalus floridulus Podlech in *Sendtnera* 1: 270. 1993; Kumar & Sane, *Legum. South Asia: Checkl.* 229. 2003.

A. floridus Benth. ex Bunge in *Mem. Acad. Imp. Sci. Saint Petersburg ser.* 7, 11: 24. 1868 & 12: 28. 1869, non Scop. (1786); Baker in *Hook. f., Fl. Brit. India* 2: 127. 1876; Chater in *Hara & Williams, Enum. Fl. Pl. Nepal* 2: 106. 1979; Sanjappa, *Legum. India* 87.1992; Press et al., *Anno. Checkl. Fl. Pl. Nepal* 166. 2000.

Distribution: Bhutan, China, India, Nepal (4200-4700).

Astragalus grahamianus Royle ex Benth. in Royle, *Illust. Bot. Himal.* 199. 1835; Ali, *Biologia* 7: 63. 1961 & in Nasir & Ali, *Fl. W. Pakistan* 100: 190. 1977; Deml, *Boissiera* 21: 100. 1972; Sanjappa, *Legum. India* 88. 1992; Kumar & Sane, *Legum. South Asia: Checkl.* 229. 2003. (Fig. 1A).

A. cicerifolius Royle ex Fisch., *Bull. Soc. Imp. Naturalistes Moscou* 26 (2): 404. 1853; Baker in *Hook. f., Fl. Brit. India* 2: 134. 1876, *p.p.*; Parker, *For. Fl. Punjab* 141. 1924.

A. daltonianus Bunge in *Mém. Acad. Imp. Sci. Saint Pétersbourg* 11 (16): 44. 1868 & 15 (1): 69. 1869.

Distribution: India, Nepal (3780-4250 m), Pakistan.

Note: Kumar and Sane (2003) have reported it from Nepal based on Press et al. (2000), however, not recorded in Chater (1979) as well as in Press et al. (2000). The species is reported here based on following specimens.

Specimens examined: NEPAL: Simen, 4100 m, 08.05.1974, *J. F. Dobremez & N. P. Manandhar*, 74-549 (KATH); Mustang, 4100 m, 16.05.1974, *J. F. Dobremez & N. P. Manandhar* 74-616 (KATH); Mustang, Lomangthang - Katrithode, 4250 m, 20.08.2002, *M. N. Subedi* 159/2002 (KATH); Mustang, Dhami - Samar, 3780 m, 25.08.2002, *M. N. Subedi* 211/2002 (KATH); Tetang, 4900 m, Lat. 29° 53', Long. 83° 50', 18.05.1974, *J. F. Dobremez & N. P. Manandhar* 74-648 (KATH).

Astragalus graveolens Buch.-Ham. ex Benth. in Royle, *Illust. Bot. Himal.* 199. 1935; Bunge in *Mem. Acad. Sci. St.-Pet. ser.* 7, 11: 26. 1868 & 12: 31. 1869; Baker in *Hook. f., Fl. Brit. India* 2: 131. 1876; Chater in *Hara & Williams, Enum. Fl. Pl. Nepal* 2: 106. 1979; Sanjappa, *Legum. India* 88. 1992; Press et al., *Anno. Checkl. Fl. Pl. Nepal* 166. 2000; Kumar & Sane, *Legum. South Asia: Checkl.* 230. 2003.

A. rotundifolius Benth. in Royle, *Illust. Bot. Himal.* 199. 1835.

Distribution: Afghanistan, China, India, Nepal (2100 m), Pakistan.

Astragalus heydei Baker in *Hook. f., Fl. India* 2:118. 1876; Kumar & Sane, *Legum. South Asia: Checkl.* 230. 2003.

Distribution: China, India, Nepal.

Note: Recorded here from Nepal based on Zhang and Podlech (2006). However, they have not cited any specimen from Nepal in their work. Kumar and Sane (2003) have recorded it from Nepal based on their personal communication with D. Podlech. The species has been transferred to *Phyllobium* [*P. heydei* (Baker) M. L. Zhang & Podlech] by Zhang and Podlech (2006).

Astragalus himalayanus Klotz. in *Klotz. & Garcke, Bot. Ergebn. Reise Waldemar* 160, t. 4. 1862; Baker in *Hook. f., Fl. Brit. India* 2: 126. 1876; Chater in *Hara & Williams, Enum. Fl. Pl. Nepal* 2: 107. 1979; Wenninger in *Mitt. Bot. Staatssamml. Munchen* 30: 123. 1991; Sanjappa, *Legum. India* 89. 1992; Press et al., *Annot. Checkl. Fl. Nepal.* 166. 2000; Kumar & Sane, *Legum. South Asia: Checkl.* 230. 2003.

A. carinalis Benth. ex Bunge in *Mem. Acad. Sci. St.-Pet. ser.* 7, 11: 23. 1868.

A. maddenianus Benth. ex Baker in *Hook. f., Fl. Brit. India* 2: 127. 1876; Ali in *Biologia* 7:39. 1961 & in Nasir & Ali, *Fl. W. Pakistan* 100: 179. 1977; Sanjappa, *Legum. India* 90. 1992.

Distribution: India, Nepal (3000-4000 m) Pakistan.

Astragalus jumlaensis Podlech, *Feddes Repert.* 117(3-4): 227. 2006.

Distribution: Nepal (Bhurchula Leh, near Jumla, 3820 m) - Endemic.

Note: Recently described and differentiated from *A. sikkimensis* Bunge (Xu and Podlech, 2006).

However, it seems to be much closer to *A. sanjappae* Chaudhary & Khan.

Astragalus kongrensis Benth. ex Baker in Hook. f., Fl. Brit. India 2: 120. 1876; Sanjappa, Legum. India 90. 1992; Chaudhary, Taiwania 51 (3): 23, f. 1.2006. (Fig. 1B).

Distribution: Bhutan, China, India, Nepal (3900-4850 m).

Note: Chaudhary (2006) for the first time recorded it from Nepal based on specimen *Duthie* 5466. The additional specimens have also been observed and cited below.

Specimens examined: NEPAL: Batase-Dhumpush, 13000 ft., 16.04.021, *T. B. Shrestha* & *M. Bistha* 2286 (KATH); Schula pass, 16000 ft., *T. B. Shrestha* 5349 (KATH); Kashi, Annapurna base camp, 3930 m, 29. 06. 2001, *P. R. Shakya* & *S. Poudel* 10467(KATH); W. Nepal, Nampha Gadh, 13000-14000 ft. 27. 7. 1886, *J. F. Duthie* 5466 (CAL).

Astragalus lachungensis Chaudhary, J. Jap Bot. 81 (3): 168, f. 1 & 2. 2006.

Distribution: India, Nepal (4900 m).

Note: New record for Nepal. Recently Podlech (2009) has transferred this species to *Phyllolobium* Fisch. [*P. lachungense* (Chaudhary) Podlech].

Specimens examined: NEPAL: Syamzo, 4900 m, 22. 06. 2000, *Y. Otaki* & *S. Pradhan* 132 (TUCH).

Astragalus langtangensis Podlech in Sendtnera 6: 136. 1999; Kumar & Sane, Legum. South Asia: Checkl. 233. 2003; Chaudhary & Srivastava in Taiwania 52 (1): 28, f. 5. 2007. (Fig. 1C).

Distribution: India, Nepal (Langtang, 3100-3900 m).

Note: Not included in Press et al. (2000). It was described by Podlech (1999) from Nepal based on *Schilling, Sayers, Bista* 380 (K). The isotype has been observed at KATH along with other additional specimens.

Specimens examined: NEPAL: Rasua Dist., Langtang, 3100 m, 17.05.1985, *K. R. Rajbhandari, I. Sharma, M. Kayastha*, 10608 (KATH); Langtang valley, 13000 ft., 24.06.1965, *Schilling, Sayers, Bista* 380 (isotype KATH); Langtang, 12300 ft., 25.05.1974, *D. D. Bhatt* 189 (TUCH); Rasuwa, Ghoratabela, 3750 m, 31.05.1993, *N. P. Manandhar* 175 – 93 (KATH); Langtang, 12300 ft. 25. 5. 1974, *D. D. Bhatt* 18 (TUCH).

Astragalus lessertioides Benth. ex Bunge in Mem. Acad. Sci. St.-Pet. ser. 7, 11: 24. 1868 & 12: 28. 1869; Baker in Hook. f., Fl. Brit. India 2: 124. 1876; Chater in Hara & Williams, Enum. Fl. Pl. Nepal 2: 107. 1979; Sanjappa, Legum. India 90. 1992; Press et al., Anno. Checkl. Fl. Pl. Nepal 166. 2000. Kumar & Sane, Legum. South Asia: Checkl. 233. 2003.

Distribution: Bhutan, China, India, Nepal (4200-4900 m).

Astragalus leucocephalus Grah. ex Benth. in Royle, Illust. Bot. Himal. 198, t. 32, f. 2. 1835; Baker in Hook. f., Fl. Brit. India 2: 128. 1876; Chater in Hara & Williams, Enum. Fl. Pl. Nepal 2: 107. 1979; Sanjappa, Legum. India 90. 1992; Press et al., Annot. Checkl. Fl. Pl. Nepal 166. 2000; Kumar & Sane, Legum. South Asia: Checkl. 233. 2003.

Distribution: Afghanistan, India, Nepal (1500-3700 m), Pakistan.

Astragalus lobbichleri Podlech, Feddes Repert. 120 (1&2): 50. 2009.

Distribution: Nepal (Raum Manangbhot, Sabzi-Chu, orogr. Linke Talseite, 3700 m) - Endemic.

Note: Podlech (2009) has differentiated it from *A. tumbaticus* C. Marquand & Airy Shaw.

Astragalus longiscapus C. C. Ni & P. C. Li, Acta Phytotax. Sin. 17(2): 108. 1979; Xu & Podlech in Wu et al., Fl. China 10: 391, f. 431, 1-10. 2010.

Distribution: China, Nepal. Alt. 4000–4700 m.

Note: Recorded here based on Xu and Podlech (2010).

Astragalus melanostachys Benth. ex Bunge in Mem. Acad. Sci. St.-Pet. ser. 7, 11: 21. 1868; Baker in Hook. f., Fl. Brit. India 2: 125. 1876; Chater in Hara & Williams, Enum. Fl. Pl. Nepal 2: 107. 1979; Sanjappa, Legum. India 91.1992; Press et al., Annot. Checkl. Fl. Pl. Nepal 166. 2000; Kumar & Sane, Legum. South Asia: Checkl. 234. 2003.

A. bracteosus Klotzsch in Klotzsch & Garcke, Bot. Erg. Waldem. Reise: 160, tab. 5. 1862, non Boiss. & Noë 1856.

A. supraglaber Kitamura in Acta Phytotax. Geobot. 16: 138. 1956.

A. macrostegius Rech. f., Symb. Ahgh. 3: 37, t. 29. 30. 1957.

Distribution: Afghanistan, China, India, Nepal (3300-5100 m), N. Eurasia, Pakistan.

Astragalus minutidentatus Y. C. Ho, Bull. Bot. Res., Harbin 1(3): 108. 1981; Xu & Podlech in Wu et al., Fl. China 10: 385, f. 422, 1-6. 2010.

Distribution: Bhutan, China, India, Nepal. Alt. 2100–4900 m.

Note: Recorded based on Xu and Podlech (2010).

Astragalus multiceps Wall. ex Benth. in Royle, Illust. Himal. Bot. 199. 1835; Baker in Hook. f., Fl. Brit. India 2: 134. 1876; Deml in Boissiera 21: 169. 1972; Chater in Hara & Williams, Enum. Fl. Pl. Nepal 2: 107. 1979; Sanjappa, Legum. India 85.1992; Press et al., Annot. Checkl. Fl. Pl. Nepal 166. 2000; Kumar & Sane, Legum. South Asia: Checkl. 234. 2003.

A. *bicuspis* Fischer, Symb. Astrag. Trag. 94. 1853; Baker in Hook. f., Fl. Brit. India 2: 135. 1876; Parker, For. Fl. Punjab 142. 1924; Chater in Hara & Williams, Enum. Fl. Pl. Nepal 2: 106. 1979; Sanjappa, Legum. India 85.1992; Press et al., Annot. Checkl. Fl. Pl. Nepal 166. 2000.

A. *jacquemonti* Bunge, Mem. Acad. Sci. St.-Pet. ser. 7, 11: 44. 1868.

? A. *leptocentrus* Bunge, Mem. Acad. Sci. St.-Pet. ser. 7, 11: 44. 1868; Baker in Hook. f., Fl. Brit. India 2: 135. 1876.

A. *polycanthus* auct. non Royle ex Benth., Baker in Hook. f., Fl. Brit. India 2: 134. 1876, *p. p.* A. *grahamianus* auct. non Royle ex Benth., Fischer, Bull. Soc. Imp. Naturalists Moscow 26 (2): 406. 1853.

Distribution: China, India, Nepal (2300-3500), Pakistan.

Note: *A. bicuspis* is a synonym of *A. multiceps*, however, Chater (1979) and Press et al. (2000) have treated them separately. Xu & Podlech (2010) have not recorded it from Nepal. However, following specimens of the species have been observed at TUCH in the present study.

Specimens examined: NEPAL: Langtang, Ghoda tabale, no. 015 (TUCH); Langtang, 2300 m, 24.03.1999, B. Shrestha & N. Adhikari 128 (TUCH).

Astragalus nakaoui Kitam., Peoples Nep. Him. 422.1957; Chater in Hara & Williams, Enum. Fl. Pl. Nepal 2: 107. 1979; Press et al., Annot. Checkl. Fl. Pl. Nepal 166. 2000; Kumar & Sane, Legum. South Asia: Checkl. 235. 2003.

Distribution: Nepal (3800 m) - Endemic.

Astragalus nepalensis Podlech, Sendtnera 6: 137. 1999; Kumar & Sane, Legum. South Asia: Checkl. 235. 2003.

Distribution: Nepal (Kali Gandaki, Muktinath trek-Marpha, 2575-2635 m) - Endemic.

Note: Not recorded in Press et al. (2000).

Astragalus notabilis Podlech, Feddes Repert. 117 (3-4): 230. 2006.

Distribution: Nepal (Mustang, Lower Puyun Khla between Yara and Dhi, 3450 m) – Endemic.

Note: Recently the species has been described and differentiated with *A. hoffmeisteri* (Klotzsch) Ali (Xu and Podlech, 2006). It seems to be closer to *A. falconeri* var. *pilosus* (Ali) Chaudhary.

Astragalus oplites Benth. ex Parker in Kew Bull. 1921: 270. 1921; Chater in Hara & Williams, Enum. Fl. Pl. Nepal 2: 107. 1979; Sanjappa, Legum. India 92. 1992; Press et al., Annot. Checkl. Fl. Pl. Nepal 166. 2000; Kumar & Sane, Legum. South Asia: Checkl. 235. 2003.

A. *zanskarensis* Benth. ex Bunge ssp. *oplites* (Benth. ex Parker) Deml in Boissiera 21: 168. 1972.

A. *cicerifolius* Royle ex Bunge in Mem. Acad. Sci. St.-Pet. ser. 7, 11: 44. 1868, non Fisch. 1853.

Distribution: China, India, Nepal (2800-4100 m), Pakistan.

Note: Not recorded from Nepal in Xu and Podlech (2010). However, following specimens of the species have been observed at KATH.

Specimens examined: NEPAL: Towards Yala glacier, 3900 m, 26.08.2000, M. N. Subedi 00400366 (KATH); Kyanging, 3900 m, 22.06.1971, P. R. Shakya & Adhikari 669(KATH); Manang, 3500 m, 21.08.1983, N. P. Manandhar 10669(KATH); Jumla Distt., 2800 m, 04.03.1976, N. P. Manandhar et al. 138 (KATH); Mustang, Samar – Kagbeni, 3130 m, 26.08.2002, M. N. Subedi 220/2002 (KATH); Mustang, Tangebu, 3000 m, 28.07.1974, D. P. Joshi & T. K. Bhattacharya 741-2067(KATH).

Astragalus oxyodon Baker in Hook. f., Fl. Brit. India 2: 125. 1876; Chaudhary et al., Taiwania 52 (3): 222. 2007; Xu & Podlech in Wu et al., Fl. China 10: 362. 2010.

Distribution: China, India, Nepal, Pakistan (?). Alt. 3500–4600 m.

Note: Chaudhary et al. (2007a) have treated the species endemic to India, however, Xu and Podlech (2010)

have recorded it also from China, Nepal and Pakistan.

Astragalus pindreensis (Benth. ex Baker) Ali in Kew Bull. 1958: 312. 1958; Sanjappa, Legum. India 92. 1992; Kumar & Sane, Legum. South Asia: Checkl. 237. 2003. (Fig. 1D).

A. candolleanus Royle ex Benth. var. *pindreensis* Benth. ex Baker in Hook. f., Fl. Brit. India 2:133. 1876.

A. rhizanthus var. *pindreensis* (Benth. ex Baker) Podlech in Mitt. Bot. Staatss. München 25: 183. 1988.

Distribution: Afghanistan, China, India, Nepal (2865-4000 m), Pakistan.

Note: New record for Nepal. Very closed to *A. rhizanthus*, but differs chiefly in leaf rachises which are hard and persistent and occasionally sharp with age.

Specimens examined: NEPAL: Mustang, Mena – Chele, 3930 m, 18.08.2001, *M. N. Subedi*, 290 – 2001 (KATH); Mustang, Samar, 4000 m, 11.07.2000, *M. N. Subedi*, 0040055 (KATH); (?) Chhety, 9400 ft., 20.06.1965, *T. B. Shrestha*, 4223 (KATH).

Astragalus poluninii Podlech, Sendtnera 7: 178. 2001.

Distribution: Nepal (Gum, near Rara 2121 m) - Endemic.

Note : Recently described and differentiated from *A. chlorostachys* Lindl. by Podlech (2001).

Astragalus polyacanthus Royle ex Benth. in Royle, Illust. Bot. Himal. 199. 1835; Baker in Hook. f., Fl. Brit. India 2:134. 1876 *pp*; Deml in Boissiera 21: 142. 1972; Chater in Hara & Williams, Enum. Fl. Pl. Nepal 2: 107. 1979; Sanjappa, Legum. India 93. 1992; Press et al., Annot. Checkl. Fl. Pl. Nepal 166. 2000; Kumar & Sane, Legum. South Asia: Checkl. 237. 2003.

A. daltonianus Bunge in Mem. Acad. Sci. St.-Pet. ser. 7. 11: 44. 1868.

A. scariosus Benth. ex Bunge. in Mem. Acad. Sci. St.-Pet. ser. 7. 11: 44. 1868.

A. tenuispinus Bunge in Mem. Acad. Sci. St.-Pet. ser. 7. 11: 44. 1868.

Distribution: India, Nepal (2000-2600 m), Pakistan.

Astragalus pseudorigidulus Podlech, Feddes Repert. 120 (1&2): 55. 2009.

Distribution: Nepal (Dogado Khola, 4550 m) - Endemic.

Note: This species has been segregated from *A. rigidulus* (Podlech, 2009).

Astragalus rhizanthus Royle ex Benth. in Royle, Illust. Bot. Himal. Mount. 200. 1835; Baker in Hook. f., Fl.

Brit. India 2:131. 1876; Podlech in Mitt. Bot. Staatss. Munchen 25: 177. 1988 *pp* (excluding *A. malacophyllus* Bunge); Sanjappa, Legum. India 93. 1992; Kumar & Sane, Legum. South Asia: Checkl. 239. 2003 *pp* (excluding *A. malacophyllus* Bunge). (Fig. 2A).

A. nuristanicus Sirj. & Rech. f. in Biol. Skr. 9, 3: 77. 1957.

A. nuristanicus var. *elasoonensis* Sirj. & Rech. F. in Biol. Skr. 9, 3: 79. 1957.

Distribution: Afghanistan, China, India, Nepal, Pakistan.

Note: Not reported by Chater (1979), Press et al. (2000) and Xu and Podlech (2010) from Nepal, however, it is recorded here based on following specimen.

Specimens examined: Old Khangsar – Dorkha, 4100 – 4850 m, 16.07.1973, *D. P. Joshi & M. M. Amatya* 73/650 (KATH).

Astragalus rigidulus Benth. ex Bunge in Mem. Acad. Sci. St.-Pet. ser. 7, 11: 23. 1868; Baker in Hook. f., Fl. Brit. India 2: 123. 1876; Chater in Hara & Williams, Enum. Fl. Pl. Nepal 2: 107. 1979; Grierson & Long in Grierson & Long, Fl. Bhutan 1 (3): 720. 1987; Sanjappa, Legum. India 94. 1992; Press et al., Annot. Checkl. Fl. Pl. Nepal 167. 2000; Kumar & Sane, Legum. South Asia: Checkl. 240. 2003.

Distribution: Bhutan, China, India, Nepal (3800-4900 m).

Astragalus sanjappae Chaudhary & Khan in Rheedeia 15 (2): 129, f. 1. 2005.

Distribution: Nepal (Batase, 3963 m), India.

Note: Recently described from India and Nepal by Chaudhary & Khan (2005).

Astragalus sikkimensis Benth. ex Bunge in Mem. Acad. Sci. St.-Pet. ser. 7, 11: 23. 1868; Baker in Hook. f., Fl. Brit. India 2: 126. 1876; Chater in Hara & Williams, Enum. Fl. Pl. Nepal 2: 107. 1979; Sanjappa, Legum. India 94. 1992; Press et al., Annot. Checkl. Fl. Pl. Nepal 167. 2000; Kumar & Sane, Legum. South Asia: Checkl. 240. 2003 *pp*. (excluding *A. tenuicaulis* Bunge).

Distribution: Bhutan, China, India, Nepal (2210 - 4331 m).

Astragalus stipulatus D. Don ex Sims in Bot. Mag. 50: t. 2380. 1823; Baker in Hook. f., Fl. Brit. India 2:131. 1876; Chater in Hara & Williams, Enum. Fl. Pl. Nepal 2: 107. 1979; Sanjappa, Legum. India 94. 1992; Press et al., Annot. Checkl. Fl. Pl. Nepal 167. 2000; Kumar & Sane, Legum. South Asia: Checkl. 241. 2003.

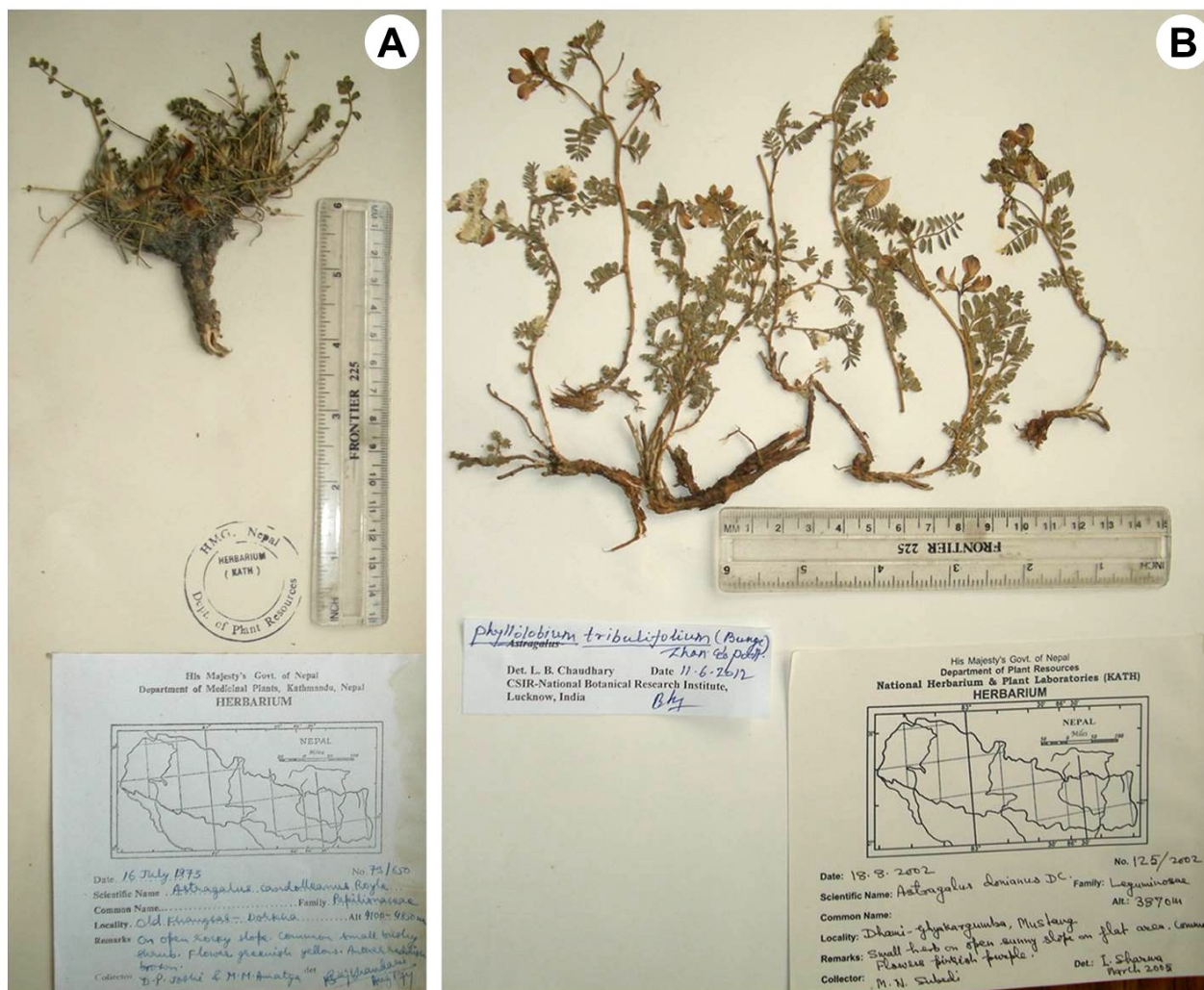
Distribution: Bhutan, China, India, Nepal (2100-3400 m).

- Astragalus stipulatus var. phulchokiensis** H. Ohashi, Fl. E. Himalaya 3: 57. 1975; Chater in Hara & Williams, Enum. Fl. Pl. Nepal 2: 107. 1979; Press et al., Annot. Checkl. Fl. Pl. Nepal 167. 2000; Kumar & Sane, Legum. South Asia: Checkl. 241. 2003.
Distribution: Nepal (2200 m) - Endemic.
- Astragalus strictus** Grah. ex Benth. in Royle, Illust. Bot. Himal. Mount. 198. 1835; Baker in Hook. f., Fl. Brit. India 2: 124. 1876; Chater in Hara & Williams, Enum. Fl. Pl. Nepal 2: 107. 1979; Press et al., Annot. Checkl. Fl. Nepal 167. 2000; Kumar & Sane, Legum. South Asia: Checkl. 241. 2003.
A. ladakensis Balakr. in J. Bomaby Nat. Hist. Soc. 63: 328. 1966; Sanjappa, Legum. India 94. 1992.
Distribution: Bangladesh, Bhutan, China, India, Nepal (3500-5420 m).
- Astragalus tecti-mundi** Freyn in Bull. Herb. Boiss., sér. 2, 4: 456. 1904; Kumar & Sane, Legum. South Asia: Checkl. 242. 2003.
A. frigidus auct non (L.) A. Gray 1864; Baker in Hook. f., Fl. Brit. India 2: 130. 1876; Chater in Hara & Williams, Enum. Fl. Pl. Nepal 2: 106. 1979; Sanjappa, Legum. India 87. 1992. Press et al., Annot. Checkl. Fl. Pl. Nepal 166. 2000.
Distribution: Afghanistan, India, Nepal ? (4100 m), Pakistan, Tadjhikistan.
Note: Its distribution needs to be rechecked in Nepal as it has not been recorded by Kumar and Sane (2003) and Xu and Podlech (2010).
- Astragalus tenuicaulis** Benth. ex Bunge in Mem. Acad. Sci. St.-Pet. ser. 7, 11: 23. 1868; Baker in Hook.f., Fl. Brit. India 2: 126. 1876; Ali in Biologia 7: 41. 1961; Sanjappa, Legum. India 95. 1992.
A. inconspicuus Baker in Hook.f., Fl. Brit. India 2: 126. 1876.
Distribution: Nepal (2100 m), India.
Note: New record for Nepal. This species has been synonymised with *A. sikkimensis* in Kumar and Sane (2003) and Xu and Podlech (2010), but Chaudhary and Khan (2005) have treated them separately.
Specimens examined: NEPAL: Serpagaon – Khanjim, 7000 ft., 17.03.022, *M. S. Bista* 3090 (KATH).
- Astragalus thomsonii** Podlech, Sendtnera 6: 140. 1999. Xu & Podlech in Wu et al., Fl. China 10: 379. 2010.
Distribution: China, India, Nepal. Alt. 3600 – 5300 m.
- Astragalus tribulifolius** Bunge in Mem. Acad. Sci. St.-Pet. ser. 7, 11: 4. 1868; Baker in Hook. f., Fl. Brit. India 2: 120. 1876; Sanjappa, Legum. India 96. 1992; Kumar & Sane, Legum. South Asia: Checkl. 243. 2003. (Fig. 2B).
A. tribulifolius var. *pauciflorus* Marq. in J. Linn. Soc. Bot. 48: 171. 1929.
Distribution: China, Nepal (3750-3870 m), Pakistan, Tadjhikistan.
Note: Not recorded in Chater (1979) and Press et al. (2000), however, included by Kumar and Sane (2003) and Xu and Podlech (2010). We also observed following specimens in the present study. Recently (Zhang and Podlech, 2009) this species has been transferred to the genus *Phyllobium* Fisch. [*P. tribulifolium* (Bunge) M. L. Zhang & Podlech].
Specimens examined: NEPAL: Mustang, Nhechung, 3800 m, 30.07.1979, *P. R. Shakya* et al. 5199 (KATH); Mustang, Samar, 3750 m, 11.07.2000, *M. N. Subedi* 0040028(KATH); Mustang, Dhami – Ghyakargumba, 3870 m, 18.08.2002, *M. N. Subedi* 125/2002(KATH).
- Astragalus tumbatsicus** C. Marquand & Airy Shaw, J. Linn. Soc., Bot. 48: 171. 1929 [*tumbatsica*]; Xu & Podlech in Wu et al., Fl. China 10: 352. 2010.
Distribution: China, Bhutan, Nepal. Alt. 3300 – 4100m.
Note: Recorded here based on Xu and Podlech (2010).
- Astragalus webbianus** Grah. ex Benth. in Royle, Illust. Himal. Bot. 199. 1835; Baker in Hook. f., Fl. Brit. India 2: 132. 1876; Sanjappa, Legum. India 96. 1992; Kumar & Sane, Legum. South Asia: Checkl. 244. 2003.
Distribution: Afghanistan, China, India, Nepal?, Pakistan.
Note: It seems that Kumar & Sane (2003) have erroneously recorded this species from Nepal by citing the reference Press et al. (2000). It has not been recorded either in press et al. (2000) or in any other works such as Baker (1876), Ali (1977), Chater (1979), Sanjappa (1992) and Xu and Podlech (2010).
- Astragalus yunnanensis** Franch., Pl. Delav. 162. 1889; Chater in Hara & Williams, Enum. Fl. Pl. Nepal 2: 107. 1979; Wenninger in Mitt. Staatss. Munchen 30:146. 1991; Press et al., Annot. Checkl. Fl. Pl. Nepal 167. 2000; Kumar & Sane, South Asia Legum.: Checkl. 244. 2003; Chaudhary & Sivastava in Taiwan 52 (1): 30. 2007.
Distribution: China, India, Nepal (3500 - 5600 m).
Note: very close to *A. kongrensis* Baker.

Fig. 1: A, *Astragalus grahamianus* Royle ex Benth. (Dobremez & Manandhar 74-648); B, *Astragalus kongrensis* Benth. ex Baker (Shakya & Poudel 10467); C, *Astragalus langtangensis* Podlech (Schilling, Sayers & Bista 380-Isotype); D, *Astragalus pindrensis* (Benth. ex Baker) Ali (Subedi 290-2001).



Fig. 2: A, *Astragalus rhizanthus* Royle ex Benth. (Joshi & Amatya 73/650); B, *Astragalus tribulifolius* Bunge (Subedi 125/2002).



Conclusion

The central Himalaya (Nepal Himalaya) is an important region as it is the meeting point of the elements of the N. W. Himalaya and the Eastern Himalaya. In addition, the region has also great affinity with the elements of Tibetans plateau. Out of 49 species of *Astragalus* found in Nepal, only 10 species are endemic, while others are distributed in adjoining regions. The examination of herbarium specimens at country's National Herbarium (KATH) and Central University Herbarium (TUCH) revealed that the genus is not well represented there and only for about 25 species (ca. 50% of total species) specimens are available. The specimens for remaining species are available at different herbaria outside the country. Hence, this group needs extensive exploration

from throughout the Nepal Himalaya to know the correct number of species within the genus and their current conservation status in the country. Through biodiversity agencies the rules should be enforced to all collectors who so ever collecting plants for any botanical study to deposit one set of herbarium specimens to the national herbarium of the country.

Acknowledgements

The Director, CSIR-National Botanical Research Institute, Lucknow, India is duly acknowledged for facilities and support. One of us (LBC) is highly thankful to INSA, New Delhi, India and NAST, Kathmandu, Nepal for financial support under international bilateral exchange programme to visit Kathmandu to study the genus *Astragalus* of Nepal at

KATH and TUCH. We greatly acknowledge the In-charge of herbaria mentioned in the work for their permission to consult the herbaria and Dr. V. Sampath Kumar, BSI, Kolkata for providing some literature.

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