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Cover: Common Silverline *Spindasis vulcanus vulcanus* in poster colours adapted from photograph by Kalpesh Tayade. © Pooja R. Patil.



## Threatened flora of Uttarakhand: an update

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**Abstract:** Encompassing 1.69% land area of India, Uttarakhand State sustains more than 25% species of flowering plants of India reflecting richness of flora. Large numbers of species in the state are threatened and several sources have come up with their own lists of threatened species using different threat categories leading to ambiguity. This communication attempts to compile a complete list of threatened Angiosperm species from eleven authentic sources with updated nomenclature, systematic position, original sources, threat assessment, elevational and global distribution. A total of 290 species belonging to 176 genera, 63 families, and 29 orders are listed which represent about 6% of the total flora. Elevational distribution of species shows that the 2–3 km elevation zone harbors more than half of the threatened flora (52.14%) and more than 44% endemic species despite the fact that maximum species richness is known in the 1–2 km elevation zone. Perusal of literature shows that selection of species for micropropagation is skewed towards medicinal plants rather than only threat status of a species. A disparity exists in two important sources (IUCN Red List 2020–21 and Indian Red Data Book) listing threatened taxa with only six species common to both. Eight additional species in IUCN Red List 2020–21 and 49 additional species in Indian Red Data Book are not included and vice versa. 267 species listed as threatened in various sources are not even evaluated by recent IUCN Redlist guidelines and thus warrant their immediate assessment to understand their correct present status in nature.

**Keywords:** Angiosperms, assessment, Indian Red Data Book, IUCN Red List, micropropagation, plants.

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**Author contributions:** Concept of work and compilation of data: DSR; writing article: DSR, SC, PC.

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## INTRODUCTION

The actual number of all extant living species on Earth is yet not exactly known but we are now beginning to understand this enormous diversity of life on Earth (Wilson 1999). Though, the estimates range from 8.6 million to 15 millions of eukaryotes and trillions of prokaryotes (bacteria and archaea) living on Earth (Mora et al. 2011; Hinchliff et al. 2015; Locey & Lenon 2016; Larsen et al. 2017), only about 1.8 million are named and listed in Catalogue of Life 2020 (Roskov et al. 2020). The Earth's biosphere has already entered into the sixth mass extinction, majorly because of human impact. With a 1,000 fold increase in the natural rate of extinction of species (Pimm et al. 2014; De Vos et al. 2015) it is no exaggeration to state that a large number of species will disappear from Earth without even getting any name. Among the estimated described 21,37,939 species 31,030 species are already facing the threat of extinction owing to various natural and anthropogenic factors (IUCN Redlist 2020). Following the IUCN data, perhaps about 20% of all existing species might become extinct within the next few decades and 40% or more by the end of the present century (Pimm et al. 2014; Kew 2016; Pimm & Raven 2017).

Green Plants (Viridiplantae) are among the better known groups of organisms and dominated by more than 0.36 million Angiosperms (flowering plants) of which 38,445 species have been assessed for threat categories. The results show that 148 are already extinct from the wild, 15,624 are threatened and 2,594 do not have adequate data to assess threats to them as per IUCN Red List 2020–21 (<https://www.iucnredlist.org/search>). India is one of the top 10 species-rich nations of the world and 18,666 species of flowering plants are known within its territory (Mao & Dash 2019). Till date, 2020 species of flowering plants of India have been assessed as per the IUCN Redlist criteria according to which six species are extinct, two are extinct from the wild, 411 are threatened (84 Critically Endangered, 180 Endangered, 147 Vulnerable), 1601 are not threatened while 93 do not have adequate data today to assess threat (<https://www.iucnredlist.org/search>).

Uttarakhand is a small (53,483 km<sup>2</sup>), mountain dominated state of India, located in the Himalayan global biodiversity hot spot and constitutes the easternmost part of the western Himalayan phytogeographical province of India (Balakrishnan 1996). Following Takhtajan (1986) and Welk (2016) Uttarakhand embraces two floristic kingdoms- 'Holarctic' (above 1–1.5 km elevation) and 'Paleotropic' (below 1km elevation) and

surrounded by western Tibetan provinces in the north and the Gangetic province in the south. Three major floristic regions represented in Uttarakhand are western Himalayan province at the higher elevation, eastern Himalayan province in mid-elevations, and the Gangetic province at lower elevations and plains, while the arid western Tibetan province also finger-in at the head of anterior valleys (Welk 2016).

Uttarakhand is enriched with 24,303 km<sup>2</sup> of forests covering 45.44% of its total geographical area and about 4800 wild taxa of seed plants within 1,400 genera of 215 families (Uniyal et al. 2007; Pusalkar & Srivastava 2018; India State of Forest 2019). Representation of different phytogeographical elements, extensive elevation gradient (ca. 200–7,817 m), mountain dominated terrain, and enormous diversity in microclimatic conditions have resulted in a high diversity of angiosperm flora which accounts for nearly 25% of total Indian flora in only 1.69% geographical area of the country. Owing to its high species richness of Angiosperms, the flora of Uttarakhand can also be assumed to having many threatened species (Images 1–24). In addition to these species, 107 species, endemic to Uttarakhand (Singh et al. 2015; Pusalkar & Srivastava 2018) are also important for conservation due to their restricted distribution in the nature.

It has already been pointed out by Pimm et al. (2014) and reiterated by Raven & Wackernagel (2020) that the species most likely to become extinct are by definition the rare ones, and most undescribed species are relatively rare. Obviously, the first step towards conservation is to know which species are rare ones (threatened species). Considering the risk of extinction of the species IUCN has prepared categories and criteria for classification of species under different threat categories (IUCN 2012). It played a pivotal role in prioritizing the threatened species and in the drafting of their conservation plans. IUCN Redlist of Threatened Species is revised and updated thrice in each calendar year and country-wise lists are available in it.

Biodiversity of India is confronting various threats due to climate change, global temperature rise, habitat destruction, poor land use practices, invasive alien species, over-exploitation of the resources and environmental pollutions (Barik et al. 2018) and flora of Uttarakhand is no exception to this (Pusalkar and Srivastava 2018). Red Data Book of Indian Plants (Nayar & Sastry 1987–90) is an incomplete document wherein data on some threatened vascular plants were provided on the basis of herbarium history of these species. Later, Rao et al. (2003) listed 1,255 species of

threatened Indian vascular plants on the basis of the 1997 IUCN Red List of Threatened Plants. While these lists or data are available at country level, an updated list of threatened and endemic species of the species-rich state of Uttarakhand is yet to be compiled. Various scientific publications (Singh et al. 2010; Balakrishna et al. 2012; Bisht et al. 2013) often mention different species as threatened without correctly justifying their threat categories by appropriate source references. The present work is an attempt to provide a recent and complete list of threatened Angiosperm species with updated nomenclature and systematic position with original sources.

## MATERIALS AND METHODS

The earliest holistic endeavour of publishing available data on threatened vascular species of India was attempted by the Botanical Survey of India, Ministry of Environment and Forests, Gol and published as 'Indian Red Data Books volume-1-3' (Nayar & Sastry 1987-90) wherein important data on 602 species were published. The species listed in these volumes and occurring in Uttarakhand are included in our list of threatened species (Table 1, column 1) with threat status (indicated by superscript '1' with threat status in column 2 of Table 1; e.g., R<sup>1</sup>). Similarly, distribution of all 1,215 angiosperm species listed in Rao et al. (2003) was studied carefully and all species known in Uttarakhand were included in table-1 and shown by superscript '2' (e.g., E<sup>2</sup>). The species listed in recent IUCN Red List 2020-21 (<https://www.iucnredlist.org/>) of threatened species for India known to be occurring in Uttarakhand are included and status listed in IUCN Red List is shown by superscript '3' (e.g., CR<sup>3</sup>). Data Deficient species (DD) in this red list are also included here on account of their rarity due to which adequate data is not available for their assessment. The recent version of IUCN Red List (IUCN Red List 2020) now has the facility to search threatened species of a particular state of India and the species found in this list are also included with their status shown by superscript '3A' (e.g., CR<sup>3A</sup>). Though, IUCN Red List for India and IUCN Red List of Uttarakhand are obtained from the same data source, they show a few differences due to which these two search results are shown differently. Ved et al. (2003) have published threatened medicinal plant species of Indian western Himalaya after threat assessment based on IUCN criteria. Those species which are listed in it and known in Uttarakhand are included in table-1 and threat assessment is shown by superscript '4' (e.g.,

EN<sup>4</sup>). Internationally, appendices of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) play an important role in regulated trade of threatened species. All the species listed in CITES appendices (2019) and known in Uttarakhand are also included in Table 1. Since no specific threat status is mentioned in CITES appendices, in column 2 status is shown as '1A' (for species listed in Appendix 1) or '2A' (species listed in appendix-2) with superscript '5' (e.g., 2A<sup>5</sup>).

The first volume of Flora of Uttarakhand (Pusalkar & Srivastava 2018) has also provided a list of threatened species and endemic species, separately, with threat status following IUCN Red List, and these are also included in Table 1. Endemic species are included in our list with 'VU' status, following Pusalkar & Srivastava (2018), based on their small area of occurrence in the world. Uniyal et al. (2007) also listed threatened species of Uttarakhand with checklist of seed plants of Uttarakhand and these species are included and shown by the superscript '7' (e.g., R<sup>7</sup>). Similarly, the species indicated as threatened in Uttarakhand by National Biodiversity Authority at <http://nbaindia.org/uploaded/pdf/notification/4.4%20%20Uttarakhand.pdf> (shown as VoE<sup>8</sup>, VoE= verge of extinction), Uttarakhand Biodiversity Board at [https://sbb.uk.gov.in/files/act/4.4\\_Uttarakhand.pdf](https://sbb.uk.gov.in/files/act/4.4_Uttarakhand.pdf) (shown as HT<sup>9</sup>, HT= high threat), ebook by Uttarakhand State Biodiversity Board at <https://sbb.uk.gov.in/pages/display/88-books> (edited by Shah; shown as HT<sup>10</sup>), and ENVIS Centre, Botanical Survey of India at [http://www.bsienvic.nic.in/Database/E\\_3942.aspx](http://www.bsienvic.nic.in/Database/E_3942.aspx) (shown by superscript '11' with threat status in column-2, e.g., R<sup>11</sup>) are also included in Table 1. All the sources have not followed IUCN criteria so the statuses mentioned are not comparable. Species endemic to Uttarakhand are also marked by '\*'. Species names are given in bold case and synonyms are in italicized normal case. If names used in original sources have changed these are given as synonyms. Names of all species are mainly checked in Plants of the World Online POWO (2019), Singh et al. (2019) and Catalogue of Life 2020 (Roskov et al. 2020) for nomenclatural updates. Synonyms, basionym wherever required (considering use in regional or national flora) are also given. After the scientific name, habit of the plant is given in column-1. In the second column threat status as given in original documents is mentioned. In the third column distribution of species in India/Himalayas and global distribution based on different sources is given. In the fourth column, elevational distribution of species compiled from various authentic sources is given. Wherever information is not available

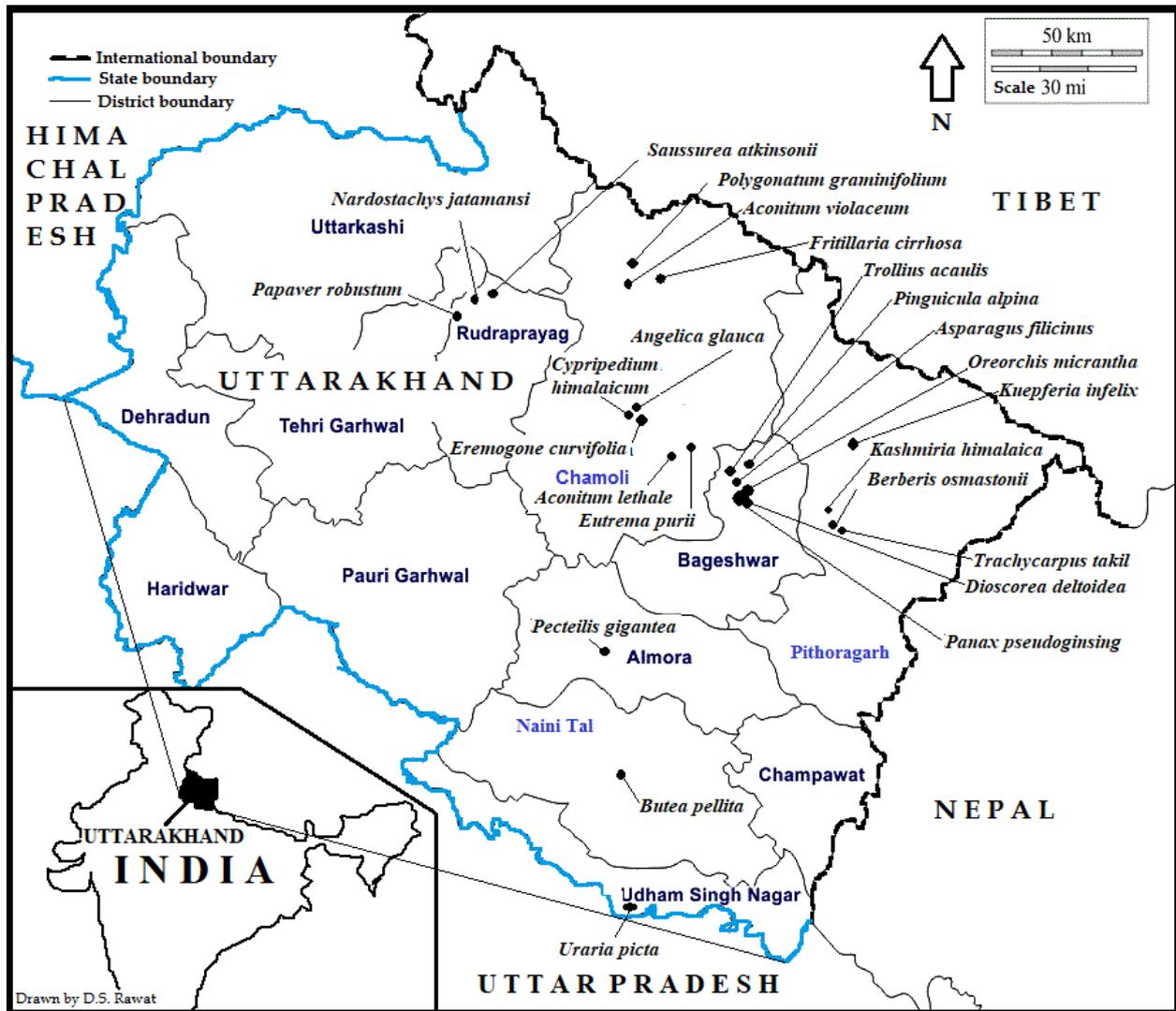


Figure 1. Location map of photographed species.

it is indicated by ‘?’.

All the threatened species listed in Table 1 are arranged order and family wise following arrangement and circumscription of families given in Angiosperm Phylogeny Group classification (APG IV 2016). Abbreviations used in Table 1 for different geographical areas (Indian states, Himalayan areas, Countries) are detailed out below Table 1. Some of the species listed in original documents are dropped from Table-1 on account of various reasons elaborated in results and discussion part (Table 2).

## RESULTS AND DISCUSSION

The compiled list of threatened species shows the presence of 290 threatened species (211 herbs, 43 shrubs, 24 trees, 12 climbers) belonging to 29 orders, 63 families and 176 genera. This number of species is about 6% of the total wild flora of the state. Some of the species listed as threatened in different sources are not included in it on account of clearly being synonyms of other common species, wrong identification, variety being not recognized in recent works or international databases, invasive species, or being cultivated species (Table 3). More than 100 species are endemic to the state. Source wise number of species included in Table 1 is depicted in table-2 which shows that maximum numbers of species are based on Pusalkar & Srivastava (2018) which is a

recent document on flora of Uttarakhand.

Family wise, Orchidaceae (27<sup>+</sup> genera and 47<sup>+</sup> spp.) contains the largest number of threatened species followed by Fabaceae (15 genera, 26 spp.), Poaceae (14 genera, 19 spp.), Apiaceae (12 genera, 16 spp.), Rosaceae (8 genera, 16 spp.), Asteraceae (8 genera, 14 spp.), Balsaminaceae (1 genus, 10 spp.), and Ranunculaceae (7 genera, 10 spp.). Rest of the families contain less than 10 threatened species. The genus *Impatiens* L. has 10 threatened species and *Berberis* L. has eight species threatened out of total 30 spp. each, known in Uttarakhand while seven species of *Spiraea* L. out of 18 total known in Uttarakhand are threatened (Uniyal et al. 2007; Pusalkar & Srivastava 2018).

Elevational distribution of 280 species compiled from different sources shows that the maximum number of threatened species (146 spp., 52.14%) are distributed in the 2.0–3.0 km elevation zone, followed by the 3.0–4.0 km zone (126 spp., 45.0%), 1.0–2.0 km zone (99 spp., 35.35%), 4.0–5.0 km zone (66 spp., 23.57%) and up to 1.0 km (58 spp., 20.71%). The lowest number of threatened species (11 spp., 3.92%) is found in the 5.0–6.0 km zone which is obvious being a species poor zone. On elevation gradient, maximum forest cover (India State of Forest Report 2019) and highest species richness across all habits was recorded in the 1–2 km zone (1.4–1.6 km) by Kharkwal et al. (2005) while Oommen & Shanker (2005) found the 1.0–2.3 km zone with the highest diversity of woody elements. Threatened species, however, are more concentrated in the 2–3 km zone and then in the 3–4 km zone, thus not directly influenced by high forest cover or species richness. Elevational distribution of 96 endemic species also shows a similar pattern with a maximum of 43 species (44.79%) in the 2–3 km zone, followed by 36 species (37.5%) in the 3–4 km zone, 28 species (29.16%) in the 1–2 km zone, 16 species (16.6%) in the 0.2–1 km zone, and 14 species (14.58%) in the 4–5 km zone. Species richness is expected to reduce with increasing elevation but in the Himalayas it is noticed highest in mid hills (1,500–2,500 m) above which it starts decreasing making a hump-shaped pattern (Grytnes & Vetaas 2002; Kharkwal et al. 2005). The species richness of threatened species as well as endemic species more or less also follows this pattern with moderate richness at lower elevations which increases to highest value in mid elevation (2–3 km elevation zone) and then starts reducing. It is apparent that species with limited elevation range (<500 m) require special attention as these are either narrow range endemics (e.g., *Eremogone curvifolia* (Majumdar) Pusalkar & D.K. Singh) or rarely collected (e.g., *Rubus*

*almorensis* Dunn).

Today, threat statuses accepted by IUCN only are considered correct and valid in international literature. As of the recent IUCN Red List 2020–21, only 54 species known in Uttarakhand have been evaluated, within which only 14 species are threatened. Critically Endangered (CR) species are *Aucklandia costus* Falc. (= *Saussurea costus* (Falc.) Lipsch.), *Gentiana kurroo* Royle, *Lilium polyphyllum* D. Don and *Nardostachys jatamansi* (D. Don) DC. Endangered species (EN) are *Aconitum heterophyllum* Wall. ex Royle, *Angelica glauca* Edgew., *Cypripedium elegans* Rchb.f., *C. himalaicum* Rolfe, and *Pittosporum eriocarpum* Royle. Vulnerable species (VU) are *Aconitum violaceum* Jacquem. ex Stapf, *Cypripedium cordigerum* D. Don, *Dalbergia latifolia*, *Dienia muscifera* Lindl. (= *Malaxis muscifera* (Lindl.) Kuntze), and *Ulmus wallichiana* Planch. Thirty-one species are evaluated but not found threatened and accordingly categorized as Least Concern (LC, 30 spp.) or Near Threatened (NT, 01 sp.). Nine species could not be evaluated for lack of sufficient data and categorized as Data Deficient (DD). A clear disparity can be seen in two important sources (IUCN Red List 2020–21 and Indian Red Data Book) where only six species (*Nardostachys jatamansi* (D. Don) DC, *Aucklandia costus* Falc., *Cypripedium cordigerum* D. Don, *C. elegans* Rchb.f., *C. himalaicum* Rolfe, *Pittosporum eriocarpum* Royle) are common. Eight additional species listed as threatened in IUCN Red List 2020–1 and 49 additional species listed as threatened in Indian Red Data Book are not included vice versa. IUCN Red List has also not assessed 256 species listed as threatened in various sources which warrant their immediate assessment by recent IUCN guidelines to understand their correct status in nature.

One of the important tools for conservation of plant species is micropropagation (Fay 1992). Reasons for selection of species for micropropagation may be various but one of them is the threatened status of a species. It is found in this study that out of 14 threatened species listed in IUCN Red List and known in Uttarakhand, successful tissue culture protocols have been developed for nine only. As per the list of threatened species by Indian Red Data Book, however, 55 species are known in Uttarakhand and only 10 species have been micropropagated. In all, tissue culture protocols are available for only 16 species (Grewal & Atal 1976; Lal et al. 1988; Mathur 1992; Sharma et al. 1993; Sharma & Seth 2001; Pandey et al. 2004, 2005; Jabeen et al. 2006; Pandey et al. 2011; Radha et al. 2011; Bhandari et al. 2013; Mishra- Rawat et al. 2013; Sharma et al. 2014; Kumari et al. 2015; Gondval et al. 2016; Gupta

**Table 1. Threatened flora of Uttarakhand.**

ORDER, FAMILY Species Name; Habit	Threat Assessment	Geographical Distribution INDIA; Outside India	Elev. Distr. (m) in UK
Order 1- <b>AUSTROBAILEYALES</b> Takht. ex Reveal Family 1- SCHIZANDRACEAE Blume			
1. <i>Schisandra grandiflora</i> (Wall.) Hook.f. & Thomson [=Kadsura grandiflora Wall.]; Cl	I <sup>2</sup> , NE <sup>3</sup> , I <sup>7</sup> , I <sup>11</sup>	HP, UK, S; Nep, Bhu, Chi	1500-3500
2. <i>Schisandra propinqua</i> (Wall.) Baill. [=Kadsura propinqua Wall.]; Cl	I <sup>2</sup> , NE <sup>3</sup> , I <sup>7</sup> , I <sup>11</sup>	UK, S; Nep, Bhu, Chi	1200-3000
Order 2- <b>MAGNOLIALES</b> Juss. ex Bercht. & J.Presl Family 2- Magnoliaceae Juss.			
3. <i>Magnolia doltsopa</i> (Buch.-Ham. ex DC.) Filger [=Michelia doltsopa Buch.-Ham. ex DC.]; T	DD <sup>3</sup>	UK, WB, S, AP, MN, MG; Ba, Mya, Chi	900-2200
4. <i>Magnolia kisopa</i> (Buch.-Ham. ex DC.) Filger [=Michelia kisopa Buch.-Ham. ex DC.]; T	DD <sup>3</sup>	UK, S; Nep; Tib	1500-2300
Order 3- <b>LAURALES</b> Juss. ex Bercht. & J. Presl Family 3- LAURACEAE Juss.			
5. <i>Alseodaphne himalayana</i> Kosterm.; Sh	NE <sup>3</sup> , VU <sup>6</sup>	UK; Nep	?
6. <i>Cinnamomum glanduliferum</i> (Wall.) Meisn. [=Laurus glandulifera Wall.]; T	I <sup>2</sup> , LC <sup>3</sup>	UK; Nep, Ban, Bhu, Mal, Chi	1200-2150
7. <i>Cinnamomum tamala</i> T. Nees & Eberm.; T	LC <sup>3</sup> , VU <sup>4</sup>	Himal, A; Mya, Lao, Viet	450-2150
Order 4- <b>DIOSCOREALES</b> R. Br. ex Mart. Family 4- DIOSCOREACEAE R. Br.			
8. <i>Dioscorea belophylla</i> (Prain) Voigt ex Haines [=Dioscorea nummularia var. belophylla Prain]; Cl	I <sup>2</sup> , NE <sup>3</sup>	Himal, NE India, Pen India	300-1800
9. <i>Dioscorea deltoidea</i> Wall. ex Griseb.; Cl (Image-1)	V <sup>1</sup> , NE <sup>3</sup> , EN <sup>4</sup> , 2A <sup>5</sup> , EN <sup>6</sup>	Himal, NE India	900-3500
Order 5- <b>LILIALES</b> Perleb Family 5- MELANTHACEAE Batsch ex Borkh.			
10. <i>Paris polyphylla</i> Sm. [=Daiswa polyphylla (Sm.) Raf.]; H	NE <sup>3</sup> , EN <sup>4</sup> , EN <sup>6</sup> , HT <sup>9</sup>	HP, UK, WB, S, AP, A, NL, MN, MG; Pak, Nep, Bhu, Mya, Chi, Jap	2000-3000
11. <i>Trillium govanianum</i> Wall. ex D.Don [=Trillidium govanianum (Wall. ex D.Don) Kunth]; H	NE <sup>3</sup> , EN <sup>6</sup> , HT <sup>9</sup>	J&K, HP, UK, S, WB; Paki, Nep	2500-4000
Family 6- COLCHICACEAE DC.			
12. <i>Gloriosa superba</i> L.; H	LC <sup>3</sup> , VU <sup>4</sup>	India; Nep, Ban, Bhu, Chi, Mya, Lao, Mal, Africa	300-1500
Family 7- SMILACEAE Vent.			
13. <i>Smilax wightii</i> A.DC.; Cl	R <sup>1</sup> , R <sup>2</sup> , NE <sup>3</sup>	UK, E & C Himal, TN	Upto 500
Family 8- LILIACEAE Juss.			
14. <i>Fritillaria cirrhosa</i> D. Don [=F. roylei Hook.]; H (Image-2)	NE <sup>3</sup> , EN <sup>4</sup> , EN <sup>6</sup>	J&K, HP, UK, S, WB; Afg, Pak, Nep, Bhu, Chi, Mya	2400-4500
15. <i>Lilium polyphyllum</i> D.Don; H	CR <sup>3A</sup> , CR <sup>3</sup> , CR <sup>4</sup> , CR <sup>6</sup> , HT <sup>9</sup>	J&K, HP, UK; Afg, Pak, Nep	2000-4000
16. <i>Lilium wallichianum</i> Schult. & Schult.f.; H	I <sup>2</sup> , NE <sup>3</sup> , EN <sup>6</sup> , I <sup>7</sup> , HT <sup>9</sup> , I <sup>11</sup>	UK, S; Nep, Bhu, Mya	1200-2400
Order 6- <b>ASPARGALES</b> Link Family 9- ORCHIDACEAE Juss.			
17. <i>Aphyllorchis gollanii</i> Duthie; H	E <sup>1</sup> /PEX <sup>1</sup> , Ex <sup>2</sup> /E <sup>2</sup> , NE <sup>3</sup> , 2A <sup>5</sup> , VU <sup>6</sup> , Ex <sup>7</sup> , Ex <sup>11</sup>	UK; China	2400-3000
18. <i>Bulbophyllum reptans</i> (Lindl.) Lindl. ex Wall. [=Bulbophyllum rauyi Arora; Tribrochia reptans Lindl.]; H	I <sup>2</sup> , NE <sup>3</sup> , 2A <sup>5</sup> , I <sup>11</sup>	UK, S, AP, NG, MN, MG, MZ, WB; Nep, Ban, Mya, Chi, Thai, Lao, Viet	500-1500
19. <i>Calanthe alismifolia</i> Lindl.; H	I <sup>2</sup> , NE <sup>3</sup> , 2A <sup>5</sup> , I <sup>7</sup> , I <sup>11</sup>	UK, S, AP, MG, NG, WB; Bhu, Chi, Mya, Jap, Lao, Tai, Viet	1500-2000
20. <i>Calanthe alpina</i> Hook.f. ex Lindl.; H	R <sup>1</sup> , R <sup>2</sup> , NE <sup>3</sup> , 2A <sup>5</sup> , R <sup>7</sup> , R <sup>11</sup>	UK, S, AP, NG, WB; Nep, Bhu, Mya, Chi, Tai, Jap	2500-3500
21. <i>Calanthe davidii</i> Franch. [=Calanthe pachystalix Reichb.f. ex Hook.f.]; H	E <sup>1</sup> , NE <sup>3</sup> , 2A <sup>5</sup>	UK, AP; Nep, Chi, Tai, Viet, Jap	1500-2000
22. <i>Calanthe mannii</i> Hook.f.; H	R <sup>1</sup> , NE <sup>3</sup> , 2A <sup>5</sup> , R <sup>11</sup>	UK, S, AP, MZ, MN, MG; Nep, Bhu, Mya, Chi, Viet, Jap	1300-2200
23. <i>Coelogyne cristata</i> Lindl.; H	R <sup>2</sup> , NE <sup>3</sup> , 2A <sup>5</sup>	HP, UK, S, AP, A, MN, MG, WB; Nep, Bhu, Ban, Chi	1000-2000
24. <i>Coelogyne flaccida</i> Lindl.; H	I <sup>2</sup> , NE <sup>3</sup> , 2A <sup>5</sup>	UK, S, AP, A, MN, MG, NG; Nep, Bhu, Ban, Mya, Lao, Thai	1000-2100
25. <i>Coelogyne nitida</i> (Wall. ex D.Don) Lindl. [=Cymbidium nitidum Wall. ex D.Don]; H	R <sup>2</sup> , NE <sup>3</sup> , 2A <sup>5</sup>	UK, S, AP, MN, MZ, MG, NG, WB; Nep, Bhu, Mya, Chi, Lao, Thai, Viet	1500-2300



ORDER, FAMILY Species Name; Habit	Threat Assessment	Geographical Distribution INDIA; Outside India	Elev. Distr. (m) in UK
26. <i>Crepidium acuminatum</i> (D.Don) Szlach. [=Malaxis acuminata D.Don]; H	NE <sup>3</sup> , 2A <sup>5</sup> , VU <sup>6</sup>	HP, UK, S, AP, A, MP, MG, MZ, WB, KN, KR, TN; Nep, Bhu, Thai, Viet, Lao, Ban, Chi, Mya, Phi, Australia	600-3000
27. <i>Cymbidium eburneum</i> Lindl.; H	V <sup>1</sup> , NE <sup>3</sup> , 2A <sup>5</sup>	UK, S, AP, A, MN, MG, MN, WB; Nep, Mya, Chi, Viet	1000-1500
28. <i>Cymbidium goeringii</i> (Rchb.f.) Rchb.f. [=Cymbidium mackinnonii Duthie; Maxillaria goeringii Rchb.f.]; H	NE <sup>3</sup> , 2A <sup>5</sup> , VU <sup>6</sup>	UK, S, AP; Bhu, Chi, Kor, Jap	1700-1800
29. <i>Cymbidium hookerianum</i> Rchb.f.; H	V <sup>1</sup> , NE <sup>3</sup> , 2A <sup>5</sup>	UK, S, AP, MG, MN, MZ; Bhu, Nep, Mya, Chi, Viet	1500-2500
30. <i>Cypripedium cordigerum</i> D.Don; H	R <sup>1</sup> , VU <sup>3A</sup> , VU <sup>3</sup> , 2A <sup>5</sup> , EN <sup>6</sup> , HT <sup>9</sup> , R <sup>11</sup>	J&K, HP, UK, S; Pak, Nep, Bhu, Chi	2100-4000
31. <i>Cypripedium elegans</i> Rchb.f.; H	R <sup>1</sup> , EN <sup>3A</sup> , EN <sup>3</sup> , 2A <sup>5</sup> , EN <sup>6</sup> , HT <sup>9</sup>	UK, S; Nep, Bhu, Chi	2500-4000
32. <i>Cypripedium himalaicum</i> Rolfe; H (Image-3)	R <sup>1</sup> , EN <sup>3</sup> , 2A <sup>5</sup> , EN <sup>6</sup> , HT <sup>9</sup> , R <sup>11</sup>	J&K, HP, UK, S; Nep, Bhu, Mya, Chi	2700-4300
33. <i>Dactylorhiza hatagirea</i> (D.Don) Soo [=Orchis hatagirea D.Don]; H	NE <sup>3</sup> , CR <sup>4</sup> , 2A <sup>5</sup> , EN <sup>6</sup> , HT <sup>9</sup>	J&K, HP, UK, S; Pak, Nep, Bhu, Chi, Mon	2500-4400
34. <i>Dendrobium macrostachyum</i> Lindl. [=Dendrobium gamblei King & Pantl.]; H	I <sup>2</sup> , LC <sup>3</sup> , 2A <sup>5</sup> , I <sup>11</sup>	Throughout India; Nep, Ban, Mya, Borneo, Jawa, Malaya, Sri Lanka, Sumatra, Thai, Viet	300-800
35. * <i>Dendrobium normale</i> Falc.; H	I <sup>2</sup> , NE <sup>3</sup> , 2A <sup>5</sup> , I <sup>7</sup> , I <sup>11</sup>	UK	900-2700
36. <i>Dienia muscifera</i> Lindl. [=Malaxis muscifera (Lindl.) Kuntze, Microstylis muscifera (Lindl.) Ridl.]; H	VU <sup>3</sup> , 2A <sup>5</sup> , EN <sup>4</sup> , EN <sup>6</sup> , HT <sup>9</sup>	J&K, HP, UK, S, AP, WB; Paki, Nep, Bhu, Mya, Chi	1800-4000
37. <i>Diplomeris hirsuta</i> (Lindl.) Lindl. [=Diplophilos hirsutus Lindl.]; H	V <sup>1</sup> , NE <sup>3</sup> , 2A <sup>5</sup> , EN <sup>6</sup> , VoE <sup>8</sup> , HT <sup>9</sup> , HT <sup>10</sup> , V <sup>11</sup>	UK, S, AP, MG, NG, WB; Nep, Chi	800-1200
38. * <i>Eria occidentalis</i> Seidenf. [=Pinalia occidentalis (Seidenf.) Schuit., Y.P. Ng & H.A. Pedersen]; H	R <sup>1</sup> , R <sup>2</sup> , NE <sup>3</sup> , 2A <sup>5</sup> , VU <sup>6</sup> , R <sup>7</sup> , R <sup>11</sup>	UK	1200-1500
39. <i>Eulophia mackinnonii</i> Duthie; H	R <sup>1</sup> , R <sup>2</sup> , NE <sup>3</sup> , 2A <sup>5</sup> , R <sup>7</sup> , R <sup>11</sup>	UK, UP, JR, CG, MP; Nep, Ban	300-800
40. <i>Eulophia obtusa</i> (Lindl.) Hook.f. [=Cyrtoptera obtusa Lindl.]; H	I <sup>2</sup> , NE <sup>3</sup> , 2A <sup>5</sup> , VU <sup>6</sup> , I <sup>7</sup> , I <sup>11</sup>	UK, UP; Nep	250-900
41. <i>Flickingeria hesperis</i> Seidenf. [=Dendrobium hesperis (Seidenf.) Schuit. & Peter B.Adams]; H	E <sup>1</sup> , E <sup>2</sup> , NE <sup>3</sup> , 2A <sup>5</sup> , VU <sup>6</sup> , E <sup>7</sup> , HT <sup>9</sup> , E <sup>11</sup>	UK, MN	1500-2000
42. <i>Galeola falconeri</i> Hook.f. [=Cyrtozia falconeri (Hook.f.) Aver.]; H	I <sup>2</sup> , NE <sup>3</sup> , 2A <sup>5</sup> , I <sup>7</sup> , I <sup>11</sup>	UK, S, AP, MN, MG, MZ, WB; Nep, Bhu, Thai, Viet, Chi	1200-2000
43. <i>Galeola lindleyana</i> (Hook.f. & Thomson) Rchb.f. [=Cyrtozia lindleyana Hook.f. & Thomson]; H	I <sup>2</sup> , NE <sup>3</sup> , 2A <sup>5</sup>	HP, UK, AP, MN, MG, MZ, NG, WB; Nep, Chi, Viet, Sumatra	1200-2400
44. * <i>Gastrochilus garhwalensis</i> Z.H.Tsi; H	NE <sup>3</sup> , 2A <sup>5</sup> , VU <sup>6</sup>	UK	1000
45. <i>Habenaria edgeworthii</i> Hook.f. ex Collett [=Herminium edgeworthii (Hook.f. ex Collett) X.H. Jin, Schuit., Raskoti & Lu Q. Huang]; H	NE <sup>3</sup> , 2A <sup>5</sup> , VU <sup>6</sup>	J&K, HP, UK, S, AP, WB; Paki, Nep, Bhu, Chi	1500-3000
46. <i>Habenaria intermedia</i> D.Don; H	NE <sup>3</sup> , EN <sup>4</sup> , 2A <sup>5</sup> , VU <sup>6</sup>	J&K, HP, UK, CG; Nep, Paki, Chi	1500-3000
47. * <i>Herminium kumaonense</i> Deva & H.B.Naithani; H	NE <sup>3</sup> , 2A <sup>5</sup> , VU <sup>6</sup>	UK	3300-3600
48. <i>Neottia acuminata</i> Schltr. [=Aphyllorchis parviflora King & Pantl.]; H	R <sup>1</sup> , LC <sup>3</sup> , 2A <sup>5</sup> , R <sup>11</sup>	UK, S, AP; Nep, Chi, Rus, Mon, Kor, Jap, Tai	3300-3600
49. * <i>Neottia mackinnonii</i> Deva & H.B.Naithani; H	NE <sup>3</sup> , 2A <sup>5</sup> , DD <sup>5</sup> , VU <sup>6</sup>	UK	1500-1800
50. * <i>Neottia microglottis</i> (Duthie) Schltr. [=Archineottia microglottis (Duthie) S.C.Chen; Listera microglottis Duthie]; H	R <sup>1</sup> , R <sup>2</sup> , NE <sup>3</sup> , 2A <sup>5</sup> , VU <sup>6</sup> , R <sup>7</sup> , R <sup>11</sup>	UK	1500-4000
51. * <i>Neottia nandadeviensis</i> (Hajra) Szlach. [=Listera nandadeviensis Hajra]; H	NE <sup>3</sup> , 2A <sup>5</sup> , VU <sup>6</sup>	UK	2400-3500
52. * <i>Nervilia gleadowii</i> A.N.Rao; H	NE <sup>3</sup> , 2A <sup>5</sup> , VU <sup>6</sup>	UK	1000
53. <i>Nervilia mackinnonii</i> (Duthie) Schltr. [=Pogonia mackinnonii Duthie]; H	I <sup>2</sup> , NE <sup>3</sup> , 2A <sup>5</sup> , VU <sup>6</sup> , I <sup>7</sup> , I <sup>11</sup>	UK; Nep, Mya, Chi	1500-1800
54. * <i>Nervilia pangteyana</i> Jalal, Kumar & G.S.Rawat; H	NE <sup>3</sup> , 2A <sup>5</sup> , VU <sup>6</sup>	UK	800-1000
55. <i>Nervilia plicata</i> (Andrews) Schltr. [=Nervilia biflora (Wight) Schltr.; Arethusa plicata Andrews]; H	I <sup>2</sup> , NE <sup>3</sup> , 2A <sup>5</sup> , I <sup>11</sup>	Throughout India; Pak, Nep, Ban, Bor, Jawa, Lao, Mya, Phil, Tai, Viet, Aus	300-1500
56. <i>Oreorchis foliosa</i> (Lindl.) Lindl. var. <i>indica</i> (Lindl.) N. Pearce & P.J. Cribb [=Corallorhiza indica Lindl., Oreorchis indica (Lindl.) Hook.f.]; H	I <sup>2</sup> , NE <sup>3</sup> , 2A <sup>5</sup> , I <sup>7</sup> , I <sup>11</sup>	HP, UK, S; Nep, Bhu, Chi, Jap	2000-2700
57. <i>Oreorchis micrantha</i> Lindl.; H (Image-4)	I <sup>2</sup> , NE <sup>3</sup> , 2A <sup>5</sup>	J&K, HP, UK, S, AP, WB; Nep, Bhu, Mya, Chi	2400-3300
58. <i>Pecteilis gigantea</i> (Sm.) Raf. [=Orchis gigantea Sm.]; H (Image-5)	NE <sup>3</sup> , 2A <sup>5</sup> , VoE <sup>8</sup> , HT <sup>9</sup> , HT <sup>10</sup>	Throughout India; Pak, Nep, Mya, Chi	300-2000
59. <i>Peristylus elisabethae</i> (Duthie) R.K.Gupta [=Peristylus kumaonensis Renz]; H	NE <sup>3</sup> , 2A <sup>5</sup> , VU <sup>6</sup>	HP, UK, S, WB; Nep, Bhu, Mya, Chi	2000-2200

ORDER, FAMILY Species Name; Habit	Threat Assessment	Geographical Distribution INDIA; Outside India	Elev. Distr. (m) in UK
60. <i>Phaius tankervilleae</i> (Banks) Blume [= <i>Limodorum tankervilleae</i> Banks]; H	NE <sup>3</sup> , 2A <sup>5</sup> , VU <sup>6</sup> , VoE <sup>8</sup> , HT <sup>9</sup> , HT <sup>10</sup>	UK, S, AP, MN, MG, MZ, WB, NG, TR, KL, OD; Nep, Bhu, Ban, Mya, Chi, Jap, Viet, Sri etc	300-500
61. <i>*Ponerorchis renzii</i> Deva & H.B.Naithani; H	NE <sup>3</sup> , 2A <sup>5</sup> , VU <sup>6</sup>	UK	3200-3400
62. <i>Satyrium nepalense</i> D.Don; H	NE <sup>3</sup> , 2A <sup>5</sup> , VU <sup>6</sup>	Himal, NE India, South India; Pak, Chi, Mya, Sri Lanka	1500-4000
63. <i>Tipularia cunninghamii</i> (King & Prain) S.C.Chen, S.W.Gale & P.J.Cribb [= <i>Didickea cunninghamii</i> King & Prain]; H	E <sup>1</sup> , E <sup>2</sup> , NE <sup>3</sup> , 2A <sup>5</sup> , E <sup>7</sup> , E <sup>11</sup>	UK, S; Tai	2000-3100
Family 10- IRIDACEAE Juss.			
64. <i>Iris milesii</i> Baker ex Foster; H	I <sup>2</sup> , NE <sup>3</sup>	W Himal; Chi	1600-2700
Family 11- AMARYLLIDACEAE J.St.-Hil.			
65. <i>Allium auriculatum</i> Kunth; H	E <sup>2</sup> , NE <sup>3</sup>	J&K, HP, UK; Nep	3300-5500
66. <i>Allium loratum</i> Baker; H	E <sup>2</sup> , NE <sup>3</sup>	J&K, HP, UK; Afg, Chi	2600-3700
67. <i>Allium roylei</i> Stearn; H	E <sup>2</sup> , NT <sup>3</sup>	J&K, UK; Afg, Pak	1900-3200
68. <i>Allium stracheyi</i> Baker; H	V <sup>1</sup> , V <sup>2</sup> , NE <sup>3</sup> , VU <sup>4</sup> , VU <sup>6</sup> , V <sup>7</sup> , V <sup>11</sup>	J&K, HP, UK; Pak, Nep	2000-3800
Family 12- ASPARAGACEAE Bercht. & J. Presl			
69. <i>Asparagus filicinus</i> Buch.-Ham. ex D.Don; H (Image-6)	DD <sup>3</sup>	Himal; Ban, Mya, Chi, Tai, Viet	2100-3000
70. <i>*Dipcadi reidii</i> Deb & S. Dasgupta; H	PEX <sup>1</sup> , Ex <sup>2</sup> , NE <sup>3</sup> , CR <sup>6</sup> , VU <sup>6</sup> , Ex <sup>7</sup> , Ex <sup>11</sup>	UK; Nep(?)	1500-2500
71. <i>Polygonatum cirrhifolium</i> (Wall.) Royle [= <i>Convallaria cirrhifolia</i> Wall.]; H	NE <sup>3</sup> , VU <sup>4</sup> , VU <sup>6</sup>	J&K, HP, UK, S; Pak, Nep, Bhu, Chi	1200-4500
72. <i>Polygonatum graminifolium</i> Hook.; H (Image-7)	I <sup>2</sup> , NE <sup>3</sup> , I <sup>7</sup> , I <sup>11</sup>	J&K, HP, UK; Nep, Bhu	2600-4650
73. <i>Polygonatum verticillatum</i> (L.) All. [= <i>Convallaria verticillata</i> L.]; H	VU <sup>4</sup> , VU <sup>6</sup>	Himal	1500-4500
Order 7- ARECALES Bromhead Family 13- ARECACEAE Bercht. & J. Presl (PALMAE Juss.)			
74. <i>Phoenix rupicola</i> T. Anderson; T	R <sup>1</sup> , V <sup>2</sup> , NT <sup>3</sup>	UK, NE India	Up to 800
75. <i>*Trachycarpus takil</i> Becc.; T (Image-8)	R <sup>1</sup> , NE <sup>3</sup> , CR <sup>6</sup> , VU <sup>6</sup> , VoE <sup>8</sup> , HT <sup>9</sup> , HT <sup>10</sup> , R <sup>11</sup>	UK	1800-2550
Order 8- ZINGIBERALES Griseb Family 14- ZINGIBERACEAE Martinov			
76. <i>Cautleya spicata</i> (Sm.) Baker [= <i>Cautleya petiolata</i> Baker]; H	I <sup>2</sup> , LC <sup>3</sup> , I <sup>7</sup> , I <sup>11</sup>	Himal; Chi, Mya	1800-2800
77. <i>Hedychium spicatum</i> Sm.; H	NE <sup>3</sup> , VU <sup>6</sup>	Himal; Chi, Mya, Thai	1500-2800
Order 9- POALES Small Family 15- ERIOCAULACEAE Martinov			
78. <i>Eriocaulon nepalense</i> J.D. Prescott ex Bong. var. <i>luzulifolium</i> (Mart.) Praj. & J.Parn. [= <i>Eriocaulon pumilio</i> Hook.f.]; H	I <sup>2</sup> , NE <sup>3</sup> , DD <sup>6</sup> , I <sup>7</sup> , I <sup>11</sup>	W Himal, NE India; Nep, Chi, Thai, New Guinea	900-2000
Family 16- CYPERACEAE Juss.			
79. <i>Carex clavispica</i> S.R. Zhang [= <i>Kobresia duthiei</i> C.B. Clarke]; H	I <sup>2</sup> , NE <sup>3</sup>	Himal	3600-4500
80. <i>Carex esenbeckii</i> Kunth [= <i>Kobresia esenbeckii</i> (Kunth) Noltie; <i>Kobresia trinervis</i> var. <i>foliosa</i> (C.B. Clarke) Kuekenh.]; H	I <sup>2</sup> , NE <sup>3</sup>	Himal; Bhu, Chi, Tib	3300-5000
81. <i>*Carex nandadeviensis</i> Ghildyal, U.C.Bhattach. & Hajra; H	NE <sup>3</sup> , VU <sup>6</sup>	UK	3000-4000
Family 17- POACEAE Barnhart (GRAMINEAE Juss.)			
82. <i>Cymbopogon microstachys</i> (Hook.f.) Soenarko [= <i>Cymbopogon flexuosus</i> var. <i>microstachys</i> (Hook.f.) Bor]; H	R <sup>2</sup> , NE <sup>3</sup> , R <sup>7</sup> , R <sup>11</sup>	N, E & NE India, Indian plains; Chi, Indochina	300-1000
83. <i>*Cymbopogon osmastonii</i> R. Parker; H	V <sup>2</sup> , NE <sup>3</sup> , VU <sup>6</sup>	UK, N India	300-500
84. <i>*Dendrocalamus somdevae</i> H.B. Naithani; Sh	NE <sup>3</sup> , END <sup>11</sup>	UK	600-1500
85. <i>Digitaria duthieana</i> Henrard ex Bor; H	DD <sup>3</sup>	UK, UP, MP	300
86. <i>Elymus duthiei</i> (Melderis) G.Singh [= <i>Agropyron duthiei</i> Melderis]; H	I <sup>2</sup> , NE <sup>3</sup> , I <sup>7</sup> , I <sup>11</sup>	W&E Himal	1000-2000
87. <i>*Eulalia madkotiensis</i> Kandwal, B.K. Gupta & S.K. Srivast.; H	NE <sup>3</sup> , VU <sup>6</sup>	UK	1200-1500
88. <i>*Festuca lucida</i> Stapf; H	I <sup>2</sup> , NE <sup>3</sup> , I <sup>7</sup> , I <sup>11</sup>	UK	2300-3000
89. <i>*Festuca nandadevica</i> Hajra; H	NE <sup>3</sup> , VU <sup>6</sup>	UK	3300-3600
90. <i>*Helictotrichon uniyalii</i> Kandwal & B.K. Gupta; H	NE <sup>3</sup> , VU <sup>6</sup>	UK	2500-3000

ORDER, FAMILY Species Name; Habit	Threat Assessment	Geographical Distribution INDIA; Outside India	Elev. Distr. (m) in UK
91. * <i>Microstegium falconeri</i> (Hook.f.) Clayton [= <i>Ischnochloa falconeri</i> Hook.f.]; H	I <sup>2</sup> , NE <sup>3</sup> , VU <sup>6</sup> , I <sup>7</sup> , I <sup>11</sup>	NW & E Himal	1800-3000
92. <i>Piptatherum hilariae</i> Pazij [= <i>Oryzopsis humilis</i> Bor; <i>Oryzopsis hilariae</i> (Pazij) Uniyal]; H	I <sup>2</sup> , NE <sup>3</sup> , I <sup>7</sup> , I <sup>11</sup>	W Himal; Taj, Afg, Paki, Tib, Chi	2000-2500
93. * <i>Poa garhwalensis</i> D.C. Nautiyal & R.D. Gaur; H	NE <sup>3</sup> , VU <sup>6</sup>	UK	3900-4200
94. <i>Poa pseudamoena</i> Bor; H	I <sup>2</sup> , NE <sup>3</sup> , I <sup>7</sup> , I <sup>11</sup>	W Himal; Tib, China	3000-3800
95. * <i>Poa rhadina</i> Bor; H	E <sup>2</sup> , NE <sup>3</sup> , VU <sup>6</sup> , E <sup>7</sup> , E <sup>11</sup>	UK	2600-4100
96. * <i>Poa royleana</i> Nees ex Steud.; H	NE <sup>3</sup> , END <sup>11</sup>	UK	2000-3300
97. * <i>Pseudodanthonia himalaica</i> (Hook.f.) Bor & C.E.Hubb. [= <i>Danthonia himalaica</i> Hook.f.]; H	I <sup>2</sup> , NE <sup>3</sup> , VU <sup>6</sup> , VU <sup>6</sup>	W Himal	2000-2300
98. <i>Puccinellia thomsonii</i> (Stapf ex Hook.f.) R.R. Stewart [= <i>Glyceria thomsonii</i> Stapf ex Hook.f.]; H	I <sup>2</sup> , NE <sup>3</sup>	W Himal; Tib	4000-4500
99. * <i>Sehima notatum</i> (Hack.) A. Camus [= <i>Ischaemum notatum</i> Hack.]; H	NE <sup>3</sup> , VU <sup>6</sup>	UK	1200-2100
100. <i>Trisetum micans</i> (Hook.f.) Bor [= <i>Avena micans</i> Hook.f.]; H	I <sup>2</sup> , NE <sup>3</sup> , I <sup>7</sup> , I <sup>11</sup>	W Himal, Indian plains	2400-3800
Order 10- RANUNCULALES Juss. ex Bercht. & J. Presl Family 18- PAPAVERACEAE Juss.			
101. <i>Corydalis cashmeriana</i> Royle; H	E <sup>2</sup> , NE <sup>3</sup>	J&K, HP, UK, S; Pak, Nep, Chi	2800-4700
102. * <i>Corydalis devendrae</i> Pusalkar; H	NE <sup>3</sup> , VU <sup>6</sup>	UK	3800-5000
103. <i>Papaver guilelmi-waldemarii</i> (Klotzsch) Christenh. & Byng [= <i>Meconopsis guilelmi-waldemarii</i> Klotzsch; <i>Meconopsis aculeata</i> Royle]; H	E <sup>2</sup> , NE <sup>3</sup> , EN <sup>4</sup>	J&K, HP, UK, S; Pak, Nep, Bhu	3500-5200
104. * <i>Papaver robustum</i> (Hook.f. & Thomson) Christenh. & Byng [= <i>Meconopsis robusta</i> Hook.f. & Thomson]; H (Image-9)	NE <sup>3</sup> , VU <sup>6</sup>	UK; Nep	2500-4300
Family 19- BERBERIDACEAE Juss.			
105. * <i>Berberis affinis</i> G. Don; Sh	R <sup>1</sup> , R <sup>2</sup> , NE <sup>3</sup> , VU <sup>6</sup> , VU <sup>6</sup> , R <sup>7</sup> , R <sup>11</sup>	UK	2200-3000
106. * <i>Berberis ahrendtii</i> R.R.Rao & Uniyal; Sh	NE <sup>3</sup> , EN <sup>6</sup> , VU <sup>6</sup>	UK	2000-3000
107. * <i>Berberis garhwalensis</i> C.K.Schneid.; Sh	NE <sup>3</sup> , DD <sup>6</sup> , VU <sup>6</sup>	UK	3000-4000
108. * <i>Berberis jaunsarensis</i> (Ahrendt) Laferr. [= <i>Mahonia jaunsarensis</i> Ahrendt]; Sh	I <sup>2</sup> , NE <sup>3</sup> , VU <sup>6</sup> , I <sup>7</sup> , I <sup>11</sup>	UK	1500-2600
109. * <i>Berberis lambertii</i> R. Parker; Sh	V <sup>1</sup> /E <sup>1</sup> , V <sup>2</sup> , NE <sup>3</sup> , CR <sup>6</sup> , VU <sup>6</sup> , V <sup>11</sup> /E <sup>11</sup>	UK	2650-2900
110. * <i>Berberis osmastonii</i> Dunn; Sh (Image-10)	R <sup>1</sup> , R <sup>2</sup> , NE <sup>3</sup> , VU <sup>6</sup> , R <sup>7</sup> , R <sup>11</sup>	UK	1700-3000
111. <i>Berberis pseudumbellata</i> R.Parker; Sh	I <sup>2</sup> , NE <sup>3</sup> , I <sup>7</sup> , I <sup>11</sup>	J&K, HP, UK; Pak	2200-3800
112. * <i>Berberis rawatii</i> U.L.Tiwari & B.S.Adhikari; Sh	NE <sup>3</sup> , VU <sup>6</sup>	UK	2200-2400
113. <i>Podophyllum hexandrum</i> Royle [= <i>Sinopodophyllum hexandrum</i> (Royle) T.S.Ying]; H	NE <sup>3</sup> , EN <sup>4</sup> , 2A <sup>3</sup> , EN <sup>6</sup>	J&K, HP, UK, S, AP; Pak, Nep, Bhu, Chi	2000-4000
Family 20- RANUNCULACEAE Juss.			
114. <i>Aconitum heterophyllum</i> Wall. ex Royle; H	EN <sup>3A</sup> , EN <sup>3</sup> , CR <sup>4</sup> , EN <sup>6</sup> , VoE <sup>8</sup> , HT <sup>9</sup> , HT <sup>10</sup>	J&K, HP, UK; Pak, Nep	2700-4800
115. <i>Aconitum laeve</i> Royle; H	NE <sup>3</sup> , EN <sup>6</sup>	J&K, HP, UK; Pak, Nep	2000-3500
116. <i>Aconitum lethale</i> Griff. [= <i>A. falconeri</i> Stapf var. <i>latilobum</i> Stapf; <i>A. balfourii</i> var. <i>rhombilobatum</i> Stapf; <i>A. falconeri</i> Stapf var. <i>falconeri</i> ]; H (Image-11)	V <sup>1</sup> , I <sup>2</sup> , NE <sup>3</sup> , VU <sup>6</sup> , EN <sup>6</sup> , I <sup>7</sup> , VoE <sup>8</sup> , HT <sup>10</sup> , I <sup>11</sup>	UK; Nep	2800-4000
117. <i>Aconitum violaceum</i> Jacquem. ex Stapf; H (Image-12)	VU <sup>3A</sup> , VU <sup>3</sup> , VU <sup>4</sup> , VU <sup>6</sup> , VoE <sup>8</sup> , HT <sup>10</sup>	J&K, HP, UK; Pak, Nep	3200-4800
118. * <i>Anemone raui</i> Goel & U.C. Bhattach.; H	NE <sup>3</sup> , VU <sup>6</sup>	HP, UK	2500-3500
119. <i>Aquilegia nivalis</i> (Baker) Falc. ex B.D. Jacks [= <i>Aquilegia glauca</i> Lindl. var. <i>nivalis</i> ; <i>Aquilegia nivalis</i> (Baker) Bruehl]; H	E <sup>2</sup> , NE <sup>3</sup>	J&K, HP, UK; Pak	3200-4500
120. <i>Delphinium koelzii</i> Munz; H	I <sup>2</sup> , NE <sup>3</sup>	HP, UK	1600-2500
121. * <i>Oxygraphis kumaonensis</i> I.D.Rai & G.S.Rawat; H	NE <sup>3</sup> , VU <sup>6</sup>	UK	4000-4100
122. * <i>Ranunculus uttaranchalensis</i> Pusalkar & D.K.Singh; H	NE <sup>3</sup> , VU <sup>6</sup>	UK	4000-4350
123. <i>Trollius acaulis</i> Lindl.; H (Image-13)	E <sup>2</sup> , NE <sup>3</sup>	J&K, HP, UK; Ira, Pak, Nep, Chi	3200-5000
Order 11- SAXIFRAGALES Bercht. & J. Presl Family 21- SAXIFRAGACEAE Juss.			
124. <i>Bergenia ciliata</i> (Haw.) Sternb. [= <i>Megasea ciliata</i> Haw.]; H	NE <sup>3</sup> , VU <sup>6</sup>	J&K, HP, UK; Pak, Nep, Mya	1000-4300

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125. <i>Saxifraga jacquemontiana</i> Decne.; H	E <sup>2</sup> , NE <sup>3</sup>	J&K, HP, UK, S; Nep, Bhu, Chi	3900-5800
126. <i>Saxifraga meeboldii</i> Engl. & Irmsch.; H	NE <sup>3</sup> , DD <sup>6</sup>	J&K, HP, UK; Tib	4000-4200
127. * <i>Saxifraga minutissima</i> D.S. Rawat; H	NE <sup>3</sup> , VU <sup>6</sup>	UK	4200-4800
Family 22- CRASSULACEAE J.St.-Hil.			
128. * <i>Sedum bhattacharyae</i> R. Manik., N.B. Singh & S.K. Srivast. [= <i>Sedum pedicellatum</i> N.B.Singh & U.C.Bhattach.]; H	NE <sup>3</sup> , VU <sup>6</sup>	UK	1500-3500
129. * <i>Sedum duthiei</i> Frod.; H	I <sup>2</sup> , NE <sup>3</sup> , DD <sup>6</sup> , VU <sup>6</sup> , I <sup>7</sup> , I <sup>11</sup>	UK	4500-4700
130. <i>Sedum heterodontum</i> Hook.f. & Thomson [= <i>Rhodiola heterodonta</i> (Hook.f. & Thomson) Boriss.]; H	NE <sup>3</sup> , VU <sup>4</sup>	J&K, HP, UK; Ira, Afg, Pak, USSR, Nep, Tib, Mon	2500-5100
131. * <i>Sedum seelemannii</i> Raym.-Hamet; H	NE <sup>3</sup> , DD <sup>6</sup> , VU <sup>6</sup>	UK	4500-4700
Order 12- FABALES Bromhead Family 23- FABACEAE Lindl. (LEGUMINOSAE Juss.)			
132. <i>Abrus fruticosus</i> Wall. ex Wight & Arn.; Cl	DD <sup>3A</sup> , DD <sup>3</sup>	UK, Indian plains, NE India; Chi, Tropical Africa	?
133. <i>Astragalus langtangensis</i> Podlech; Sh	DD <sup>3A</sup> , DD <sup>3</sup>	UK, Nep	3500-4000
134. * <i>Astragalus nainitalensis</i> L.B. Chaudhary; Sh	NE <sup>3</sup> , VU <sup>6</sup>	UK	1700-1900
135. <i>Astragalus stewartii</i> Baker [= <i>Astragalus bakeri</i> Ali]; Sh	I <sup>2</sup> , NE <sup>3</sup>	J&K, UK; Paki	1500-3200
136. * <i>Astragalus uttaranchalensis</i> L.B. Chaudhary & J.H. Khan; Sh	NE <sup>3</sup> , VU <sup>6</sup>	UK	3200-3500
137. <i>Butea peltita</i> Hook.f. ex Prain [= <i>Meizotropis peltita</i> (Hook.f ex Prain) Sanjappa]; Sh (Image-14)	NE <sup>3</sup> , CR <sup>6</sup> , VoE <sup>8</sup> , HT <sup>9</sup> , HT <sup>10</sup>	UK; Nep	1400-1500
138. <i>Dalbergia lanceolaria</i> L.f.; T	NE <sup>3</sup> , 2A <sup>5</sup>	UK, Tropical Himal, India; Sri Lanka, Mya	300-1000
139. <i>Dalbergia latifolia</i> Roxb.; T	VU <sup>3</sup> , 2A <sup>5</sup>	UK, India; Nep, Mal	300-500
140. <i>Dalbergia sericea</i> G. Don; T	NE <sup>3</sup> , 2A <sup>5</sup>	UK; Nep, Ban, Chi	300-1500
141. <i>Dalbergia sissoo</i> Roxb. ex DC.; T	NE <sup>3</sup> , 2A <sup>5</sup>	J&K, HP, UK; Ira, Afg, Pak, Nep, Ban, Mya	300-1200
142. <i>Dalbergia volubilis</i> Roxb.; Cl	NE <sup>3</sup> , 2A <sup>5</sup>	UK, E Himal, NE India, Indian plains; Nep, Ban, Mya, China, Thai, Viet, Lao	300-600
143. * <i>Derris kanjilalii</i> K.C. Sahni & H.B. Naithani; Cl	NE <sup>3</sup> , VU <sup>6</sup>	UK; Nep	300-400
144. * <i>Desmodium garhwalensis</i> L.R. Dangwal & R.D. Gaur; Sh	NE <sup>3</sup> , VU <sup>6</sup>	UK	700-1800
145. <i>Hedysarum astragaloides</i> Benth. ex Baker; H	R <sup>1</sup> , R <sup>2</sup> , NE <sup>3</sup>	J&K, HP, UK; Afg, Paki	3500-4500
146. <i>Hedysarum cachemirianum</i> Benth. ex Baker; H	R <sup>1</sup> /V <sup>1</sup> , NE <sup>3</sup>	J&K, UK; Paki	3700-4000
147. <i>Hedysarum microcalyx</i> Baker; H	V <sup>1</sup> , NE <sup>3</sup>	J&K, HP, UK; Paki	2700-4400
148. <i>Indigofera cedrorum</i> Dunn; Sh	I <sup>2</sup> , NE <sup>3</sup> , VU <sup>6</sup>	HP, UK	1200-2500
149. <i>Indigofera dosua</i> Buch.-Ham. ex D.Don var. <i>simlensis</i> (Ali) Sanjappa [= <i>Indigofera simlensis</i> Ali]; Sh	I <sup>2</sup> , NE <sup>3</sup> , VU <sup>6</sup>	HP, UK	600-3000
150. <i>Indigofera thothathrii</i> Sanjappa; Sh	NE <sup>3</sup> , VU <sup>6</sup>	UK, UP, A	Up to 500
151. <i>Indopiptadenia oudhensis</i> (Brandis) Brenan [= <i>Piptadenia oudhensis</i> Brandis]; T	NE <sup>3</sup> , EN <sup>6</sup> , VoE <sup>8</sup> , HT <sup>9</sup> , HT <sup>10</sup>	UK, UP; Nep	300-600
152. <i>Macrotyloma sar-garhwalensis</i> R.D. Gaur & L.R. Dangwal; H	NE <sup>3</sup> , VU <sup>6</sup>	UK	600- 1500
153. * <i>Pueraria garhwalensis</i> L.R. Dangwal & D.S. Rawat; Cl	NE <sup>3</sup> , VU <sup>6</sup>	UK	300-600
154. * <i>Senna davidsonii</i> (V. Singh) V. Singh [= <i>Cassia davidsonii</i> V. Singh]; Sh	NE <sup>3</sup> , VU <sup>6</sup> , DD <sup>6</sup>	UP (UK ?)	?
155. <i>Thermopsis inflata</i> Cambess.; H	I <sup>2</sup> , NE <sup>3</sup>	J&K, HP, UK, S; Paki, Nep, Chi	4900-5500
156. <i>Uraria picta</i> (Jacq.) Desv. ex DC. [= <i>Hedysarum pictum</i> Jacq.]; H (Image-15)	LC <sup>3</sup> , HT <sup>9</sup>	Himal, India; Pak, Ban, Mya, Chi, Jawa, Male, Phil, Sri Lanka, Thai, Tr Africa	Up to 1500
157. <i>Vigna aconitifolia</i> (Jacq.) Marechal [= <i>Phaseolus aconitifolius</i> Jacq.]; H	DD <sup>3</sup>	UK, Throughout India; Pak, Ban, Mya, Chi, Sri	Up to 2000
Order 13- ROSALES Bercht. & J. Presl Family 24- ROSACEAE Juss.			
158. * <i>Alchemilla palii</i> Panigrahi & Purohit; Sh	NE <sup>3</sup> , DD <sup>11</sup>	UK	?
159. * <i>Cotoneaster parkinsonii</i> Panigrahi & Arv. Kumar; Sh	NE <sup>3</sup> , VU <sup>6</sup>	UK, E Himal, NE India; Nep, Mya	2400-2500

ORDER, FAMILY Species Name; Habit	Threat Assessment	Geographical Distribution INDIA; Outside India	Elev. Distr. (m) in UK
160. <i>Cotoneaster roseus</i> Edgew. [= <i>Cotoneaster osmastonii</i> G.Klotz]; Sh	NE <sup>3</sup> , VU <sup>6</sup>	W Himal; Afg, Pak	2400-3300
161. <i>Cotoneaster simonsii</i> Hort. ex Baker; Sh	I <sup>1</sup> , I <sup>2</sup> , NE <sup>3</sup>	UK, S; Bhutan	1500-3200
162. * <i>Geum aequilobatum</i> K.M.Purohit & Panigrahi; H	NE <sup>3</sup> , END <sup>11</sup>	UK	1000-1500
163. <i>Prunus jacquemontii</i> Hook.f. Sh	DD <sup>3</sup>	J&K, UK; Afg, Pak	2800-3500
164. * <i>Rosa hirsuta</i> Ghora & Panigrahi; Sh	NE <sup>3</sup> , VU <sup>6</sup>	UK	3600-3800
165. * <i>Rubus almoresis</i> Dunn; Sh	I <sup>2</sup> , NE <sup>3</sup> , DD <sup>6</sup> , VU <sup>6</sup> , I <sup>7</sup> , I <sup>11</sup>	UK	2400-2700
166. * <i>Sibbaldia axilliflora</i> (Hook.f.) Chatterjee [= <i>Potentilla axilliflora</i> Hook.f.]; Sh	NE <sup>3</sup> , DD <sup>5</sup> , VU <sup>6</sup>	UK	?
167. * <i>Spiraea diversifolia</i> Dunn; Sh	I <sup>2</sup> , NE <sup>3</sup> , I <sup>7</sup> , I <sup>11</sup>	UK; Nep(?) (CoL)	2700-4400
168. * <i>Spiraea duthieana</i> Zinserl.; Sh	NE <sup>3</sup> , VU <sup>6</sup>	UK	2400-3100
169. * <i>Spiraea hypoleuca</i> Dunn.; Sh	NE <sup>3</sup> , VU <sup>6</sup>	UK; Nep? (CoL)	2100-3300
170. * <i>Spiraea panchanani</i> Panigrahi & K.M.Purohit; Sh	NE <sup>3</sup> , VU <sup>6</sup>	UK	2400
171. * <i>Spiraea panigrahiana</i> K.M. Purohit.; Sh	NE <sup>3</sup> , VU <sup>6</sup>	UK	1900
172. * <i>Spiraea parkeri</i> Panigrahi & K.M. Purohit; Sh	NE <sup>3</sup> , DD <sup>6</sup> , VU <sup>6</sup>	UK	1900-2000
173. * <i>Spiraea raizadae</i> Panigrahi & K.M. Purohit; Sh	NE <sup>3</sup> , VU <sup>6</sup>	UK	3200-3300
Family 25- RHAMNACEAE Juss.			
174. * <i>Sageretia devendrae</i> Pusalkar; Sh	NE <sup>3</sup> , VU <sup>6</sup>	UK	2000-2500
Family 26- ULMACEAE Mirb.			
175. <i>Ulmus wallichiana</i> Planch.; T	E <sup>2</sup> , VU <sup>3</sup> , NE <sup>3</sup>	J&K, HP, UK; Afg, Paki, N	1500-3000
Order 14- FAGALES Engl. Family 27- BETULACEAE Gray			
176. <i>Carpinus faginea</i> Lindl.; T	DD <sup>3A</sup> , DD <sup>3</sup>	UK; Nep	1200-2200
177. <i>Corylus jacquemontii</i> Decne.; T	DD <sup>3A</sup> , DD <sup>3</sup>	J&K, HP, UK; Nep	2000-2700
Order 15- CUCURBITALES Juss. ex Bercht. & J. Presl Family 28- DATISCAEAE Dumort.			
178. <i>Datisca cannabina</i> L.; H	NE <sup>3</sup> , EN <sup>4</sup>	UK; Mediterranean, Afg, Pak, Nep, Viet	700-1550
Order 16- MALPIGHIALES Juss. ex Bercht. & J. Presl Family 29- HYPERICACEAE Juss.			
179. <i>Hypericum perforatum</i> L.; H	LC <sup>3</sup> , VU <sup>4</sup>	J&K, HP, UK; Europe, E Asia, N Africa, Chi	1000-3000
Family 30- VIOLACEAE Batsch			
180. <i>Viola kunawarensis</i> Royle; H	I <sup>2</sup> , NE <sup>3</sup> , I <sup>7</sup> , I <sup>11</sup>	J&K, HP, UK, S; Afg, Paki, Nep, Tib	2800-5200
181. <i>Viola repens</i> Wall. ex Ging.; H	NE <sup>3</sup> , VU <sup>6</sup>	Himal; Pak, Mya, Chi, Thai, Sri Lanka	500-3200
Family 31- EUPHORBIACEAE Juss.			
182. <i>Euphorbia royleana</i> Boiss.; T	NE <sup>3</sup> , 2A <sup>5</sup>	J&K, HP, UK, NE India, E Himal; Pak, Nep, Mya, Chi, Tai	600-1800
Order 17- MYRTALES Juss. ex Bercht. & J. Presl Family 32- ONAGRACEAE Juss.			
183. <i>Epilobium glaciale</i> P.H. Raven; H	I <sup>2</sup> , NE <sup>3</sup>	J&K, HP, UK; Pak	3600-4400
Order 18- CROSOSOMATALES Takht. ex Reveal Family 33- STAPHYLEACEAE Martinov			
184. <i>Staphylea cochinchinensis</i> (Lour.) Byng & Christenh. [= <i>Ticeros cochinchinensis</i> Lour.; <i>Turpinia cochinchinensis</i> (Lour.) Merr.; <i>Turpinia nepalensis</i> Wall.]; T	NE <sup>3</sup> , VU <sup>6</sup> , VoE <sup>8</sup> , HT <sup>9</sup> , HT <sup>10</sup>	UK, E Himal; Nep, Ban, Mya, Thai, Viet, Lao	1000-2200
Order 19- SAPINDALES Juss. ex Bercht. & J. Presl Family 34- SAPINDACEAE Juss.			
185. <i>Acer caesium</i> Wall. ex Brandis; T	V <sup>1</sup> , V <sup>2</sup> , NE <sup>3</sup> , VU <sup>6</sup> , V <sup>7</sup> , V <sup>11</sup>	J&K, HP, UK; Pak, Nep, Chi	2000-3350
Family 35- RUTACEAE Juss.			
186. <i>Zanthoxylum armatum</i> DC.; T	LC <sup>3</sup> , VU <sup>4</sup>	J&K, HP, UK, MN, MG, NG, OD, AD; Pak, Nep, Mya, Chi, Jap, Kor, Phil, Tai, Viet	1000-2200

ORDER, FAMILY Species Name; Habit	Threat Assessment	Geographical Distribution INDIA; Outside India	Elev. Distr. (m) in UK
Order 20- BRASSICALES Bromhead Family 36- BRASSICACEAE Burnett			
187. * <i>Eutrema purii</i> (D.S. Rawat, L.R. Dangwal & R.D. Gaur) Al-Shehbaz, G.Q. Hao & J. Quan Liu [= <i>Dilophia purii</i> D.S. Rawat, L.R. Dangwal & R.D. Gaur]; H (Image-16)	NE <sup>3</sup> , VU <sup>6</sup>	UK	4500-5000
Order 21- CARYOPHYLLALES Juss. ex Bercht. & J. Presl Family 37- POLYGONACEAE Juss.			
188. * <i>Koenigia binsarii</i> (Silas & R.D.Gaur) R.D.Gaur [= <i>Polygonum binsarii</i> Silas & R.D.Gaur]; H	NE <sup>3</sup> , VU <sup>6</sup>	UK	2400-2700
189. <i>Rheum australe</i> D.Don [= <i>Rheum emodii</i> Wall. ex Meisn.]; H	NE <sup>3</sup> , EN <sup>4</sup> , EN <sup>6</sup>	UK, E Himal; Mya	3000-4450
190. <i>Rheum moorcroftianum</i> Royle; H	NE <sup>3</sup> , VU <sup>6</sup>	HP, UK; Nep	3500-4800
191. <i>Rheum webbianum</i> Royle; H	NE <sup>3</sup> , VU <sup>4</sup> , VU <sup>6</sup>	J&K, HP, UK; Pak, Nep, Tib	2400-5000
192. * <i>Rumex gangotrianus</i> Aswal & S.K. Srivast.; H	NE <sup>3</sup> , VU <sup>6</sup>	UK	2600-3150
Family 38- CARYOPHYLLACEAE Juss.			
193. <i>Arenaria neelgherrensis</i> Wight & Arn.; H	I <sup>2</sup> , NE <sup>3</sup>	J&K, HP, UK, S; Paki, Nep, Maha, TN	900-3700
194. <i>Cerastium thomsonii</i> Hook.f.; H	I <sup>2</sup> , NE <sup>3</sup> , I <sup>7</sup> , I <sup>11</sup>	J&K, HP, UK	2500-3650
195. * <i>Eremogone curvifolia</i> (Majumdar) Pusalkar & D.K. Singh [= <i>Arenaria curvifolia</i> Majumdar]; H (Image-17)	E <sup>1</sup> , E <sup>2</sup> , NE <sup>3</sup> , CR <sup>6</sup> , VU <sup>6</sup> , HT <sup>9</sup> , E <sup>11</sup>	UK	3300-3650
196. * <i>Eremogone ferruginea</i> (Duthie ex F.N. Williams) Pusalkar & D. K. Singh [= <i>A. ferruginea</i> Duthie ex F.N. Williams]; H	E <sup>1</sup> , E <sup>2</sup> , NE <sup>3</sup> , DD <sup>6</sup> , VU <sup>6</sup> , I <sup>7</sup> , I <sup>11</sup>	UK	2400-3050
197. <i>Odontostemma thangoense</i> (W.W. Sm.) Rabeler & W.L. Wagner [= <i>Arenaria thangoensis</i> W.W. Sm.]; H	V <sup>1</sup> , V <sup>2</sup> , NE <sup>3</sup>	UK, S; Tib	3300-3600
198. <i>Silene kumaonensis</i> F.N.Williams; H	R <sup>1</sup> , R <sup>2</sup> , NE <sup>3</sup> , R <sup>11</sup>	UK; Nep	2500-3000
199. <i>Silene stracheyi</i> Edgew.	NE <sup>3</sup> , DD <sup>6</sup>	UK, S; Nep, Bhu	2250-3030
200. <i>Stellaria depressa</i> Em. Schmid; H	I <sup>2</sup> , NE <sup>3</sup>	J&K, UK; Tib	4800-5000
Order 22- ERICALES Bercht. & J. Presl Family 39- BALSAMINACEAE A. Rich.			
201. * <i>Impatiens devendrae</i> Pusalkar; H	NE <sup>3</sup> , VU <sup>6</sup>	UK	1200-3200
202. * <i>Impatiens duthiei</i> Hook.f.; H	NE <sup>3</sup> , VU <sup>6</sup>	UK	2700m
203. * <i>Impatiens inayatii</i> Hook.f.; H	NE <sup>3</sup> , DD <sup>6</sup> , VU <sup>6</sup>	UK	2400-2700
204. * <i>Impatiens jaeschkei</i> Hook.f.; H	NE <sup>3</sup> , END <sup>11</sup>	UK	2700-3000
205. * <i>Impatiens kaliensis</i> Grey-Wilson; H	NE <sup>3</sup> , VU <sup>6</sup>	UK	2200-3250
206. * <i>Impatiens langeana</i> Hook.f.; H	NE <sup>3</sup> , DD <sup>6</sup> , VU <sup>6</sup>	UK	?
207. * <i>Impatiens podocarpa</i> Hook.f.; H	NE <sup>3</sup> , END <sup>11</sup>	UK	2100-2400
208. * <i>Impatiens polysciadia</i> Hook.f.; H	NE <sup>3</sup> , DD <sup>6</sup> , VU <sup>6</sup>	UK	?
209. * <i>Impatiens reidii</i> Hook.f.; H	NE <sup>3</sup> , DD <sup>6</sup> , VU <sup>6</sup>	UK	1800-2600
210. * <i>Impatiens violoides</i> Edgew. ex Hook.f.; H	NE <sup>3</sup> , DD <sup>6</sup> , VU <sup>6</sup>	UK	2400-2700
Family 40- PRIMULACEAE Batsch ex Borkh.			
211. <i>Embelia tsjeriam-cottam</i> (Roem. & Schult.) A. DC. [= <i>Ardisia tsjeriam-cottam</i> Roem. & Schult.]; T	NE <sup>3</sup> , VU <sup>4</sup>	J&K, UK, WB; Pak, Nep, Ban, MYA, Thai, Viet, Sri Lanka	450-1800
212. * <i>Primula garhwalia</i> (Balodi & S.Singh) K.K.Khanna & An.Kumar [= <i>Androsace garhwalicum</i> Balodi & S.Singh]; H	NE <sup>3</sup> , VU <sup>6</sup>	UK	4100-4400
213. <i>Primula drummondiana</i> Craib; H	I <sup>2</sup> , NE <sup>3</sup>	HP, UK; Nep	2400
214. <i>Primula minutissima</i> Jacquem. ex Duby; H	E <sup>2</sup> , NE <sup>3</sup>	J&K, HP, UK; Nep	3500-5450
Family 41- SYMPLOCACEAE Desf.			
215. <i>Symplocos paniculata</i> Miq.; T	NE <sup>3</sup> , VU <sup>4</sup>	Himal; Pak, Ban, Mya, Chi, Jap, Lao, Viet	1000-2900
Family 42- ERICACEAE Juss.			
216. * <i>Rhododendron rawatii</i> I.D.Rai & B.S.Adhikari; T	NE <sup>3</sup> , VU <sup>6</sup>	UK	3100-3350
Order 23- GENTIANALES Juss. ex Bercht. & J. Presl Family 43- RUBIACEAE Juss.			
217. <i>Clarkella nana</i> (Edgew.) Hook.f. [= <i>Ophiorrhiza nana</i> Edgew.]; H	R <sup>1</sup> , R <sup>2</sup> , NE <sup>3</sup> , R <sup>7</sup> , R <sup>11</sup>	UK; Mya, Chi, Thai	1200-2400
218. * <i>Leptodermis riparia</i> R.Parker; Sh	NE <sup>3</sup> , VU <sup>6</sup>	UK	700-1600

ORDER, FAMILY Species Name; Habit	Threat Assessment	Geographical Distribution INDIA; Outside India	Elev. Distr. (m) in UK
219. <i>Rubia edgeworthii</i> Hook.f.; Cl	V <sup>1</sup> , V <sup>2</sup> , NE <sup>3</sup> , V <sup>7</sup> , V <sup>11</sup>	UK, Chi	900-1200
Family 44- GENTIANACEAE Juss.			
220. <i>Gentiana cachemirica</i> Decne.; H	E <sup>2</sup> , NE <sup>3</sup>	J&K, UK; Paki	2600-3900
221. <i>Gentiana crassuloides</i> Bureau & Franch.; H	R <sup>2</sup> , NE <sup>3</sup> , R <sup>7</sup> , R <sup>11</sup>	UK, S, AP; Nep, Bhu, Chi	3400-5000
222. <i>Gentiana kurroo</i> Royle; H	CR <sup>3A</sup> , CR <sup>3</sup> , CR <sup>4</sup> , EN <sup>6</sup> , VoE <sup>8</sup> , HT <sup>9</sup> , HT <sup>10</sup>	HP, UK; Afg, Pak, Mya	1500-3000
223. * <i>Gentiana saginoides</i> Burkill; H	R <sup>2</sup> , NE <sup>3</sup> , CR <sup>6</sup> , VU <sup>6</sup> , R <sup>7</sup> , R <sup>11</sup>	UK	3000-3600
224. * <i>Gentiana tetrasepala</i> Biswas; H	NE <sup>3</sup> , VU <sup>6</sup> , VU <sup>6</sup>	UK	3800-4500
225. <i>Kuepferia infelix</i> (C.B.Clarke) Adr. Favre [= <i>Gentiana infelix</i> C.B. Clarke]; H (Image-18)	R <sup>2</sup> , NE <sup>3</sup> , VU <sup>6</sup> , R <sup>7</sup> , R <sup>11</sup>	HP, UK, S; Nep, Bhu, Mya, Chi	4000-4900
226. * <i>Swertia alpina</i> U.C.Bhattach. & S.Agrawal; H	NE <sup>3</sup> , VU <sup>6</sup>	UK	3200-4500
227. <i>Swertia chirayita</i> (Roxb.) H. Karst. [= <i>Gentiana chirayita</i> Roxb.]; H	NE <sup>3</sup> , EN <sup>4</sup> , EN <sup>6</sup>	J&K, HP, UK, E Himal; Nep,	1200-3600
Family 45- APOCYNACEAE Juss.			
228. <i>Ceropegia angustifolia</i> Wight; Cl	V <sup>1</sup> , V <sup>2</sup> , NE <sup>3</sup>	UK, UP, S, A, MG, WB; Ban	1000-2400
229. <i>Ceropegia bulbosa</i> Roxb.; Cl	V <sup>2</sup> , NE <sup>3</sup> , EN <sup>4</sup> , VU <sup>6</sup>	All over India	300-600
230. <i>Rauvolfia serpentina</i> (L.) Benth. ex Kurz; Sh	NE <sup>3</sup> , VU <sup>4</sup> , 2A <sup>5</sup>	All over India	300-600
Order 24- BORAGINALES Juss. ex Bercht. & J. Presl Family 46- BORAGINACEAE Juss.			
231. <i>Arnebia benthamii</i> (Wall. ex G.Don) I.M. Johnston. [= <i>Echium benthamii</i> Wall. & G.Don]; H	E <sup>2</sup> , NE <sup>3</sup> , VU <sup>6</sup> , CR <sup>4</sup> , HT <sup>9</sup>	J&K, HP, UK; Paki, Nep	3000-5000
232. <i>Arnebia euchroma</i> (Royle ex Benth.) I.M. Johnston. [= <i>Lithospermum euchromon</i> Royle ex Benth.]; H	NE <sup>3</sup> , EN <sup>4</sup> , VU <sup>6</sup> , HT <sup>9</sup>	J&K, HP, UK; Ira, Afg, Pak, Kaza, Nep, Tib, Chi	3500-4600
233. * <i>Cynoglossum jaunsarensis</i> (Kazmi) Pusalkar [= <i>Ivanjohnstonia jaunsariensis</i> Kazmi]; H	NE <sup>3</sup> , DD <sup>6</sup> , VU <sup>6</sup>	UK	2200-2400
Order 25- SOLANALES Juss. ex Bercht. & J. Presl Family 47- CONVULVACEAE Juss.			
234. <i>Ipomoea laxiflora</i> H.J. Chowdhery & M.R. Debta; Cl	NE <sup>3</sup> , VU <sup>6</sup>	UK, MH	Up to 800
Family 48- SOLANACEAE Juss.			
235. <i>Hyoscyamus niger</i> L.; H	NE <sup>3</sup> , VU <sup>4</sup>	J&K, HP, UK, S, AP; Temperate Eurasia, NW Africa	2800-4200
Order 26- LAMIALES Bromhead Family 49- OLEACEAE Hoffmanns. & Link			
236. <i>Fraxinus micrantha</i> Lingelsh.; T	DD <sup>3</sup>	W Himal; Pak, Nep	1500-2400
237. <i>Schrebera swietenoides</i> Roxb.; T	NE <sup>3</sup> , EN <sup>6</sup> , VoE <sup>8</sup> , HT <sup>9</sup> , HT <sup>10</sup>		450-762
Family 50- GESNERIACEAE Rich. & Juss.			
238. <i>Didymocarpus aromaticus</i> Don; H	NE <sup>3</sup> , VU <sup>6</sup>		1800-3000
239. <i>Didymocarpus pedicellatus</i> R.Br.; H	NE <sup>3</sup> , VU <sup>4</sup>		500-1700
Family 51- PLANTAGINACEAE Juss.			
240. * <i>Kashmiria himalaica</i> (Hook.f.) D.Y. Hong [= <i>Falconeria himalaica</i> Hook.f.; <i>Wulfenia himalaica</i> (Hook.f.) Pennell]; H (Image-19)	NE <sup>3</sup> , VU <sup>6</sup> , VU <sup>6</sup>	UK	2400-3800
241. <i>Neopicrorhiza scrophulariiflora</i> (Pennell) D.Y. Hong [= <i>Picrorhiza scrophulariiflora</i> Pennell]; H	NE <sup>3</sup> , EN <sup>6</sup>	Himal; Chi	3000-4600
242. <i>Picrorhiza kurroa</i> Royle ex Benth.; H	V <sup>1</sup> , NE <sup>3</sup> , CR <sup>4</sup> , 2A <sup>5</sup> , EN <sup>6</sup>	J&K, HP, UK; Pak	3000-4600
243. * <i>Picrorhiza tungnathii</i> Pusalkar; H	NE <sup>3</sup> , VU <sup>6</sup>	UK	3500-3800
Family 52- SCROPHULARIACEAE Juss.			
244. * <i>Scrophularia obtusa</i> Edgew. ex Hook.f.; H	NE <sup>3</sup> , VU <sup>6</sup>	UK	1500-2100
Family 53- ACANTHACEAE Juss.			
245. * <i>Phlogacanthus lambertii</i> Raizada; Sh	NE <sup>3</sup> , DD <sup>6</sup> , VU <sup>6</sup>	UK	800-900
Family 54- BIGNONIACEAE Juss.			
246. <i>Incarvillea emodi</i> (Royle ex Lindl) Chatterjee [= <i>Amphicome emodi</i> Royle ex Benth.]; Sh	NE <sup>3</sup> , VU <sup>6</sup> , HT <sup>9</sup>	J&K, HP, UK; Afg, Pak, Nep	450-2500
Family 55- LENTIBULARIACEAE Rich.			

ORDER, FAMILY Species Name; Habit	Threat Assessment	Geographical Distribution INDIA; Outside India	Elev. Distr. (m) in UK
247. <i>Pinguicula alpina</i> L.; H (Image-20)	NE <sup>3</sup> , VU <sup>6</sup> , VoE <sup>8</sup> , HT <sup>9</sup> , HT <sup>10</sup>	W Himal: Europe, Siberia, Tib, Chi	3000-4400
Family 56- LAMIACEAE Martinov (LABIATAE Juss.)			
248. <i>Elsholtzia densa</i> Benth.; H	I <sup>2</sup> , NE <sup>3</sup>	J&K, HP, UK; Taji, Afg, Pak, Nep, Bhu, Tib, Chi	2600-3650
249. <i>Nepeta campestris</i> Benth.; H	NE <sup>3</sup> , I <sup>2</sup>	J&K, HP, UK	2500-3000
250. <i>Phlomoides superba</i> (Royle ex Benth.) Kamelin & Makhm. [=Eremostachys superba Royle ex Benth.]; H	NE <sup>3</sup> , VU <sup>4</sup> , EN <sup>6</sup> , VoE <sup>8</sup> , HT <sup>9</sup> , HT <sup>10</sup>	J&K, HP, UK; Afg, Pak	300-700
251. <i>Roylea cinerea</i> (D.Don) Baill. [=Ballota cinerea D. Don]; Sh	NE <sup>3</sup> , VU <sup>4</sup>	J&K, HP, UK; Nep	500-2400
Family 57- OROBANCHACEAE Vent.			
252. <i>Gleadovia ruborum</i> Gamble & Prain; H	NE <sup>3</sup> , EN <sup>6</sup>	HP, UK; Chi	2500-3900
Order 27- ASTERALES Link Family 58- CAMPANULACEAE Juss.			
253. <i>Campanula wattiana</i> B.K. Nayar & Babu; H	R <sup>1</sup> , R <sup>2</sup> , NE <sup>3</sup> , R <sup>7</sup> , END, R <sup>11</sup>	HP, UK	2200-3800
254. <i>Cyananthus integer</i> Wall. ex Benth.; H	R <sup>1</sup> , R <sup>2</sup> , NE <sup>3</sup> , R <sup>7</sup> , END <sup>6</sup> , R <sup>11</sup>	UK; Nep	3000-4500
Family 59- ASTERACEAE Bercht. & J. Presl (COMPOSITAE Giseke)			
255. * <i>Artemisia austrohimalayaensis</i> Y.R.Ling & H.S.Puri [=Artemisia austrohimalayana Y.R. Ling & H.S.Puri]; H	NE <sup>3</sup> , VU <sup>6</sup>	HP, UK	3500-4200
256. <i>Aucklandia costus</i> Falc. [=Saussurea costus (Falc.) Lipsch.; Saussurea lappa (DC.) Sch. Bip.]; H	E <sup>1</sup> , E <sup>2</sup> , CR <sup>3</sup> , 1A <sup>5</sup>	J&K, HP, UK-Cultivated	2000-3800
257. * <i>Catamixis baccharoides</i> Thomson; Sh	V <sup>1</sup> , V <sup>2</sup> , NE <sup>3</sup> , CR <sup>6</sup> , VU <sup>6</sup> , V <sup>11</sup>	UK, HP; Nep	450-900
258. <i>Cremanthodium arnicoides</i> (DC. ex Royle) R.D. Good [=Ligularia arnicoides DC. ex Royle]; H	E <sup>2</sup> , NE <sup>3</sup>	J&K, HP, UK; Nep, Chi	2500-5200
259. <i>Dolomiaea macrocephala</i> DC. ex Royle [=Jurinea dolomiaea Boiss.]; H	NE <sup>3</sup> , EN <sup>4</sup> , EN <sup>6</sup>	J&K, HP, UK; Pak, Nep, Chi	3000-4300
260. <i>Himalaiella foliosa</i> (Edgew.) Raab- Straube [=Aplotaxis foliosa Edgew.; Saussurea foliosa (Edgew.) Hook.f.]; H	I <sup>2</sup> , NE <sup>3</sup> , I <sup>11</sup>	J&K, HP, UK; Nep	2400-3200
261. * <i>Melanoseris filicina</i> (Stebbins) N. Kilian [=Lactuca filicina Duthie ex Stebbins; =Cicerbita filicina (Duthie ex Stebbins) Mumgain & R.R. Rao]; H	E <sup>1</sup> , E <sup>2</sup> , NE <sup>3</sup> , CR <sup>6</sup> , VU <sup>6</sup> , E <sup>11</sup>	UK	1800-2500
262. <i>Saussurea atkinsonii</i> C.B. Clarke; H (Image-21)	I <sup>2</sup> , NE <sup>3</sup>	J&K, HP, UK	3000-4600
263. <i>Saussurea bracteata</i> Decne.; H	R <sup>1</sup> , R <sup>2</sup> , NE <sup>3</sup> , R <sup>7</sup> , R <sup>11</sup>	J&K, HP, UK; Pak, Chi	3500-5600
264. <i>Saussurea pterocaulon</i> Decne.[=Saussurea clarkei Hook.f.]; H	R <sup>1</sup> , R <sup>2</sup> , NE <sup>3</sup>	J&K, UK	4000-4500
265. <i>Saussurea gossypiphora</i> D.Don; H	NE <sup>3</sup> , VU <sup>4</sup>	Himal; Chi	3600-5600
266. <i>Saussurea obvallata</i> (DC.) Edgew. [=Aplotaxis obvallata DC.]; H	NE <sup>3</sup> , EN <sup>4</sup> , VU <sup>6</sup>	Himal; Pak, Chi	3800-5300
267. <i>Saussurea roylei</i> (DC.) Sch. Bip. [=Aplotaxis roylei DC.]; H	I <sup>2</sup> , NE <sup>3</sup>	J&K, HP, UK; Nep, Chi	3300-4800
268. * <i>Saussurea sudhanshui</i> Hajra; H	NE <sup>3</sup> , VU <sup>6</sup>	UK	4500-5000
Order 28- DIPSACALES Juss. ex Bercht. & J. Presl Family 60- CAPRIFOLIACEAE Juss.			
269. <i>Nardostachys jatamansi</i> (D.Don) DC. [=Patrinia jatamansi D.Don]; H (Image-22)	CR <sup>3A</sup> , CR <sup>3</sup> , CR <sup>4</sup> , EN <sup>6</sup> , HT <sup>9</sup> , HT <sup>10</sup>	UK, E Himal; Nep, Mya, Chi	2500-4800
270. <i>Valeriana jatamansi</i> Jones; H	NE <sup>3</sup> , VU <sup>4</sup> , VU <sup>6</sup>	Himal; Mya, Chi, Thai, Viet	1500-3600
271. * <i>Valeriana mussooriensis</i> Ved Prakash, Aswal & Mehrotra; H	NE <sup>3</sup> , VU <sup>6</sup>	UK	1500-2000
272. * <i>Valeriana roylei</i> Klotzsch; H	NE <sup>3</sup> , VU <sup>6</sup>	UK	?
Order 29- APIALES Nakai Family 61- PITTOSPORACEAE R. Br.			
273. <i>Pittosporum eriocarpum</i> Royle; T	I <sup>1</sup> , I <sup>2</sup> , EN <sup>3</sup> , VU <sup>6</sup> , VU <sup>6</sup> , I <sup>7</sup> , R <sup>11</sup>	HP, UK	300-2300
Family 62- ARALIACEAE Juss.			
274. <i>Panax pseudoginseng</i> Wall.; H (Image-23)	V <sup>1</sup> , NE <sup>3</sup> , CR <sup>6</sup>	UK, NE India; Nep	2100-4300
Family 63- APIACEAE Lindl. (UMBELLIFERAE Juss)			
275. <i>Angelica archangelica</i> L.; H	LC <sup>3</sup> , EN <sup>6</sup>	W Himal	3000-4000
276. <i>Angelica glauca</i> Edgew.; H (Image-24)	EN <sup>3A</sup> , EN <sup>3</sup> , EN <sup>4</sup> , EN <sup>6</sup>	W Himal	2400-4500



ORDER, FAMILY Species Name; Habit	Threat Assessment	Geographical Distribution INDIA; Outside India	Elev. Distr. (m) in UK
277. * <i>Angelica indica</i> Pimenov & Kljuykov; H	NE <sup>3</sup> , VU <sup>6</sup>	UK	3000-3300
278. * <i>Bupleurum maddenii</i> C.B. Clarke; H	NE <sup>3</sup> , VU <sup>6</sup>	UK	2500-3000
279. <i>Ferula jaeskeana</i> C.B. Clarke; H	NE <sup>3</sup> , VU <sup>4</sup>	J&K, UK	2400-3600
280. <i>Heracleum candicans</i> Wall. ex DC.; H	NE <sup>3</sup> , VU <sup>4</sup>	W Himal; Mya	1800-3600
281. <i>Heracleum jacquemontii</i> C.B. Clarke [= <i>Heracleum jacquemontii</i> C.B. Clarke ex Hook.f.]; H	I <sup>1</sup> , I <sup>2</sup> , NE <sup>3</sup> , I <sup>7</sup> , I <sup>11</sup>	W Himal	?
282. * <i>Hymenidium dentatum</i> (DC.) Pimenov & Kljuykov [= <i>Pleurospermum erosa</i> (DC.) P.K. Mukh.; <i>Hymenolaena dentata</i> var. <i>erosa</i> DC.]; H	NE <sup>3</sup> , VU <sup>6</sup>	UK	2700-3900
283. * <i>Kailashia robusta</i> Pimenov & Kljuykov; H	NE <sup>3</sup> , VU <sup>6</sup>	UK	3700-3850
284. * <i>Kedarnatha meifolia</i> Pimenov & Kljuykov; H	NE <sup>3</sup> , VU <sup>6</sup>	UK	3300
285. * <i>Kedarnatha sanctuarii</i> P.K. Mukh. & Constance; H	NE <sup>3</sup> , END <sup>11</sup>	UK	?
286. * <i>Oreocome aegopodioides</i> Pimenov & Kljuykov; H	NE <sup>3</sup> , VU <sup>6</sup>	UK	3000-3300
287. * <i>Peucedanum dehradunense</i> Babu; H	NE <sup>3</sup> , VU <sup>6</sup>	UK	700-800
288. * <i>Pimpinella stracheyi</i> C.B. Clarke, H	NE <sup>3</sup> , VU <sup>6</sup>	UK	2200-2300
289. <i>Pleurospermum angelicoides</i> (Wall. ex DC.) Benth. ex C.B. Clarke [= <i>Hymenolaena angelicoides</i> DC.]; H	NE <sup>3</sup> , VU <sup>4</sup>	UK, NE India; Nep	2400-4200
290. * <i>Trachyspermum falconeri</i> (C.B. Clarke) H. Wolff. [= <i>Carum falconeri</i> C.B. Clarke]; H	NE <sup>3</sup> , VU <sup>6</sup>	UK	1500-2700

\*endemic species; H=herb, Sh=shrub, T=tree, Cl=climber;

Ex=extinct, PEx=presumed extinct, E=endangered, V=vulnerable, R=rare, I= Indeterminate; EX=extinct, EW=extinct in wild, CR=critically endangered, EN=endangered, VU=vulnerable, DD=data deficient, NE<sup>3</sup>= not evaluated for threat assessment, LC=least concerned, NT=near threatened ; 1A=listed in Appendix-1 of CITES, 2A=listed in Appendix-2 of CITES; VoE=verge of extinction; HT= highly threatened.

A=Assam, AD= Andhra Pradesh, AP=Arunachal Pradesh, Himal= Entire Himalaya from J&K to Arunachal Pradesh, HP=Himachal Pradesh, India= throughout India, J&K=Jammu & Kashmir, MG=Meghalaya, MN=Manipur, NE India= North East Indian states, NI= Nicobar Island, NL=Nagaland, OD=Odisha, Pen India= Peninsular India, S=Sikkim, TN=Tamil Nadu, UK=Uttarakhand, UP=Uttar Pradesh, WB=West Bengal.

Afg= Afganistan, Ban=Bangladesh, Bh=Bhutan, Chi=China, Ira=Iran, Kor=Korea, Kaz=Kazakistan, La=Laos, Mal=Malesia, Mon=Mongolia, Mya=Myanmar, Nep=Nepal, Pak=Pakistan, Tib=Tibet, Viet=Vietnam

**Table 2. Taxa excluded from Table 1 (Threatened flora of Uttarakhand) on account of various reasons.**

Species/taxa excluded	Reason for exclusion (reference)
1. <i>Iris duthie</i> Foster (Iridaceae)	Synonym of <i>Iris kemaonensis</i> Wall. ex D. Don, a common species (POWO 2019)
2. <i>Microschoenus duthie</i> C.B. Clarke (Cyperaceae)	Synonym of <i>Juncus duthie</i> (C.B. Clarke) Noltie, a common species (POWO 2019)
3. <i>Berberis petiolaris</i> Wall. ex G. Don var. <i>garhwala</i> Ahrendt (Berberidaceae)	Variety not recognized in recent works (Pusalkar & Srivastava 2018)
4. <i>Aconitum ferox</i> Wall. ex Ser. (Ranunculaceae)	Erroneous identification; species not known in Western Himalaya (Pusalkar & Srivastava 2018)
5. <i>Aconitum deinorrhizum</i> Stapf. (Ranunculaceae)	Erroneous identification; species not known in Western Himalaya (Pusalkar & Srivastava 2018)
6. <i>Caragana aegacanthoides</i> (R. Parker) L.B. Chaudhary & S.K. Srivast. (Fabaceae)	Not endemic to Uttarakhand (POWO 2019)
7. <i>Pueraria stracheyi</i> Baker (Fabaceae)	Synonym of <i>Apios carnea</i> (Wall.) Benth. ex Baker; a common species (POWO 2019)
8. <i>Saraca asoca</i> (Roxb.) W.J. de Wilde (Fabaceae)	Cultivated species in Uttarakhand
9. <i>Acer osmastonii</i> Gamble (Sapindaceae)	Erroneous identification (Pusalkar & Srivastava 2018)
10. <i>Acer oblongum</i> Wall. ex DC. var. <i>membranaceum</i> Banerji (Sapindaceae)	Variety not recognized in recent work (Pusalkar & Srivastava 2018)
11. <i>Santalum album</i> L. (Santalaceae)	Cultivated species in Uttarakhand
12. <i>Sagina purii</i> R.D. Gaur (Caryophyllaceae)	Synonym of <i>Sagina apetala</i> Ard. (Chandra 2015)
13. <i>Impatiens vexillaria</i> Hook.f. (Balsaminaceae)	Known by type only and described from Himachal Pradesh (Hooker 1910)
14. <i>Arnebia nandadeviensis</i> Chandra Sek. & R.S. Rawal (Boraginaceae)	Synonym of <i>Onosma bracteata</i> Wall. (Tiwari 2016)
15. <i>Ageratum haustonianum</i> Mill. (Asteraceae)	Common invasive species in Uttarakhand
16. <i>Nardostachys grandiflora</i> DC. (Valerianaceae)	Synonym of <i>N. jatamansi</i> (D. Don) DC. (POWO 2019)

**Table 3. Original sources, threat status and number of species included in Table 1 (threatened flora of Uttarakhand) based on them.**

Superscript number used in table-1; Original source	Threat statuses used	Threat statuses followed by original source	Number of species
<sup>1</sup> Nayar & Sastry (1987-90)	Ex, E, V, R, I	Lucas & Synge (1978)	55
<sup>2</sup> Rao et al. (2003)	Ex, E, V, R, I	IUCN (1994)	115
<sup>3</sup> IUCN Red List for India	EX, EW, CR, EN, VU, DD	IUCN (new)	34
<sup>3A</sup> IUCN Red List for Uttarakhand	EX, EW, CR, EN, VU, DD	IUCN (new)	12
<sup>4</sup> Ved et al. (2003)	EX, EW, CR, EN, VU, I	IUCN (older)	44
<sup>5</sup> CITES Appendices (2019)	None	None	12*
<sup>6</sup> Pusalkar & Srivastava (2018)	EX, EW, CR, EN, VU, DD	IUCN (new?)	165*
<sup>7</sup> Uniyal et al. (2007)	Ex, E, V, R, I	Lucas & Synge (1978)	55
<sup>8</sup> National Biodiversity Authority list for Uttarakhand	Verge of Extinction (VoE)	None	15
<sup>9</sup> Uttarakhand State Biodiversity Board, Annexure-2	Highly Threatened (HT)	None	27
<sup>10</sup> Shah (ebook publ. by Uttarakhand State Biodiversity Board)	Highly Threatened (HT)	None	15
<sup>11</sup> Threatened Taxa list available at ENVIS Centre BSI	Ex, E, V, R, I	Lucas & Synge (1978)	67

12+= 12 listed species and all orchids in the area; 165+= 165 listed species and all orchids in the area.

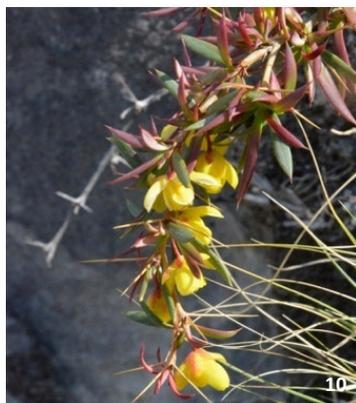
et al. 2016; Panwar et al. 2015, 2016, 2017; Thakur et al. 2016). This selection of species seems more skewed towards economically important species (12 species, mainly medicinal) than on only threatened species which suggests that only threatened status is considered a meagre reason for micropropagation.

It has been emphasized that for conservation of biodiversity we have to focus on biodiversity hotspots and documentation of distribution of biodiversity has to be improved (Myers et al. 2000; Raven & Wackernagel 2020). Uttarakhand is one of the important zones of the Himalayan biodiversity hotspot with more than 45% flowering plant species, 60% genera, 92% families, thus, sustaining rich flowering plant diversity interspersed with a large number of threatened species (Rana & Rawat 2017; Pusalkar & Srivastava 2018). Threat statuses of threatened plant species in entire India, including Uttarakhand, are ambiguous and require their correct assessment using categories and criteria suggested in recent IUCN Redlist to be globally acceptable (Barik et al. 2018). The information in this communication is an attempt to provide the current situation of threatened flora of Uttarakhand as identified by various official sources. Images of 24 threatened species and locations of individuals photographed are shown in Figure 1 to further facilitate conservation studies on these species. It is now crucial to assess these proposed threatened species (barring 34 already assessed) with modern IUCN threat categories to find the most threatened species for prioritized conservation by all available means. Such an assessment will restrict the unnecessary inflation of threatened plants list consequently reducing pressure

on the resources being spent for conservation. The given list of species will also be helpful to subsequent scientific publications for correctly referring to any species threatened in Uttarakhand, however, it should be used judiciously as all species listed in it are not threatened strictly according to the IUCN Red List criteria.

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Images 1–12. Threatened flora of Uttarakhand: 1—*Dioscorea deltoidea* | 2—*Fritillaria cirrhosa* | 3—*Cypripedium himalaicum* | 4—*Oreorchis micrantha* | 5—*Pecteilis gigantea* | 6—*Asparagus filicinus* | 7—*Polygonatum graminifolium* | 8—*Trachycarpus takil* | 9—*Papaver robustum* | 10—*Berberis osmastonii* | 11—*Aconitum lethale* | 12—*Aconitum violaceum*. © D.S. Rawat & Satish Chandra.



Images 13–24. Threatened Flora of Uttarakhand: 13—*Trollius acaulis* | 14—*Butea pellita* | 15—*Uraria picta* | 16—*Eutrema purii* | 17—*Eremogone curvifolia* | 18—*Kuefferia infelix* | 19—*Kashmiria himalaica* | 20—*Pinguicula alpine* | 21—*Saussurea atkinsonii* | 22—*Nardostachys jatamansi* | 23—*Panax pseudoginseng* | 24—*Angelica glauca*. © D.S. Rawat & Satish Chandra.

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