

Distributional records of new and lesser-known angiospermic trees from Uttarakhand, India

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ABSTRACT

The state of Uttarakhand has about 4800 species under 213 families, which is about 22 per cent of the total Indian Flora. Most updated information on the floristic account of Uttarakhand is available in a checklist, which includes both wild and cultivated plants, but, without any precise locality. During a floristic survey of Uttarakhand and scrutiny of herbarium specimens, the distribution of twenty-nine species was studied, among them three species, viz., *Acacia leucophloea* (Roxb.) Willd., *Cordia macleodii* (Griff.) Hook.f. & Thoms., and *Syzygium heyneanum* (Duthie) Wall. ex Gamble have been recorded for the first time in Uttarakhand. *Dalbergia latifolia* Roxb., so far known under cultivation, is now recorded from Chandi Devi area. Other twenty-three species are rare and restricted in distribution. Localities and a note on each species have been provided. All the species except *Acacia leucophloea* (Roxb.) Willd. and *Acacia modesta* Wall., are placed according to current nomenclature (POWO).

INTRODUCTION

Uttarakhand became the 27th state of India on 9th November, 2000 (Fig. 1). The state is located between 77°34' to 81°03' E and 28°43' to 31°28'N and encompasses a geographical area of 53483 km² with 46035 km² of hilly terrain and 7448 km² of plain areas. About 45.44% or 24305 km² of total geographic area is covered by forests. Out of total forest cover, 5005 km² area is under very dense forest, 12768 km² under moderately dense forest, and 6482 km² under open forests (FSI, 2021).

The state harbours 4,800 species of flowering plants under 1,400 genera of 215 families accounting for slightly over 22 per cent of the total Indian flowering plants. Angiosperms include 4,781 taxa under 1,391 genera and 211 families, while gymnosperms are represented by 19 species under 9 genera of 4 families (Pusalkar & Srivastava, 2018). To date, the most authentic information on the flora of Uttarakhand is based on a checklist prepared by Uniyal et al. (2007), which includes many cultivated and introduced species, viz., *Michelia doltsopa*, *Dillenia indica*, *Nandina domestica*,

Bixa orellana, *Sterculia urens*, *Elaeocarpus* spp., *Casimiroa edulis*, etc. without any indication of wild occurrence or under cultivation. Since it is a checklist, the precise locality of species is not mentioned. After Uniyal et al. (2007), recently Pusalkar and Srivastava (2018) published a detailed remarkable flora of Uttarakhand, dealing with families *Ranunculaceae* up to *Moringaceae*, based on Bentham and Hooker (1862-1883) classification. Recently, Chaturvedi, Chandra and Rawat (2022) recorded a total of 290 threatened plant species from Uttarakhand, including 24 tree species. Four tree species mentioned by them, viz., *Magnolia doltsopa* (Buch.-Ham. ex DC.) Baill., *Alseodaphne himalayana* Kosterm., *Phoenix rupicola* T.Anders. and *Dalbergia latifolia* Roxb., need verification of their wild occurrence in Uttarakhand. Keeping in view, occurrences with precise locality of the tree species discussed in the paper have been provided.

RESULTS AND DISCUSSION

During the floristic survey of Uttarakhand and scrutiny of herbarium specimens deposited at Forest Research Institute Herbarium (DD) and Botanical Survey of India, Northern Regional Centre, Dehradun (BSD), the authors found some interesting distributions of the twenty-nine tree species of flowering plants. Scrutiny of literature, viz., Duthie (1906), Duthie (1903-1929), Osmaston (1927), Gupta (1968), Kanjilal (1969), Raizada (1976), Raizada and Saxena (1978), Naithani (1984-1985), Pant (1986), Hajra and Balodi (1995), Gaur (1999), Murti, Singh and Singh (2000), Singh and Anand (2002), Rana, Datt and Rao (2003), Uniyal et al. (2007), Rawat (2014), Agarwal (2017) and Pusalkar and Srivastava

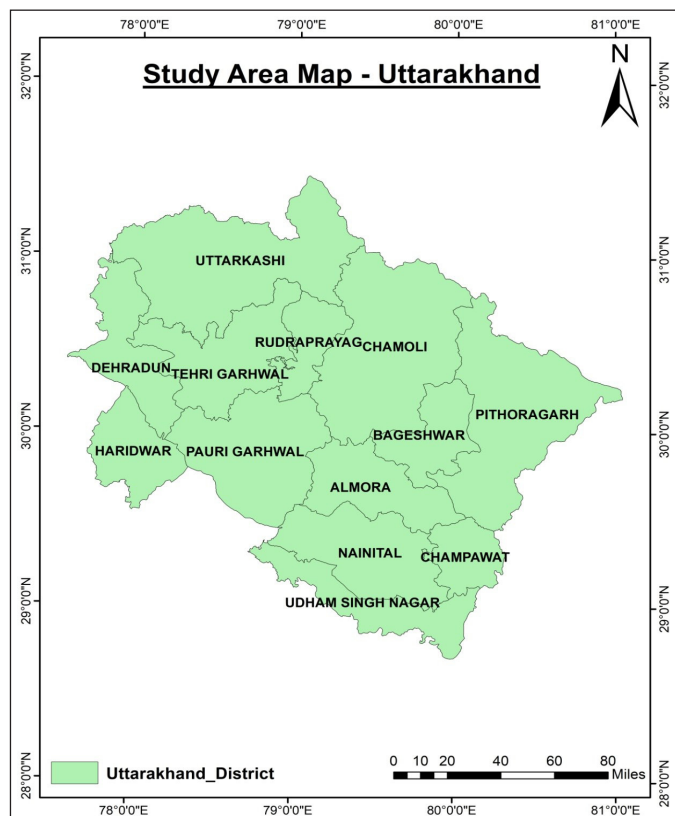


Figure 1. District Map of Uttarakhand.

(2018), Chandra et al. (2022), Naithani and Chandra (2023), revealed the interesting distribution of these species. Out of that, three species, viz., *Acacia leucophloea* (Roxb.) Willd., *Cordia macleodii* (Griff.) Hook.f. & Thom. and *Syzygium heyneanum* (Duthie) Wall. ex Gamble are being reported for the first time from the state. Also, a wild population of *Dalbergia latifolia* Roxb., is reported for the first time. The rest twenty-three species are lesser known and show a restricted distribution. The distribution of these is provided in this article with the exact locations either via GPS reading or quoting recent herbarium collections. Additionally, correct nomenclature, synonyms, and a brief note on each species have also been provided. Regarding botanical names of two well-known forestry species, viz., Safed keekar, Rongh (*Acacia leucophloea* (Roxb.) Willd.) and Amritsar gum, Black sally, Phulai (*A. modesta* Wall.), have been retained under genus *Acacia*, as the foresters are much acquainted with earlier names and are not much aware of *Vachellia leucophloea* (Roxb.) Maslin and *Senegalia modesta* (Wall.) P.J.H.Hurter. Rest of the species are in accordance with POWO. The present information will be very useful for the preparation of Flora of Uttarakhand, in future.

ENUMERATION

ACACIA Mill. (Mimosaceae).

Acacia leucophloea (Roxb.) Willd., Sp. Pl. 4:1083.1806; Baker in Hook.f., Fl. Brit. India, 2: 294. 1878. *Mimosa leucophloea*

Roxb., Pl. Coromand. 2:27, t.150. 1800. *Vachellia leucophloea* (Roxb.) Maslin, Seigler & Edinger in Blumea 58: 42. 2013.

Names: *Safed keekar, Rongh.*

There is no record of the occurrence of this species from Uttarakhand. Even Sanjappa (1992), Chakrabarty and Gangopdhyay (1996), and Uniyal et al. (2007) have not mentioned its occurrence in Uttarakhand. It is now reported for the first time in Uttarakhand.

Specimen examined: Ranipur, Dehra Dun, 27th January 1916, A.E. Osmaston 732, Acc. No. 1666 (DD); Ranipur 1st April 1972, Som Deva 6674, Acc. No. 154740 (DD); Near Old Forest Rest House, Mohand, Dehra Dun, 27th February 1998, H.B. Naithani 2018, Acc. No. 17316 (DD).

Acacia modesta Wall., Pl. Asiat. Rar. 2: 27, t. 130. 1831; Baker in Hook.f., Fl. Brit. India 2: 296. 1878. *Senegalia modesta* (Wall.) P.J.H.Hurter, Mabblerley's Pl.- Book: 1021.2008

Names: *Amritsar gum, Black selly, Phulai.*

Uniyal et al. (2007) mentioned it in the checklist without any precise locality. Scrutiny of the herbarium specimen reveals that there is no specimen of it deposited in the herbarium of Forest Research Institute, Dehra Dun (DD) and Botanical Survey of India, Northern Regional Centre, Dehra Dun (BSD). Even, Sanjappa (1992) and Chakrabarty and Gangopadhyay (1996) have not mentioned it from Uttarakhand. Its collection from Haridwar indicates its wild occurrence in Uttarakhand.

Specimen examined: Haridwar on the bank of Ganges, 6th May 1967, Som Deva 2344, Acc. No. 154741 (DD).

ACER L. (Sapindaceae).

Acer laevigatum Wall., Pl. Asiat. Rar. 2: 3, t. 104. 1830; Hiern in Hook.f., Fl. Brit. India 1: 693. 1875; Osmaston, For. Fl. Kumaon 125. 1927; Kanjilal, For. Fl. Chakrata, Dehradun, Saharanpur or. Div. Uttar Pradesh 144. 1969; Pusalkar & Srivastava, Fl. Uttarakhand 1: 1016. 2018; Naithani & Nainamalai, Trees Shillong 16. Ph. 3. 2019.

Pramanick, Dash and Mastakar (2020) has mentioned the distribution of *Acer laevigatum* Wall., from Arunachal Pradesh, Manipur, Meghalaya, Nagaland, Uttar Pradesh and West Bengal. From Uttar Pradesh, however, Naithani (2018) has not mentioned its occurrence. It has a very restricted distribution in Uttarakhand. Scrutiny of herbarium specimens revealed that there is no specimen of it deposited in BSD. However, there are only four specimens deposited in DD. The last collection was made by Osmaston in 1914 from the Garhwal region. Recently, one of the authors (SK) collected it from Mossy Falls, Mussoorie after a lapse of more than hundred years.

Specimens examined: Triyugi Narain, Garhwal, 7th November 1914, A.E. Osmaston 517. Acc. No. 21963, 11359 (DD); Mussoorie, Mackinnon s.n. (DD); Ravine near Mossy Falls,

Mussoorie, 14th April 2023, *Shivam Kishwan*. Acc. No. 173954 (DD).

ACRONYCHIA J.R.Forst & G.Forst. (Rutaceae).

Acronychia pedunculata (L.) Miq., Fl. Ned. Ind., Eerste Bijv. 3: 532. 1861; Pusalkar & Srivastava, Fl. Uttarakhand 1: 882. 2018. *Jambolifera pedunculata* L., Sp. Pl. 1: 349. 1753. *Acronychia laurifolia* Bl., Bijdr. 245. 1825; Hook.f., Fl. Brit. India 1: 498. 1875; Kanjilal, For. Fl. Chakrata, Dehradun, Saharanpur For. Div. Uttar Pradesh 97: 1969.

According to Pramanick, Dash and Mastakar (2020), this species is widely distributed in India. However, they have not mentioned its occurrence in Uttarakhand. Scrutiny of the literature, and herbarium specimens indicate that in Uttarakhand it is confined only to the freshwater swamps of Dehradun district. There are four specimens deposited in BSD, all collected in the year 1958 from Mothronwala. Recently its good population was located at Golatappar swamp, Haridwar Road, Dehradun. It has now been collected by one of the authors (HBN) after a lapse of 60 years.

Specimens examined: Mothronwala, Dehradun, 31st December 1958, *K.M.M. Dakshini* 5500. Acc. No. 20920 (BSD); Golatappar Swamp, Haridwar Road, 3rd May, 2018, *H.B. Naithani* 5845. Acc. No. 173213, 173214 (DD).

ALNUS Mill. (Betulaceae).

Alnus nitida (Spach.) Endl., Gen. Pl. Suppl. 4(2): 20.1847; Hook.f., Fl. Brit. India 5: 600. 1888; Kanjilal, For. Fl. Chakrata, Dehradun, Saharanpur For. Div. Uttar Pradesh: 498. 1969. *Clethropsis nitida* Spach. in Ann. Sci. Nat. Bot. Ser. 2, 15: 202. 1841.

Name: *Kunis*.

Alnus nitida is so far known only from Western Himalaya, i.e., Jammu & Kashmir, Himachal Pradesh, and Uttarakhand. Agarwal (2017) has mentioned its occurrence from Pabar Valley and Tiuni on the basis of a collection made by *A. Smythies?* and *K.C. Sahn*i respectively in 1958. Manikandan in 2010 collected a specimen that seems to be *Alnus nepalensis*. Recently, authors (HBN & AC) collected it from Arakot, Tons Forest Division, Uttarkashi after a lapse of 57 years.

Specimens examined: Gangnani, Jamuna Forest Division, Tehri Garhwal, 29th May 1960, *K.C. Sahn*i 26852. Acc. No. 140782 (DD); Arakot, Tons Forest Division, District Uttarkashi, 3rd August 2017, *H.B. Naithani* & *Anup Chandra* 5802. Acc. No. 172735, 172736, 172737 (DD).

BOSWELLIA Roxb. ex Colebr. (Bursaceae).

Boswellia serrata Roxb. ex Colebr., Asiat. Res. 9: 379, t. 5. 1807; Hook.f., Fl. Brit. India 1: 528. 1875; Kanjilal, For. Fl. Chakrata, Dehradun, Saharanpur For. Div.: 105. 1969.

Names: *Indian Olibanum Tree, Salai, Salar.*

Kanjilal (1969) mentioned its distribution throughout the Saharanpur Siwaliks, now a part of the Saharanpur district in Uttar Pradesh. There is no record of its occurrence in Uttarakhand. Also, no herbarium specimen of it from Uttarakhand is deposited in DD & BSD. A survey in Uttarakhand revealed that it is only found in the Siwalik hills of Mansa Devi (29°57'23.3" N, 78°09'29.6" E, 439 m) and Chandi Devi (29°55'54.1" N, 78°11'00.3" E, 453 m), Haridwar district, where it is common.

Note: Tree is the only non-coniferous source of turpentine and rosin in India. Exudes oleo-resin called Indian olibanum or Indian Frankincense; also known as Luban or Salai guggal, chiefly used as incense. A multipurpose tree.

BRASSAIOPSIS Decne. & Planch. (Araliaceae).

Brassaiopsis aculeata (Buch.-Ham. ex D.Don) Seem. in J. Bot. 2: 293. 1864; C.B. Clarke in Hook.f., Fl. Brit. India 2: 738. 1879; Osmaston, For. Fl. Kumaon 263. 1927, Kanjilal, For. Fl. Chakrata, Dehradun, Saharanpur For. Div. 271. 1969. *Hedera aculeata* Buch.-Ham. ex D.Don, Prodr. Fl. Nepal: 187. 1825.

Murugan and Aridasan (2020) mentioned the distribution of *Brassaiopsis aculeata* only from Arunachal Pradesh, Assam, and Manipur. However, Kanjilal (1969), Osmaston (1927), and Raizada and Saxena (1978) have reported it from Uttarakhand. Scrutiny of the herbarium at DD and BSD shows that the last specimen of *B. aculeata* was collected by B.D. Naithani in 1979 from Chamoli. The present collection from Mussoorie and Bageshwar (Kumaon) is after a lapse of 34 years.

Specimen examined: Bhagwangad, Nigol Valley, Chamoli District, 16th February 1979, *B.D. Naithani* 63741. Acc. No. 71715 (BSD); Mossy Fall, Mussoorie, 12th August 2013, *H.B. Naithani* 5351. Acc. No. 173912 (DD); Near Village Ghansu, Kapkot Range, Bageshwar Forest Division (29°59'35.3" N, 79°54'37.6" E, 1108 m), 9th March 2022, *Shivam Kishwan* 4. Acc. No. 173951, 173953; Near Pamtodi Village, Thal-Didihat Road, Pithoragarh, 20th March 2023, *Shivam Kishwan*. Acc. No. 173955, 173956.

CINNAMOMUM Schaeff. (Lauraceae).

Cinnamomum glanduliferum (Wall.) Meisn. in DC., Prodr. 15:25. 1864; Hook.f., Fl. Brit. India 5:135.1886.; Osmaston, For. Fl. Kumaon: 444. 1927. *Laurus glandulifera* Wall., Trans. Med. Soc. Calcutta 1:45, 51, pl. 1. 1825.

On the occurrence of *Cinnamomum glanduliferum* from Kumaon, Osmaston (1927) stated that, "Occurs in the most easterly portions of Almora between 4,000' and 7,000'. Mr. W.J. Lambert inform me that it is not common in Oak Forest. We have only one sheet at Dehra Dun collected from Chirapani at 6,000 ft elevation." Scrutiny of specimens deposited in DD revealed the specimen from Chirapani is not traceable. However, there is only one specimen available

from Uttarakhand, viz., Pithoragarh, East Almora, collected by a Forest Officer in May 1932, Herb. Acc. No. 59903. The present collection was made by the author (HBN) after a lapse of 84 years from the Chirapani.

Specimen examined: East Almora, Pithoragarh. May 1932. *Forest Officer*. Acc. No. 59903 (DD); Chirapani, Champawat district (29°17'26.7" N, 80° 06'04.1" E), 15th October 2016, *H.B. Naithani* 5743. Acc. No. 173119 (DD).

CLEYERA Thunb. (Pentaphylacaceae).

Cleyera japonica Thunb. var. *wallichiana* (DC.) Sealy in Bot. Mag. 163: t. 9606. 1940; Pusalkar & Srivastava, Fl. Uttarakhand 1:740. 2018. *C. ochracea* DC. var. *wallichiana* DC. in Mem. Soc. Phys. Geneve 1: 413. 1832. *C. ochracea* sensu Dyer in Hook.f., Fl. Brit. India 1: 283. 1874, non DC. 1832; Osmaston, For. Fl. Kumaon: 42. 1927.

Osmaston (1927) mentions the presence of *Cleyera echinacea* in East Almora Division. W.J. Lambert reported it being fairly common in Chaukori and Berinag. From Northeast India Kanjilal, Kanjilal and Das (1934) mentioned it from Assam and Meghalaya. However, Haridasan and Rao (1985) probably failed to locate it from Meghalaya and mentioned its presence by quoting the reference of Kanjilal, Kanjilal and Das (1934). This also indicates its rarity in Northeast India. From Western Himalaya, it was last collected in the year 1932 by Osmaston from Kumaon, and the specimen is deposited in DD. No herbarium specimens of it are deposited at BSD. The present collection is made by one of the authors (SK) from Kumaon after a lapse of 89 years.

Specimen examined: Below Dhirugadh in Saryu Valley, East Almora. 26th January 1932. *A.E. Osmaston* 1484. Acc. No. 58343 (DD); Near Udyari Bend, Thal-Berinag Road, Pithoragarh (29°48'50.6" N, 80°02'25.9" E, 1805 m), 25th February 2021, *Shivam Kishwan*. Acc. No. 173191 (DD); Near Didihat Town, Didihat range, Pithoragarh, 20th March 2023, *Shivam Kishwan*. Acc. No. 173958, 173959 (DD).

COCHLOSPERMUM Kunth. (Bixaceae).

Cochlospermum religiosum (L.) Alston, Handb. Fl. Ceylon 6 (suppl.): 14. 1931; Pusalkar & Srivastava, Fl. Uttarakhand 1: 623. 2018. *Bombax religiosum* L., Sp. Pl. 1: 512. 1753. *Cochlospermum gossypium* DC., Prodr. 1: 527. 1824; Hook.f. & Thoms., Fl. Brit. India 1: 190. 1872; Osmaston, For. Fl. Kumaon 29. 1927; Kanjilal, For. Fl. Chakrata, Dehradun, Saharanpur For. Div. Uttar Pradesh. 61.1969.

Name: Gold-silk Cotton Tree

Osmaston (1927) reported it only from Laldhang, Lansdowne Division. Kanjilal (1969) reported it as common on dry slopes of outer Siwaliks, especially towards Ranipur, Haridwar. Gaur (1999) considered it rare and collected it from Laldhang. Scrutiny of herbarium specimens revealed that

there is a single specimen deposited at DD from Saharanpur. No specimen is deposited at BSD. Also, no specimen was traceable in the herbarium of Garhwal University, Srinagar (GUH). In the recent past, it was collected by G.S Rawat from Haridwar. Recently, authors (HBN & SK) collected it from Rajaji Tiger Reserve and Chandi Devi area of Haridwar.

Specimen examined: Ranipur, Haridwar, *G.S. Rawat* 5667 (WII); Mayapur Purbi Gate, Compartment No. 2, Haridwar Range, Rajaji Tiger Reserve, 9th March 2023, *H.B. Naithani & Shivam Kishwan* 5884. Acc. No. 173963 (DD); Chandi Devi, Haridwar, Uttarakhand, 18th March 2023. *H.B. Naithani & Shivam Kishwan* 5888. Acc. No. 173964 (DD).

Note: This species is mistaken for *Sterculia villosa*, especially when only in leaf. Recommended to introduce in gardens as ornamental for its big yellow flowers.

CORDIA L. (Boraginaceae).

Cordia macleodii (Griff.) Hook.f. & Thoms. in J. Proc. Linn. Soc. Bot. 2:128.1858; Clarke in Hook. f., Fl. Brit. India 4: 139. 1883. *Hemigymnia macleodii* Griff. in Calcutta J. Nat. Hist. 3:363.1843.

Meena et al. (2020) mentioned distribution from Uttarakhand without giving any precise locality. Authors could not find its occurrence in any publications related to Uttarakhand. It is now collected by one of the authors (HBN) for the first time from Uttarakhand, which is a new record for Uttarakhand.

Specimen examined: 9 km after Ghat on Pithoragarh Road, 6th May 2007, *H.B. Naithani* 4562. Acc. No. 173677 (DD).

Cordia vestita (A.DC.) Hook.f. & Thoms. in J. Proc. Linn. Soc. Bot. 2: 128. 1858; Osmaston, For. Fl. Kumaon 372. 1927; Kanjilal, For. Fl. Chakrata, Dehradun, Saharanpur For. Div. Uttar Pradesh 359. 1969. *Gynaion vestitum* A.DC. in DC., Prodr. 9: 468. 1845.

Kanjilal (1969) has mentioned distribution of *Cordia vestita* as fairly common in Saharanpur Siwaliks but occasional in Dehradun. Osmaston (1927) and Gaur (1999) also stated it to be fairly common in miscellaneous forests in their respective areas. However, a total of four specimens were located while scrutinizing the herbariums of DD and BSD. It was last collected by Som Deva in 1967 from Mohand Pass. In the year 2007, one of the authors (HBN) located a tree of this species from Chirak, Beribara and Ghati between Kansro and Motichur, Rajaji Tiger Reserve, Dehradun.

Specimen examined: Mohand Pass near Tunnel, 5th May 1967, *Som Deva* 2324. Acc. No. 43760 (BSD).

COTONEASTER Medik. (Rosaceae)

Cotoneaster frigidus Wall. ex Lindl., Edward's Bot. Reg. 15: t. 1229. 1829; Hook. f., Fl. Brit. India 2:385. 1878; Osmaston, For. Fl. Kumaon: 226. 1927.

Scrutiny of herbarium specimens revealed that from North-West Himalaya *Cotoneaster frigidus* was last collected by R.N. Parker from Baling, Dhauli Valley, Kumaon on 27th July 1923 (DD). After that, it has never been collected and no collection is deposited in BSD. From North West Himalaya, a collection was made by one of the authors (HBN) in the year 2019, where Inayat had collected it in the year 1900 from Nagling. Thus, the present collection is made after a lapse of 96 years from Uttarakhand.

Specimen examined: Baling, Dhauli Valley, 21st June 1923, R.N. Parker 2106. Acc. No. 36637 (DD); Nagling, Darma Valley, Pithoragrah district, (29°40'42.9" N, 79°48'37.8" E, 1618 m), 13th October 2019, H.B. Naithani 5862, Acc. No. 173789 (DD).

DALBERGIA L.f. (Fabaceae).

Dalbergia latifolia Roxb., Pl. Corom. 2:7, t.113. 1799; Baker in Hook. f., Fl. Brit. India 2:235. 1876.

The wild occurrence of *Dalbergia latifolia* from Uttarakhand is not perfectly known. Thothathri (1987) has quoted two herbarium specimens of *D. latifolia* from Uttarakhand. One of them from Sarju Valley, 1000-2000 m, collected in July 1876 by J.F. Duthie, deposited in (BSI) and the other from Motichur, Shiwalik and Jaunsar division, collected in January 1922 by Sharma, deposited in (LE). However, from Sarju Valley Kumaon region it is neither mentioned by Duthie (1906) nor Osmaston (1927). With regard to Motichur which is at present a Forest range of Rajaji Tiger Reserve, it has not been recorded by Singh and Prakash (2002). Kanjilal (1969) mentioned its occurrence under cultivation at Mayapur, Haridwar. On a recent visit to Mayapur, about 15 trees were observed, and two were in the seedling stage. Thus, probably on the basis of Kanjilal (1969) and Thothathri (1987), its occurrence has been mentioned by Uniyal et al. (2007) and followed by Sanjappa (2020).

In a recent survey one of the authors (HBN) located three full-grown large trees with fruits on the south slope of the dry deciduous forest of Chandi Devi, Haridwar Forest Division, which is the first report of its wild occurrence from Uttarakhand. The horizontal distance between Chandi Devi and Mayapur is only about 3 km, it may be possible that seeds were dispersed through bird's excreta or wind.

Specimen examined: Chandi Temple, South slope, Haridwar, 3rd December 2020, H.B. Naithani & J. Saxena 5867, Acc. No. 172777 (DD).

DYSOXYLUM Blume ex Raspail (Meliaceae)

Dysoxylum gotadhora (Buch.-Ham.) Mabb., Fl. China 11: 127. 2008. *Guarea gotadhora* Buch.-Ham., Mem. Wern. Nat. Hist. Soc. 6: 307. 1832. *Guarea binectarifera* Roxb., Fl. Ind. 2: 240. 1832 (as *binenarifera*). *Dysoxylum binectariferum* (Roxb.) Hook.f. ex Bedd., Trans. Linn. Soc. London 25: 212. 1865; Hiern. in Hook.f., Fl. Brit. India 1: 546. 1875; Osmaston,

For. Fl. Kumaon 87. 1927; Pusalkar & Srivastava, Fl. Uttarakhand 1: 914. 2019.

Name: *Oculkat*.

Dysoxylum gotadhora (syn. *D. binectariferum*) is distributed in Northeast India, South India, Andaman & Nicobar Islands and Sri Lanka. However, from North India, it has been reported only in Uttarakhand, that too only in Haldwani Forest Division. Pusalkar and Srivastava (2019) have stated that it is locally extremely rare in Uttarakhand. They have not quoted any herbarium specimen and only mentioned its occurrence from Pilapani, Haldwani based on the authority of Osmaston (1927). One of the authors (HBN) has located its good population after a lapse of 60 years in the Haldwani Forest Division where it has good regeneration.

Specimens examined: Sudhnath near Pilapani, Haldwani Division, January 1954, S.K. Seth, Acc. No. 116190 (DD); Bhargot-1, Joula Sal, Haldwani Forest Division (29°03'29.8"N, 79°52'27.1" E), 7th November 2014, H.B. Naithani 5383. Acc. no. 170784 (DD).

FICUS L. (Moraceae).

Ficus oligodon Miq. in Ann. Mus. Bot. Lugduno-Batavi 3: 234. 1867. *F. pomifera* Wall. ex King in Ann. Roy. Bot. Gard. Calcutta 1: 71, t. 215. 1888; King in Hook.f., Fl. Brit. India 5: 535. 1888; Osmaston, For. Fl. Kumaon 512. 1927; Kanjilal, For. Fl. Chakrata, Dehradun, Saharanpur For. Div. Uttar Pradesh: 483. 1969.

Ficus pomifera was stated as rare by Osmaston (1927), who collected it from the Golatappar swamp, Dehradun and in Garhwal area. It was also collected from the Khairi swamp by P.C. Kanjilal more than 100 years before C.M. Arora collected it from Golatappar swamp, stating that he has seen only one tree there. Two trees of this species are growing in the campus of Forest Research Institute, Dehradun. Recently, it was collected by one of the authors from two locations in Didihat Range, Pithoragarh district.

Specimens examined: Golatappar Swamp, 4th July 1969. C.M. Arora 38870. Acc. No. 43966 (BSD); Near Kaulagarh gate, Forest Research Institute, Dehradun, 20th August 2009, H.B. Naithani 5097. Acc. No. 173906 (DD); Near Didihat Town, Didihat Range, Pithoragarh, 20th March 2023, Shivam Kishwan. Acc. No. 173960; Near Pamodi Village, Thal-Didihat Road, Pithoragarh, 17th March 2023, Shivam Kishwan. Acc. No. 173961, 173962

Note: Upadhyaya and Ansari (2020) and Sudhakar et al. (2022) have treated *Ficus oligodon* Miq. as a synonym of *Ficus auriculata* Lour. Study of live material revealed that *F. auriculata* has leaves 10-30 cm broad, ovate or rounded; base deeply cordate, strongly 5-7 nerved; receptacles turbinate, 5 × 8 cm. This species is commonly found both in the wild and cultivation (for vegetable) in Uttarakhand. While, *F. oligodon* has leaves 5-15 cm broad, elliptic or elliptic-

oblong; base rounded or slightly acute, 3-nerved; receptacles globose or sub-pyriform, about 2.5 cm in diameter. Thus, both species are distinct.

FRAXINUS Tourn. ex L. (Oleaceae).

Fraxinus floribunda Wall., Pl. Ind. 1: 150. 1820. *F. urophylla* (G.Don) Wall. ex A.DC., Prodr. 8: 275. 1844. *Ornus urophylla* G.Don, Gen. Hist. 4: 57. 1837.

Clarke (1882) stated that *Fraxinus floribunda* grows from Kashmir to Bhutan. Srivastava (2020) reported its distribution from Jammu & Kashmir, Meghalaya and Uttarakhand. However, Kanjilal (1969), Osmaston (1927), and Gaur (1999) have not reported it in their floras. Even Stewart (1972) has mentioned its occurrence as doubtful from Jammu & Kashmir. Additionally, it has a rare occurrence in Meghalaya. Scrutiny of herbarium specimens at DD and BSD revealed that there is no specimen of this species deposited from Western Himalaya. However, Osmaston (1927) stated that there is no evidence among the specimen at Dehradun or at Kew that *F. floribunda* is found here, though there are a few flowering specimens available for examination. Thus, the occurrence of *F. floribunda* is doubtful from Western Himalaya. Its colour photographs of flowers and fruits are provided by Naithani and Nainamalai (2019).

HETEROPANAX Seem. (Araliaceae).

Heteropanax fragrans (Roxb. ex DC.) Seem., Fl. Vit. 114. 1866; Osmaston, For. Fl. Kumaon: 262. 1927; Kanjilal, For. Fl. Chakrata, Dehradun, Saharanpur For. Div. Uttar Pradesh: 270. 1969. *Panax fragrans* Roxb. ex DC., Prodr. 4: 254. 1830. *H. fragrans* var. *attenuatus* Clarke in Hook.f., Fl. Brit. India 2: 735. 1879. *H. fragrans* var. *subcordatus* Clarke in Hook.f., Fl. Brit. India 2: 735. 1879.

Osmaston (1927) stated it as uncommon and occurring throughout the sub-Himalayan tracts and outer hill ranges. Kanjilal (1969) stated that this species is fairly common in Dehradun and Saharanpur Siwaliks. Gaur (1999) considered it rare and reported it from Sara, Pauri Garhwal without giving the precise date of collection. Scrutiny of specimens at DD revealed that the species was last collected by Bis Ram from Bindal Khala near Kowlagarh Tea Estate, Dehradun on 16th February 1926. In BSD, a single collection made by Y.K. Sarin from Nakraunda Swamp, Dehradun on 8th January 1958 is deposited. One of the authors (HBN) has collected it from Dehradun after a lapse of 53 years.

Specimens examined: Nakraunda Swamp, Dehradun, 8th January 1958, Y.K. Sarin 3873. Acc. No. 39982 (BSD); Near Kaulagarh Gate, Forest Research Institute, Dehradun, 18th December 2011, H.B. Naithani 5149. Acc. No. 173907 & 173908 (DD); Watershed Management Office, Indira Nagar, Dehradun, 25th January 2022, H.B. Naithani 5878. Acc. No. 173910 & 173911 (DD).

Note: *Heteropanax fragrans*, when not in flowers, is often mistaken for *Oroxylum indicum*, but can be distinguished by the alternate leaves.

HOVENIA Thunb. (Rhamnaceae).

Hovenia dulcis Thunb., Nov. Gen. Pl. 1: 8. 1781; Lawson in Hook.f., Fl. Brit. India 1: 640. 1875; Osmaston, For. Fl. Kumaon 108. 1927; Kanjilal, For. Fl. Chakrata, Dehradun, Saharanpur For. Div. Uttar Pradesh: 130. 1969; Pusalkar & Srivastava, Fl. Uttarakhand 1: 954. 2018.

Osmaston (1927) mentioned that *Hovenia dulcis* occurs throughout the central and inner hill ranges between 3000 and 6000 ft. but is rather scarce. Kanjilal (1969) mentioned it from Jaunsar and Tehri Garhwal between 3000 and 6000 ft. Pusalkar and Srivastava (2018) considered it rare, quoting old collections made by Duthie and Kanjilal. There are many specimens deposited in DD, while the last collection was from Nolarha?, Ramganga river made by Bis Ram on 2nd June 1933. However, there are no specimens of it deposited in BSD. The present collection was made by the author (HBN) after a lapse of 73 years. In 2017, the author (HBN) located many trees of this species between Mori and Naitwar, Uttarkashi, and on the bank of River Rupin between Naitwar and Istgadh, Uttarkashi.

Specimens examined: Nolarha?, Ramganga River, West Almora Division, Kumaon, 2nd June 1933, Bis Ram 2301. Acc. No. 63640 (DD); On the way to Budhakedhar, Tehri Garhwal, 29th May 2006, H.B. Naithani 4401. Acc. No. 173658 (DD).

LINDERA Thunb. (Lauraceae).

Lindera nacusua (D.Don) Merr. in Lingnan Sci. J. 15: 419. 1936; Chakrabarty in Ind. J. For. 39(2): 189. 2016. *Laurus nacusua* D.Don, Prodr. Fl. Nepal. 64. 1825. *Lindera bifaria* (Nees) Benth. ex Hook.f., Fl. Brit. India 5: 184. 1886; Osmaston, For. Fl. Kumaon 451. 1927. *Daphnidium bifarium* Nees in Wall., Pl. Asiat. Rar. 2: 63. 1831.

Osmaston (1927) stated it as rare, mentioning a single specimen collected by W.J. Lambert deposited at DD. After Lambert, Osmaston collected two more specimens from Parkot Reserve, West Almora Division in the year 1932. Scrutiny of specimens at BSD revealed that not a single specimen of it is deposited there. Chakrabarty (2016), has not mentioned its occurrence in Western Himalaya. One of the authors (SK) made the present collection after a lapse of 90 years from Uttarakhand.

Specimen examined: Parkot Reserve, West Almora Division. 9th November 1932. A.E. Osmaston 1524. Acc. No. 61187, 61188 (DD); Asu Village, near Kapkot, Bageshwar (29°55'35.8" N, 79°53'25.0" E, 1084 m), 10th March 2022, Shivam Kishwan. Acc. No. 173192 (DD).

MALUS Mill. (Rosaceae).

Malus baccata (L.) Borkh. var. *himalaica* (Maxim.) Schneid., III. Handb. Laubholz. 1: 721. 1906. *Pyrus baccata* var. *himalaica* Maxim. in Bull. Acad. Imp. Sci. St.-Petersburg ser. 3. 19: 171. 1873. *Pyrus baccata* sensu Hook.f., Fl. Brit. India 2: 373. 1878; Osmaston, For. Fl. Kumaon: 218. 1927.

Eng. *Siberian Crab*.

Osmaston (1927) states that *Malus baccata* var. *himalaica* is found at about 3000 m. Scrutiny of herbarium specimens revealed that this plant species was last collected by Bipin Balodi from Milam village, Pithoragarh without giving its precise date of collection. This rare species was collected from Nilang, Uttarkashi district by S. Chandola after a lapse of 18 years, in the year 2006.

Specimens examined: Khatersami Reserve, North Garhwal, 11th April 1919, A.E. Osmaston 1078. Acc. No. 22029 (DD); Champawat, 8th May 1961, U.C. Bhattacharya 15000. Acc. No. 38497 (BSD); Hunther, Milam Village, Pithoragarh, *Bipin Balodi* 77638. Acc. No. 81711 (BSD); Hindolghadh, Nilang, Jadh Ganga Catchment, Uttarkashi, S. Chandola 138 (WII).

PANDANUS Parkinson (Pandaceae).

Pandanus furcatus Roxb., Hort. Bengal. 71.1814; Hook.f., Fl. Brit. India 6:484.1893.

Uniyal et al. (2007) reported *Pandanus furcatus* probably because of its presence under cultivation at Forest Research Institute, Dehra Dun. In the past and present floras, viz., Duthie (1906), Osmaston (1927), Kanjilal (1969), Naithani (1984-1985), Murti, Singh and Singh (2000), Gaur (1999) have not mentioned its occurrence from Uttarakhand. Even there is no specimen of this species deposited in DD and BSD. In a recent publication, Gogoi (2020) mentioned its wide distribution, viz., Assam, Goa, Karnataka, Kerala, Maharashtra, Meghalaya, Nagaland, and Sikkim. One of the authors (HBN) collected it from Ramnagar, Forest Division, which is its first wild occurrence from Uttarakhand.

Specimen examined: Sitabani, Ramnagar Forest Division, Ramnagar, 12th August 2018, H.B. Naithani 5859, Acc. No. 173123 (DD).

SCHREBERA Roxb. (Oleaceae).

Schrebera swietenoides Roxb., Pl. Corom. 2(1): 1. t. 101. 1799; Hook.f., Fl. Brit. India 3: 604. 1882; Osmaston, For. Fl. Kumaon: 333. 1927.

Osmaston (1927) stated it to be uncommon and occurring in Sal Forest of Ramnagar and Kalagarh Division. Scrutiny of herbarium specimens reveals that there are three specimens deposited in DD, last collected by R.S. Hole and U.N. Kanjilal from Garhwal Division in 1905. However, there is no specimen of it deposited in BSD. In the year 2004, one of the authors (HBN) conducted a quantitative study in Corbett

Tiger Reserve and located its population in Dhikala, Sarpaduli Range (29°31'09.4" N, 78°58'27.2" E) and in Jamunagarwar, Kalagarh Range (29°30'53.9" N, 78°58'09.6" E).

Specimens examined: Between Barsoti and Jamnagiri?, 18th January 1905, U.N. Kanjilal 1298. Acc. No. 170063 (DD); Jamua jusar?, Garhwal Division, 18th January 1905, R.S. Hole. Acc. No. 30076; Adnala Block, Adnala Range, Ramnagar, February? Harendra Singh 74. Acc. No. 9848 (DD).

SLOANEA L. (Elaeocarpaceae).

Sloanea tomentosa (Benth.) Rehder & Wilson in Sarg. Pl. Wilson. 2 (2): 362. 1915; Pusalkar & Srivastava, Fl. Uttarakhand 1: 822. 2018. *Echinocarpus tomentosus* Benth. in J. Proc. Linn. Soc. Bot. 5(Suppl. 2): 73. 1861; Masters in Hook.f., Fl. Brit. India 1: 400. 1874; Osmaston, For. Fl. Kumaon 62. 1927.

Scrutiny of the herbarium specimens revealed that from Uttarakhand it was collected from Girgaon, Kumaon in 1900 by H.G. Champion from Jakha, West Almorah in September 1917 by Lambert from Lodhi Valley in October 1917 and by Osmaston from Sirkhot, Garhwal in June-July 1918. Gaur (1999) and Pusalkar and Srivastava (2018) reported its occurrence from Laldhang, Pauri Garhwal on the basis of collection No. 8728 deposited in the Garhwal University, Herbarium, Srinagar Garhwal. The present authors thoroughly surveyed Laldhang area but failed to locate it. Also, herbarium No. 8728 could not be traced. Pande (2010) has mentioned its location from Dhaulachina, Almora in Kumaon, but probably did not collect its herbarium specimen. Very recently Goraya and Naithani (2021) recorded for the first time the generic record of *Sloanea* from Himachal Pradesh. Recently one of the authors (HBN) located only one tree of this rare species from Kumaon Himalaya. The tree was completely lopped for fodder.

Specimen examined: 3-4 km after Dhaulchhina on Sheraghat Road, Dist. Almora (29°40'42.93" N and 79°48'37.84" E), 6th August 2018, H.B. Naithani 5847, Acc. No. 173122 (DD).

STAPHYLEA L. (Staphyleaceae).

Staphylea cochinchinensis (Lour.) Byng & Christenh., Global Fl. 4: 133. 2018. *Triceros cochinchinensis* Lour., Fl. Cochinch. 1: 184. 1790. *Turpinia nepalensis* Wall. ex Wight & Arn., Prodr. Fl. Ind. Orient. 156. 1834; Osmaston, For. Fl. Kumaon: 123. 1927; Pusalkar & Srivastava, Fl. Uttarakhand 1: 1023. 2018. *T. pomifera* sensu Hiern in Hook.f., Fl. Brit. India 1: 698. 1875, pp. non (Roxb.) DC. 1825.

Osmaston (1927) stated that "it occurs in central and inner ranges between 3000 to 6000 ft. scarce and rare in Garhwal." Pusalkar and Srivastava (2018) mentioned the collections made from Patwadangar, Nainital by B.S. Kalakoti No. 3539 deposited in Kumaon University herbarium, Nainital. One of the authors (HBN) visited Kumaon University herbarium in 2017 but could not trace the herbarium specimen. The

location of the collection by Kalakoti was also visited, but the tree could not be located. Scrutiny of herbarium specimens at DD revealed three specimens of it deposited and one specimen of it is deposited in BSD. It was last collected by H.G. Champion in 1920. According to Chandran (2012), this species is found in Pithoragarh Forest Division (Askot Wildlife Sanctuary) on the forest path between the village Koli and Kuta-Churani on the north of Gandhura Reserve Forest in Gori Ganga catchment at around 1000 m.

Specimens examined: Mandalchatti, Malla Nagpur, North Garhwal, 25th October 1918, A.E. Osmaston 1011. Acc. No. 21248, 21249, 21250, 22176, 22177 (DD); West Almora, 17th July 1919, H.G. Champion. Acc. No. 21321, 21327 (DD); North Binsar, Central Almora, 10th September 1920, H.G. Champion. Acc. No. 22243 (DD).

SYMPLOCOS Jacq. (Symplocaceae)

Symplocos cochinchinensis (Lour.) Moore subsp. *laurinus* (Retz.) Noot., Liden Bot. ser. 1: 156. 1975 et Fl. Males. 8(2): 248. 1977. *Myrtus laurina* Retz., Obs. Bot. 4: 26. 1786 (as *laurius*). *Symplocos spicata* Roxb., Fl. Ind. 2: 541. 1832; Clarke in Hook. f., Fl. Brit. India. 3: 573. 1882; Osmaston, For. Fl. Kumaon: 329. 1927.

Osmaston (1927) reported *Symplocos spicata*, which is now a synonym of *Symplocos cochinchinensis* on the basis of a collection made by W.J. Lambert on 15th October 1919 from Thal, East Almora. Later Osmaston on 13th December 1926 collected it from Okhuldunga Reserve Nainital. M.A. Rau collected three specimens in 1958, two of them were collected from Kali Valley, Pithoragarh district, Kumaon and one from Phata, Chamoli Garhwal. These specimens are housed in herbarium of BSD. Recently one of the authors (HBN) made two collections. A critical checking of the identity of all specimens revealed that only two specimens, one collected by Lambert, and other by HBN turned out to be *Symplocos*

cochinchinensis subsp. *laurinus*, rest all belong to *Symplocos cochinchinensis* subsp. *cochinchinensis* (syn. *S. ferruginea* Roxb.). At present both the subspecies were collected after a lapse of 50 years. As regards, *S. cochinchinensis* subsp. *cochinchinensis* (syn. *S. ferruginea*), Chandran (2008) stated that it has restricted distribution around Patwadangar, Nainital.

Specimens examined: Okhaldunga Reserve, Nainital Division. 13th December 1926, A.E. Osmaston 1325. Acc. No. 43143, 43144; Between Thal and Sandev, Pithoragarh district, 18th October 2016, H.B. Naithani 5752. Acc. No. 173120 (DD).

SYZYGIUM Gaertn. (Myrtaceae).

Syzygium heyneanum (Duthie) Wall. ex Gamble, Fl. Pres. Madras 1(3): 482.1919. *Eugenia heyneana* Duthie in Hook. f., Fl. Brit. India 2:500.1879.

Name: *Jamoi*.

There is no record of the distribution of this species in Uttarakhand. It is being reported for the first time in Uttarakhand.

Specimen examined: Ray River Lachiwala, Dehra Dun, 21st June 1967, Som Deva 2557, Acc. No. 154737 (DD).

TORRICELLIA DC. (Torricealiaceae).

Torricealia tiliifolia DC., Prodr. 4: 257. 1830; Clarke in Hook.f., Fl. Brit. India 2: 748. 1879; Osmaston, For. Fl. Kumaon: 270. 1927.

Clarke (1879) mentioned distribution of *Torricealia tillifolia* from Nepal, Sikkim, and Bhutan. Osmaston (1927) reported it from East Almora and stated that it is fairly common there. However, Chandran (2008) stated that there are two populations of this species in the Pithoragarh district, viz., Guini Band near Birhi and other at Patal Bhubaneshwar



Plate 1. (A.) *Acacia leucophloea*, (B.) *A. modesta*, (C.) *Acer laevigatum*.



Plate 2. (A.) *Acronychia pedunculata*, (B.) *Alnus nitida*, (C.) *Boswellia serrata*, (D. & E.) *Brassaiopsis aculeata*, (F.) *Cinnamomum glanduliferum*, (G.) *Cleypora japonica* var. *wallichiana*, (H.) *Cochlospermum religiosum*, (I.) *Cordia macleadii*.



Plate 3. (A.) *Cordia vestita*, (B.) *Cotoneaster frigidus*, (C.) *Dalbergia latifolia*, (D.) *Dysoxylum gotadhora*, (E.) *Ficus oligodon*, (F.) *Fraxinus floribunda*, (G.) *Heteropanax fragrans*, (H.) *Hovenia dulcis*, (I.) *Lindera nacusua*.



Plate 4. (A.) *Malus baccata* var. *himalaica*, (B.) *Pandanus furcatus*, (C.) *Schrebera swietenoides*, (D.) *Sloanea tomentosa*, (E.) *Staphylea cochinchinensis*, (F.) *Symplocos cochinchinensis* subsp. *laurinus*, (G.) *Syzygium heyneanum*, (H.) *Torriceilia tiliifolia*, (I.) *Viburnum cordifolium*.

where there are few scattered trees. One of the authors (HBN) also located a few trees between Lohaghat and Ghat. Scrutiny of the herbarium specimens at DD revealed that three specimens of it are deposited from Western Himalaya with the last one being collected by Aarsin? from Kailas, Pithoragarh district in July 1956. However, there are no specimens of it in BSD. One of the authors (HBN) visited Munsiyari in 2018 and located a few trees at Gini Band (30°01'17" N, 80°10'35" E, 2010 m).

Specimen examined: Forest above Gini. 17th August 1884, J.F. Duthie 3783 (DD); Garhwal 1918, R.S. Hole 914. Acc. No. 20300 (DD); Kailas, Pithoragarh District, Almora, July 1956, Aarsin? (DD).

VIBURNUM L. (Caprifoliaceae).

Viburnum cordifolium Wall. ex DC., Prodr. 4: 327. 1830; Clarke in Hook.f., Fl. Brit. India 3: 6. 1880; Osmaston, For. Fl. Kumaon 275. 1927.

Osmaston (1927) stated that *Viburnum cordifolium* is not very common and occurs in central and inner ranges east of Ramganga. Scrutiny of herbarium specimens deposited at DD revealed that it was last collected by A.E. Osmaston in 1932 from Namik Reserve, East Almora Division. However, there are no specimens of this species in BSD. One of the authors (SK) recently collected it from Bageshwar district after a lapse of 89 years.

Acharya and Mukherjee (2014) overlooked the publication of Naithani and Bennet (1984) in which *V. betulifolium* Batalin and *V. sempervirens* K.Koch have been recorded as new to India from Arunachal Pradesh. Gangopadhyaya et al. (2020) have not mentioned the occurrence of *V. betulifolium* Batalin in India. However, they have included *V. sempervirens* K.Koch, providing *V. nervosum* sensu Hook. & Arn., non D.Don as its synonym. At present, *V. nervosum* non D.Don, 1825 is a synonym of *V. grandiflorum* Wall. ex DC. *V. cordifolium* Wall. ex DC. is now a distinct species.

Specimen examined: Namik Reserve, East Almora Division, U.P., 11th October 1932, A.E. Osmaston 1514. Acc. No. 61222, 61223 (DD); Near Dangu Bugyal, Kapkot Range (Liti Village), Bageshwar Forest Division. 11th September 2021. Shivam Kishwan. Acc. No. 173952.

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