

Lectotypification and new locality report for monotypic and critically endangered genus *Catamixis* (Asteraceae: Pertyoideae: Pertyeae)

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प्रतिरूपी एवं अत्यधिक संकटापन्न वंश *केटामिक्सिस* (एस्टरेसी: परटायोडी: परटाइ) के लिए लेक्टोटाइपिफिकेशन एवं नया स्थानिक अभिलेख

एस. के. श्रीवास्तव एवं प्रशान्त के. पुसालकर

सारांश

केटामिक्सिस बाक्कराइडिस थॉमसन वंश *केटामिक्सिस* थॉमसन (एस्टरेसी : परटायोडी परटाइ) की प्रतिरूपी संक्रीण विस्तारित स्थानिक जाति है, जो भारत एवं नेपाल में पाई जाती है एवं लेक्टोटाइपिफाइड है। इस संकटापन्न जाति के लिए प्रस्तुत शोध पत्र यहां के द्वारा विस्तृत आकार- वर्गिकीय, लक्षणों एवं अद्यतन वितरण सीमा प्रथम बार एक नये स्थानिक अभिलेख के साथ उपलब्ध करवाई गई है।

ABSTRACT

Catamixis baccharoides Thomson, a narrow range endemic species of a monotypic genus *Catamixis* Thomson (Asteraceae: Pertyoideae: Pertyeae) found in India and Nepal, is lectotyped. Detailed morpho-taxonomic characterization and updated distribution range is provided for the first time with a new locality record for this critically endangered species.

Keywords: Asteraceae, *Catamixis*, Endemic, Endangered, Lectotypification

INTRODUCTION

Catamixis Thomson [Asteraceae: Pertyoideae: Pertyeae], with representative chasmophyte *C. baccharoides* Thomson, is a monotypic, narrow range endemic genus found in India and Nepal. It is distributed in the outer western Himalaya and Siwalik region of Garhwal (Uttarakhand), with disjunct records from Western Nepal (Kitamura &

Gould, 1982) and Haryana (Parker, 1956; Jain & al., 2000; Kumar, 2001).

Systematic Position: The systematic placement of the genus was reviewed in detail by Ortiz & al. (2008), who concluded that in spite of many characters of Mutisieae (*sensu* Cabrera, 1977) including palynological features (described in details by Ortiz & al., (2008), the genus differs in some characters and hence Ortiz & al. (2008) treated

Catamixis as 'unplaced genus'. Panero (2008) observed that two conserved *Indel* patterns in the intergenic spacer *ndhI-ndhG* of the chloroplast DNA showed a 145 base pair deletion in *Catamixis*, as in the genera *Ainsliaea* DC., *Myriopholis* Bunge, and *Pertya* Sch.Bip. A sequence data of the chloroplast gene *matK* further revealed that *Catamixis*, *Ainsliaea*, and *Pertya* share a mutation unique to the Pertyoideae lineage. Based on these molecular signatures, Panero (2008) concluded the inclusion of *Catamixis* in the subfamily Pertyoideae Panero & V.A. Funk. In spite of its placement in the tribe Pertyeae Panero & V.A. Funk by Jeffrey (2007), Panero (2008) clearly stated that affinities of *Catamixis* within Pertyoideae are yet to be clearly understood. Notably, in contrast with other Pertyeae members, which show deeply 5-lobed ligule limb, *Catamixis* has shallowly 5-toothed ligule limb and hence Panero (2008) stressed that further detailed molecular studies on Pertyoideae members will reveal its true placement and affinities within the subfamily Pertyoideae.

Taxonomy

Catamixis baccharoides Thomson in J. Linn. Soc., Bot. 9: 343, t. 4. 1866 (1867); C.B. Clarke, Compos. Ind.: 248. 1876; Hook.f., Fl. Brit. India 3: 389. 1881; Duthie, Fl. Upp. Gangetic Plain 1(2):444.1905 [Repr.1960] Kanjilal, Fl. Chakrata: 284. 1928; R.N. Parker, Forest Fl. Punjab Hazara Delhi: 294. 1956; R.K. Gupta, Seasonal Flow. Ind. Summer Resort Mussoorie: 192. 1967; M.B. Raizada & H.O. Saxena, Fl. Mussoorie 1: 390. 1978; S.K. Jain & A.R.K. Sastry, Threat. Pl. India: 18. 1980; U.C. Bhattach. & A.K. Goel, Studies Veg. Tehri Dam & Rare Pl. Garhwal Himal.: 35. 1982; S. Kitamura & S. Gould in H. Hara & al., Enum. Flow. Pl. Nepal 3: 19. 1982; Hajra in S.K. Jain & R.R. Rao, Assessment Threat. Pl. India: 7. 1983; Hajra, Ind. Pl. Red Data Book 1: 38. 1984; M.P. Nayar & M. Ahmedullah in Bull. Bot. Surv. India 27: 248, f. 1. 1985; R.R. Rao & al., Fl. Ind. Enum. Asteraceae: 22. 1988; R.R. Rao in Hajra & al., Fl. India 13: 169, f. 52. 1995; R.D. Gaur, Fl. Garhwal: 565. 1999; Khanna & al., Dicot. Pl. Uttar Pradesh Checkl.: 194. 1999; S.P. Jain & al., Fl. Haryana: 113. 2000; S. Kumar, Fl. Haryana: 194, f. 35. 2001; Uniyal & al., Flow. Pl. Uttarakhand Checkl.: 153. 2007; Ortiz & al. in V.A. Funk & al., Syst. Evolution & Biogeogr. Compositae: 209–210, f. 12.8–12.9. 2008; Karthikeyan & al., Flow. Pl. Ind. Dicot.: 210. 2009.

[Plate. 1]

Vish patra (Garhwali) [Gaur, 1999; Sharma & al., 2011].

Shrub, bushy, evergreen, 0.8–1.2(–1.8) m tall, erect, ascending, rarely a large shrub. Stem much branched, densely leafy, greyish black, glabrous below, densely tomentose in upper part, ridged or wrinkled, with conspicuous scars of fallen petiole bases. Leaves alternate; petiole 5–25 mm long, often sericeous, apparently narrowly winged due to decurrent lamina base; lamina typically wedge-shaped, sometimes obovate or obovate-spathulate, rarely sub-orbicular-obovate or oblong-obovate, 2.8–8 × 1.8–5 cm, thick, coriaceous or sub-coriaceous, cuneate or narrowed at base, decurrent on petiole, coarsely serrate, crenate-serrate to obtusely incised-dentate at margins, rounded or obtuse, toothed at apex, surface glabrous or puberulous above, puberulous beneath, often sparsely to moderately pubescent in basal half, glandular or not, sometimes glabrescent with age, prominently veined; veins raised on both surfaces when dry. Capitulescence terminal, dichotomously branched many times, few to many-capitulate corymbose panicle, overtopping foliage; inflorescence branches glandular, puberulous; lower bracts foliaceous, reduced; upper bract and bracteoles reduced, herbaceous, green or purplish, often setaceous; uppermost bracteoles and outermost phyllaries sometimes alike and closely placed to capitula base; peduncle branches often with many sterile bracts/bracteoles. Capitula 8–10 mm long, homogamous, ligulate. Florets white, sometimes yellow (Parker, 1956; Gupta, 1967), all similar, hermaphrodite, fertile, 5–7 per capitula, glabrous. Phyllaries (4–)5–9(–13)-seriate, scarcely imbricate, somewhat laxly placed, shorter than flower, often purplish, longer inwards, apex acute to acuminate; margins thin, pale, scabrid or glandular-ciliate or laciniate; outer surface glandular-papillose or puberulous; outer phyllaries triangular-ovate to ovate-lanceolate, 0.5–1 × 0.3–0.7 mm, usually purplish or purple-tipped in distal half; inner lanceolate, narrowly lanceolate or linear-lanceolate, 3–7 × 0.7–1 mm, often with conspicuous purple midvein and purple marginal lines. Receptacle convex, glabrous, epaleate, ± alveolate. Corolla tube 3.5–5 mm long; ligule limb linear-spathulate, spreading, 4–5 mm long, 0.7–1 mm broad, 5-toothed at apex; teeth equal or unequal. Exserted anther tube bluish or purple-tinged, 2–3 mm long; anther appendages narrow-triangular, apex sub-acute or somewhat rounded; collar scarcely distinguishable from filament; anther base sagittate with laciniate tails. Style filiform, 4–5 mm long; shaft glabrous; arms erect, short, dorsally short papillose; apices slightly rounded. Cypselas narrowly turbinate, obovate, oblong-obovate or obconical,



Plate -1: *Catamixis baccharoides* Thomson. **A.** Habitat on road side rocky slope at Shambu ki Chauki, **B.** Habitat on vulnerable landslide affected slope, **C.** Habit, **D.** Foliage close-up, **E.** Inflorescence, **F.** Floret close-up, **G.** Infructescence, **H.** Infructescence close-up.



Fig-1: Scanned Image of Lectotype of *Catamixis baccharoides* Thomson.

1–3 × 0.6–1.2 mm, brownish, sub-flattened, densely hairy, apparently silky-villose or sericeous; cypselas hairs in basal/sub-basal part longer than upper, hairs equaling or slightly exceeding cypselas, reaching slightly above pappus base; pappus 2-seriate or sub-2-seriate; hairs slender, 3.5–8 mm long, white, barbellate; outer pappus shorter.

Lectotype (designated here): India, Siwaliks, J.L. Stewart 209 K000323047!: lower left hand side specimen marked with an arrow [mounted on the same sheet [barcode number K000323047] with three more branches bearing capitulescence and some additional broken pieces of capitulescence and leaves mounted at right hand lower corner of this sheet. (Fig. 1).

In the protologue (Thomson, 1867) collections of J.L. Stewart, Dr. Falconer and Mr. Edgeworth from Siwalik Himalaya were mentioned and all of them are housed at K. Thomson (1867) also mentioned about an original collection by Royle which could not be located by him, but during the present study this collection of Royle was found at DD. Of the material referred in protologue, one collection of M.P. Edgeworth and another of J.L. Stewart were from Siwaliks, N.W. India without precise localities. Of Falconer's collections, one [K000323045] was without precise locality, whereas the other [K000323046] was from Beribara, presently in Haridwar district, Uttarakhand. Since the first specimen has information in Devnagari script and second in Urdu, these specimens were possibly collected by Falconer's two different local collectors, and not by himself. For the purpose of lectotypification, the collection with precise type locality would best serve the purpose and hence Falconer's collection from Beribara becomes the first choice. However, K000323046 has two mounted branches in vegetative condition as compared to other collections in flowering/fruitletting and second collection in Herbarium Falconer [K000323045] has no reference in protologue. Since, Thomson (1867) mentioned that Edgeworth's collection [K000323048] was too immature to show the diagnostic characters and highlighted that Stewart's specimen studied by him at K was excellent representative of this taxon, hence K000323047 became our obvious choice for the lectotypification.

Illustrations: Thomson (1867), Nayar & Ahmedullah (1985), Rao (1995: f. 52); Ortiz & al. (2008: 209–210, f. 12.8–12.9).

Flowering and Fruitletting: March–June.

Habitat and Ecology: Rare and restricted to semi-arid habitats of vertical, open sandy slopes (Haridwar Shiwalik,

Timli pass), rocky cliffs (Mohand pass, Chakrata), or dry, eroded steep calcareous/ limestone slopes (Byasi-Karnaprayag, Saknidhar) along road sides, often associated with *Euphorbia royleana* Boiss.; 650–1000 m elevation. Endemic to Indo-Nepal Siwalik hills and outer Himalayan zone.

Conservation Status: Critically Endangered [IUCN Red List Criteria B2 - Area of occupancy (AOO): <10km² and B2(b) - Continuous decline observed, estimated, inferred and projected in (ii) area of occupancy, (v) number of mature individuals; Criteria C - Number of mature individuals: < 250; C2(a-i) - Number of mature individuals in each subpopulation: ≤ 50 (IUCN, 2014)].

Distribution: INDIA [Haryana (Kalesar, Dharpur-Yamunanagar (Jain & al., 2000; Kumar, 2001), Uttarakhand (Dehradun district: Mussoorie, Mohand (3 km from Mohand village, on 10–15 m high cliff along road side), Timli pass [Shiv Mandir-Badshahi bagh (Pundir, 2015)], Chakrata [Kalsi-Sahiya road, near Shambhu ki Chowki]; Haridwar district: Beribara, Ranipur, Mansa Devi hill; Pauri: Lansdowne division; Tehri district: Byasi-Karnaprayag, near Saknidhar, 10–12 km from Byasi], NEPAL (west).

New locality of distribution: While studying the distribution it was noted that Thomson (1867) described the species from Siwalik with mention of Beribara. Hooker (1881) referred to its general habitat in Garhwal Siwalik, but no locality was mentioned. Later, it was recorded from Timli pass by Kanjilal in 1900 and at Mohand pass by R.N. Parker in 1925. Notably, collections by R.N. Parker in 1918 from Kalesar in Ambala Siwalik of Haryana (Housed at DD) along with its extended distribution range report (Parker, 1956) from Ambala to Ganges remained overlooked and for over a century it had been known as Garhwal Siwalik endemic. In 1982, Bhattacharyya and Goel reported the species from adjacent region of Tehri Garhwal in outer Himalayan hills at Saknidhar on Byasi-Deoprayag road, which was then believed to be first record from outer Himalaya outside Siwalik. However, this report again overlooked Royle's collection from Mussoorie housed at DD and reported occurrence in Mussoorie hills by Gupta (1967) and Raizada and Saxena (1978). The species remained known as Indian endemic till report from western Nepal (Kitamura & Gould, 1982). Interestingly, the species is hitherto not recorded from Kumaon, a corridor between Garhwal and Nepal. Thus, the species is primarily a Siwalik floristic element reported from Timli pass and Mohand in Dehradun

district; Lansdowne division in Pauri district; Beribara, Ranipur, Mansa Devi hill in Haridwar district of Uttarakhand, and Ambala Siwalik in Haryana. It also occurs in outer Himalayan slopes at Mussoorie and near Saknidhar on Byasi-Karnaprayag road in Tehri district of Uttarakhand. The Garhwal Siwalik is possibly the centre of origin of this narrow-range narrow endemic.

Recently under 'New locality search for Rare, Threatened and Endemic species', an ongoing objective of the department, a team from Botanical Survey of India, Northern Regional Centre has discovered a new locality for this endangered species at: Uttarakhand, District Dehradun, Chakrata tehsil, Kalsi to Sahiya, 8 km from Kalsi, near Shambhu ki Chowki, 25 sq m area [between 30°33'658" N – 30°33'675" N and 77°51'069" – 77°51'079" E] harboring 22 individuals on uphill (left hand side facing Sahiya) vertical slopes. It should be noted that the said locality is also along road side and widening of this road will result in complete destruction of local population of the species. During our three visits in the last couple of years in August 2013, May 2014 and August 2014, we have already noted that the slopes were partly damaged resulting in loss of two healthy plants previously growing at hand's reach. Immediate action on the part of Forest Department is needed for the sustenance of other populations.

Specimens examined: HARYANA: Ambala Siwaliks, Kalesar, 26.12.1918, *R.N. Parker s.n.*, acc. no. 21214 (DD). UTTARAKHAND: N.W. India, Siwalik range, 1844, *M.P. Edgeworth* 49 (K000323048); Beribara, *H. Falconer s.n.* (K000323046); Mussoorie, *Royle* 99/196 (DD); Deyrah Dhoon, 1846, Saharanpur Siwaliks (now in Uttarakhand), Timli pass, 12.1.1900, *U. Kanjilal* 1129 (DD); Timli pass, Siwalik range, 30.12.1900, *Harsukh* 23109, 23109a (DD); Timli, July 1900, *U. Kanjilal* 859 (DD), with a note 'also behind Ranipur near Haridwar'; Haridwar, Beribara, April 1901, Ranger *Pancham Singh* for *U. Kanjilal* 1130 (DD); Uttar Pradesh, Siwalik, near Mohand, 29.5.1925, *R.N. Parker s.n.* (GH00263953); Siwalik (Pauri), east of Haridwar, Lansdowne division, 1.1.1926, *W.J. Lambert s.n.* acc. no. 41554 (DD); Dehradun, Timli pass, 8.1.1967, *Som Deva* 1579 (BSD); Dehradun, Mohand pass, 700 m, 23.3.1967, *Som Deva* 1971 (BSD); Haridwar, Mansa Devi hill, 500 m, 7.5.1967, *Som Deva* 2350 (BSD); Dehradun, Timli pass, 800 m, 11.5.1967, *Som Deva* 2323 (DD); Timpli pass, 900–1000 m, 11.4.1969, *U.C. Bhattacharyya* 37758 (BSD); Garhwal, Tehri, 10 km after Byashi on way to Dev Prayag, 9.6.1967, *H.B. Naithani* 2105 (DD);

Rajaji sanctuary, 135/8 miles, 17.4.1970, *J.V.S. Rao* 40035 (BSD); on way to Dev Prayag, 8 km from Byasi, 1000 m, 20.3.1981, *U.C. Bhattacharyya* 72699 (BSD); Tehri, on way to Dev Prayag, 900 m, 7.4.1981, *A.K. Goel* 72903 (BSD); Garhwal, Shimpuri-Dev Prayag, 13.2.1982, *P.K. Hajra* 50375 (BSD); on way to Mohand, 17.12.1987, *B.P. Uniyal* 80553 (BSD); Tehri, Byasi to Devprayag, about 8 km from Byasi, before Saknidhar, 28.5.1993, *S.K. Murti* 83488 (BSD); Chakrata, Kalsi-Sahiya, near Shambhu ki Chowki, 905 m, 27.08.2013, *P.K. Pusalkar* 121900 (BSD); Mohand pass, 900 m, 21.5.2014, *Pooja Chauhan* 9, Acc. No. 115876 (BSD); Chakrata, Kalsi-Sahiya, near Shambhu ki Chowki, 30°33'658" N, 77°51'069" E, 901 m, 26.5.2014, *S.K. Srivastava & P.K. Pusalkar* 122754 (BSD).

Threat: The species is of rare occurrence, confined only to above said localities with unique habitat at 650–1000 m elevation on vertical, open rocky or lime cliffs and eroded steep calcareous slopes with number of individuals varying from 5–22 (–50) in each locality. Nearly in all the above localities the species was found growing along road side slopes vulnerable to road construction/ road widening. It was categorized as 'rare' in Indian Plant Red Data Book (Hajra, 1984), whereas Nayar and Ahmedullah (1985) also highlighted threat due to then ongoing mining and quarrying operations. The possibility of the population loss of some of unrecorded populations in Mussoorie and adjoining environs due to above said reasons cannot be rejected. Different researchers have placed the species in different threat categories as follows: Rare (Hajra, 1984), Threatened/Extinction-prone (Nayar & Ahmedullah, 1985), Threatened (Gaur, 1999), Endangered/on the verge of Extinction (Pundir, 2015). Based on field surveys Pundir (2015) reported that during 1997–2001, 60 bushes existed in Haridwar Siwalik, 17 at Mohand pass and 36 at Saknidhar (Byasi-Karnaprayag) area. However, the number of individual in all localities were constantly declined and in 2014 Saknidhar slopes only had 11 individuals left, with 6 plants in very poor health. He further observed that two of the exceptionally large, small tree-sized specimens seen by him in Saknidhar area in 1997 were currently non extant (Pundir, 2015). Notably, localities in Haridwar Siwalik and Mohand are included in the Rajaji National Park, an important *in-situ* conservation area of Uttarakhand. It is noteworthy that the Botanical Survey of India, Dehradun has selected the species as prime target species under *ex-situ* conservation program and some seedlings have been successfully raised through cypsela germination.

Notes: According to Gaur (1999), the species is believed to be poisonous. According to Sharma & al. (2011) roots are medicinal.

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REFERENCES

- BHATTACHARYYA, U.C. AND A.K. GOEL. 1982. Report on - Some ecological aspects of flora and vegetation of Tehri Dam and some rare plants in Garhwal Himalayas. Botanical Survey of India, Howrah.
- CABRERA, A.L. 1977. Mutisieae – Systematic review. In: V.H. Heywood, J.B. Harborne & B.L. Turner (eds.), *The Biology and Chemistry of the Compositae 2*: 1039–1066. Academic Press, London.
- CLARKE, C.B. 1845. *Compositae Indicae*. P. 248. Thacker, Spink & Co., Calcutta.
- GAUR, R.D. 1999. Flora of the District Garhwal North West Himalaya (with Ethnobotanical Notes), Srinagar (Garhwal). Transmedia Publ., Srinagar.
- GUPTA, R.K. 1967. Seasonal Flowers of the Indian Summers Resorts, Mussoorie Hills. Navyug Printers, New Delhi.
- HAJRA, P.K. 1983. Plants of Northwest Himalaya with restricted distribution – A census. In: S.K. Jain & R.R. Rao (eds.), *An Assessment of Threatened Plants of India*. P. 7. Botanical Survey of India, Howrah.
- HAJRA, P.K. 1984. *Catamixis baccaroides* Thoms. (Asteraceae). In: S.K. Jain & A.R.K. Sastry (eds.), *The Indian Plant Red Data Book*. Pp. 38–39. Botanical Survey of India, Howrah.
- HOOKER, J.D. 1881. *The Flora of British India* 3: 389. L. Reeve & Co., London.
- IUCN 2014. Guidelines for Using the IUCN Red List Categories and Criteria. Version 11. Prepared by the Standards and Petitions Subcommittee. <http://www.iucnredlist.org/documents/RedListGuidelines.pdf>.
- JAIN, S.K. AND SASTRY, A.R.K. 1980. Threatened Plants of India – A State-of-the-Art Report. P. 18. Botanical Survey of India, Howrah.
- JAIN, S.P., D.M. VERMA, S.C. SINGH, J.S. SINGH AND S. KUMAR. 2000. Flora of Haryana. P. 113. CSIR-CIMAP, Lucknow.
- JEFFREY, C. 2007 [2006]. Introduction with key to tribes. In: J.W. Kadereit & C. Jeffrey (eds.), *The Families and Genera of Vascular Plants*, 8 (Flowering Plants: Eudicots. Asterales.). Pp. 61–87. Springer, Berlin.
- KANJILAL, U. 1928. Forest Flora of the Chakrata, Dehradun and Saharanpur forest Divisions, United Provinces. [Revised edition by B.L. Gupta]. Delhi.
- KARTHIKEYAN, S., M. SANJAPPA AND S. MOORTHY. 2009. Flowering Plants of India – Dicotyledons, Volume-1 (Acanthaceae – Avicenniaceae). Botanical Survey of India, Kolkata.
- KHANNA, K.K., V. MUDGAL, B.P. UNİYAL AND J.R. SHARMA. 1999. Dicotyledonous Plants of Uttar Pradesh - A Checklist. Bishen Singh Mahendra Pal Singh Publ., Dehradun.
- KITAMURA, S. AND S. GOULD. 1982. Compositae. In: H. Hara, A.O. Chater & L.H.J. Williams (eds.), *An Enumeration of Flowering Plants of Nepal* 3: 9–49. The British Museum (Natural History), London.
- KUMAR, S. 2001. The Flora of Haryana (Materials). Pp. 194–195. Bishen Singh Mahendra Pal Singh Publ., Dehradun.
- NAYAR, M.P. AND M. AHMEDULLAH. 1985. *Catamixis baccharoides* Thoms. – An endemic chasmophyte of the W. Himalaya under threat. *Bull. Bot. Surv. India* 27: 248–250.
- ORTIZ, S., J.M. BONIFACINO, J.V. CRISCI, V.A. FUNK, H.V. HANSEN, D.J. NICHOLAS HIND, L. KATINAS, N. ROQUE, G. SANCHO, A. SUSANNA AND M.C. TELLERÍA. 2008. The basal grade of Compositae: Mutisieae (*sensu* Cabrera) and Carduoideae. In: V.A. Funk, A. Susanna, T. Stuessy & R. Bayer (eds.), *Systematics, Evolution, and Biogeography of Compositae*. Pp.193–213. International Association for Plant Taxonomy, Vienna.
- PANERO, J.L. 2008. Shared molecular signatures support the inclusion of *Catamixis* in subfamily Pertyoideae (Asteraceae). *Phytologia* 90: 418–424.
- PARKER, R.N. 1956. Forest Flora for the Punjab with Hazara and Delhi, 3rd Edition. Pp. 293–294. The Superintendent Government Printing, Lahore.
- PUNDIR, Y.P.S. 2015. Is *Catamixis baccharoides* Thoms. Endangered or At the verge of Extinction? Distribution and an approach for Conservation. Kobo – ebook. <https://store.kobobooks.com> [accessed on 22.06.2015]
- RAIZADA, M.B. AND H.O. SAXENA. 1978. Flora of Mussoorie Vol. 1. Bishen Singh Mahendra Pal Singh Publ., Dehradun.
- RAO, R.R. 1995. *Catamixis* Thomson. In: Hajra, P.K., R.R. Rao, D.K. Singh & B.P. Uniyal (eds.), *Flora of India* 13 (Asteraceae: Innuleae-Vernonieae): 168–169. Botanical Survey of India, Calcutta.

- RAO, R.R., H.J. CHOWDHERRY, P.K. HAJRA, S. KUMAR, P.C. PANT, B.D. NAITHANI, B.P. UNIYAL, R. MATHUR AND S.K. MAMGAIN 1988. *Florae Indicae Enumeratio – Asteraceae*. Botanical Survey of India, Calcutta.
- SHARMA, J., R.D. GAUR AND M. PAINULI. 2011. Conservation status and diversity of some important plants in the Siwalik Himalaya of Uttarakhand, India. *Int. J. Med. Arom. Pl.* 1(2): 75–82.
- THOMSON, T. 1866 (1867). On two new genera of Compositae, Mutisiaceae, from India. *J. Linn. Soc., Bot.* 9: 342–344.
- UNIYAL, B.P., J.R. SHARMA, U. CHOUDHARY AND D.K. SINGH. 2007. *Flowering Plants of Uttarakhand [A Checklist]*. Bishen Singh Mahendra Pal Singh Publ., Dehradun, India.