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Wild Medicinal Plants of Himachal Pradesh: An Assessment of their Conservation Status and Management Prioritisation 2013

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Sponsored by
National Medicinal Plants Board
(Government of India)

Himachal Pradesh Forest Department

Herb Gatherers

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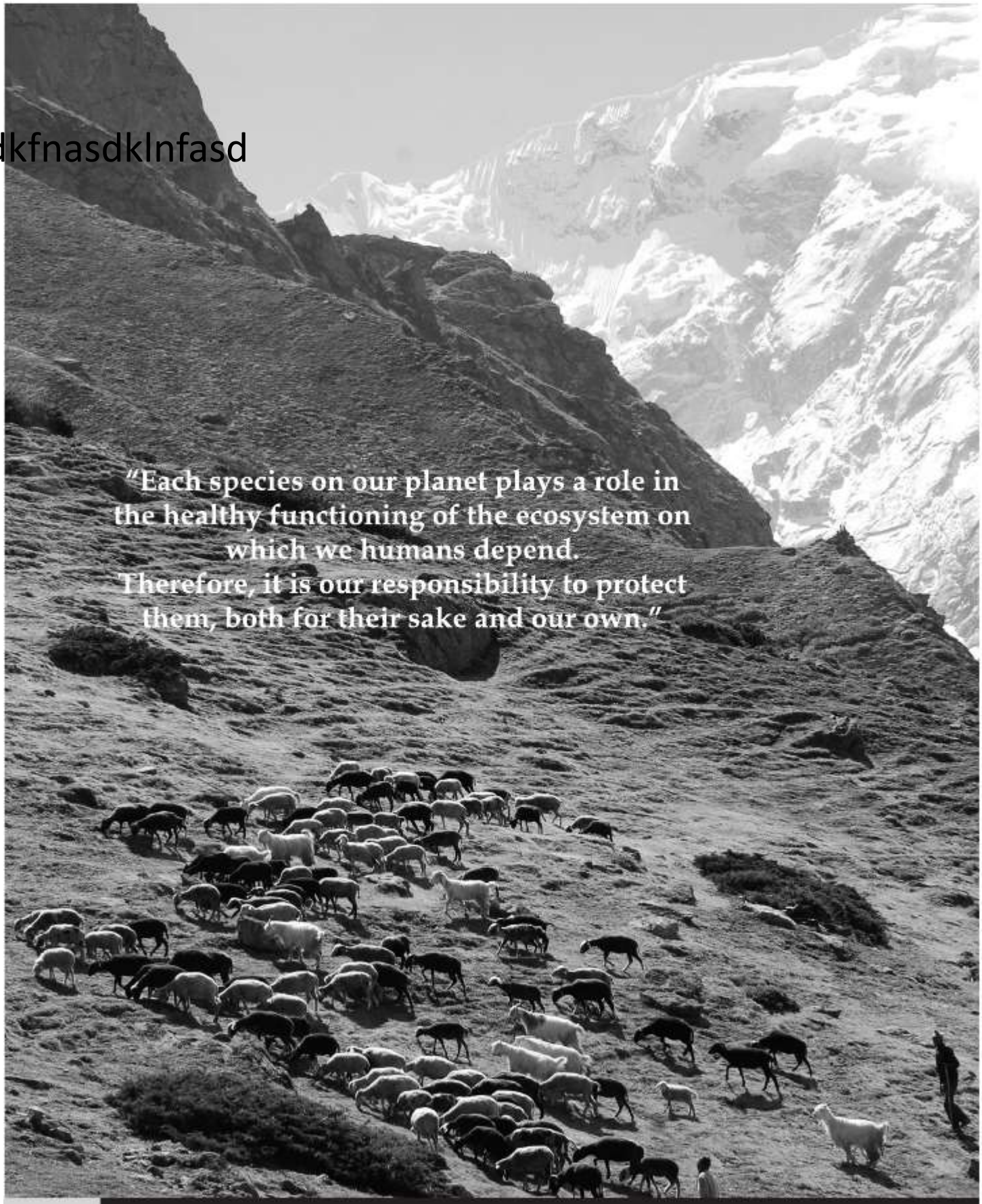

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[*An Outcome of the Conservation Assessment & Management Prioritisation (CAMP) Workshop held at Shimla on 01-04 December 2010*]

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1. Medicinal Plants; 2. Destructive Harvesting; 3. Threatened; 4.Conservation Management; 5. Himachal Pradesh; 6. North-west Himalayas

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Thakur Singh Bharmouri,
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हिमाचल प्रदेश सरकार

March, 2013

MESSAGE

The Himalayas has been long revered for its might and for the bountiful store of its rare healing herbs. Legendary drugs like 'sanjivani' are believed to have their source in the Himalayas. No wonder that the healing magic of the Himalayan herbs has immensely contributed to the evolution of a number of Indian health care systems, the prominent among these being Ayurveda, Unani and Swa-rigpa (Tibetan). These medicinal herbs also form the mainstay of the strong folk health traditions in the State. In addition, the local people derive a significant part of their cash income from the sale of wild collected medicinal herbs. This wild collection for self use and for sale, till recently, was based on the sustainable harvest practices developed by local communities over ages.

The medicinal wealth of the State has, however, come under stress. Whereas the growing demand for herbs is prompting destructive harvest, the biotic and developmental pressures are causing habitat degradation. There has been a general concern about the depleting supplies of the precious Himalayan herbs from the State. It is in this context that the rapid threat assessment exercise carried out by the State Forest Department to know the threat status of medicinal plant species in the State and prioritise the same for conservation action is very timely.

I am sure that the priority list of medicinal plant species and the action plan for their rehabilitation presented in this book will guide the policy makers, the forest managers, the researchers, the users and the wild gatherers towards conservation of the threatened medicinal plant species in the State.

I congratulate and compliment the Himachal Pradesh Forest Department for this commendable work.

TSBharmouri

(Thakur Singh Bharmouri)

Bharathi S. Sihag, IAS
Pr. Secretary (Forests),
Government of Himachal Pradesh

हिमाचल प्रदेश सरकार

March, 2013

MESSAGE

Himachal Pradesh, a Himalayan Hill State with varied physiographic zones, is a natural habitat for more than 800 medicinal plant species, many of which form key ingredients of important formulations under various Indian Systems of Medicine. This medicinal plant diversity also forms the base for the strong and crucial folk health care traditions and the related knowledge base in the State. In addition to providing self-reliance in primary health care to the local households, many of these medicinal plants are regularly used as cure for various livestock ailments. Continuous availability of this very important socio-economic resource depends upon its careful harvesting and maintenance of habitat health. Destructive exploitation to meet the growing commercial demand and degradation of natural habitats has, however, adversely affected the natural populations of many important medicinal plant species in the State. The declining availability of these plant species has implications not only for the very existence of the species, but also for the survival of health care traditions and related knowledge base in the country.

I am pleased to note that the State Forest Department has undertaken three threat assessment exercises by involving experts and local stakeholders, to assess the threat status of medicinal plant species in the State. The latest Conservation Assessment and Management Prioritisation exercise organized at Shimla during December 2010 has resulted in categorisation of 47 medicinal plant species as 'threatened' in the State. It is a matter of concern. I would like to call upon the forest managers and the researchers to develop and put in place appropriate mechanisms to halt further degradation of these species. I would also like to call upon the commercial users of these species to develop appreciation about the impending extinction of these species and contribute towards promoting sustainable harvest methods.

This book, in addition to presenting report of the threat assessment exercise (Shimla, 2010), also provides a comprehensive Action Plan for their rehabilitation of the threatened medicinal plant species. Colour images of the threatened species will help the field staff in critical identification of these species for effective conservation action. I am sure that this work will form the basis to guide conservation management, research and sustainable utilization initiatives with respect to threatened medicinal plant species in the State.

I commend the efforts of the Himachal Pradesh Forest Department and particularly the authors for bringing out this comprehensive work.

(Bharathi S. Sihag)

R. K. Gupta, IFS
Pr. Chief Conservator of Forests
& Head of Forest Force,
Himachal Pradesh Forest Department

हिमाचल प्रदेश सरकार

March, 2013

FOREWORD

The hill state of Himachal Pradesh harbours about 3,500 species of higher plants, spread across the forest types varying from sub-tropical along Punjab plains to temperate and alpine towards higher reaches. This large floral diversity makes a very significant socio-economic contribution to the lives of local people, especially those living in remote areas. An estimated 1,300 native plant species are used by local people to meet their daily household needs of firewood, fodder, food, fruits, fibre and health care. Many of these plant species are also used in religious ceremonies and rituals. Nearly 100 of these species, mainly medicinal plants collected from the wild by the local people, have good commercial demand and their trade has been forming an important source of cash income to the wild gatherers. The removals of medicinal plants from the wild for self use and for trade have been in accordance with sustainable harvest traditions till very recently.

The time-tested sustainable harvest practices developed by the local communities over centuries are, however, fast crumbling and people have taken to over-exploitation of this precious resource to make a quick buck. The situation is compounded by the continuous degradation of natural habitats due to various biotic pressures, including ingress by exotic weeds. These pressures have resulted in adversely impacting the wild populations of many medicinal plants species, some of which have come to face a real threat of extinction.

The State Forest Department, seized of this concern about dwindling populations of medicinal plant species, has initiated measures to address this issue and strengthen wild populations of commercially important native medicinal plant species. The Department had actively associated with the Foundation for Revitalisation of Local Health Traditions (FRLHT), a Bangalore based organization, in organizing threat assessment workshops at Kullu (1998) and Shimla (2003) with specific objective to assess threat categorisation of medicinal plant species in the State. The Shimla (2010) exercise to assess threat status of medicinal plant species in the State is continuation of the process. I am pleased to put on record that the threat assessment exercise, appropriately called 'Conservation Assessment and Management Prioritisation' (CAMP), followed IUCN's latest red list categories and criteria, and as such its results are globally compatible and valid. Participation by noted experts and local stakeholders in the exercise makes it all the more credible.

I congratulate Dr. G. S. Goraya, IFS and his team in successfully organizing this threat assessment exercise. I also congratulate the editorial team for meticulous analysis of data, synthesis of the

results of all the three threat assessment exercises, bringing out a priority list of medicinal plants for conservation action and compilation of comprehensive report of the exercise in the form of a very useful book.

The road map for conservation and development of threatened medicinal plant species, included in the book in the form of an implementable Action Plan, will surely guide future research and management initiatives on these species.

(R. K. Gupta)

Preface

North-west Himalayas harbours an array of highly sought after medicinal plants used in the thriving indigenous health care traditions. Collected mainly from the wild, these medicinal plants not only form a preferred raw material for the growing herbal industry, but also play a very significant role in the local rural livelihoods by way of generating much needed cash income for these communities. With the increasing developmental and biotic pressures, coupled with the destructive harvest to meet the growing industrial demand, this important resource has come under tremendous stress. Many species of medicinal plants, in fact, are now perceived to be facing real threat of extinction. However, in the absence of any focused efforts to document the populations in the wild, information on the conservation status of medicinal plants has been rather sketchy. This group of plants has also not received due management focus due to the current forest management practices being largely tree-centric. This degradation of the wild medicinal plant resources, besides threatening the very existence of many species, has a direct impact on the rural poor who have to spend increasingly more time for wild collections.

The Himachal Pradesh government has identified the medicinal plant sector as one of the key areas having vast potential for development and enhancing rural livelihoods. The State government envisages developing Himachal Pradesh as the leading 'Herbal State' in the country. Realisation of this vision needs detailed information on the diversity and status of wild populations of various medicinal plant species in the State. The State Forest Department has initiated programs to arrest the further degradation of medicinal plant resources. It is to support the medicinal plant conservation programs in the State and to develop clear management focus that the Himachal Pradesh Medicinal Plants Society (HPMPS), under the aegis of the State Forest Department, organised a Conservation Assessment and Management Prioritisation (CAMP) workshop for medicinal plants at Shimla from 01-04 December, 2010. This publication presents the results and outcomes of this workshop and similar workshops organised earlier in the State.

Mr. Vinay Tandon, ex-Principal Chief Conservator of Forests, Himachal Pradesh Forest Department and the Vice Chair, South Asia, IUCN/SSC Medicinal Plants Specialist Group has been a source of great inspiration for the conduct of CAMP workshop. I express my deep gratitude to him. I would also like to express my gratitude to Mrs. Bharathi S. Sihag, Pr. Secretary (Forests) to the Government of Himachal Pradesh and Sh. R. K. Gupta, Pr. Chief Conservator of Forests, Himachal Pradesh Forest Department for encouragement in bringing out this publication.

I am obliged to Mr. D. K. Ved, Advisor, FRLHT, Bangalore, Dr. G. S. Rawat, Head, Habitat Ecology Division, Wildlife Institute of India, Dehradun and Dr. Vaneet Jishtu, Scientist, Rain Forest Research Institute, Jorhat for agreeing to be part of the Core team and actively contributing towards short-listing of species for the workshop, analysis of the data and compilation of this report.

I am grateful to Sh. Mohinder Pal, ex-Director, Himalayan Forest Research Institute, Shimla for hosting the Workshop at the serene environs of the Institute. I would like to acknowledge with thanks the support extended by the HFRI's team of scientists in successful conduct of the workshop. My special thanks are due to Dr. K. S. Kapoor, Mr. Manoj Bhaik, Dr. Vijendra Pal and Dr. P. S. Negi.

I would also like to put on record my sincere gratitude to the National Medicinal Plants Board (NMPB), Department of AYUSH, Government of India, for funding the medicinal plant CAMP workshop and this publication under its Project No. CONS/HP-02/2009-10, titled "Conservation, development and sustainable management of priority wild medicinal plant species in Himachal Pradesh". I would also like to place on record my sincere gratitude to Mr. B. S. Sajwan, Pr. Chief Conservator of Forests, Arunachal Pradesh and Ex-CEO, NMPB for his whole hearted support to the idea of assessing threat status of medicinal plants for focused conservation action. I am also grateful to Mr. Bala Prasad, CEO, NMPB for extending moral support and good wishes for the organisation of this workshop.

Assessing threat to a diversity of medicinal plant species, inhabiting a wide range of phyto-geographical zones, would not have been possible without coming together and sharing of knowledge by a galaxy of field botanists, taxonomists, researchers, forest managers, wild gatherers, traders and end users. I am grateful to all of them for seeing reason in the initiative, accepting our invitation and actively participating in the workshop. I am also obliged to Dr. S. K. Srivastava, Dy. Director, BSI, Dehradun, Dr. K. Ravikumar, Dy. Director, FRLHT, Bangalore and Dr. H B Naithani, FRI, Dehradun for meticulously going through the botanical nomenclature and correcting the same.

Last but not the least, I acknowledge with thanks the hard work put in by Mr. K. K. Gupta, the then DFO (Hqrs), O/o CCF (Floral Diversity, NTFP & Research Mgmt.), Sundernagar and Mr. O. C. Sharma, the then DFO (Research), Sundernagar in taking care of all logistic arrangements. I also put on record my appreciation for Ms. Narvada Devi, Sr. Assistant for providing secretarial support and meticulously typing the Taxon Data Sheets.

I hope that this publication will be of immense use to the forest managers, researchers, and field botanists in planning focused medicinal plant conservation action. It would also be helpful to the wild gatherers, traders and end users in appreciating the medicinal plants conservation imperatives.

March 2013

Dr. G S Goraya
Addl. Pr. Chief Conservator of Forests
(Research & Training)
Sundernagar

Contents

Abbreviations & Acronyms

AYUSH	Department of Ayurveda, Unani, Siddha, Homeopathy
CAMP	Conservation Assessment and Management Prioritisation
CR	Critically Endangered
DD	Data Deficient
EN	Endangered
FRH	Forest Rest House
FRLHT	Foundation for Revitalisation of Local Health Traditions
GHNP	Great Himalayan National Park
HFRI	Himalayan Forest Research Institute
HPFD	Himachal Pradesh Forest Deartment
HRG	Himalayan Research Group
IUCN	International Conservation Union
JFMC	Joint Forest Management Committee
MPCA	Medicinal Plants Conservation Area
MPSG	Medicinal Plants Specialist Group
NBPGR	National Bureau of Plant Genetic Resources
NE	Not Evaluated
NGO	Non Government Organisation
NMPB	National Medicinal Plants Board
NT	Near Threatened
NTFP	Non Timber Forest Produce/ Non Timber Forest Products
RFRI	Rain Forest Research Institute
SSC	Species Survival Commission
VU	Vulnerable
WG	Working Group

Wild Medicinal Plants of Himachal Pradesh: An Assessment of their Conservation Status and Management Prioritisation

1.1. Background

North-west Himalayas is considered to be a treasure house of healing herbs, many of which form important ingredients of famous traditional health care formulations. Whereas 1185 such species have been documented from Uttarakhand, more than 800 such species are reported to exist in Himachal Pradesh. Many of these species have come to be subjected to excessive annual harvests to meet the growing trade needs, adversely affecting their wild populations. The fast dwindling natural populations of these herbs have, therefore, become a cause of concern.

In an effort to understand the threat status of medicinal plants of the region, the high altitude medicinal plants of Jammu & Kashmir and Himachal Pradesh were subjected to a rapid threat assessment during 1998 through a CAMP process at Kullu (Ved & Tandon, 1998). This assessment was based on the IUCN's Red List Categories and Criteria defined in version 2.3: IUCN (1994). Of the 42 medicinal plant taxa taken up for assessment, 35 taxa were assessed as threatened in respect of Jammu & Kashmir and 34 taxa were assessed as threatened in respect of Himachal Pradesh.

Medicinal plant resources of the north-west Himalayas, in respect of the Indian States of Uttarakhand, Himachal Pradesh and Jammu & Kashmir, were subjected to a more comprehensive rapid threat assessment during 2003 through a CAMP process held at Shimla (Ved *et. al*, 2003). This assessment was carried out following the IUCN's latest available Red List Categories and Criteria i.e. version 3.1: IUCN (2000). Of the 71 medicinal plant taxa assessed in this process, 19 were assessed to be threatened 'globally', the three states together accounting for more than 60% of their global distribution. State-wise analysis of the assessed taxa revealed that 60 medicinal plant taxa were threatened in Himachal Pradesh, 59 in Jammu & Kashmir and 48 in Uttarakhand.

The above Red-listing processes did trigger appreciation about the subject and initiation of research and field surveys on the threatened species. However, the issue on management front remained largely un-attended, giving rise to the need to re-assess the threat status of medicinal plants in the State.

It was in this context that the present rapid threat assessment workshop - the Conservation Assessment and Management Prioritisation (CAMP) Workshop – in respect of medicinal plants was organised at Shimla from 01st to 04th December, 2010. Participants to this workshop included (i) Field botanists, taxonomists, scientists working on medicinal plant resources of north-west Himalayas and representing esteemed research organisations like Botanical Survey of India, Wildlife Institute of India, Himalayan Forest Research Institute, Institute of Himalayan Bioresources Technology, National Bureau of Plant Genetic Resources, etc. (ii) Forest managers from Himachal Pradesh and Uttarakhand, (iii) Research NGOs viz. Foundation for Revitalisation of Local Health Traditions, World Wide Fund for Nature and Himalayan Research Group, (iv) Herbal industry namely Dabur India, and (v) representatives of local users.

1.2. Workshop Objectives

The specific objectives of the Shimla CAMP Workshop were –

(i) to assess threat status of medicinal plants of the north-west Himalayan medicinal plant species, including re-assessment of the threat status of medicinal plants arrived at during previous assessment (CAMP Shimla 2003), with special focus on their status in Himachal Pradesh, and

(ii) to bring out a consensus list of priority red listed medicinal plant species for focused conservation and research initiative in the State/ region.

1.3. Candidate Species taken up for Assessment

A core team comprising of (i) Dr. G S Goraya, CCF (NTFP), (ii) Sh. D K Ved, Advisor, FRLHT, Bangalore, (iii) Dr. G S Rawat, WII, Dehradun, and (iv) Dr. Vaneet Jishtu, Scientist, RFRI, Jorhat under the overall guidance of Sh. Vinay Tandon, PCCF, HP, was constituted to work out the 1st draft list of candidate species for this workshop.

The Core Team started preparing the 1st draft list of candidate species with the list of 60 species assessed as 'threatened' during the CAMP Shimla (2003) forming the base. The core team also considered some fresh medicinal plant taxa, perceived to be facing threat in the region. Based primarily on the following criteria, the core team arrived at the 1st draft list of candidate species comprising 55 entities (42 of the 60 species assessed earlier + 13 fresh taxa):

- Recorded in active trade, especially those harvested for parts potentially damaging to the plants (e.g. root, bark, whole plant)
- Endemic to the region
- Perceived/ suspected to have lost about 30% or more of its population or distribution range.

This 1st draft list of 55 candidate species was circulated to the perspective resource persons in a pre-workshop interaction process. This list was revised to 80 taxa (all 60 species assessed earlier + 20 fresh taxa) on the basis of suggestions received from the resource persons.

This revised draft list of 80 candidate species (Annexure-I) was presented in the 1st plenary during the opening session of the workshop for finalisation. Each of these 80 species was taken up for preliminary discussion. The participants felt that all the listed species were of conservation concern and needed conservation action. However, they also felt that in view of the specific information now available on the distribution and threat status of species assessed as threatened during CAMP Shimla (2003), there was a need to prune the list to arrive at 'actionable list' of species needing priority action.

The following criteria were thereafter adopted to arrive at the final list of candidate species for assessment:

- Species in known significant trade/ demand
- Species facing threat due to degradation of habitat
- Species with highly scattered and limited distribution
- Species having range of distribution largely limited to western Himalayas

Based on the above criteria and discussions in the 1st plenary, a **Final List of 57 Candidate Species** (41 of the 60 assessed earlier + 16 fresh) was drawn for assessment during the workshop (Table-1).

Table-1: Final List of 57 Candidate Species taken up for Threat Assessment at Shimla CAMP Workshop, 2010

S. No.	Botanical Name	Local Name	Family
1	*Aconitum deinorrhizum* Stapf	Mohra	Ranunculaceae
2	*Aconitum heterophyllum* Wall. ex Royle	Atis	Ranunculaceae
3	*Aconitum laeve* Royle	Mohra	Ranunculaceae
4	*Aconitum violaceum* Jacquem ex Stapf	Mitha Telia	Ranunculaceae
5	*Allium consanguineum* Kunth (=*A.stracheyi* Baker)	Farna	Alliaceae
6	*Angelica glauca* Edgew.	Chora	Apiaceae
7	*Arnebia benthamii* (Wall. ex G.Don) I. M. Johnst.	Ratanjot	Boraginaceae
8	*Arnebia euchroma* (Royle) I. M. Johnst.	Ratanjot	Boraginaceae
9	*Atropa acuminata* Royle ex. Lindl.	Jharka	Solanaceae
10	*Berberis aristata* DC.	Kashmal	Berberidaceae
11	*Betula utilis* D. Don	Bhoj	Betulaceae
12	*Bunium persicum* B. Fedtsch	Kala Zeera	Apiaceae
13	*Cinnamomum tamala* (Buch.-Ham.) T. Nees & Nees	Tejpatta	Lauraceae
14	*Colchicum luteum* Baker	Suranjan kadvi	Liliaceae
15	*Dactylorhiza hatagirea* (D. Don.) Soo	Salam panja	Orchidaceae
16	*Desmodium gangeticum* (L.) DC.	Salparni	Fabaceae
17	*Didymocarpus pedicellata* R.Br.	Pathar laung	Gesneriaceae
18	*Dioscorea deltoidea* Wall. ex Griseb.	Shingli Mingli	Liliaceae
19	*Ephedra gerardiana* Wall. ex Stapf	Somlata	Ephedraceae
20	*Fritillaria roylei* Hook.	Kakoli	Liliaceae
21	*Gentiana kurroo* Royle	Kutki	Gentianaceae
22	*Habenaria edgeworthii* Hook. f. ex Collett	Jeevak	Orchidaceae
23	*Habenaria intermedia* D. Don	Rishbak	Orchidaceae
24	*Hyoscyamus niger* L.	Khurasani Ajwain	Solanaceae
25	*Hypericum perforatum* L.	Basant	Hypericaceae
26	*Hyssopus officinalis* L.	Juffa	Lamiaceae
27	*Juniperus communis* L.	Hauber	Cupressaceae
28	*Jurinea dolomiaea* Boiss. (=*J. macrocephala* (Royle) Cl.)	Dhoop	Asteraceae
29	*Lilium polyphyllum* D. Don	Ksheer kakoli	Liliaceae

S. No.	Botanical Name	Local Name	Family
30	*Litsea glutinosa* (Lour.) C. B. Rob. *(= L. chinensis* Lam.*)*	Meda lakri	Lauraceae
31	*Malaxis acuminata* D. Don	Vridhi	Orchidaceae
32	*Malaxis muscifera* (Lindl.) Kuntze *(=Deina muscifera* Lindl.*)*	Ridhi	Orchidaceae
33	*Nardostachys grandiflora* DC.	Jatamansi	Boraginaceae
34	*Onosma hispidum* Wall. ex G. Don	Gauzaban	Boraginaceae
35	*Oroxylum indicum* (L.) Kurz	Tatpalanga	Bignoniaceae
36	*Paeonia emodi* Wall. ex Royle		Ranunculaceae
37	*Paris polyphylla* Sm.	Dudhia bach	Liliaceae
38	*Picrorhiza kurroa* Royle ex Benth.	Karu	Scrophulariaceae
39	*Podophyllum hexandrum* Royle *(=P. emodi* Wall. ex Royle*)*	Bankakri	Berberidaceae
40	*Polygonatum cirrhifolium* (Wall.) Royle	Salam mishri	Liliaceae
41	*Polygonatum multiflorum* (L.) All.	Salam mishri	Liliaceae
42	*Polygonatum verticillatum* (L.) All.	Salam mishri	Liliaceae
43	*Rheum australe* D. Don *(=R. emodi* Wall. ex Meisn.*)*	Revand chini	Polygonaceae
44	*Rheum moorcroftianum* Royle	Revand chini	Polygonaceae
45	*Rheum spiciforme* Royle	Revand chini	Polygonaceae
46	*Rheum webbianum* Royle	Revand chini	Polygonaceae
47	*Roscoea alpina* Royle	Kakoli	Zingiberaceae
48	*Roscoea procera* Wall.	Kakoli	Zingiberaceae
49	*Saussurea obvallata* (DC.) Edgew.	Brahm Kamal	Asteraceae
50	*Selinum connifolium* (Wall. ex DC.) Benth. & Hook. f. *(=S. tenuifolium* Wall. ex DC.*)*	Bhutkesi	Apiaceae
51	*Selinum vaginatum* (Edgew.) C. B. Clarke	Bhutkesi	Apiaceae
52	*Skimmia laureola* (DC.) Siebold & Zucc. ex Walp. *(=S. anquetilia* Taylor & Airy Shaw)	Ner dhoop	Rutaceae
53	*Swertia chirayita* (Roxb. ex Fleming) Karsten	Chiretta/ Chirayata	Gentianaceae
54	*Symplocos paniculata* (Thunb.) Miq.	Lodh	Styracaceae
55	*Taxus wallichiana* Zucc. *(=T. baccata* L. subsp. *wallichiana* (Zucc.*)* Pilg.	Rakhal/ Birmi	Taxaceae

S. No.	Botanical Name	Local Name	Family
56	*Uraria picta* (Jacquin) Desvaux ex DC.	Prshnparni	Fabaceae
57	*Zanthoxylum armatum* DC. *(=Z. alatum* Roxb.*)*	Tirmir/ Timru	Rutaceae

As is apparent from the final list of candidate species listed in Table-1, 19 of the 60 species assessed as threatened during the CAMP Shimla (2003) could not satisfy the criteria adopted for finalisation of the list of candidate species for re-assessment during the current CAMP workshop. Species like *Bergenia stracheyi, Datisca cannabina, Eremostachys superba, Ferula jaeschkeana, Juniperus polycapos, Meconopsis aculeata, Physochlaena praealta, Roylea cinerea, Saussurea gossypiphora,* and *Rhododendron* spp. even as assessed as threatened during CAMP Shimla (2003), were not taken up as candidate species for re-assessment for the present CAMP Workshop due to their being not in significant commercial trade, their large distribution range, and due to little perceived threat to their habitats. Species like *Heracleum lanatum* and *Hippophae rhamnoides* were not taken up as candidate species as their major exploitation is from private lands where these are customarily grown along field bunds.

Similarly, other threatened species like *Gloriosa superba, Rauvolfia serpentina* and *Embelia tsjeriam-cottam* were not taken up for re-assessment as the State accounted for only a miniscule of their total global population. Further, species like *Valeriana jatamansii* were excluded from the current evaluation process due to the fact that it now formed a subject of large scale plantations in the region.

It was, however, unanimously agreed that till the time the species assessed as threatened during CAMP Kullu (1998) and CAMP Shimla (2003), and not taken up as candidate species for re-assessment for the present CAMP workshop, were put to re-assessment in future, their threat status in the region as assessed during the previous CAMP workshops will continue to be applicable and these species will remain a subject of conservation concern.

1.4. Threat Assessment of Candidate Taxa – the Process

The latest, **"Red List" Criteria [Version 3.1: IUCN (2001)]**, adopted by IUCN, was employed to make threat assessment to the candidate taxa listed above. Dr. G. S. Goraya, with Dr. G. S. Rawat in the Chair, introduced the participants to the CAMP process and highlighted the need for collating basic information, based mainly on the participant's own field experience, on candidate taxa in respect of their distribution, population status and threat perception. He also informed the participants about the CAMP exercises carried out earlier at Kullu (1998) and Shimla (2003) in respect of medicinal plants of western Himalayas. Sh. Vinay Tandon, Pr. Chief Conservator of Forests, Himachal Pradesh and Vice-Chair, South Asia, IUCN/SSC Medicinal Plants Specialist Group, while formally inaugurating the workshop, reiterated the need for carrying out threat assessment of medicinal plants to enable the forest managers to arrive at conservation prioritization.

The introduction was followed by detailed instructions, and clarification of doubts, in respect of data recording on the Taxon Data Sheets. The participants were provided with a copy of a Briefing Book, specially prepared for this CAMP Workshop, containing details of the CAMP process, IUCN's Red List Criteria and methods of its application.

The participants were, thereafter, divided into 4 Working Groups (WG) and each WG assigned 4 taxa for first time assessment and 10 taxa for re-assessment, with WG No. 3 being assigned 11 taxa for re-assessment with the following expectations:

1. Assigning the taxon, based on given criteria, to IUCN Red List Category
2. Making recommendation for research and management action towards strengthening of wild populations of the Red-listed species to their natural habitats.
3. Making recommendations for *in situ* and *ex situ* conservation of the taxon based primarily on their status in the wild.

Working Group-wise detail of taxa assigned is given in Table-2.

Table-2: Detail of Working Groups (WG) and Assigned Taxa

WG No.	WG Members	Taxa for Fresh assessment	Taxa for Re-assessment
WG-1	Dr. G S Rawat, **Facilitator** Dr. D R Nag, **Co-Facilitator** Mrs. V. Thaplyal Mr. B S Rana Dr. G P Kithothi Dr. Vaneet Jishtu Dr. Sanjay Uniyal, **Recorder**	*Aconitum laeve* *Berberis aristata* *Juniperus communis* *Onosma hispidum*	*Aconitum violaceum* *Allium consanguineum* *Arnebia euchroma* *Bunium persicum* *Colchicum luteum* *Ephedra gerardiana* *Hyoscyamus niger* *Hyssopus officinalis* *Rheum moorcroftianum* *Saussurea obvallata*

WG No.	WG Members	Taxa for Fresh assessment	Taxa for Re-assessment
WG-2	Dr. N S Chauhan, **Facilitator** Dr. B D Sharma, **Co-Facilitator** Dr. K S Kapoor Dr. Sandeep Sharma Dr. M K Brahmi Dr. R. Murugan Dr. Pitambar Negi, **Recorder**	*Habenaria edgeworthii* *Malaxis acuminata* *Roscoea alpina* *Roscoea procera*	*Arnebia benthamii* *Dactylorhiza hatagirea* *Fritillaria roylei* *Habenaria intermedia* *Lilium polyphyllum* *Malaxis mucifera* *Polygonatum cirrhifolium* *Polygonatum multiflorum* *Polygonatum verticillatum* *Taxus wallichiana*
WG-3	Dr. S K Srivastava, **Facilitator** Dr. J C Rana, **Co-Facilitator** Dr. R K Verma Dr. K Ravikumar Mr. K K Gupta Mr. S Chowdhury Mr. Rajnish Mahajan, **Recorder**	*Paeonia emodi* *Selinum connifolium* *Selinum vaginatum* *Skimmia laureola*	*Aconitum heterophyllum* *Aconitum deinorrhizum* *Angelica glauca* *Atropa acuminata* *Betula utilis* *Dioscorea deltoidea* *Jurinea dolomiaea* *Nardostachys grandiflora* *Paris polyphylla* *Picrorhiza kurroa* *Podophyllum hexandrum*
WG-4	Dr. H B Naithani, **Facilitator** Dr. Rakesh Shah, **Co-Facilitator** Dr. Jagdish Singh Dr. Lal Singh Dr. Rajeev Dwivedi Mr. O C Sharma Dr. A Rajasekaran Mr. Sanjeev Sharma, **Recorder**	*Desmodium gangeticum* *Oroxylum indicum* *Symplocos paniculata* *Uraria picta*	*Cinnamomum tamala* *Didymocarpus pedicellata* *Gentiana kurroo* *Hypericum perforatum* *Litsea glutinosa* *Rheum australe* *Rheum spiciforme* *Rheum webbianum* *Swertia chirayita* *Zanthoxylum armatum*

Mr. D. K. Ved and Dr. G. S. Goraya were the overall workshop facilitators

The day-1 of the Workshop ended with the WG members familiarizing with each other, recollecting their field knowledge about the assigned taxa and having hands-on exercise in respect of various data entry columns in the Taxon Data Sheets.

Mr. D. K. Ved, during the opening session of day-2, updated the participants with the IUCN's threat assessment criteria and their application for assigning threat categories. While emphasising the role of Facilitator, Co-facilitator and Recorder for each Working Group, he called upon the participants to carefully work out the population status, range of occurrence and area of occupancy of the taxa under consideration to be able to arrive at the local and global threat assessment.

Each Working Group was thereafter provided with blank Taxon Data Sheets @ one sheet per taxa to be assessed and a set of regional floras and other publications for reference. The 16 taxa, selected for first-time assessment for the region, were taken up for assessment on day-2 itself and subjected to

detailed discussion and literature review by the Working Groups. The data entered in the Taxon Data Sheets by one WG was first reviewed by other WGs and then put up to the Plenary for further discussions and finalisation.

The day-3 was dedicated to re-assessment of the 41 taxa, assessed as threatened during Shimla CAMP (2003). The Taxon Data Sheets, filled in by the designated WGs for each of the 41 taxa taken up for re-assessment, were subjected to review by other WGs. These were then put up to the Plenary for full house discussion and finalization.

The Core Team analysed and compiled the finalized data recorded in the Taxon Data Sheets with respect to (i) criteria employed, (ii) threat category assigned, and (iii) recommendations for priority action. Dr. Goraya, on behalf of the Core Team, presented the draft analysis of data and Working Group recommendations in the plenary session on the last day of the Workshop for review by the participants. The additions/ modifications in the data/ action plan suggested by participants were appropriately incorporated in the Taxon Data Sheets alongwith corresponding modifications in the analysis. The Plenary assigned definite threat categories to 47 candidate species and in respect of the remaining 10 candidate species took the following decisions:

- Even as the wild populations of *Aconitum laeve, Desmodium gangeticum, Oroxylum indicum* and *Uraria picta* were faced with serious threat in the region, these were 'Not Evaluated' on the technical grounds as their occurrence in the region represented only a small fraction of their global populations. The Group, however, recommended conservation measures to save and strengthen their wild populations in the State.
- *Paeonia emodi* remained an enigmatic species for the region. Whereas it was generally accepted that the wild populations of the species have sharply dwindled over the years, not enough field data could be pooled during the workshop to put this species under the 'threatened' categories. The species was, therefore, assessed as 'Data Deficient', with recommendations to undertake focused surveys in its type localities to record status of its wild populations.
- The wild populations of *Didymocarpus pedicellata, Hyoscyamus niger, Hyssopus officinalis, Onosma hispidum* and *Rheum spiciforme* were noted to be fairly stable in the region with little evidence of harvesting for trade or specific degradation of their habitats. These species were, therefore, assessed as 'Near Threatened' and it was recommended to keep an eye on the status of their wild populations.

The concluding session of the Workshop was chaired by Dr. K. R. Dhiman, Vice Chancellor, Dr. Y S Parmar University of Horticulture and Forestry, Nauni, Solan. Dr. G. S. Rawat, on behalf of the Core Team, made a detailed presentation on the final workshop outcomes. He especially drew the attention of the Chief Guest and the participants towards the Action List of threatened medicinal plant species that had emerged for priority action during the workshop. He also presented an Action Plan towards concerted research and conservation action in respect of the species assessed as threatened.

1.5. CAMP Shimla (2010) – Analysis of Outcomes

Species-wise detail of threat categories assigned to the 57 taxa taken up for assessment in the Shimla CAMP Workshop is given as Table-3. A total of 47 taxa have be assessed as 'threatened' i.e. categorized as 'Critically Endangered', 'Endangered' and 'Vulnerable', with the 5 of the remaining ten taxa assessed as 'Near Threatened', 4 taxa were Not Evaluated as their wild populations in the State represent only marginal percentage of the total global population. Assessment in respect of one species could not be made due to non-availability of supporting data. Summary of the Red-list status assigned to the 57 candidate taxa is given in Table-4.

Table-4: CAMP Shimla (2010) - Summary of Red List Status

Red List Category	Status of Species Assessed in Himachal Pradesh	Global Assessment Status
A. Threatened		
CR: Critically Endangered	11	5
EN: Endangered	19	7
VU: Vulnerable	17	5
Total Threatened:	**47**	**17**
B. Others		
NT: Near Threatened	5	-
DD: Data Deficient	1	-
NE: Not Evaluated	4	-
Total Others:	**10**	**-**

A quick analysis of the tables 3 and 4 reveals that, in view of the major proportion of their global population being recorded from the region, the workshop was able to assess global threat status in respect of 17 taxa. This finding clearly brings out the urgent need for putting in place concerted conservation measures for long-term conservation of these species as any further degradation of wild populations of these 17 taxa in the State would have far reaching impact on the very survival of these species on this earth.

The list of medicinal plant taxa assessed in the CAMP Workshop as 'threatened' was also subjected to habit-wise analysis and it came out that 77% of these taxa are herbs, with trees, shrubs and climbers accounting for less than 1/4th of the total species assessed as of conservation concern in the region (Fig.-1). It is also interesting to note that all the 11 taxa assessed as Critically Endangered and 16 out of 19 taxa assessed as Endangered in the workshop are herbs.

Fig.-1 : Habit-wise Analysis of Red-listed Medicinal Plant Taxa

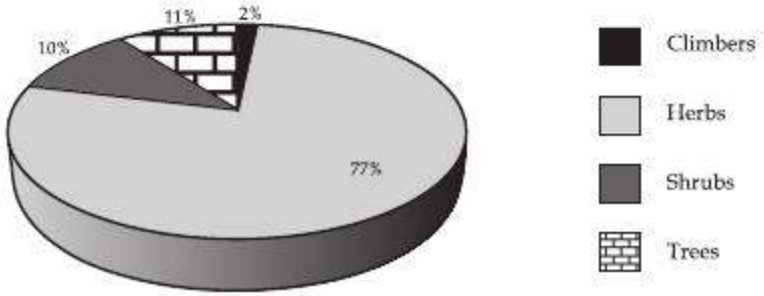


Table-3: Red-list Status of candidate species as per Shimla CAMP, December 2010

S. No.	Botanical Name	Habit[1]	Status assessed for Himachal Pradesh[2]	Criteria[3]	% of Global Population	Global Status	Previous Status (Shimla CAMP, 2003)
1	*Aconitum heterophyllum*	H	CR	A2 c,d	≈60	CR	CR
2	*Aconitum deinorrhizum*	H	CR	A2 c,d	≈60	CR	EN
3	*Atropa acuminata (=Atropa belladona)*	H	CR	A2 c,d	20-25	-	CR
4	*Dactylorhiza hatagirea (=Orchis latifolia)*	H	CR	A2 c,d	40-50	-	CR
5	*Gentiana kurroo*	H	CR	A2 c,d	60-70	CR	CR
6	*Habenaria edgeworthii*	H	CR	A2 c,d	≈50	CR	-
7	*Jurinea dolomiaea (=J. macrocephala)*	H	CR	A2 c,d	≈40	-	EN
8	*Lilium polyphyllum*	H	CR	A2 c,d	≈80	CR	CR
9	*Malaxis muscifera*	H	CR	A2 c,d	30-40	-	CR
10	*Picrorhiza kurroa*	H	CR	A2 c,d	≈30	-	EN
11	*Swertia chirayita (= S. chirata)*	H	CR	A2 c,d	30-40	-	CR
12	*Angelica glauca*	H	EN	A2 c,d	70-80	EN	EN
13	*Arnebia benthamii*	H	EN	A2 c,d	50-60	EN	CR
14	*Arnebia euchroma*	H	EN	A2 c,d	≈50	EN	CR
15	*Berberis aristata*	S	EN	A2 c,d	≈50	EN	-
16	*Betula utilis*	T	EN	A2 c,d	20-25	-	EN
17	*Colchicum luteum*	H	EN	A2 c,d	5-10	-	VU
18	*Dioscorea deltoidea*	C	EN	A2 c,d	≈70	EN	EN
19	*Fritillaria roylei*	H	EN	A2 c,d	≈50	EN	EN
20	*Habenaria intermedia*	H	EN	A2 c,d	60-70	EN	EN
21	*Nardostachys grandiflora (=N. jatamansi)*	H	EN	A2 c,d	≈25	-	EN
22	*Paris polyphylla*	H	EN	A2 c,d	≈15	-	EN
23	*Podophyllum hexandrum (= P. emodi)*	H	EN	A2 c,d	20-25	-	EN

Sr. No.	Botanical Name	Habit[1]	Status assessed for Himachal Pradesh[2]	Criteria[3]	% of Global Population	Global Status	Previous Status (Shimla CAMP, 2003)
24	*Polygonatum cirrhifolium*	H	EN	A2 c,d	20-25	-	EN
25	*Polygonatum multiflorum*	H	EN	A2 c,d	20-25	-	VU
26	*Polygonatum verticillatum*	H	EN	A2 c,d	40-50	-	VU
27	*Rheum moorcroftianum*	H	EN	A2 c,d	≈50	-	EN
28	*Saussurea obvallata*	H	EN	A2 c,d	≈30	-	CR
29	*Taxus wallichiana (= T. baccata)*	T	EN	A2 c,d	25-30	-	EN
30	*Zanthoxylum armatum (= Z. alatum)*	S	EN	A2 c,d	10-15	-	EN
31	*Aconitum violaceum*	H	VU	A2 c,d	≈50	VU	VU
32	*Allium consanguineum (=A. stracheyi)*	H	VU	A2 c,d	75-80	VU	VU
33	*Bunium persicum*	H	VU	A2 c,d	≈20	-	VU
34	*Cinnamomum tamala*	T	VU	A2 c,d	<5	-	VU
35	*Ephedra gerardiana*	S	VU	A2 c,d	≈20	-	EN
36	*Hypericum perforatum*	H	VU	A2 c,d	<5	-	VU
37	*Juniperus communis*	S	VU	A2 c,d	10-20	-	-
38	*Litsea glutinosa (= L. chinensis)*	T	VU	A2 c,d	<5	-	VU
39	*Malaxis acuminata*	H	VU	A2 c,d	30-40	-	-
40	*Rheum australe (= R. emodi)*	H	VU	A2 c,d	30-40	-	EN
41	*Rheum webbianum*	H	VU	A2 c,d	50-60	VU	VU
42	*Roscoea alpina*	H	VU	A2 c,d	30-40	-	-
43	*Roscoea procera*	H	VU	A2 c,d	40-50	-	-
44	*Selinum vaginatum*	H	VU	A2 c,d	≈60	VU	-
45	*Selinum connifolium (S. tenuifolium)*	H	VU	A2 c,d	≈60	VU	-
46	*Skimmia laureola*	S	VU	A2 c,d	20-25	-	-
47	*Symplocos paniculata*	T	VU	A2 c,d	10-15	-	-

Sr. No.	Botanical Name	Habit[1]	Status assessed for Himachal Pradesh[2]	Criteria[3]	% of Global Population	Global Status	Previous Status (Shimla CAMP, 2003)
48	*Didymocarpus pedicellata*	H	NT	A2 c,d	10-15	-	VU
49	*Hyoscyamus niger*	H	NT	A2 c,d	≈20	-	EN
50	*Hyssopus officinalis*	H	NT	A2 c,d	≈30	-	VU
51	*Onosma hispidum*	H	NT	A2 c,d	40-50	-	-
52	*Rheum spiciforme*	H	NT	A2 c,d	30-40	-	VU
53	*Paeonia emodi*	H	DD	-	30-40	-	-
54	*Aconitum leave*	H	NE	-			-
55	*Desmodium gangeticum*	H	NE	-	<1	-	-
56	*Oroxylum indicum*	T	NE	-	<1	-	-
57	*Uraria picta*	S	NE	-	<1	-	-

1 = H (herb); S (shrub); T (tree); C (climber)
2 = CR (Critically Endangered); EN (Endangered); VU (Vulnerable); NT (Near Threatened); DD (Data Deficient); NE (Not Evaluated)
3 = A2 c,d

Family-wise analysis of the 47 taxa assessed as 'threatened' reveals that these taxa are spread over 21 families, with highest representation by taxa belonging to family Liliaceae (8) followed by Orchidaceae (5) and Apiaceae (4) and 3 taxa each belonging to families Ranunculaceae, Boraginaceae and Polygonaceae. Six families are represented by two taxa each and nine families are represented by one taxon each. Family-wise detail of the 47 taxa assessed as threatened is given in the table-5 below:

Table 5: Family-wise representation of Red Listed Medicinal Plant taxa in Himahchal Pradesh

S. No.	Name of Family	No. of Taxa
1	Liliaceae	8
2	Orchidaceae	5
3	Apiaceae	4
4	Ranunculaceae	3
5	Boraginaceae	3
6	Polygonaceae	3
7	Asteraceae	2
8	Berberidaceae	2
9	Gentianaceae	2
10	Lauraceae	2
11	Rutaceaeae	2
12	Zingiberaceae	2
13	Alliaceae	1
14	Betulaceae	1
15	Cupressaceae	1
16	Ephedraceae	1
17	Hypericaceae	1
18	Scrophulariaceae	1
19	Solanaceae	1
20	Styracaceae	1
21	Taxaceae	1

One of the key outputs of the CAMP Shimla (2010) was re-assessment of the threat status of taxa assigned different red-list categories during earlier threat assessment exercises. Analysis of Annexure-I reveals that this exercise has resulted in upgradation of the threat status of 3 taxa from 'Endangered' to 'Critically Endangered' and 3 taxa from 'Vulnerable' to 'Endangered'. Similarly, threat categorisation in respect of 4 taxa has been downgraded from 'Critically Endangered' to 'Endangered', 2 taxa from 'Endangered' to 'Vulnerable', one taxa from 'Endangered' to 'Near Threatened' and 3 taxa from 'Vulnerable' to 'Near Threatened'.

Consolidated Red-List of Medicinal Plants of Himachal Pradesh:

The Shimla CAMP (2010) presented an opportunity to update and consolidate the results of all the three threat assessment exercises carried out for the State. Consolidated list of medicinal plant species assessed during CAMP Kullu (1998), CAMP Shimla (2003) and CAMP Shimla (2010) is presented as Annexure-II. Analysis of this list reveals the following:

Total number of medicinal plant species taken up for assessment in CAMP Kullu (1998), CAMP Shimla (2003), and CAMP Shimla (2010)	:	87
Total number of species assessed as 'Threatened'	:	66

Red-list categorisation of the 66 species assessed as 'Threatened' is as follows:

Critically Endangered	= 12
Endangered	= 23
Vulnerable	= 31

The CAMP Shimla (2010) has made strong recommendation for focused initiatives towards conservation of all these species through appropriate research, conservation management and sustainable harvest programs.

1.6. CAMP Shimla (2010) – Highlights

The Shimla medicinal plant threat assessment exercise marked a quantum improvement over similar exercises conduced for the region earlier in respect of (i) understanding of the process and participation, (ii) quality of the field data, (iii) handling of species-specific issues, and (iv) recommending focused action plan.

The Group highlighted concerns over the issues of equivalents, substitutes and adulterants under raw drug trade. An example of *Swertia chirayita* was cited to substantiate this concern as many species of *Swertia* (viz. *S. angustifolia, S. cordata, S. ciliata, S. paniculata,* etc.) were being traded under the generic name 'Chiretta'. While recommending the use of only authenticated germplasm for cultivation of this species, the Group highlighted the role of Research Institutes in making available such authenticated germplasm. The Group also expressed concern about mis-identification of species in the field by the wild gatherers and the forest staff, making threat assessment of many species difficult. The example of *Dactylorhiza hatageria* and *Gymnadenia orchioides* – both locally known as 'salam panja' and of *Saussurea gossypiphora* and *Saussurea simpsoniana*- both locally know as 'ghuggi' - were cited to highlight this issue.

The issue related to revision of botanical nomenclature was also highlighted in respect of some species. The example of *Taxus* sp. of Western Himalayas was cited to elaborate this issue. The local forest managers were found to be comfortable with the old basic name *Taxus baccata* and its recently updated nomenclature to *Taxus baccata* subsp. *wallichiana, Taxus wallichiana, Taxus fauna* and *Taxus contorta* was creating uncertainty in their minds about the identification of species under reference. Similar examples of nomenclature changes in respect of *Abies spectabilis* vs. *Abies gamblei; Selinum tenuifolium* vs. *Selinum connifolium* were also cited. The Group recommended use of the commonly prevalent botanical names along with the updated nomenclature for the benefit of forest managers and other stakeholder groups.

The Group also raised the issue of developing agro-practices in respect of various medicinal plant species under threat. Standardized nursery and plantation protocols were as necessary to promote cultivation of priority species as these were necessary for initiating augmentation plantations in the forests. The Research Institutes, the Group felt, needed to pool their resources and address this issue in a time bound manner.

The Group also highlighted the immediate need to undertake reconnaissance and detailed surveys to locate viable populations for species assessed as 'threatened' and recommended a collaborative arrangement between the Forest Department and the Research Institutes for the purpose.

It goes to the credit of the Group that a prioritized list of species and a workable Action Plan aimed at management of priority medicinal plants has emerged at the end of the workshop. The Group, through this initiative, has set precedence for future threat assessment exercises.

1.7. CAMP Shimla (2010) – Proposed Action Plan

The Shimla CAMP process also resulted in drawing up a comprehensive Action Plan for priority research and conservation action in respect of the species taken up for assessment in the workshop. Considering that it will not be possible to allocate same level of attention and resources to all the species categorised as 'Red Listed', species were clubbed into various groups needing different types and levels of action.

For example, the 11 species forming candidates for 'Ashtavarga' group of herbs were clubbed into one group for focused action in respect of comprehensive field surveys, creation of germplasm banks, long-term seed storage and development of agro-techniques for possible cultivation and augmentation of wild populations.

Similarly, a group of 4 species i.e. *Aconitum heterophyllum, Bunium persicum, Picrorhiza kurroa,* and *Swertia chirayita* for 'Cultivation' were also identified. All these 4 species are threatened' in the wild, are in high demand, and have sound agro-economics.

In respect of the 'threatened' tree species like *Taxus wallichiana, Betula utilis* and *Cinnamomum tamala,* and critically endangered herb species like *Gentiana kurroo* where wild populations have been reasonable well surveyed, it has been proposed to afford long-term conservation to their wild populations through *in situ* conservation reserves to be called Medicinal Plant Conservation Areas (MPCAs). These conservation reserves shall be created by setting apart sizeable forest areas bearing viable populations of these species. Possible sites for creating such reserves for these species have also been indicated.

For other species, measures like 'Population and Habitat Viability Survey', 'establishment of germplasm banks', 'augmentation plantations', etc. have been proposed.

Detailed Action Plan in matrix format is given as Table-6.

Table-6: Action Plan Emerging out of Shimla CAMP Workshop (December 2010)

S. No.	Species	IUCN Red-List Status	*In Situ* Conservation			*Ex situ* Conservation			Remarks
			Survey & Locate viable wild Populations	Set up MPCAs	Strengthen wild populations	Establish live Germplasm banks for conservation, demonstration & research	Long-term Seed Storage	Cultivation	
1	*Malaxis muscifera*	CR	√	Yes, after survey	Augmentation plantations on pilot scale to strengthen wild populations – - after survey - with JFMCs	Create compact germplasm bank-cum-demonstration centre for all 11 species Develop mass multiplication protocols	√ (with NBPGR)	Work out agro-techniques and agro-economics. (Trials underway on 3 species by HRG)	These 11 species are candidates for **Ashtavarga** group (a much acclaimed Ayurvedic recipe forming important ingredient of Chayavanprash), where underground parts are used.
2	*Malaxis acuminata*	VU							
3	*Habenaria edgeworthii*	CR							
4	*Habenaria intermedia*	EN							
5	*Lilium polyphyllum*	CR							
6	*Fritillaria roylei*	EN							
7	*Roscoea procera*	VU							
8	*Roscoea alpina*	VU							
9	*Polygonatum cirrhifolium*	EN							
10	*Polygonatum verticillatum*	EN							
11	*Polygonatum multiflorum*	EN							
12	*Taxus wallichiana*	EN	√	√ MPCAs at Daranghati (Shimla) & GHNP (Kullu)	√ (Already under plantation program of Forest Dept.)	Live hedges in the compounds of FRHs/ offices/ along nursery fences	√	2 private farms (Kullu & Mandi) already cultivating the species (Germplasm from NE) under controlled conditions.	Himalayan Tree/ in trade/ habitat specific/ scanty natural regeneration

S. No.	Species	IUCN Red-List Status	*In Situ* Conservation			*Ex situ* Conservation			Remarks
			Survey & Locate viable wild Populations	Set up MPCAs	Strengthen wild populations	Establish live Germplasm banks for conservation, demonstration & research	Long-term Seed Storage	Cultivation	
13	*Betula utilis*	EN	√	√ MPCAs at Chitkul & Rupi Bhaba (Kinnaur)	√	In MPCAs	√	No	Bark in trade/ also cut for fuel / scanty natural regeneration
14	*Cinnamomum tamala*	VU	√	√ 2 MPCAs in Mandi & Kangra	√ (Under plantation program of Forest Dept.)	In MPCA	√	Under agro-forestry on field bunds	Leaves in trade / destructive harvesting practices
15	*Bunium persicum*	VU	√	√ MPCAs for Patish & Karu after survey	√ (augmentation plantations initiated with NMPB support)	In herbal gardens	√	Lahaul, Kinnaur	Highly recommended for Cultivation, being in high demand. Need authentic seed/ germplasm in commercial quantities
16	*Aconitum heterophyllum*	CR						Lahaul, Kullu	
17	*Picrorhiza kurroa*	CR						Lahaul, Kullu, Chamba	
18	*Swertia chirayita*	CR						Sirmour, Mandi, Shimla, Kullu.	
19	*Aconitum deinorrhizum*	CR	√	MPCA for *G. kurroo* (Sangrah). For others survey for	Develop & standardise mass multiplication techniques	Develop germplasm banks for conservation, demonstarti on,	√	No	All these species are critically endangered, habitat specific.
20	*Atropa acuminata*	CR							
21	*Dactylorhiza hatagirea*	CR							

S. No.	Species	IUCN Red-List Status	*In Situ* Conservation			*Ex situ* Conservation			Remarks
			Survey & Locate viable wild Populations	Set up MPCAs	Strengthen wild populations	Establish live Germplasm banks for conservation, demonstration & research	Long-term Seed Storage	Cultivation	
22	*Gentiana kurroo*	CR		Viable populations		Research			
23	*Jurinea dolomiaea*	CR							
24	*Angelica glauca*	EN	√		Plantation with JFMCs		√	Possible cultivation	Concrete conservation action on these species will follow survey results.
25	*Arnebia benthamii*	EN	Surveys for viable wild populations				√		
26	*Arnebia euchroma*	EN					√		
27	*Berberis aristata*	EN			Plantations		√		
28	*Colchicum luteum*	EN					√		
29	*Dioscorea deltoidea*	EN			Plantations		√		
30	*Ephedra gerardiana*	EN			Plantations		√		
31	*Nardostachys grandiflora*	EN			Plantations		√		
32	*Paris polyphylla*	EN					√		
33	*Podophyllum hexandrum*	EN					√		
34	*Rheum moorcroftianum*	EN					√		
35	*Saussurea obvallata*	EN					√		
36	*Zanthoxylum armatum*	EN			Plantations		√		
37	*Aconitum violaceum*	VU					√		
38	*Allium consanguineum*	VU					√	Possible cultivation	
39	*Hypericum perforatum*	VU					√		
40	*Juniperus communis*	VU					√		
41	*Litsea glutinosa*	VU			Plantations		√		

S. No.	Species	IUCN Red-List Status	*In Situ* Conservation			*Ex situ* Conservation			Remarks
			Survey & Locate viable wild Populations	Set up MPCAs	Strengthen wild populations	Establish live Germplasm banks for conservation, demonstration & research	Long-term Seed Storage	Cultivation	
42	*Rheum australe*	VU					√		
43	*Rheum webbianum*	VU					√		
44	*Selinum coniifolium*	VU					√		
45	*Selinum vaginatum*	VU					√		
46	*Skimmia laureola*	VU					√		
47	*Symplocos paniculata*	VU			Plantations		√		
48	*Didymocarpus pedicellata*	NT	√				√		Collection of more field data regarding their wild populations.
49	*Hyoscyamus niger*	NT					√		
50	*Hyssopus officinalis*	NT					√		
51	*Onosma hispidum*	NT					√		
52	*Rheum spiciforme*	NT					√		
53	*Paeonia emodi*	DD	√ Survey for locating wild populations				√		The species could not be assessed due to want of reliable data.
54	*Desmodium gangeticum*	NE	√			Germplasm bank	√		These three species not assessed as <1% of their global populations are represented in H.P. However, concrete action proposed in view of their declining populations in the State

S. No.	Species	IUCN Red-List Status	*In Situ* Conservation			*Ex situ* Conservation			Remarks
			Survey & Locate viable wild Populations	Set up MPCAs	Strengthen wild populations	Establish live Germplasm banks for conservation, demonstration & research	Long-term Seed Storage	Cultivation	
55	*Oroxylum indicum*	NE	√		Plantations		√		
56	*Uraria picta*	NE				Germplasm bank	√		
57	*Aconitum laeve*	NE					√		<1% global population. Not in trade.

MPCA : Medicinal Plant Conservation Area (an area with viable natural populations of a species set aside for its long-term conservation)
JFMC : Joint Forest Management Committees (set up for involvement of local communities in management of forestry resources)
NMPB : National Medicinal Plants Board (a body set up by the federal government for promotion of medicinal plants sector)
NBPGR: National Bureau of Plant Genetic Resources (a government organisation with facilities for long-term storage of seed)
HRG : Himalayan Research Group (a Shimla based research NGO)
GHNP : Great Himalayan National Park

Annexure-I

Initial List of 80 Candidate Species Proposed for Threat Assessment at CAMP Shimla, 2010

S. No.	Botanical Name	Common/ Local Name	Threat Status (as per Shimla CAMP 2003)
1	*Aconitum deinorrhizum*	Mohra	EN
2	*Aconitum heterophyllum*	Atis	CR
3	*Aconitum laeve*	-	-
4	*Aconitum violaceum*	Mithi patish, Mitha telia	VU
5	*Allium consanguineum (= A. stracheyi)*	Jambu, Faran	VU
6	*Angelica glauca*	Chora	EN
7	*Arnebia benthami*	Ratanjot	CR
8	*Arnebia euchroma*	Ratanjot	CR
9	*Asparagus adscendens*	Safed Musli/ Sansarpalli	-
10	*Atropa acuminata*	Jharka	CR
11	*Berberis aristata*	Kashmal	-
12	*Bergenia stracheyi*	Pashanbhed	VU
13	*Betula utilis*	Bhojpatra/ Bhoj	EN
14	*Bunium persicum*	Kala zira, Shia zira	VU
15	*Cinnamomum tamala*	Tejpatta	VU
16	*Colchicum luteum*	Suranjan kadvi	VU
17	*Dactylorhiza hatagirea*	Salam panja	CR
18	*Datisca cannabina*	Bajar bhang	EN
19	*Desmodium gangeticum*	Salparni	-
20	*Didymocarpus pedicellata*	Pathar laung, Patharphori	VU
21	*Dienia muscifera (=Malaxis muscifera)*	Jeevak/ Rishabhik	CR
22	*Dioscorea deltoidea*	Shingli mingli	EN
23	*Embelia tsjeriam-cottam*	Vibidang	VU
24	*Ephedra gerardiana*	Somlata	EN
25	*Eremostachys superba*	Gaju mulla	VU
26	*Ferula jaeschkeana*	Kindal	VU
27	*Fritillaria roylei*	Ksheer kakoli	EN
28	*Gentiana kurroo*	Kutki	CR
29	*Gloriosa superba*	Kalihari	VU
30	*Habenaria edgeworthii*	Vriddhi	-
31	*Habenaria intermedia*	Riddhi	EN
32	*Heracleum lanatum*	Patrali	VU
33	*Hippophae rhamnoides*	Chharma, Seabuckthorn	VU
34	*Hyoscyamus niger*	Khurasani ajwain	EN
35	*Hypericum perforatum*	Basant, Khoontir	VU
36	*Hyssopus officinalis*	Juffa	VU
37	*Juniperus communis*	Hauber	-
38	*Juniperus polycarpos*	Jau, Hauber	EN
39	*Jurinea dolomiaea*	Dhoop	EN
40	*Lilium polyphyllum*	Ksheer kakoli	CR

S. No.	Botanical Name	Common/ Local Name	Threat Status (as per Shimla CAMP 2003)
41	*Litsea glutinosa*	Meda sak	VU
42	*Malaxis acuminata*	Jeevak	-
43	*Meconopsis aculeata*	Patishan rooli	EN
44	*Nardostachys grandiflora*	Balchharh	EN
45	*Onosma hispidum*	Ratanjot	-
46	*Oroxylum indicum*	Tatpalanga	-
47	*Paeonia emodi*	Udsalap	-
48	*Paris polyphylla*	Meethi bach, Dudh bach	EN
49	*Physochlaena praealta*	Bajar bhang	VU
50	*Picrorhiza kurroa*	Karu	EN
51	*Pistacia integerrima*	Kakkarsingi	-
52	*Podophyllum hexandrum*	Bankakri	EN
53	*Polygonatum cirrhifolium*	Salam mishri, Maha meda	EN
54	*Polygonatum multiflorum*	Salam mishri	VU
55	*Polygonatum verticillatum*	Salam mishri, Meda	VU
56	*Potentilla nepalensis*	Dorighas	-
57	*Rauvolfia serpentina*	Sarpagandha	CR
58	*Rheum emodi*	Revandchini	EN
59	*Rheum moorcroftianum*	Revandchini	EN
60	*Rheum spiciforme*	Revandchini, Chukri	VU
61	*Rheum webbianum*	Revandchini	VU
62	*Rhodiola heterodonta*	Rose root	VU
63	*Rhododendron anthopogon*	Talispatra	VU
64	*Rhododendron campanulatum*	Kashmiri patta	VU
65	*Rhododendron lepidotum*	Talishi	VU
66	*Roscoea alpine*	Kakoli	-
67	*Roscoea procera*	Kakoli	-
68	*Roylea cinerea*	Karvi	VU
69	*Salvia moorcroftiana*	Thuth	-
70	*Saussurea gossypiphora*	Ghughi	CR
71	*Saussurea obvallata*	Brahmkamal	CR
72	*Selinum connifolium (= S. tenuifolium)*	Bhutkesi	-
73	*Selinum vaginatum*	Bhutkesi	-
74	*Skimmia laureola*	Ner dhoop	-
75	*Swertia chirayita (= S. chirata)*	Chiretta	CR
76	*Symplocos paniculata*	Lodh	LC
77	*Taxus wallichiana*	Rakhal, Birmi Talish	EN
78	*Uraria picta*	Prshnparni	-
79	*Valeriana jatamansi*	Mushkbala, Nihanu, Tagar	VU
80	*Zanthoxylum armatum*	Tirmur	EN

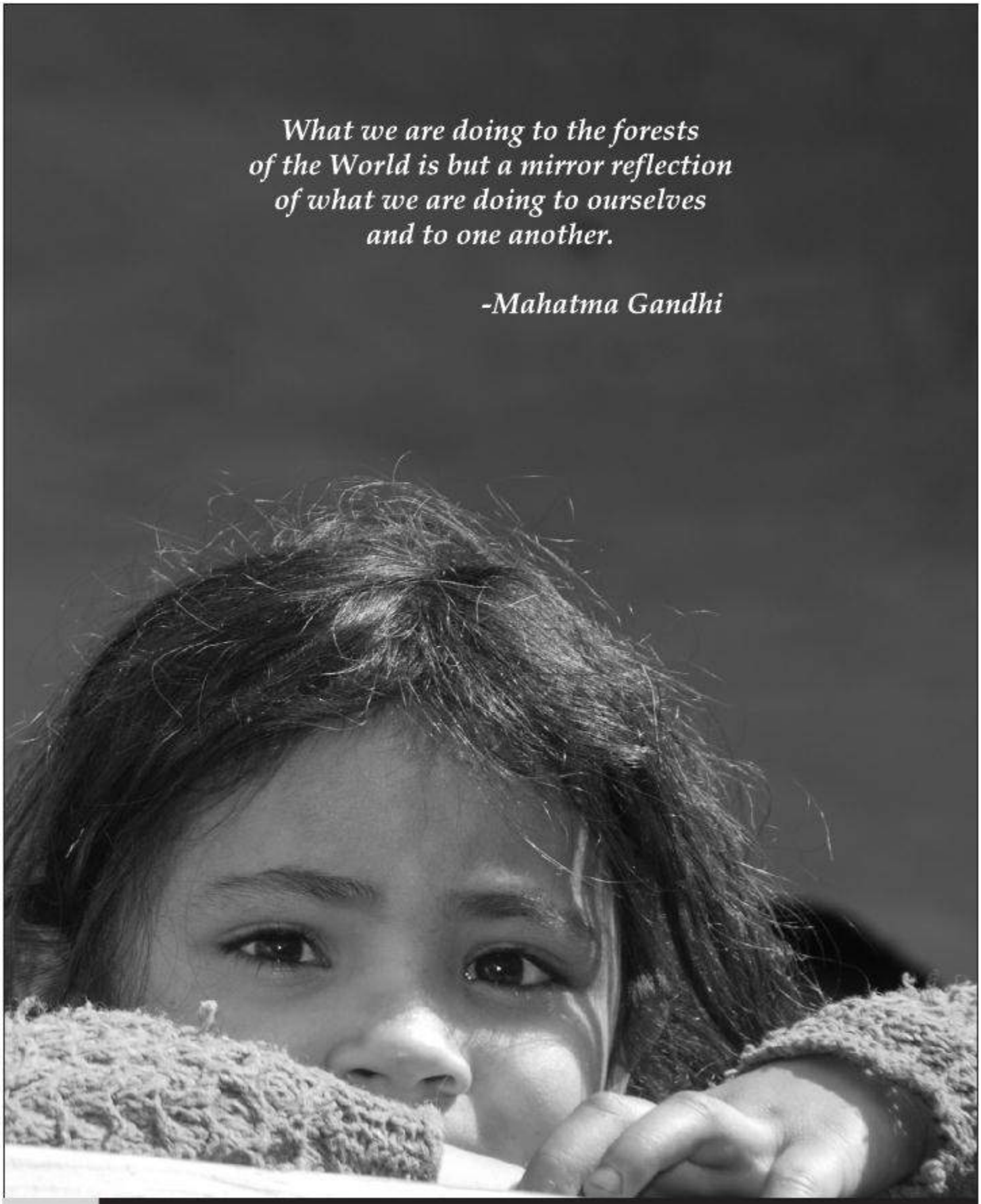
Annexure-II

Consolidated List of Medicinal Plant Species Assessed as 'Threatened' for Himachal Pradesh in various CAMP Processes (Kullu, 1998, Shimla, 2003 & Shimla, 2010)

S. No.	Botanical Name	Threat Status (as per Kullu CAMP, 1998)	Threat Status (as per Shimla CAMP, 2003)	Threat Status (as per Shimla CAMP, 2010)
1	*Aconitum chasmanthum*	DD	-	-
2	*Aconitum deinorrhizum*	EN	EN	**CR**
3	*Aconitum heterophyllum*	EN	CR	**CR**
4	*Aconitum leave*	-	-	NE
5	*Aconitum violaceum*	VU	VU	**VU**
6	*Allium consanguineum (= A. stracheyi)*	VU	VU	**VU**
7	*Angelica glauca*	EN	EN	**EN**
8	*Arnebia benthamii*	CR	CR	**EN**
9	*Arnebia euchroma*	EN	CR	**EN**
10	*Artemisia maritima*	VU	NT	-
11	*Atropa acuminata (= Atropa belladona)*	-	CR	**CR**
12	*Balanophora involucrata*	-	DD	-
13	*Berberis aristata*	-	-	**EN**
14	*Bergenia stracheyi*	VU	**VU**	-
15	*Betula utilis*	EN	EN	**EN**
16	*Bunium persicum (= Carum bulbocastanum)*	-	VU	**VU**
17	*Ceropegia bulbosa*	-	DD	-
18	*Cinnamomum tamala*	-	VU	**VU**
19	*Colchicum luteum*	-	VU	**EN**
20	*Dactylorhiza hatagirea (= Orchis latifolia)*	CR	CR	**CR**
21	*Datisca cannabina*	-	**EN**	-
22	*Desmodium gangeticum*	-	-	NE
23	*Dictamnus albus*	-	LC	-
24	*Didymocarpus pedicellata*	-	VU	NT
25	*Dioscorea deltoidea*	-	EN	**EN**
26	*Embelia tsjeriam-cottam*	-	**VU**	-
27	*Ephedra gerardiana*	VU	EN	**VU**
28	*Eremostachys superba*	-	**VU**	-

S. No.	Botanical Name	Threat Status (as per Kullu CAMP, 1998)	Threat Status (as per Shimla CAMP, 2003)	Threat Status (as per Shimla CAMP, 2010)
29	*Eremurus himalaicus*	-	LC	-
30	*Ferula jaeschkeana*	VU	**VU**	-
31	*Ferula narthex*	NE	-	-
32	*Fritillaria roylei*	EN	EN	**EN**
33	*Gentiana kurroo*	EN	CR	**CR**
34	*Gloriosa superba*	-	**VU**	-
35	*Habenaria edgeworthii*	-	-	**CR**
36	*Habenaria intermedia*	-	EN	**EN**
37	*Heracleum lanatum*	VU	**VU**	-
38	*Hippophae rhamnoides*	LR-NT	**VU**	-
39	*Hippophae salicifolia*	-	NT	-
40	*Hyoscyamus niger*	LR-NT	EN	NT
41	*Hypericum perforatum*	-	VU	**VU**
42	*Hyssopus officinalis*	-	VU	NT
43	*Inula racemosa*	NE	-	-
44	*Juniperus communis*	-	-	**VU**
45	*Juniperus polycarpos (= J. macropoda)*	-	**EN**	-
46	*Jurinea dolomiaea (= J. macrocephala)*	VU	EN	**CR**
47	*Lilium polyphyllum*	-	CR	**CR**
48	*Litsea glutinosa (= L. chinensis)*	-	VU	**VU**
49	*Malaxis acuminata*	-	-	**VU**
50	*Malaxis muscifera*	VU	CR	**EN**
51	*Meconopsis aculeata*	VU	**EN**	-
52	*Nardostachys grandiflora (= N. jatamansi)*	EN	EN	**EN**
53	*Onosma hispidum*	-	-	NT
54	*Oroxylum indicum*	-	-	NE
55	*Paeonia emodi*	-	-	DD
56	*Paris polyphylla*	-	EN	**EN**
57	*Physochlaena praealta*	VU	**VU**	-
58	*Picrorhiza kurroa*	EN	EN	**CR**
59	*Pleurospermum angelicoides*	-	DD	-

S. No.	Botanical Name	Threat Status (as per Kullu CAMP, 1998)	Threat Status (as per Shimla CAMP, 2003)	Threat Status (as per Shimla CAMP, 2010)
60	*Podophyllum hexandrum (= P. emodi)*	EN	EN	**EN**
61	*Polygonatum cirrhifolium*	-	EN	**EN**
62	*Polygonatum multiflorum*	VU	VU	**EN**
63	*Polygonatum verticillatum*	VU	VU	**EN**
64	*Rauvolfia serpentina*	-	**CR**	-
65	*Rheum australe (= R. emodi)*	VU	EN	**VU**
66	*Rheum moorcroftianum*	VU	EN	**EN**
67	*Rheum spiciforme*	VU	VU	NT
68	*Rheum webbianum*	VU	VU	**VU**
69	*Rhodiola heterodonta*	-	**VU**	-
70	*Rhododendron anthopogon*	VU	**VU**	-
71	*Rhododendron campanulatum*	VU	**VU**	-
72	*Rhododendron lepidotum*	VU	**VU**	-
73	*Roscoea alpina*	-	-	**VU**
74	*Roscoea procera*	-	-	**VU**
75	*Roylea cinerea (= R. calycina)*	-	**VU**	-
76	*Saussurea costus*	NE	-	-
77	*Saussurea gossypiphora*	EN	**CR**	-
78	*Saussurea obvallata*	VU	CR	**EN**
79	*Selinum tenuifolium (=S. connifolium)*	LR-LC	-	**VU**
80	*Selinum vaginatum*	LR-LC	-	**VU**
81	*Skimmia laureola*	-	-	**VU**
82	*Swertia chirayita (= S. chirata)*	-	CR	**CR**
83	*Symplocos paniculata*	-	LC	**VU**
84	*Taxus wallichiana (= T. baccata)*	-	EN	**EN**
85	*Uraria picta*	-	-	NE
86	*Valeriana jatamansi (= V. wallichii)*	-	**VU**	-
87	*Zanthoxylum armatum*	-	EN	**EN**


What we are doing to the forests
of the World is but a mirror reflection
of what we are doing to ourselves
and to one another.
-Mahatma Gandhi

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Red Listed Medicinal Plants of Himachal Pradesh

Aconitum heterophyllum (Atis)
Critically Endangered

Aconitum deinorrhizum (Mohra)
Critically Endangered

Malaxis muscifera (Ridhi)
Critically Endangered

Atropa acuminata (Jharka)
Critically Endangered

Dactylorhiza hatagirea (Salampanja)
Critically Endangered

Gentiana kurroo (Kutki)
Critically Endangered

Picrorhiza kurroa (Karu)
Critically Endangered

Habenaria edgeworthii (Jeevak)
Critically Endangered

Jurinea dolomiaea (Dhoop)
Critically Endangered

Lilium polyphyllum (Ksheer kakoli)
Critically Endangered

Red Listed Medicinal Plants of Himachal Pradesh

Swertia chirayita (Chiretta)
Critically Endangered

Saussurea simpsoniana (Ghugi)
Critically Endangered

Rauvolfia serpentina (Sarpagandha)
Critically Endangered

Angelica glauca (Chora)
Endangered

Arnebia euchroma (Ratanjot)
Endangered

Berberis aristata (Kashmal)
Endangered

Habenaria intermedia (Rishbak)
Endangered

Paris polyphylla (Satva)
Endangered

Podophyllum hexandrum (Bankakri)
Endangered

Polygonatum cirrhifolium (Meda)
Endangered

Polygonatum verticillatum (Mahameda)
Endangered

Saussurea obvallata (Brahmkamal)
Endangered

Red Listed Medicinal Plants of Himachal Pradesh

Arnebia benthamii (Ratanjot)
Endangered

Betula utilis (Bhojpatra)
Endangered

Colchicum luteum (Suranjan)
Endangered

Dioscorea deltoidea (Singli-Mingli)
Endangered

Fritillaria roylei (Kakoli)
Endangered

Juniperus macropoda (Dhup)
Endangered

Meconopsis aculeata (Blue Poppy)
Endangered

Nardostachys grandiflora (Jatamansi)
Endangered

Taxus wallichiana (Rakhal)
Endangered

Red Listed Medicinal Plants of Himachal Pradesh

Zanthoxylum armatum (Tirmira)
Endangered

Rheum moorcroftianum (Revandchini)
Endangered

Datisca cannabina (Bajarbhang)
Endangered

Aconitum violaceum (Mithi Patis)
Vulnerable

Allium consanguineum (Farna)
Vulnerable

Bunium persicum (Kala Jira)
Vulnerable

Ephedra gerardiana (Somlata)
Vulnerable

Gloriosa superba (Kalahari)
Vulnerable

Hypericum perforatum (Basant)
Vulnerable

Malaxis acuminata (Vridhi)
Vulnerable

Red Listed Medicinal Plants of Himachal Pradesh

Bergenia stracheyi (Pashen Bhed)
Vulnerable

Litsea glutinosa (Meda)
Vulnerable

Heracleum lanatum (Patrala)
Vulnerable

Cinnamomum tamala (Tejpatta)
Vulnerable

Juniperus communis (Hauber)
Vulnerable

Symplocos paniculata (Lodh)
Vulnerable

Rheum australe (Revandchini)
Vulnerable

Ferula jaeschkeana (Jangli Hing)
Vulnerable

Roylea cinerea (Karvi)
Vulnerable

Red Listed Medicinal Plants of Himachal Pradesh

Roscoea procera (Kakoli)
Vulnerable

Rheum webbianum (Revandchini)
Vulnerable

Roscoea alpina (Kakoli)
Vulnerable

Selinum vaginatum (Bhutkeshi)
Vulnerable

Hippophae rhamnoides (Chharma)
Vulnerable

Selinum connifolium (Bhutkeshi)
Vulnerable

Sub-alpine Landscape

Red Listed Medicinal Plants of Himachal Pradesh

Rhododendron campanulatum (Kashmiri Patta)
Vulnerable

Rhododendron lepidotum (Talishi)
Vulnerable

Valeriana jatamansii (Mushkbala)
Vulnerable

Skimmia laureola (Ner Dhoop)
Vulnerable

Physochlaena praealta (Bajar Bhang)
Vulnerable

Temperate Landscape

Medicinal Plant Habitats of Himachal Pradesh

Rhododendron anthopogon (Talish Patra)
Vulnerable

Rhodiola heterodonta (Rose Root)
Vulnerable

Uraria picta (Prasni Parni)
Threatened (NA)

Didymocarpus pedicellata (Pathar Long)
Near Threatened

Polygonatum multiflorum (Salam Misri)
Endangered

Moist Alpine Landscape

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Index

1

Aconitum deinorohizum Stapf.

Erect branched herbs up to 150 cm tall, with paired carrot like tubers. Leaves reniform-cordate in outline, usually deeply 5-lobed, sharply toothed. Flowers bright blue with purple veins and having prominent hood, borne in long terminal spikes on every branch. Fruits a capsule with numerous seeds.

S. No.	Data Items	Details			
1	**Basionym / Synonym (s)**	NA			
2	**Family**	Ranunculaceae			
3	**Taxonomic Status**	Species			
4	**Vernacular Names**	Mouro, Mohro, Mohrabish, Sawed bish.			
5	**Habit**	Herb - perennial			
6	**Habitat**	Alpine & Sub-alpine meadows.			
7	**Original Global Distribution**	India, Nepal			
8a	**Recorded Distribution in India (by States)**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand			
b	**Distribution within the State/ region**	**HP:** Shimla, Kullu, Kinnaur. **UK:** Kumaon (No definite localities are known).			
c	**% of global distribution in the State/region**	≈60%			
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Dodrakwar (4 poplns.); Marui Thatch, Lamba Thatch, Odi-Shagali Thatch, Gorju, Thatch. No definite localities in UK			
b	**Elevation Range (m asl)**	2800-4500			
c	**Data Quality (Please refer briefing book)**	2 & 3			
10	**Extent of Occurrence in Km^2 (EOO) [Global] [Regional]**	>20,000 km^2			
11	**Area of Occupancy in Km^2 (AOO) [Global] [Regional]**	500 km^2			
12 a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**	**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
		√			
b	**Time /Rate (3 generations or 10 years whichever is longer)**	10 years			

13	**Threats**		L (Loss of habitat), H (Harvest)		
14	**Are the populations in adjoining states facing similar threats/pressures?**		Yes		
15	**Trade**	**Names**	Mohru		
		Level (s)	**Local**	**Regional**	**National**
			√	√	
		Parts traded	Tubers		
		Effect on population	Declining		
		Data Quality	2 & 3		
16	**Other comments**		• Tubers are used in trade.		
17	**Existing Status**		-		
	- CITES		-		
	- Legislation (Pl. Specify)		Negative list of Export, 1998.		
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		M & AP of Himachal Pradesh: Chauhan, N. S. 2006.		
19	**Conservation measures under implementation in the State**		No		
20	**Record of cultivation, if any**		-		
21	**Criteria based on (Please refer briefing book)**		A2c,d (Literature, field observation & herbarium data.)		
	Red List Status Assigned		**CR**		
22	**Data sources used in the present CAMP**		Flora & Personal field observation of group members.		
23	**Recommendations**		Species specific survey & Monitoring.		
	Management		-		
	a) *in situ*		Shimla, Kullu, Kinnaur (HP) under PAN		
	b) *ex situ*		-		
	i) Research		Germ plasm should be conserved in NBPGR and HFRI		
	ii) Cultivation (if agro techniques are available)		Not known		
	iii) Germplasm banks		-		
24	**Compilers**		Group-III		
25	**Reviewers**		WG IV & Plenary		

2

Aconitum heterophyllum Wall. ex Royle

Erect simple or branched herbs up to 120 cm tall, with paired tubers. Leaves variable, orbicular-cordate to ovate-cordate in outline, usually deeply 5-lobed, coarsely toothed. Flowers greenish purple with dark veins and prominent rounded hood, borne in loose spikes. Fruits straight follicles. Seeds with almost winged angles.

S. No.	Data Items	Details
1	**Basionym / Synonym (s)**	NA
2	**Family**	Ranunculaceae
3	**Taxonomic Status**	Species
4	**Vernacular Names**	Atish, Patish, Ativisha, Bonga (Lahaul & Spiti), Atishang (Kinnaur)
5	**Habit**	Perennial tuberous herbs upto 1m high
6	**Habitat**	Alpine to Sub-alpine zones in open grassy meadows and along slopes.
7	**Original Global Distribution**	India, Nepal & Pakistan
8a	**Recorded Distribution in India (by States)**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand.
b	**Distribution within the State/ region**	**HP** : Chamba, Kangra, Kinnaur, Kullu, Lahul & Spiti, Shimla & Sirmour. **J&K** : Anantnag **UK** : Chamoli, Uttarkashi
c	**% of global distribution in the State/region**	≈ 60% 15% (UK), 30% (HP), 15% (J&K)
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Chhota & Bara Bhangal (2 poplns.); Dainsar & Hamsar in upper Shimla (2 poplns.); Panju-Talram, Chhajpur & Khashadhar, Larot, Shagali Thatch; Kullu Valley (2 poplns.); Sheuthru & Bajouni Thatch, Tod Valley (1 popln.) Chika, Miyar Valley (1 popln.); Miyar Nallah, Mani Mahesh(1 popln), Pattan Valley (Lahaul & Spiti), Chamba, Pangi Valley. **J&K:** Saital, Scoj, Klhoai **UK:** Dayara, Rudranath, Kuovari Pass, Kyarki, Bedani, Milam, Gidara, Kushkalyani (Uttarkashi); Bagi (Tehri); Malari & Milam (NDBR)
b	**Elevation Range (m asl)**	2500-4500
c	**Data Quality (Please refer briefing book)**	2 & 3
10	**Extent of Occurrence in Km² (EOO) [Global] [Regional]**	>20,000 km²
11	**Area of Occupancy in Km² (AOO) [Global] [Regional]**	>2000 km²

12 a	Assessment of Population Reduction, if any (pl. tick in appropriate cell)		≥ 80%	50 to 80%	30 to 49%	-
			√			
b	Time /Rate (3 generations or 10 years whichever is longer)		10 years			
13	Threats		C (Climate), Hp (Harvest for parts), Lf (Loss of habitat-fragmentation), D (Disease)			
14	Are the populations in adjoining states facing similar threats/pressures?		Yes			
15	Trade	Names	Atis			
		Level (s)	Local	Regional	National	
			√	√	√	
		Parts traded	Tubers and Seeds			
		Effect on population	Declining			
		Data Quality	2 & 3			
16	Other comments		• Wild populations of *A. heterophllum* is depleting as these are being uprooted for *ex-situ* fields, which is not multiplying as desired, which result in the loss of wild and multiplied population as well. • Unorganized harvesting of tubers before seed setting.			
17	Existing Status		-			
	- CITES		-			
	- Legislation (Pl. Specify)		Negative list of Export.			
18	Recent field studies (Please site author, year of study, title of study, publications etc.)		Singh, Ranjeet. HFRI, 2006-10, Insect Pest of Important Medicinal Plants of H.P. Shimla & Kullu. Chandra Shekar, K. & Srivastava, S. K.2001-2009. Flora of Pin Valley. Uniyal, *et. al*.2002. Nautiyal *et. al*.2002. Chauhan, N. S. 1984, 1999, 2000.			
19	Conservation measures under implementation in the State		NMPB sponsored projects to HPFD for *in situ* & *ex situ* conservation in 4 districts of HP (2008-13); includes this species.			
20	Record of cultivation, if any		NMPB-Deptt. Of Ayurveda sponsored project to promote cultivation of this species. Total area recorded under cultivation of this species is 2 ha. in Lahual & Kullu.			
21	Criteria based on (Please refer briefing book)		A2c,d			
	Red List Status Assigned		**CR**			
22	Data sources used in the present CAMP		Floras, Reports, Projects & Group discussion.			
23	Recommendations		Survey & Monitoring studies.			
	Management		-			
	a) *in situ*		To be established in protected areas.			
	b) *ex situ*		Herbal Garden, Forest Deptt. Nursery, NBPGR-Germ plasm. Dabur is promoting the cultivation of Atis in Lahaul Block of Lahaul & Spiti Dist. during 2009 in about 5 acres area. It is also learnt that Lahaul Medicinal Plants Society has started cultivation of Atis through its farmers(>350 nos.)			
	i) Research		Studies on 'Seed Biology' is recommended, due to poor seed germination.			
	ii) Cultivation (if agro techniques are available)		-			
	iii) Germplasm banks		In the form of FD Nurseries & NBPGR seed banks.			
24	Compilers		Group-III			
25	Reviewers		WG IV & Plenary			

3

Aconitum laeve Royle

Erect branched herbs up to 250 cm tall. Leaves orbicular, 5-9 lobed to the base, segments lobed and sharply toothed. Flowers pale yellow to dull purple. Hood prominent, lateral sepals much shorter than the hood. Follicles three.

S. No.	Data Items	Details			
1	**Basionym / Synonym (s)**	NA			
2	**Family**	Ranunculaceae			
3	**Taxonomic Status**	Species			
4	**Vernacular Names**	Mohra (HP); Gobria bish (UK)			
5	**Habit**	Biennial Herb			
6	**Habitat**	Sub-alpine shrubberies			
7	**Original Global Distribution**	Pakistan to West Nepal			
8a	**Recorded Distribution in India (by States)**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand			
b	**Distribution within the State/ region**	**HP:** GHNP, Kinnaur, Chamba			
c	**% of global distribution in the State/region**	≈40%			
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Dhel & Majhoni (GHNP) Detailed information for other areas not available.			
b	**Elevation Range (m asl)**	2500-3500 m asl			
c	**Data Quality (Please refer briefing book)**	2 & 3			
10	**Extent of Occurrence in Km^2 (EOO)** **[Global]** **[Regional]**	 >20,000 km^2 >800 km^2			
11	**Area of Occupancy in Km^2 (AOO)** **[Global]** **[Regional]**	 NA <200 km^2			
12a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**	**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
		-N.A.-			
b	**Time /Rate (3 generations or 10 years whichever is longer)**	10 years			

13	**Threats**		No information available and shared.		
14	**Are the populations in adjoining states facing similar threats/pressures?**		Not known		
15	**Trade**	**Names**			
		Level (s)	**Local**	**Regional**	**National**
			-Not known-		
		Parts traded	Roots (tubers)		
		Effect on population	No information		
		Data Quality	-		
16	**Other comments**		No recent field work shared or brought to notice		
17	**Existing Status**		-		
	- CITES		-		
	- Legislation (Pl. Specify)		-		
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		No information		
19	**Conservation measures under implementation in the State**		Nothing specific		
20	**Record of cultivation, if any**		Nil		
21	**Criteria based on (Please refer briefing book)**		-		
	Red List Status Assigned		**NE** (Not Evaluated)		
22	**Data sources used in the present CAMP**		-		
23	**Recommendations**		-		
	Management		-		
	a) *in situ*		-		
	b) *ex situ*		-		
	i) Research		Field survey to build data on distribution and locations		
	ii) Cultivation (if agro techniques are available)		-		
	iii) Germplasm banks		-		
24	**Compilers**		WG-1		
25	**Reviewers**		WG II & Plenary		

4

Aconitum violaceum Jacq. ex Stapf.

Delicate herbs, 10-30 cm tall. Leaves rounded, palmately cut to the base. Flowers violet to blue, with prominent hood, and borne in a 2-many flowered spikes.

S. No.	Data Items	Details			
1	**Basionym / Synonym (s)**	*A. napellus* var. *multifolium* (Royle) Hook			
2	**Family**	Ranunculaceae			
3	**Taxonomic Status**	Species			
4	**Vernacular Names**	Dhudhia Mohra (Kangra), Oonyalkas (Kinnaur), Dusi Lama (Spiti), Dhudh Atis (Kumaon, UK), Meetha Patis (Chamoli & Pithoragarh, UK)			
5	**Habit**	Herb – biennial			
6	**Habitat**	Alpine Kobresia sedge meadow (moist); also associated with *Cassiope fastigiata* and *Gaultheria trichophylla*			
7	**Original Global Distribution**	Himalaya – Pakistan, India, Nepal, China			
8a	**Recorded Distribution in India (by States)**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand			
b	**Distribution within the State/ region**	**HP:** Chamba, Kangra, Kullu, Mandi, Kinnaur, Shimla, Lahaul & Spiti **UK:** Uttarkashi, Tehri, Rudraprayag			
c	**% of global distribution in the State/region**	≈50%			
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Sach Pass, Tyasu Dhar, Mani Mahesh, Kugti WLS (Chamba), Dhauladhar WLS (Kangra); GHNP, Rohtang (Kullu); Shikari Devi WLS (Mandi); Bari Kanda, Chitkul Rakcham (Kinnaur); Mural Danda, Chanshal Shimla); Myar, Baralacha, Pin Valley NP (Lahaul & Spiti)			
b	**Elevation Range (m asl)**	3500-4800			
c	**Data Quality (Please refer briefing book)**	2 & 3			
10	**Extent of Occurrence in Km^2 (EOO)**				
	[Global]	>20,000 km^2			
	[Regional]	>10,000 km^2			
11	**Area of Occupancy in Km^2 (AOO)**				
	[Global]	NA			
	[Regional]	250-300 km^2			
12a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**	**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
			√		
b	**Time /Rate (3 generations or 10 years whichever is longer)**	10 years			

13	**Threats**		• Habitat Degradation • Over Exploitation		
14	**Are the populations in adjoining states facing similar threats/ pressures?**		No		
15	**Trade**	**Names**	Dhudhia (Meetha Patis)		
		Level (s)	**Local**	**Regional**	**National**
			√	√	√
		Parts traded	Tuber-roots		
		Effect on population	Declining		
		Data Quality	2 & 3		
16	**Other comments**		• Used as a home remedy and also as an adulterant for *Aconitum heterophyllum*		
17	**Existing Status**		VU (as per Shimla CAMP, 2003)		
	- CITES		-		
	- Legislation (Pl. Specify)		-		
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		IHBT, 2004, 2007 & 2010. HFRI, 2007. Uniyal, S. K., Jishtu, V.		
19	**Conservation measures under implementation in the State**		-		
20	**Record of cultivation, if any**		-		
21	**Criteria based on (Please refer briefing book)**		A2c,d		
	Red List Status Assigned		**VU**		
22	**Data sources used in the present CAMP**		Uniyal, S. K. Jishtu, V.		
23	**Recommendations**		• Permanent Monitoring Plots (PMPs) for baseline data & periodic observation • Trade data (volume, collection & consumption)		
	Management		-		
	a) *in situ*		-		
	b) *ex situ*		-		
	i) Research		Permanent Monitoring Plots (PMPs) for baseline data & periodic observation		
	ii) Cultivation (if agro techniques are available)		-		
	iii) Germplasm banks		-		
24	**Compilers**		Group-I		
25	**Reviewers**		WG II & Plenary		

5

Allium consanguineum Kunth

Plants up to 35 cm tall. Bulbs cylindrical to ovoid; outer coats coriaceous, brown, striate. Leaves 3-5, linear, flattened. Umbels hemispherical, dense flowered. Tepals 5-6 mm long, oblong, acute to obtuse, yellow or pink ; filaments exserted, style as long as or longer than the filaments.

S. No.	Data Items	Details			
1	**Basionym / Synonym (s)**	*Allium stracheyi* Baker			
2	**Family**	Alliaceae			
3	**Taxonomic Status**	Species			
4	**Vernacular Names**	Dimok (Spiti), Khawarniing (Lahaul & Spiti), Khome, Farna (Kinnaur), Jumbo (Garhwal)			
5	**Habit**	Herb - perennial			
6	**Habitat**	Alpine dry slopes of Trans-Himalaya			
7	**Original Global Distribution**	Central Asia, Himalaya, Afganistan, Pakistan, India, Nepal, China			
8a	**Recorded Distribution in India (by States)**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand			
b	**Distribution within the State/ region**	**HP:** Chamba, Kinnaur, Lahaul & Spiti. **UK:** Uttarkashi, Chamoli			
c	**% of global distribution in the State/region**	≈50%			
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Gurdhar Pass (Chamba); Miyad Valley, Guru Ghantal, Kibber WLS (Lahaul & Spiti); Baspa Valley (Kinnaur) **UK:** Gangotri, NDBR			
b	**Elevation Range (m asl)**	3500-5000			
c	**Data Quality (Please refer briefing book)**	2 & 3			
10	**Extent of Occurrence in Km^2 (EOO)** **[Global]** **[Regional]**	 >20,000 km^2 >20,000 km^2			
11	**Area of Occupancy in Km^2 (AOO)** **[Global]** **[Regional]**	 ≈2000 km^2			
12 a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**	**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
			√		
b	**Time /Rate (3 generations or 10 years whichever is longer)**	10 years			

13	**Threats**		Over collection		
14	**Are the populations in adjoining states facing similar threats/pressures?**		Yes		
15	**Trade**	**Names**	Jumbo & Pharna		
		Level (s)	**Local**	**Regional**	**National**
				√	
		Parts traded	Aerial (Leaves, flower)		
		Effect on population	Declining		
		Data Quality	2 & 3		
16	**Other comments**		• Allied species are also sold under the same name (Rs 450/kg cost, Malari, 2007 HBN)		
17	**Existing Status**		NT in UK VU in HP		
	- CITES		-		
	- Legislation (Pl. Specify)		-		
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		Jishtu, V., 2005. Rana, B. S., 2005. Management Plan of Kibber WLS.		
19	**Conservation measures under implementation in the State**		-		
20	**Record of cultivation, if any**		• None in HP • Limited cultivation in Johar & Malari (UK)		
21	**Criteria based on (Please refer briefing book)**		A2c,d		
	Red List Status Assigned		**VU**		
22	**Data sources used in the present CAMP**		Jishtu,V. & Rana, B. S.		
23	**Recommendations**		-		
	Management		-		
	a) *in situ*		Rotational Harvest		
	b) *ex situ*		-		
	i) Research		Screening of material for superior quality stock.		
	ii) Cultivation (if agro techniques are available)		Nursery development & extension.		
	iii) Germplasm banks		Need to be established		
24	**Compilers**		Group-I		
25	**Reviewers**		WG II & Plenary		

6

Angelica glauca Edgew.

Perennial herbs up to 2 m tall with thick aromatic rootstock. Stem stout, fistular. Leaves petiolate, lower part of petiole inflated; leaflets oval to ovate, serrate, glaucous beneath. Flowers white in large compound umbels. Involucre of 5 long, linear bracts. Rays 20 or more. Fruit oblong-flattened with winged lateral ridges. Inner seed face concave.

S. No.	Data Items	Details
1	**Basionym / Synonym (s)**	NA
2	**Family**	Apiaceae.
3	**Taxonomic Status**	Species
4	**Vernacular Names**	Churaka, Chora, Chura, Chamchorni, Gandrayan (UK) Neulang suppla (Kinnaur)
5	**Habit**	Herb - perennial
6	**Habitat**	On moist slopes near water springs in sub-alpine edges
7	**Original Global Distribution**	India, Afghanistan
8a	**Recorded Distribution in India (by States)**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand
b	**Distribution within the State/ region**	**HP:** Chamba, Kangra, Kinnaur, Kullu, Shimla, Sirmour **UK:** Chamoli, Uttarkashi
c	**% of global distribution in the State/region**	≈75%
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Bada & Chhota Bhangal (Kangra) (2 poplns.); Hatu Peak (5 poplns.), Narkanda, Rohru, Chopal, Sarahan, Harot (Shimla); Kalatop, Kala Ban, Hadser (4 poplns.), Satrundi (Chamba); Trilokinath (Lahaul & Spiti); Sangla, Rakcham (Kinnaur); GHNP (Kullu). **UK:** Uttarkashi, Kedarnath, Khatling, Gidara, Kiari, Valley of Flowers, Chamoli, Juni in Bageshwar
b	**Elevation Range (m asl)**	2500-3300
c	**Data Quality (Please refer briefing book)**	2 & 3
10	**Extent of Occurrence in Km^2 (EOO) [Global] [Regional]**	>20,000 km^2
11	**Area of Occupancy in Km^2 (AOO) [Global] [Regional]**	>2000 km^2

12 a b	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**		**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
				√		
	Time /Rate (3 generations or 10 years whichever is longer)		10 years			
13	**Threats**		Ov (Over exploitation), Lf (Loss of habitat), Lp (Loss of habitat - quality), Tp (Trade for parts), C (Climate)			
14	**Are the populations in adjoining states facing similar threats/pressures?**		Yes			
15	**Trade**	**Names**				
		Level (s)	**Local**	**Regional**	**National**	
			√	√	√	
		Parts traded	Roots			
		Effect on population	Declining			
		Data Quality	2 & 3			
16	**Other comments**		• Roots and roots stocks are used in trade.			
17	**Existing Status**		-			
	- CITES		-			
	- Legislation (Pl. Specify)		-			
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		Chauhan, N. S., 2006. BSI Herbarium Data Sarin, Y. K. & Singh, P. B.,1998.HP Dhar *et. al.* 2003. Kumaon. Kala *el. al.* 1997. Valley of Flowers Badola, H. K. 2000 -2002. H.P.			
19	**Conservation measures under implementation in the State**		*in situ* conservation in PAs & *ex situ* conservation initiatives by NMBP sponsored projects and Dept. of AYUSH.			
20	**Record of cultivation, if any**		2 ha. cultivated by farmers in Lauhal & Chamba.			
21	**Criteria based on (Please re fer briefing book)**		A2c,d			
	Red List Status Assigned		**EN**			
22	**Data sources used in the present CAMP**		Flora, Survey & personal observation of the group members.			
23	**Recommendations**		-			
	Management		-			
	a) *in situ*		In protected areas.			
	b) *ex situ*		-			
	i) Researc h		-			
	ii) Cultivation (if agro techniques are available)		Agro techniques standardized.			
	iii) Germplasm banks		Forest Nurseries, HFRI and AYUSH and NGO, University.			
24.	**Compilers**		Group - III			
25.	**Reviewers**		WG IV & Plenary			

7

Arnebia benthamii (Wall. ex G.Don) I.M. Johnst.

Erect hairy perennial herbs upto 75 cm tall. Roots thick, purplish. Basal leaves lanceolate, strigosely hairy; nerves impressed above, prominent on the under surface. Flowers red-purple, borne in long, cylindrical spikes. Bracts long, linear, grey hairy and drooping.

S. No.	Data Items	Details
1	**Basionym / Synonym (s)**	*Macrotomia benthamii* (Wall.) A. DC.
2	**Family**	Boraginaceae.
3	**Taxonomic Status**	Species
4	**Vernacular Names**	Rattanjot (H); Khomey (Kinnaur); Masreen (Dodra kwar); Dimok (Spiti)
5	**Habit**	Herb -perennial
6	**Habitat**	Open moist slopes, alpine slopes & meadows in moist temperate & alpine regions.
7	**Original Global Distribution**	India, Pakistan, Nepal.
8a	**Recorded Distribution in India (by States)**	Kashmir to Nepal
b	**Distribution within the State/ region**	**HP:** Bada & Chhota Bhangal, Kullu, Jakha Kanda, Chanshal, Sangla, Rakcham Kanda, Bari Kanda, Mural Danda, Rupi-Bhabha Sanctuary
c	**% of global distribution in the State/region**	≈ 50%
9 a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** 10 locations; Bari Kanda (2000 m²), Jakha Kanda to Mural Danda (10,000 m²); Bada & Chhota Bhangal (5000 m²); Bansherudhar, Chanderkhani, Roragthatch (2000 m²)(Kullu); Holi Range in Chamba (500 m²) **UK:** Govind NP, Yamunotri, Gidara, Khatling, Pindari, Johar Valley, Askot WLS
b	**Elevation Range (m asl)**	3000-4300 Temperate-subalpine
c	**Data Quality (Please refer briefing book)**	2
10	**Extent of Occurrence in Km² (EOO)** **[Global]** **[Regional]**	 >20,000 km² >2,000 km²
11	**Area of Occupancy in Km² (AOO)** **[Global]** **[Regional]**	 >1000 km² >20 km²

12 a	Assessment of Population Reduction, if any (pl. tick in appropriate cell)		≥ 80%	50 to 80%	30 to 49%	< 30%
			√	√		
b	Time /Rate (3 generations or 10 years whichever is longer)		7 years			
13	Threats		Lf (Loss of habitat-fragmentation) , Lp (Loss of habitat-quality), Hm (Harvest for medicine), Tp (Trade for parts)			
14	Are the populations in adjoining states facing similar threats/pressures?		Yes			
15	Trade	Names	Ratanjot			
		Level (s)	Local	Regional	National	
			√	√	√	
		Parts traded	Root			
		Effect on population	Declining			
		Data Quality	2 & 3			
16	Other comments		• Used as medicines in Ayurveda for cuts and burns, eye sores, as coloring matter in food stuffs, coloring of hair oils, Buddhist religious rites, dyeing of silk. • Used for colouring"Torma" in Monasteries. (Torma: an edible made from Sattu)			
17	Existing Status		CR (Kullu, 1998 & Shimla, 2003)			
	- CITES		-			
	- Legislation (Pl. Specify)		-			
18	Recent field studies (Please site author, year of study, title of study, publications etc.)		M & AP of HP, Chauhan, N. S. Nature's MP of Uttaranchal Vol. II, Shah, Rakesh, 2006.			
19	Conservation measures under implementation in the State		*Ex-situ* conservation in UHF Herbal Garden, Rahla Forest nursery, Chitkul. Good collection practices by traditional harvesters.			
20	Record of cultivation, if any		-			
21	Criteria based on (Please refer briefing book)		A2c,d			
	Red List Status Assigned		**EN**			
22	Data sources used in the present CAMP		Chauhan, N. S. Sharma, B. D. Negi, P. S.			
23	Recommendations		Status survey, propagation techniques and development of agro- techniques.			
	Management		-			
	a) *in situ*		Protection of area in Bari Kanda, Jakha Kanda, Ranihartu (Bada Bhangal).			
	b) *ex situ*		Area expansión under nurseries and experimental farms.			
	i) Research		• Development of agrotechniques • Standardization of quality parameters • Ensure sustainable harvesting practices.			
	ii) Cultivation (if agro techniques are available)		Required			
	iii) Germplasm banks		To be established			
24	Compilers		Group-II			
25	Reviewers		WG III & Plenary			

8

Arnebia euchroma (Royle ex Benth.) I.M. Johnston

Erect hairy perennial tufted herbs upto 50 cm tall. Roots thick, purplish. Leaves linear lanceolate, strigosely hairy. Flowers pale pink-purple, turning dark purple, borne in rounded terminal bunches. Bracts leaf-like not exceeding the calyx.

S. No.	Data Items	Details			
1	**Basionym/ Synonym (s)**	*Lithospermum euchromon* Royle			
2	**Family**	Boraginaceae			
3	**Taxonomic Status**	Species			
4	**Vernacular Names**	Dimok (Spiti), Khawarniing (Lahaul & Spiti), Khome (Kinnaur)			
5	**Habit**	Herb - perennial			
6	**Habitat**	Alpine dry slopes of Trans-Himalaya			
7	**Original Global Distribution**	Central Asia, Himalaya, Afganistan, Pakistan, India, Nepal, China			
8a	**Recorded Distribution in India (by States)**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand			
b	**Distribution within the State/ region**	**HP:** Chamba, Kinnaur, Lahaul & Spiti. **UK:** Uttarkashi, Chamoli			
c	**% of global distribution in the State/region**	≈50%			
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Gurdhar Pass (Chamba); Miyad Valley, Guru Ghantal, Kibber WLS (Lahaul & Spiti); Baspa Valley (Kinnaur) **UK:** Gangotri, NDBR			
b	**Elevation Range (m asl)**	3500-5000			
c	**Data Quality (Please refer briefing book)**	2 & 3			
10	**Extent of Occurrence in Km^2 (EOO)** **[Global]** **[Regional]**	 >20,000 km^2 >20,000 km^2			
11	**Area of Occupancy in Km^2 (AOO)** **[Global]** **[Regional]**	 ≈2000 km^2			
12 a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**	**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
			√		
b	**Time /Rate (3 generations or 10 years whichever is longer)**	10 years			

13	**Threats**		Ov (Over harvesting)		
14	**Are the populations in adjoining states facing similar threats/pressures?**		Yes (J &K)		
15	**Trade**	**Names**	Ratanjot		
		Level (s)	**Local**	**Regional**	**National**
			√	√	√
		Parts traded	Roots		
		Effect on population	Declining		
		Data Quality	2 & 3		
16	**Other comments**		• Mostly used by Buddhists • Colours and Dyes • Used in Unani Medicines		
17	**Existing Status**		CR		
	- CITES		-		
	- Legislation (Pl. Specify)		-		
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		Angmo, K., 2010(WII).		
19	**Conservation measures under implementation in the State**		-		
20	**Record of cultivation, if any**		-		
21	**Criteria based on (Please refer briefing book)**		A2c,d		
	Red List Status Assigned		**EN**		
22	**Data sources used in the present CAMP**		Group discussion Rana, B. S.		
23	**Recommendations**		-		
	Management		-		
	a) *in situ*		-		
	b) *ex situ*		-		
	i) Research		Restocking of depleted populations.		
	ii) Cultivation (if agro techniques are available)		-		
	iii) Germplasm banks		Required		
24	**Compilers**		Group-I		
25	**Reviewers**		WG II & Plenary		

9

Atropa acuminata Royle ex Lindl.

Tall, fistular, much branched herbs, up to 1.6 m tall. Leaves elliptic-lanceolate to ovate-lanceolate, acuminate, cuneate. Flowers yellowish, solitary, shortly stalked. Calyx ovate-acute, unequal, persistent. Stamens included. Berry globose, 10 mm, black-purple when ripe.

S. No.	Data Items	Details			
1	**Basionym / Synonym (s)**	*Atropa belladonna* (non L.) C.B. Clarke			
2	**Family**	Solanaceae			
3	**Taxonomic Status**	Species			
4	**Vernacular Names**	Kadwa Kafal, Lal Tang (Ladakh) Jalagi, Gilvi (HP)			
5	**Habit**	Herb-perennial; upto 1m			
6	**Habitat**	Grows in Alpine scrubs and margins of Oak Forests			
7	**Original Global Distribution**	India, Pakistan, East Iran, East Afganistan, Mangolia			
8a	**Recorded Distribution in India (by States)**	Jammu & Kashmir, Himachal Pradesh			
b	**Distribution within the State/ region**	**HP:** Pangi, Sangla, Narkanda **JK:** Billauar, Marwahi, Dodo, Ramban, Anantnag, Kargil, Baramullah, Pir Panjal			
c	**% of global distribution in the State/region**	≈25%			
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**Himachal Pradesh:** 3 populations. **Jammu & Kashmir:** 9 populations.			
b	**Elevation Range (m asl)**	2400-3600			
c	**Data Quality (Please refer briefing book)**	2 & 3			
10	**Extent of Occurrence in Km^2 (EOO) [Global] [Regional]**	>20,000 km^2			
11	**Area of Occupancy in Km^2 (AOO) [Global] [Regional]**	>2000 km^2			
12 a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**	**≥ 80%**	**50 to 80%**	**30 to 49%**	–
		√			
b	**Time /Rate (3 generations or 10 years whichever is longer)**	10 years			

13	**Threats**		Lf (Loss of habitat), Hm (Harvest for medicine), Tp (Trade for parts)		
14	**Are the populations in adjoining states facing similar threats/pressures?**		Not known		
15	**Trade**	**Names**	Kadwa Kafal		
		Level (s)	**Local**	**Regional**	**National**
			√	√	√
		Parts traded	Leaf, Root		
		Effect on population	Declining		
		Data Quality	3 & 4		
16	**Other comments**		• Requires measures to prevent hybridisation of Indian Belladona (*Atropaacuminata*) from cultivated *Atropa belladonna*. • In Uttarakhand, it has been planted in germplasm gardens.		
17	**Existing Status**		-		
	- CITES		-		
	- Legislation (Pl. Specify)		-		
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		Chauhan, N. S., 2006. Kaul, M. K.: Medicinal Plants of Kashmir Himalayas. SKUAST, Srinagar, Kashmir		
19	**Conservation measures under implementation in the State**		Vanaspati Van -Ganderbad SKUAST Kashmir Conservatory		
20	**Record of cultivation, if any**		Not Known		
21	**Criteria based on (Please refer briefing book)**		A2c,d		
	Red List Status Assigned		**CR**		
22	**Data sources used in the present CAMP**		Literature, Herbarium Data.		
23	**Recommendations**		Conservation of the habitat		
	Management		-		
	a) *in situ*		Ganderbad F.D., Gulmarg, Chattorgola, SKUAST Kashmir		
	b) *ex situ*		Required protocol for large scale multiplication		
	i) Research		-		
	ii) Cultivation (if agro techniques are available)		-		
	iii) Germplasm banks		Germplasm bank established in Kashmir		
24	**Compilers**		Group-III		
25	**Reviewers**		WG IV & Plenary		

10

Berberis aristata DC.

Large spiny shrubs upto 4 m tall. Stem pale yellow; spines stout, simple to 3-fid. Leaves thick, obovate/ elliptic, with spiny margin and prominent veins. Flowers pale yellow in 15-25 flowered racemes, much longer than the leaves. Berries oblong-globose, dark red turning blue covered with white powdery bloom.

S. No.	Data Items	Details			
1	**Basionym / Synonym (s)**	NA			
2	**Family**	Berberidaceae			
3	**Taxonomic Status**	Species			
4	**Vernacular Names**	Kashmal (Kangra), Kemali (Lahaul), Khapacha (Kinnaur) Chotia, Daruhaldi (UK)			
5	**Habit**	Shrub			
6	**Habitat**	Temperate moist slopes.			
7	**Original Global Distribution**	India, Nepal, Bhutan			
8a	**Recorded Distribution in India (by States)**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand			
b	**Distribution within the State/ region**	**HP:** Chamba, Kangra, Kullu, Kinnaur, Shimla, Mandi, Solan.			
c	**% of global distribution in the State/region**	≈70%			
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Dhauladhar (Kangra); Barot, Karsog, Winch Camp (Mandi); Devidhar, Rohru & Rajgarh Forest Division (Shimla); Nichar, Sangla (Kinnaur) Parvati Valley (Kullu)			
b	**Elevation Range (m asl)**	1800-3000			
c	**Data Quality (Please refer briefing book)**	2 & 3			
10	**Extent of Occurrence in Km^2 (EOO)** [Global] [Regional]	>20,000 km^2 >10,000 km^2			
11	**Area of Occupancy in Km^2 (AOO)** [Global] [Regional]	10,000 km^2 <5,000 km^2			
12a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**	**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
			√		
b	**Time /Rate (3 generations or 10 years whichever is longer)**	10 years			

13	**Threats**		• Over exploitation • Habitat degradation		
14	**Are the populations in adjoining states facing similar threats/pressures?**		Yes		
15	**Trade**	**Names**	Daru haridra		
		Level (s)	**Local**	**Regional**	**National**
			√	√	√
		Parts traded	Root, Stem		
		Effect on population	Declining		
		Data Quality	2 & 3		
16	**Other comments**		• Other species of *Berberis* also traded under the same name. • Also used for fencing. • Used as biofence & for medicines and dyes		
17	**Existing Status**		EN		
	- CITES		-		
	- Legislation (Pl. Specify)		-		
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		Nag, D.R.; On going studies of WII (UK) Chauhan, N. S. Sharma, B. D. Kapoor, K. S. Negi, P.S.		
19	**Conservation measures under implementation in the State**		-		
20	**Record of cultivation, if any**		-		
21	**Criteria based on (Please refer briefing book)**		A2c,d		
	Red List Status Assigned		**EN**		
22	**Data sources used in the present CAMP**		Flora, Paper, Group discussion.		
23	**Recommendations**		Regeneration studies & propagation studies to be conducted.		
	Management		-		
	a) *in situ*		Required		
	b) *ex situ*		-		
	i) Research		• Survey and Mapping. • Propagation techniques to be developed.		
	ii) Cultivation (if agro techniques are available)		• Agro-techniques to be developed. • Evaluation for higher berberin content.		
	iii) Germplasm banks		Nursery to be established		
24	**Compilers**		Group-I		
25	**Reviewers**		WG II & Plenary		

11

Betula utilis D. Don

Deciduous trees up to 20 m tall. Bark peeling horizontally, white to brownish-white. Leaves ovate or rhomboid, base rounded, sub-cordate or cuneate, margin doubly serrate to sub-serrate. Male flowers in catkins, borne at the tips of long shoots. Female catkins short, solitary or in pairs at the end of dwarf shoots.

S. No.	Data Items	Details
1	**Basionym / Synonym (s)**	*B. bhojpatra* Lindl.
2	**Family**	Betulaceae
3	**Taxonomic Status**	Species
4	**Vernacular Names**	Bhojpatra, Bhurjapatra, Bhuj, Bhooj, Bhurjagranthi.
5	**Habit**	Tree upto 20m tall.
6	**Habitat**	Alpine Region to cold Desert (Transitional Zone); on slopes along water course.
7	**Original Global Distribution**	India, Nepal, Pakistan, SW China, Bhutan, Japan.
8a	**Recorded Distribution in India (by States)**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand
b	**Distribution within the State/ region**	**HP:** Shimla, Kangra, Kullu, Spiti, Kinnaur, Chamba. **UK:** Chamoli, Uttarkashi, Pithoragarh
c	**% of global distribution in the State/region**	≈25%
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Bada Bhangal (Kangra-1 popln.); Chanshal, Gajiyan Thatch, Chandranalah, Rupin Catchment, Khabal Kanda (Shimla-5 poplns.); Pangi, Bharmour (Chamba-1 popln.); Parvati Valley, Tosh-Pulga (Kullu-2 poplns.); Churdhar (Sirmour-1popln.); Chitkul, Sangla Kanda (Kinnaur-1popln.); Poh Bridge-Saran (Lahaul & Spiti) **UK:** Chakrata (Dehradun-1popln.); Bhatwari, Ukhimath (Uttarkashi-2 poplns.); Gopeshwer, Joshimath 3 (Chamoli -2 poplns.); Munsiyari, Dharchula (Pithoragarh-2 poplns.).
b	**Elevation Range (m asl)**	3000-4300
c	**Data Quality (Please refer briefing book)**	2 & 3
10	**Extent of Occurrence in Km^2 (EOO) [Global] [Regional]**	>20,000 km^2
11	**Area of Occupancy in Km^2 (AOO) [Global] [Regional]**	>2000 km^2

12 a	Assessment of Population Reduction, if any (pl. tick in appropriate cell)		≥ 80%	50 to 80%	30 to 49%	< 30%
				√		
b	Time /Rate (3 generations or 10 years whichever is longer)		3 Generations			
13	Threats		Hp (Harvest for parts), Lp (Loss of habitat-quality), T (Trade), C (Climate)			
14	Are the populations in adjoining states facing similar threats/pressures?		Yes			
15	Trade	Names				
		Level (s)	Local	Regional	National	
			√	√		
		Parts traded	Bark (Stem)			
		Effect on population	Declining			
		Data Quality	2 & 3			
16	Other comments		• Regeneration problem because of delayed good seed year (4-5 years). • Poor germination %			
17	Existing Status		-			
	- CITES		-			
	- Legislation (Pl. Specify)		-			
18	Recent field studies (Please site author, year of study, title of study, publications etc.)		Singh, P. B. (90-98), Pandey, S., Rana, B. S., Thakur, B. C., Brijlal (H.P.) Verma, R. K. 2009. Final Project Tech. Report, HFRI, HP. Verma, R. K. & Kapoor, K. S. 2009, Plant Wealth in Cold Deserts, Kinnaur, HP. HFRI.			
19	Conservation measures under implementation in the State		Transition Zone Project under CAT Plan in H.P. being implemented.			
20	Record of cultivation, if any		-			
21	Criteria based on (Please refer briefing book)		A2c,d			
	Red List Status Assigned		EN			
22	Data sources used in the present CAMP		Based on personal observation, literature.			
23	Recommendations		-			
	Management		-			
	a) *in situ*		Protected Area Network.			
	b) *ex situ*		-			
	i) Research		Studies on Reproductive/Seed Biology.			
	ii) Cultivation (if agro techniques are available)		-			
	iii) Germplasm banks		-			
24	Compilers		Group-III			
25	Reviewers		WG IV & Plenary			

12

Bunium persicum (Boiss.) Fedtsch.

Branched herbs up to 70 cm tall. Leaves finely divided, segments filiform. Lower leaves petiolate, upper sessile. Flowers white, small borne in umbels with 8-20 unequal rays. Fruit oblong, 3-4 mm long, dark brown with prominent ridges.

S. No.	Data Items	Detail			
1	**Basionym / Synonym (s)**	*Carum bulbocastanam* auct. non Koch			
2	**Family**	Apiaceae			
3	**Taxonomic Status**	Species			
4	**Vernacular Names**	Jeera (Lahaul & Spiti), Shingu (Miyad), Kala Zira (Kin.)			
5	**Habit**	Herb - perennial			
6	**Habitat**	Alpine dry slopes especially in Lahaul & Pangi			
7	**Original Global Distribution**	Northern Asia, North Africa, South Europe.			
8a	**Recorded Distribution in India (by States)**	Jammu & Kashmir, Himachal Pradesh			
b	**Distribution within the State/ region**	**HP:** Lahual & Spiti, Chamba, Kinnaur			
c	**% of global distribution in the State/region**	≈20%			
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Pangi (Chamba); Miyad Valley, Pattan & Gahar Valley, Spiti (Lahaul & Spiti); Shong (Kinnaur) **J&K:** Paddar, Gurej			
b	**Elevation Range (m asl)**	2500-4000			
c	**Data Quality (Please refer briefing book)**	2 & 3			
10	**Extent of Occurrence in Km^2 (EOO)** **[Global]** **[Regional]**	 >20,000 km^2 >4,000-5,000 km^2			
11	**Area of Occupancy in Km^2 (AOO)** **[Global]** **[Regional]**	 NA ≈ 500 km^2			
12a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**	**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
					√
b	**Time /Rate (3 generations or 10 years whichever is longer)**	10 years			

13	**Threats**		Habitat Degradation		
14	**Are the populations in adjoining states facing similar threats/pressures?**		Not known		
15	**Trade**	**Names**	Jeera, Kala Jeera		
		Level (s)	**Local**	**Regional**	**National**
			√	√	√
		Parts traded	Seeds		
		Effect on population	Declining		
		Data Quality	2 & 3		
16	**Other comments**		• Tubers edible		
17	**Existing Status**		VU		
	- CITES		-		
	- Legislation (Pl. Specify)		-		
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		Sharma, O. P., 2010. Jishtu, V., 2005, 2008.		
19	**Conservation measures under implementation in the State**		-		
20	**Record of cultivation, if any**		Cultivated in Batseri, Kinnaur.		
21	**Criteria based on (Please refer briefing book)**		A2c,d		
	Red List Status Assigned		**VU**		
22	**Data sources used in the present CAMP**		Group discussion Refer point 19		
23	**Recommendations**				
	Management				
	a) *in situ*		Recommended		
	b) *ex situ*				
	i)Research		Screening of elite population.		
	ii) Cultivation (if agro techniques are available)		Dissemination of cultivation techniques		
	iii) Germplasm banks		Required geographical indicators as Lahaul Jeera		
24	**Compilers**		Group-I		
25	**Reviewers**		WG II & Plenary		

13

Cinnamomum tamala (Buch.-Ham.) T. Nees & Nees

Medium sized trees. Stem rough with grey brown wrinkled bark. Leaves aromatic, thick, oblong lanceolate, shining above, nerves 3 from the base, prominent. Flowers minute, greenish yellow, in terminal and axillary spikes. Fruit ovoid succulent drupes turning purplish black on ripening.

S. No.	Data Items	Details			
1	**Basionym / Synonym (s)**	*Laurus tamala* Buch.-Ham.			
2	**Family**	Lauraceae			
3	**Taxonomic Status**	Species			
4	**Vernacular Names**	Tejpatta, Tejpat, Dalchini			
5	**Habit**	Tree			
6	**Habitat**	Sub- tropical			
7	**Original Global Distribution**	Kashmir to Bhutan, Myanmar, Bangladesh.			
8 a	**Recorded Distribution in India (by States)**	NW & Central Himalaya and Meghalaya.			
b	**Distribution within the State/ region**	**HP:** Lower Hills (Joginder Nagar), Sundernagar, Palampur, Pabbar Valley, Chamba. **UK:** Occasional; through out the foot hills.			
c	**% of global distribution in the State/region**	<1%			
9 a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Joginder Nagar, Mandi, Hamirpur, Shimla, Kangra, Chamba, Solan, Nahan, Palampur. **UK:** Uttarkashi, Chamoli, Mussoorie, Pithoragarh, Nainital, Almora			
b	**Elevation Range (m asl)**	400-2500			
c	**Data Quality (Please refer briefing book)**	3			
10	**Extent of Occurrence in Km^2 (EOO)** **[Global]** **[Regional]**	-			
11	**Area of Occupancy in Km^2 (AOO)** **[Global]** **[Regional]**	-			
12 a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**	**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
				√	
b	**Time /Rate (3 generations or 10 years whichever is longer)**	3 Generations			

13	**Threats**		L (Loss of habitat), Tp(Traded for parts), Sd (Drought), Hf (Harvest for food), Hm (Harvest for medicine)		
14	**Are the populations in adjoining states facing similar threats/pressures?**		Yes		
15	**Trade**	**Names**	Tejpatta.		
		Level (s)	Local	Regional	National
			√	√	√
		Parts traded	Leaves, Bark		
		Effect on population	NA		
		Data Quality	3		
16	**Other comments**		• *Cocculus laurifolius* & *Lindera pulcherrima* are mixed with leaves. • According to Khari-Bawdi trader, Mandi stock is considered as one of the best quality material.		
17	**Existing Status**		-		
	- CITES		-		
	- Legislation (Pl. Specify)		-		
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		Field studies. Chauhan (1999).		
19	**Conservation measures under implementation in the State**		-		
20	**Record of cultivation, if any**		-		
21	**Criteria based on (Please refer briefing book)**		A2c,d		
	Red List Status Assigned		**VU**		
22	**Data sources used in the present CAMP**		3		
23	**Recommendations**		-		
	Management		-		
	a) *in situ*		Augmentation of *in- situ* population.		
	b) *ex situ*		Cultivation in Gardens & Arboratum.		
	i) Research		• Screening of various population; gall formation reported in Jogindarnagar & Sundernagar (ref. Sh. Nag). • Sustainable harvesting models should be developed.		
	ii) Cultivation (if agro techniques are available)		Nijmullah Ghati model of Coop. harvest plan (UK) recommended for HP.		
	iii) Germplasm banks		-		
24	**Compilers**		Group-IV		
25	**Reviewers**		WG I & Plenary		

14

Colchicum luteum Baker

Perennial herb with ovoid corm that is flattened at the base with longitudinal groove on one side and a membranous brown to dark-brown coat. Leaves 3-6, appearing at flowering time, linear to broadly linear. Flowers golden yellow, appearing from the ground with young leaves. Fruit an ovoid capsule; seeds numerous.

S. No.	Data Items	Details			
1	**Basionym / Synonym (s)**	NA			
2	**Family**	Liliaceae			
3	**Taxonomic Status**	Species			
4	**Vernacular Names**	Kukum (Lahaul & Spiti)			
5	**Habit**	Herb - perennial			
6	**Habitat**	Open grassy slopes			
7	**Original global distribution**	Central Asia, Afghanistan, Pakistan, India			
8a	**Recorded Distribution in India (by States)**	Jammu & Kashmir, Himachal Pradesh			
b	**Distribution within the State/ region**	**HP:** Chamba, Lahaul & Spiti.			
c	**% of global distribution in the State/region**	≈5%			
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Kukumseri, Shansha, Krudhi Nala (Lahaul & Spiti)			
b	**Elevation Range (m asl)**	2500-3000			
c	**Data Quality (Please refer briefing book)**	2 &3			
10	**Extent of Occurrence in Km^2 (EOO) [Global] [Regional]**	>20,000 km^2 >1,000 km^2			
11	**Area of Occupancy in Km^2 (AOO) [Global] [Regional]**	NA ≈100 km^2			
12a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**	**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
					✓
b	**Time /Rate (3 generations or 10 years whichever is longer)**	10 years			

13	**Threats**		Habitat Degradation		
14	**Are the populations in adjoining states facing similar threats/pressures?**		Yes		
15	**Trade**	**Names**	Suranjan		
		Level (s)	**Local**	**Regional**	**National**
					√
		Parts traded	Corms		
		Effect on population	Declining		
		Data Quality	2 & 3		
16	**Other comments**		• Kukumsheri derives it name from this plant • Kukum-Common name • Seheri- Meaning field		
17	**Existing Status**		VU		
	- CITES		NA		
	- Legislation (Pl. Specify)		NA		
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		Rana, B. S. Sharma, Rajendra.		
19	**Conservation measures under implementation in the State**		-		
20	**Record of cultivation, if any**		-		
21	**Criteria based on (Please refer briefing book)**		A2c,d		
	Red List Status Assigned		**CR**		
22	**Data sources used in the present CAMP**		Group discussion.		
23	**Recommendations**		-		
	Management		-		
	a) *in situ*		A part of Kukumsehri should be marked as MPCA		
	b) *ex situ*		-		
	i)Research		Genetic diversity assessment		
	ii) Cultivation (if agro techniques are available)		NA		
	iii) Germplasm banks		-		
24	**Compilers**		Group-I		
25	**Reviewers**		WG II & Plenary		

15

Dactylorhiza hatagirea D. Don (Soo)

Herbs up to 60 cm tall with robust leafy stems. Leaves adpressed to the stem, lanceolate to oblong lanceolate, elliptic. Flowers spotted rosy-purple in many flowered dense, short, cylindrical spikes. Lower bracts exceeding the flowers. Spur cylindric, blunt.

S. No.	Data Items	Details
1	**Basionym / Synonym (s)**	*Orchis latifolia* auct.non L.
2	**Family**	Orchidaceae
3	**Taxonomic Status**	Species
4	**Vernacular Names**	Hathjorni, Hathpanja (HP) Salep, Salampanja (Hindi)
5	**Habit**	Perennial terrestrial orchid
6	**Habitat**	Temperate & Alpine meadow/pastures in moist places.
7	**Original Global Distribution**	Himalaya (Pakistan to Nepal, China)
8a	**Recorded Distribution in India (by States)**	Himalaya Region
b	**Distribution within the State/ region**	**HP:** Shego, Gete, Mane, PinValley (Spiti); Chitkul, Sangla, Rakchan,Bhabha Valley, Chanshal, Mural Danda, Marhi, Jutadhar (Holi Range), Pattan Valley (Lahual), Churdhar (Sirmour), Dhanchho (Manimahesh)
c	**% of global distribution in the State/region**	≈30-50%
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** More than 50 locations; Lahual & Spiti, Pin Valley & Spiti Valley (5000 m²); Kinnaur (2000 m²); Chamba - Holi Range, Pangi, Bharmaur (10,000 m²); Chanshal to Mural Danda (10,000 m²); Churdhar (1000 m²), Rohtang (2000 m²) **UK:** Gidara; Kandara; Malari, Bilju (Jobar); Kulti
b	**Elevation Range (m asl)**	2800-4000
c	**Data Quality (Please refer briefing book)**	2
10	**Extent of Occurrence in Km^2 (EOO)** **[Global]** **[Regional]**	 >20,000 km^2 5,000 km^2
11	**Area of Occupancy in Km^2 (AOO)** **[Global]** **[Regional]**	 ±20,000 km^2 200 km^2

12 a	Assessment of Population Reduction, if any (pl. tick in appropriate cell)		≥ 80%	50 to 80%	30 to 49%	< 30%
				√		
b	Time /Rate (3 generations or 10 years whichever is longer)		10 years			
13	Threats		Lf (Loss of habitat-fragmentation) , Lp(Loss of habitat-quality), Hm (Harvest for medicine), Tp (Trade for parts)			
14	Are the populations in adjoining states facing similar threats/pressures?		Yes			
15	Trade	Names	Salampanja/Hathjori			
		Level (s)	Local	Regional	National	
			√	√	√	
		Parts traded	Tubers			
		Effect on population	Declining			
		Data Quality	2 & 3			
16	Other comments		Used as aphrodisiac by locals, general tonic			
17	Existing Status		CR			
	- CITES		Appendix-II			
	- Legislation (Pl. Specify)		-			
18	Recent field studies (Please site author, year of study, title of study, publications etc.)		M & AP of HP, Chauhan, N. S. Nature's MP of Uttaranchal Vol II. Shah, Rakesh , 2006. Deva, S & Naithani, HB. Orchid Flora of NW Him. 1986			
19	Conservation measures under implementation in the State		*ex -situ* conservation by UHF & Herbal Garden, Rah la Forest Nursery, Chitkul Good collection practices should be followed strictly.			
20	Record of cultivation, if any		NA			
21	Criteria based on (Please refer briefing book)		A2c,d			
	Red List Status Assigned		**CR**			
22	Data sources used in the present CAMP		Chauhan, N. S. Sharma, B. D. Sharma, Sandeep. Negi, P. S.			
23	Recommendations		Status survey & development of agro- techniques.			
	Management		Scientific management.			
	a) *in situ*		Protection of existing areas.			
	b) *ex situ*		Area extension under nurseries & experimental sites.			
	i) Research		Development & propagation techniques.			
	ii) Cultivation (if agro techniques are available)		Required to be promoted.			
	iii) Germplasm banks		To be established.			
24	Compilers		Group - II			
25	Reviewers		WG III & Plenary			

16

Desmodium gangeticum (L.) DC.

Perennial under-shrubs with spreading-ascending angular branches up to 120 cm long. Leaves unifoliolate, simple, variable, glabrous above, pubescent below. Flowers violet to white in terminal or axillary raceme, 15-30 cm long. Fruit curved pod, upper suture slightly indented, lower deeply indented between the seeds, pubescent with hooked hairs.

S. No.	Data Items	Details
1	**Basionym / Synonym (s)**	*Hedysarum gangeticum* L. *Hedysarum maculatum* L.
2	**Family**	Fabaceae
3	**Taxonomic Status**	Species
4	**Vernacular Names**	Salpan, Salpani, Salwan, Salparni.
5	**Habit**	Shurb
6	**Habitat**	Common in Sal Forest & sometimes in Dry Mixed Forest.
7	**Original Global Distribution**	Himalyas; Down to Myanmar, Sri Lanka, Tropical Africa, Malaya, China, Phillippines, included in West Indies.
8a	**Recorded Distribution in India (by States)**	Throughout India.
b	**Distribution within the State/ region**	**HP:** Sal Forests of Sirmour **UK:** Sal Forests of Uttarakhand
c	**% of global distribution in the State/region**	<1%
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Sirmour, Chamba, Kinnaur, Shimla. **UK:** Dehradun, Haridwar, Rishikesh, Corbett National Park, Rajaji National Park, Ramnagar, Champawat.
b	**Elevation Range (m asl)**	Upto 1700
c	**Data Quality (Please refer briefing book)**	3
10	**Extent of Occurrence in Km^2 (EOO) [Global] [Regional]**	NA
11	**Area of Occupancy in Km^2 (AOO) [Global] [Regional]**	NA

12 a	Assessment of Population Reduction, if any (pl. tick in appropriate cell)		≥ 80%	50 to 80%	30 to 49%	< 30%
b					√	
	Time /Rate (3 generations or 10 years whichever is longer)		10 years.			
13	Threats		Hm (Harvest for medicine), Tp (Trade for parts)			
14	Are the populations in adjoining states facing similar threats/pressures?		Yes			
15	Trade	Names				
		Level (s)	Local	Regional	National	
			√	√	√	
		Parts traded	Roots & whole plant.			
		Effect on population	Population reduction.			
		Data Quality	3			
16	Other comments		• In place of this species other species, viz., *Flemengia strobilifera* (*Flemengia chappar*) is heavily extracted.			
17	Existing Status		-			
	- CITES		-			
	- Legislation (Pl. Specify)		-			
18	Recent field studies (Please site author, year of study, title of study, publications etc.)		Flora of Sirmour, Flora Himachal Pradesh (H.P.) Field studies in U.K.			
19	Conservation measures under implementation in the State		-			
20	Record of cultivation, if any		Dabur at Lucknow and Kushinagar in U.P. have started large scale cultivation.			
21	Criteria based on (Please refer briefing book)		A2c,d			
	Red List Status Assigned		VU			
22	Data sources used in the present CAMP		3			
23	Recommendations		-			
	Management		-			
	a) *in situ*		-			
	b) *ex situ*		-			
	i) Research		-			
	ii) Cultivation (if agro techniques are available)		• By seed (Dabur). • Seeds available at FRI, Dehradun.			
	iii) Germplasm banks					
24	Compilers		Group-IV			
25	Reviewers		WG I & Plenary			

17

Didymocarpus pedicellata R. Br.

Erect perennial herbs with rhizomatous rootstock. Stem short with single or a pair of unequal leaves. Leaves broad, ovate or rounded with obliquely cordate base, green above and whitish below, glandular punctate. Flowers dark purple in compound umbels. Fruit filiform, stalked capsules.

S. No.	Data Items	Details			
1	**Basionym / Synonym (s)**	*Didymocarpus platypus* C. B. Clarke			
2	**Family**	Gesneriaceae			
3	**Taxonomic Status**	Species			
4	**Vernacular Names**	Pather, Phori, Pathar Long (Hindi), Shila Pushpa (Sankrit), Musakarni (Kangra)			
5	**Habit**	Perennial Herb.			
6	**Habitat**	Shady rocks, damp places on lime stones.			
7	**Original Global Distribution**	North- west Himalya, Nepal, Bhutan, Arunachal Pradesh.			
8a	**Recorded Distribution in India (by States)**	Himachal Pradesh & Uttar Pradesh (Endemic)			
b	**Distribution within the State/ region**	Himachal Pradesh & Uttar Pradesh			
c	**% of global distribution in the State/region**	-			
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Chamba, Kangra **UK:** Mussoorie, Tehri, Bageshwar			
b	**Elevation Range (m asl)**	500-2500			
c	**Data Quality (Please refer briefing book)**	3			
10	**Extent of Occurrence in Km^2 (EOO) [Global] [Regional]**	2000 km^2			
11	**Area of Occupancy in Km^2 (AOO) [Global] [Regional]**	1000 km^2			
12a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**	**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
					√
b	**Time /Rate (3 generations or 10 years whichever is longer)**	10 years			

13	**Threats**		Lf (Loss of habitat-fragmentation), Sf (Fire)		
14	**Are the populations in adjoining states facing similar threats/pressures?**		No		
15	**Trade**	**Names**	Shila Pushpa, Pathar Long.		
		Level (s)	**Local**	**Regional**	**National**
			√		√
		Parts traded	Leaves		
		Effect on population	NA		
		Data Quality	3		
16	**Other comments**		Grows on limestone rocks.		
17	**Existing Status**		-		
	- CITES		-		
	- Legislation (Pl. Specify)		-		
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		Flora of Himachal Pradesh, 1984 (H.P.). Field Survey, Dr. Naithani. (UK) Hooker, J. D., 1885. Flora of British India, Vol. IV: 543		
19	**Conservation measures under implementation in the State**		-		
20	**Record of cultivation, if any**		-		
21	**Criteria based on (Please refer briefing book)**		A2c,d		
	Red List Status Assigned		**NT**		
22	**Data sources used in the present CAMP**		3		
23	**Recommendations**		-		
	Management		-		
	a) *in situ*		-		
	b) *ex situ*		-		
	i) Research		• Status Survey • Market Survey		
	ii) Cultivation (if agro techniques are available)		-		
	iii) Germplasm banks		-		
24	**Compilers**		Group-IV		
25	**Reviewers**		WG I & Plenary		

18

Dioscorea deltoidea Wall. ex Griseb.

Slender twining herbs with ligneous, irregular tuberous roots. Stems glabrous, twining clockwise. Leaves alternate, sub-deltoid to ovate, cordate, basal lobes rounded, 7-9-nerved, acuminate. Male spikes solitary, axillary, at times branched; female spikes solitary, few-flowered. Capsule 2 cm long, broadly rounded, winged.

S. No.	Data Items	Details
1	**Basionym / Synonym (s)**	NA
2	**Family**	Dioscoreaceae
3	**Taxonomic Status**	Species
4	**Vernacular Names**	Harvish (G), Keerish (H), Tarur (H), Kriss (Punjabi), Shingli-Mingli, Ganj, Kins
5	**Habit**	Extensive tuberous climber
6	**Habitat**	Temperate & Sub-alpine forests
7	**Original Global Distribution**	Himalaya: Afghanistan to Indo China
8a	**Recorded Distribution in India (by States)**	J&K. H.P., U.K (Haridwar, Dehradun, Tehri, Pauri, Pithoragarh).
b	**Distribution within the State/ region**	**HP:** Kullu, Mandi, Rohru, Shimla, Kangra, Chamba, Kinnaur
c	**% of global distribution in the State/region**	≈70% 25% (HP), 20% (J&K), 25% (UK)
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Kullu, Chhur Valley (Mandi); Rohru & Chopal Areas (Shimla); Manekhdhar, Kundrala (Rohru), Lohardi to Dogra (Mandi & Kangra); Achnetugarh & Gaurigarh; Kothi, Manali, Manalsa, Nichar, Randung, Bushahr, Sarahan, Sangla Hills-Baspa Valley, Pubani Slopes, FRH, Kinnaur, Hadson Forest, Putrangaon, on the way to Shoana; Urni, Bushahr. **UK:** Jim Corbett NP., Garhwal, Kumaon-Kaudia, (Tehri), Khirsu (Pauri), Balanti (Pithoragarh), Tons Valley (Govind WLS) **J&K:** Gurej Valley, All temperates areas of J&K
b	**Elevation Range (m asl)**	1000-3000
c	**Data Quality (Please refer briefing book)**	2 & 3
10	**Extent of Occurrence in Km^2 (EOO) [Global] [Regional]**	>20,000 km^2
11	**Area of Occupancy in Km^2 (AOO) [Global] [Regional]**	>2000 km^2

12a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**		**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
				✓		
b	**Time /Rate (3 generations or 10 years whichever is longer)**		10 years			
13	**Threats**		Lf (Loss of habitat-fragmentation), T (Trade), Hm (Harvest for medicine), Tp (Traded for parts)			
14	**Are the populations in adjoining states facing similar threats/pressures?**		Yes			
15	**Trade**	**Names**	Dioscorea, Shingli-Mingli.			
		Level (s)	**Local**	**Regional**	**National**	
			✓	✓	✓	
		Parts traded	Tubers			
		Effect on population	Declining			
		Data Quality	2 & 3			
16	**Other comments**		• Over exploited for its medicinal tubers.			
17	**Existing Status**		-			
	- CITES		-			
	- Legislation (Pl. Specify)		Banned by Ministry of Commerce			
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		Verma, R. K. Project Report Cold Dam Catchment. Chandola, S. 1999-2002. Garhwal. Gaur, R. D., 1998-2001 Samant, 1999. Badola, H. K., 1998-2002. Kullu Valley. - , *et. al.*, 1996 "Suplement to Cultivation of Medicinal Plants." Vaneet, Jishtu, 2001-02. Sangla Valley & Rupi-Bhaha WLS. Goraya, G. S. & Kumar, K. Ravi, 2006. Chamba Valley.			
19	**Conservation measures under implementation in the State**		NMPB sponsored projects in four Districts of H.P.			
20	**Record of cultivation, if any**		Dept. of Ayurveda, (NMPB) promoting cultivation.			
21	**Criteria based on (Please refer briefing book)**		A2c,d			
	Red List Status Assigned		**EN**			
22	**Data sources used in the present CAMP**		Floras, Personal Observations of the group members			
23	**Recommendations**		-			
	Management		-			
	a) *in situ*		-			
	b) *ex situ*		-			
	i) Research		Status survey & monitoring recommended for cultivation in farmer's land.			
	ii) Cultivation (if agro techniques are available)		Agro technique standardized by UHF, Nouni.			
	iii) Germplasm banks		Forest Nurseries, Herbal Gardens, NBPGR.			
24	**Compilers**		Group-III			
25	**Reviewers**		WG IV & Plenary			

19

Ephedra gerardiana Wall. ex Stapf

Densely tufted shrubs upto 90 cm tall. Branchlets green, jointed, ascending, striate and smooth. Male cones ovate, solitary or in clusters of 2 - 3 with 4 - 8 flowers in each cone. Female cones solitary. Fruit an ovoid berry with fleshy red succulent bracts encircling 1-2 seeds.

S. No.	Data Items	Details			
1	**Basionym / Synonym (s)**	*Ephedra vulgaris* auct. non Rich.			
2	**Family**	Ephedraceae			
3	**Taxonomic Status**	Species			
4	**Vernacular Names**	Tse (Spiti); Tshhedang (Kinnaur); Bhutshut (Lakail); Chappat (Spiti)			
5	**Habit**	Shrub.			
6	**Habitat**	Dry slopes especially in Trans Himalayas.			
7	**Original Global Distribution**	Central Asia, Afganistan, Himalaya & SW China, Bhutan, Nepal.			
8a	**Recorded Distribution in India (by States)**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Sikkim.			
b	**Distribution within the State/ region**	**HP:** Chamba, Kinnaur, Lahaul & Spiti **UK:** Uttarkashi, Chamoli, Pithoragarh			
c	**% of global distribution in the State/region**	≈20%			
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Pangi (Chamba); Myar, Pin Valley NP, (Lahaul & Spiti), Pooh (Kinnaur) **UK:** Gangotri NP, NDBR, North Johar Valley			
b	**Elevation Range (m asl)**	2800-4500			
c	**Data Quality (Please refer briefing book)**	2 & 3			
10	**Extent of Occurrence in Km^2 (EOO)** **[Global]** **[Regional]**	 >20,000 km^2 >20,000 km^2			
11	**Area of Occupancy in Km^2 (AOO)** **[Global]** **[Regional]**	 NA >20,000 km^2			
12a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**	**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
				√	
b	**Time /Rate (3 generations or 10 years whichever is longer)**	30 years			

13	**Threats**		Ov(Over Exploitation)		
14	**Are the populations in adjoining states facing similar threats/pressures?**		Yes		
15	**Trade**	**Names**	Somlata		
		Level (s)	**Local**	**Regional**	**National**
					√
		Parts traded	Tender shoots		
		Effect on population	Declining		
		Data Quality	2 & 3		
16	**Other comments**		• Entire plant is harvested. • Also used as fuel wood.		
17	**Existing Status**		EN		
	- CITES		-		
	- Legislation (Pl. Specify)		-		
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		-		
19	**Conservation measures under implementation in the State**		-		
20	**Record of cultivation, if any**		-		
21	**Criteria based on (Please refer briefing book)**		A2c,d		
	Red List Status Assigned		**VU**		
22	**Data sources used in the present CAMP**		Group discussion		
23	**Recommendations**		-		
	Management		-		
	a) *in situ*		-		
	b) *ex situ*		-		
	i)Research		Taxonomic evaluation of the genus		
	ii) Cultivation (if agro techniques are available)		-		
	iii) Germplasm banks		-		
24	**Compilers**		Group-I		
25	**Reviewers**		WG II & Plenary		

20

Fritillaria roylei Hook.

Erect bulbous herbs. Leaves 7-11, opposite or in whorls of 3 or 4 or alternate; linear-lanceolate, obtuse to acute-acuminate. Flowers solitary or 2-3 in raceme; nodding, bell shaped; yellowish green, chequered with dull purple. Fruit a broadly oblong, obtusely angled, 6-winged capsule.

S. No.	Data Items	Details			
1	**Basionym / Synonym (s)**	NA			
2	**Family**	Liliaceae.			
3	**Taxonomic Status**	Species			
4	**Vernacular Names**	Kshirkakoli, Sakakal misri.			
5	**Habit**	Herb - perennial.			
6	**Habitat**	Sub-Alpine/Alpine Slopes/Meadows, Shrubberies.			
7	**Original Global Distribution**	India, Pakistan			
8a	**Recorded Distribution in India (by States)**	Western Himalaya			
b	**Distribution within the State/ region**	**HP:** Chitkul (Kinnaur); Panju & Talra (Chhajpur); Rohtang Slopes, Pangi Valley, Chanshal, Mural Danda			
c	**% of global distribution in the State/region**	≈ 50-80%			
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Chitkul (Kinnaur), Chhajpur, Rohtang, Churdhar, Chanshal, Mural Danda, Pangi Valley. **UK:** Govind NP; Khatling, Valley of Flowers, Punchchuli area.			
b	**Elevation Range (m asl)**	2800-4000			
c	**Data Quality (Please refer briefing book)**	2 & 3			
10	**Extent of Occurrence in Km^2 (EOO)** **[Global]** **[Regional]**	 >16,000 km^2 >10,000 km^2			
11	**Area of Occupancy in Km^2 (AOO)** **[Global]** **[Regional]**	 2000 km^2 500 km^2			
12a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**	**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
			√		
b	**Time /Rate (3 generations or 10 years whichever is longer)**	10 years			

13	**Threats**		Lf (Loss of habitat-fragmentation), Lp (Loss of habitat-quality), Hm (Harvest for medicine), Tp (Trade for parts)		
14	**Are the populations in adjoining states facing similar threats/pressures?**		Yes		
15	**Trade**	**Names**			
		Level (s)	**Local**	**Regional**	**National**
			√	√	√
		Parts traded	Bulbs		
		Effect on population	Declining		
		Data Quality	2 & 3		
16	**Other comments**		Used in Ashtavarga (a combination of 8 rejuvenating drugs in preparation of the famous Ayurvedic tonic - Chyavanprash).		
17	**Existing Status**		-		
	- CITES		-		
	- Legislation (Pl. Specify)		-		
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		M & AP of HP, Chauhan, N. S. Booklet: Sharma, B. D., & Balkrishan. Nature's M.P. of Uttaranchal Vol. II: Shah, Rakesh.		
19	**Conservation measures under implementation in the State**		-		
20	**Record of cultivation, if any**		-		
21	**Criteria based on (Please refer briefing book)**		A2c,d		
	Red List Status Assigned		**EN**		
22	**Data sources used in the present CAMP**		Chauhan, N. S. Sharma, B. D. Negi, P. S.		
23	**Recommendations**		Status survey, conservation measures & development of propagation techniques.		
	Management		-		
	a) *in situ*		Protection of existing sites.		
	b) *ex situ*		Establishment of germplasm bank		
	i) Research		Status survey and development of propagation techniques.		
	ii) Cultivation (if agro techniques are available)		-		
	iii) Germplasm banks		Needs to be established.		
24	**Compilers**		Group-II		
25	**Reviewers**		WG III & Plenary		

21

Gentiana kurroo Royle

Spreading perennial herbs with thick rootstock. Stem leafy, branched from base. Basal leaves rosulate and oblong-linear, cauline leaves smaller, linear, connate at base forming a tube. Flowers solitary, pedicellate, showy blue, funnel shaped, borne in terminal clusters. Fruit a stalked, lanceolate capsule.

S. No.	Data Items	Details			
1	**Basionym / Synonym (s)**	NA			
2	**Family**	Gentianaceae			
3	**Taxonomic Status**	Species			
4	**Vernacular Names**	Karu, Kutki, Indian Genitan			
5	**Habit**	Perennial Herb			
6	**Habitat**	Moist places, rock crevices			
7	**Original Global Distribution**	India, Nepal, Pakistan.			
8a	**Recorded Distribution in India (by States)**	Western Himalayas from J&K to Dehradun in Uttarakhand.			
b	**Distribution within the State/ region**	**HP:** Chitkul, Karol, Pachhad Chansal, Karka Pattan **J&K:** Pir Panjal, Kashmir Valley, Chenab Valley. **UK:** Uttarkashi, Gangotri, Pindari, Garhwal.			
c	**% of global distribution in the State/region**	NA			
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Churdhar, Tirthan Valley (GHNP), Kandaghat, Kinnaur, Chitkul, Karol, Chanshal. **UK:** Konain Range Chakrata & Kaddukhal near Mussoorie.			
b	**Elevation Range (m asl)**	900-2800 3100			
c	**Data Quality (Please refer briefing book)**	2 & 3			
10	**Extent of Occurrence in Km^2 (EOO) [Global] [Regional]**	10,000 km^2			
11	**Area of Occupancy in Km^2 (AOO) [Global] [Regional]**	1,000 km^2			
12a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**	**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
		√			
b	**Time /Rate (3 generations or 10 years whichever is longer)**	10 years			

13	**Threats**		Lf (Loss of habitat-fragmentation)		
14	**Are the populations in adjoining states facing similar threats/pressures?**		Yes		
15	**Trade**	**Names**	Tryaman		
		Level (s)	**Local**	**Regional**	**National**
			√	√	√
		Parts traded	Whole plants (Roots)		
		Effect on population	Declining		
		Data Quality	2 & 3		
16	**Other comments**		• Karu, exported • Traded mixed with *P. kurooa.* • Low population availability in H.P.		
17	**Existing Status**		-		
	- CITES		-		
	- Legislation (Pl. Specify)		-		
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		Field Studies by Dr. H.B. Naithani in UK. Flora of GHNP (2000), Chauhan (1999)		
19	**Conservation measures under implementation in the State**		-		
20	**Record of cultivation, if any**		-		
21	**Criteria based on (Please refer briefing book)**		A2c,d		
	Red List Status Assigned		**CR**		
22	**Data sources used in the present CAMP**		3		
23	**Recommendations**		-		
	Management		-		
	a) in situ		-		
	b) ex situ		-		
	i) Research		Population status should be asse ssed. Nursery technique to be developed.		
	ii) Cultivation (if agro techniques are available)		-		
	iii) Germplasm banks		-		
24	**Compilers**		Group-IV		
25	**Reviewers**		WG 1 & Plenary		

22

Habenaria edgeworthii Hook. f. ex Collett.

Stout erect, leafy, perennial herbs up to 60 cm tall with tuberous roots. Leaves 2-4, sheathing, ovate to ovate-lanceolate. Flowers yellowish-green, borne in dense, cylindrical spikes. Spur longer than ovary, spreading and directed upwards, usually hooked downwards towards the tip.

S. No.	Data Items	Details
1	**Basionym / Synonym (s)**	*Platanthera edgeworthii* (Hook. f. ex Collett) Gupta *Habenaria acuminata* Lindl.
2	**Family**	Orchidaceae
3	**Taxonomic Status**	Species
4	**Vernacular Names**	Jeevak
5	**Habit**	Herb - Terrestrial
6	**Habitat**	Grassy hill slopes, open grass land
7	**Original Global Distribution**	North-West Himalaya from Surat Pakistan to Garhwal Himalaya & Nepal
8a	**Recorded Distribution in India (by States)**	Kashmir to Kumaon
b	**Distribution within the State/ region**	Jammu & Kasmir, Himachal Pradesh, Uttarakhand
c	**% of global distribution in the State/region**	≈50%
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Shimla, Shali Range, Roru-Baghi, Chachiot Block, Shikari Devi WLS, KamruNag, Rwanda, Banjar, Jalodi Slopes, Nauradhar, Dharon- ki- dhar, Chail, Billing, Barot, Chamba **UK:** Mussoorie, Chakrata, Nainital, Pauri
b	**Elevation Range (masl)**	2000-3000
c	**Data Quality (Please refer briefing book)**	2 & 3
10	**Extent of Occurrence in Km^2 (EOO)** **[Global]** **[Regional]**	 >20,000 km^2 <10,000 km^2
11	**Area of Occupancy in Km^2 (AOO)** **[Global]** **[Regional]**	 2000 km^2 ±1000 km^2

12a	Assessment of Population Reduction, if any (pl. tick in appropriate cell)		≥ 80%	50 to 80%	30 to 49%	< 30%
			√			
b	Time /Rate (3 generations or 10 years whichever is longer)		10 years			
13	Threats		Lf (Loss of habitat-fragmentation), Lp (Loss of habitat-quality), Hm (Harvest for medicine), Tp (Trade for parts)			
14	Are the populations in adjoining states facing similar threats/pressures?		Yes			
15	Trade	Names	Ridhi- Vridhi			
		Level (s)	Local	Regional	National	
			√	√	√	
		Parts traded	Tubers			
		Effect on population	Declining			
		Data Quality	2 & 3			
16	Other comments		• Used as one of the ingredients of Chayawanprash.			
17	Existing Status		-			
	- CITES		-			
	- Legislation (Pl. Specify)		-			
18	Recent field studies (Please site author, year of study, title of study, publications etc.)		eflora of Pakistan Demand & supply of MP in India: FRLHT, 2008. Nature's MP of Uttaranchal: Shah, Rakesh. Flora of Dist.Garhwal N.W.Himalayas: Gaur, R. D. Flora of Chamba Distt: Singh, H. & Sharma, M. Booklet: Sharma, B. D. & Bal Krishan			
19	Conservation measures under implementation in the State		-			
20	Record of cultivation, if any		-			
21	Criteria based on (Please refer briefing book)		A2c,d			
	Red List Status Assigned		CR			
22	Data sources used in the present CAMP		Chauhan, N. S. Sharma, B. D. Kapoor, K. S.			
23	Recommendations		Status survey, conservation measures, propagation techniques			
	Management		-			
	a) *in situ*		Protection of existing population			
	b) *ex situ*		Restricted harvest & establishment of field gene bank.			
	i) Research		Development of propagation techniques			
	ii) Cultivation (if agro techniques are available)		-			
	iii) Germplasm banks		To be established			
24	Compilers		Group-II			
25	Reviewers		WG III & Plenary			

23

Habenaria intermedia D. Don

Herbs with 30-50 cm long leafy stems. Tubers sessile, small. Leaves 3-5, ovate-oblong, acuminate, sheathing. Flowers large, white. Sepals green, the dorsal ovate-lanceolate, recurved. Petals white, crescent-shaped, recurved; lip deeply 3-lobed with side lobes deeply cut into thread like segments. Spur green, slightly twisted.

S. No.	Data Items				
1	**Basionym / Synonym (s)**	NA			
2	**Family**	Orchidaceae			
3	**Taxonomic Status**	Species			
4	**Vernacular Names**	Rishbak, Padma, Devsund			
5	**Habit**	Herb - terrestrial			
6	**Habitat**	Temperate grassy slopes			
7	**Original Global Distribution**	India, Nepal & Pakistan			
8a	**Recorded Distribution in India (by States)**	Western Himalayan States of H.P, J&K, U.K, Meghalaya (NE)			
b	**Distribution within the State/ region**	**HP:** Simla Hills, Hatu, Karsog Hills, Dalhousie, Kinnaur			
c	**% of global distribution in the State/region**	≈50-70%			
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Shimla Hills, Hatu, Fagu, Kufri, Mashobra, Summer Hill, Rwanda, Kamrunag (Karsog), Dalhousie (Chamba); Nichar & Rohru Hills **UK:** Chakrata, Mussoorie, Tehri, Pauri, Nainital			
b	**Elevation Range (m asl)**	2000-3000			
c	**Data Quality (Please refer briefing book)**	2 & 3			
10	**Extent of Occurrence in Km^2 (EOO)** **[Global]** **[Regional]**	>20,000 km^2 5,000-10,000 km^2			
11	**Area of Occupancy in Km^2 (AOO)** **[Global]** **[Regional]**	2000 km^2 500 km^2			
12a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**	**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
			√		
b	**Time /Rate (3 generations or 10 years whichever is longer)**	10 years			

13	**Threats**		Lf (Loss of habitat-fragmentation) , Lp (Loss of habitat-quality), Hm (Harvest for medicine), Tp (Trade for parts)		
14	**Are the populations in adjoining states facing similar threats/pressures?**		Yes		
15	**Trade**	**Names**	Ridhi		
		Level (s)	**Local**	**Regional**	**National**
			√	√	√
		Parts traded	Tubers		
		Effect on population	Declining		
		Data Quality	2 & 3		
16	**Other comments**		• Used in Ashtavarga (a combination of 8 rejuvenating drugs in preparation of the famous Ayurvedic tonic-Chyavanprash).		
17	**Existing Status**		-		
	- CITES		-		
	- Legislation (Pl. Specify)		-		
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		M & AP of HP: Chauhan, N. S. Booklet: Sharma, B. D. & Bal Krishan Nature's MP of Uttranchal Vol. II: Shah, Rakesh.		
19	**Conservation measures under implementation in the State**		-		
20	**Record of cultivation, if any**		-		
21	**Criteria based on (Please refer briefing book)**		A2c,d		
	Red List Status Assigned		**EN**		
22	**Data sources used in the present CAMP**		Chauhan, N. S. Sharma, B. D. Negi, P. S.		
23	**Recommendations**		Status survey, conservation measures		
	Management		-		
	a) *in situ*		Protection of existing sites		
	b) *ex situ*		Establishment of germplasm bank		
	i) Research		Status survey & development of propagation techniques		
	ii) Cultivation (if agro techniques are available)		-		
	iii) Germplasm banks		To be established		
24	**Compilers**		Group-II		
25	**Reviewers**		WG III & Plenary		

24

Hyoscyamus niger L.

Biennial hairy herbs up to 1.5 m tall with unpleasant smell. Leaves sessile, ovate-oblong, simple or lobed, glandular-pubescent, especially on the nerves and margins. Flowers cup-shaped, pale yellow with brown-purple nerves. Stamens protruding, unequal. Style exceeding the stamens in length, purplish. Seeds ± 1.2 mm long, kidney shaped, rough and brown.

S. No.	Data Items	Details			
1	**Basionym / Synonym (s)**	NA			
2	**Family**	Solanaceae			
3	**Taxonomic Status**	Species			
4	**Vernacular Names**	Khursaini Ajwain (Chamba), Dhatura (Lahaul & Spiti), Tukhlang (Kinnaur)			
5	**Habit**	Herb - biennial			
6	**Habitat**	Around human settlements especially in cold deserts			
7	**Original Global Distribution**	Central Asia, Afghanistan, Himalaya, India, Nepal, China, North Africa, North America			
8a	**Recorded Distribution in India (by States)**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand			
b	**Distribution within the State/ region**	**HP:** Chamba, Kinnaur, Lahaul & Spiti, Pooh Division **UK:** Uttarkashi, Chamoli, Pithoragarh			
c	**% of global distribution in the State/region**	≈20%			
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Kelang Dhar (Chamba); Pin Valley, Lahual Valley (Lahaul & Spiti); Pooh & Sangla (Kinnaur) **UK:** Badrinath, Darma Valley, Malari			
b	**Elevation Range (m asl)**	2500-4000			
c	**Data Quality (Please refer briefing book)**	2 & 3			
10	**Extent of Occurrence in Km^2 (EOO)** **[Global]** **[Regional]**	 >20,000 km^2 <10,000 km^2			
11	**Area of Occupancy in Km^2 (AOO)** **[Global]** **[Regional]**	 ±10,000 km^2 <2,000 km^2			
12a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**	**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
					√ (30-45%)
b	**Time /Rate (3 generations or 10 years whichever is longer)**	10 years			

13	**Threats**		Development activities		
14	**Are the populations in adjoining states facing similar threats/pressures?**		Yes		
15	**Trade**	**Names**	Khursani Ajwain		
		Level (s)	**Local**	**Regional**	**National**
					√
		Parts traded	Seeds		
		Effect on population	Declining		
		Data Quality	2 & 3		
16	**Other comments**		• Also used as a sedative • Annual demand from Dabur alone 500-700 kg.		
17	**Existing Status**		EN		
	- CITES		-		
	- Legislation (Pl. Specify)		-		
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		Rana, B. S., 2008. V. Jishtu, 2008. Uniyal, S. K., 2009. Chauhan, N. S. Sharma, B. D. Negi, P. S.		
19	**Conservation measures under implementation in the State**		-		
20	**Record of cultivation, if any**		-		
21	**Criteria based on (Please refer briefing book)**		A2c,d		
	Red List Status Assigned		**VU**		
22	**Data sources used in the present CAMP**		Flora, Papers, Group discussion		
23	**Recommendations**		-		
	Management		-		
	a) *in situ*		-		
	b) *ex situ*		-		
	i)Research		• Market Survey • Evaluation for quality trade		
	ii) Cultivation (if agro techniques are available)		-		
	iii) Germplasm banks		• To be established at Pin Valley • Nursery trials at different ecozones		
24	**Compilers**		Group-I		
25	**Reviewers**		WG II & Plenary		

25

Hypericum perforatum L.

Erect glandular herbs up to 50 cm tall. Stem 2-edged. Leaves opposite, narrow ovate to elliptic-oblong, entire. Flowers yellow, in terminal corymbose cymes. Petals with marginal black gland dots. Stamens in 3 fascicles (2+2+1). Fruit an ovoid pyramidal capsule.

S. No.	Data Items	Details
1	**Basionym / Synonym (s)**	NA
2	**Family**	Hypericaceae
3	**Taxonomic Status**	Species
4	**Vernacular Names**	Dendhu, Balsna, Balsna, Basant (Hindi) St. John's Wort/Amber/Cammock/Devils Scourge/ Grace of God (English)
5	**Habit**	Perennial Herb.
6	**Habitat**	Shady locality, Way side, Grazing Locality, Dry Hill Slopes
7	**Original Global Distribution**	North Western Himalayas, Europe, North Temperate Asia, North Africa
8a	**Recorded Distribution in India (by States)**	Jammu & Kashmir, Himachal Pradesh, J&K, Uttarakhand
b	**Distribution within the State/ region**	**HP:** Shimla, Kullu, Kinnaur, Chamba. **UK:** Thoughout U.K.
c	**% of global distribution in the State/region**	<5%
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Shimla, Larot, Chansal, Dhawkhari, Khuninala, Pabber Valley, Parvati & Sainj Valley, Bharmour. **UK:** Chakrata, Chamba, Chamoli.
b	**Elevation Range (m asl)**	1200-2600
c	**Data Quality (Please refer briefing book)**	2 & 3
10	**Extent of Occurrence in Km^2 (EOO) [Global] [Regional]**	NA
11	**Area of Occupancy in Km^2 (AOO) [Global] [Regional]**	NA

12 a	Assessment of Population Reduction, if any (pl. tick in appropriate cell)		≥ 80%	50 to 80%	30 to 49%	< 30%
					√	
b	Time /Rate (3 generations or 10 years whichever is longer)		10 Years.			
13	Threats		Lf (Loss of habitat), Hm (Harvest for medicine), T (Trade)			
14	Are the populations in adjoining states facing similar threats/pressures?		Yes			
15	Trade	Names				
		Level (s)	Local	Regional	National	
			√	√	√	
		Parts traded	Whole Plant.			
		Effect on population	-			
		Data Quality	3			
16	Other comments		*Reinwardtia trigyna* is used as adulterant under "vasant" (ref. Dr. Nag).			
17	Existing Status		-			
	- CITES		-			
	- Legislation (Pl. Specify)		-			
18	Recent field studies (Please site author, year of study, title of study, publications etc.)		Naithani, H. B., 2002. Personal observations. Gaur, 1999. Chauhan N. S., 1999.			
19	Conservation measures under implementation in the State		Nil			
20	Record of cultivation, if any		Chama FD has established nursey at Sagnad			
21	Criteria based on (Please refer briefing book)		A2c,d			
	Red List Status Assigned		VU			
22	Data sources used in the present CAMP		3			
23	Recommendations		-			
	Management		-			
	a) *in situ*		-			
	b) *ex situ*		-			
	i)Research		-			
	ii) Cultivation (if agro techniques are available)		Techniques available By Seeds.			
	iii) Germplasm banks		Need to be established.			
24	Compilers		Group-IV			
25	Reviewers		WG I & Plenary			

26

Hyssopus officinalis L.

Highly aromatic, semi evergreen tufted perennials up to 60 cm tall. Leaves linear to lanceolate, sessile. Flowers blue-purple, borne in many flowered spikes.

S. No.	Data Items	Details			
1	**Basionym / Synonym (s)**	NA			
2	**Family**	Lamiaceae			
3	**Taxonomic Status**	Species			
4	**Vernacular Names**	Zufah (Unani), Zujajain (Unani), Tengu (Kinnaur)			
5	**Habit**	Herb			
6	**Habitat**	Alpine dry slopes especially in Trans-Himalaya			
7	**Original Global Distribution**	Eastern Europe, Western Asia, Himalaya			
8a	**Recorded Distribution in India (by States)**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand			
b	**Distribution within the State/ region**	**HP:** Chamba, Kinnaur, Lahaul & Spiti. **UK:** Uttarkashi, Chamoli.			
c	**% of global distribution in the State/region**	≈30%			
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Jalma, Pattan Valley, Pin Valley, Kibber WLS (Lahaul & Spiti), Pooh (Kinnaur). **UK:** Gangotri NP, Above Malari .			
b	**Elevation Range (m asl)**	2800-4200			
c	**Data Quality (Please refer briefing book)**	2 & 3			
10	**Extent of Occurrence in Km^2 (EOO)** **[Global]** **[Regional]**	 >20,000 km^2 ≈10,000 km^2			
11	**Area of Occupancy in Km^2 (AOO)** **[Global]** **[Regional]**	 NA ≈2000 km^2			
12a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**	**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
					√
b	**Time /Rate (3 generations or 10 years whichever is longer)**	10 years			

13	**Threats**		Recurrent demand		
14	**Are the populations in adjoining states facing similar threats/pressures?**		Yes		
15	**Trade**	**Names**	Zufah		
		Level (s)	**Local**	**Regional**	**National**
		Parts traded	Flower		
		Effect on population	Declining		
		Data Quality	2 & 3		
16	**Other comments**		• Also used as insect repellant in Spiti		
17	**Existing Status**		VU (as per Shimla CAMP, 2003)		
	- CITES		-		
	- Legislation (Pl. Specify)		-		
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		Rana, B. S., 1993-96. Long-term monitoring in Pin Valley NP.		
19	**Conservation measures under implementation in the State**		NA		
20	**Record of cultivation, if any**		NA		
21	**Criteria based on (Please refer briefing book)**		A2c,d		
	Red List Status Assigned		**NT**		
22	**Data sources used in the present CAMP**		Flora, Papers, Group discussion.		
23	**Recommendations**		-		
	Management		-		
	a) *in situ*		Population to be marked & monitored in PA's		
	b) *ex situ*		-		
	i)Research		Market Survey, Screening of population		
	ii) Cultivation (if agro techniques are available)		Agro-techniques to be developed.		
	iii) Germplasm banks		Required		
24	**Compilers**		Group-I		
25	**Reviewers**		WG II & Plenary		

27

Juniperus communis L.

Dense thicket forming aromatic shrubs upto 75 cm tall. Leaves needle-like, in whorls of threes, spreading at right angles from the branchlets. Male cones small, ovoid. Female cones solitary, globose, bluish–black when ripe.

S. No.	Data Items	
1	**Basionym / Synonym (s)**	*Juniperus communis* L. var. *saxatilis* Pallas
2	**Family**	Cupresaceae.
3	**Taxonomic Status**	Species
4	**Vernacular Names**	Shur (Lahual); Jheleru (Kinnaur); Shukpa (Spiti); Bhethal (Kumaon); Chil (Garhwal)
5	**Habit**	Stunted / prostrate shrub
6	**Habitat**	Alpine dry scrub.
7	**Original Global Distribution**	Europe, North Africa, North America, Central Asia, Himalaya, India, Nepal, China, Bhutan.
8a	**Recorded Distribution in India (by States)**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Sikkim
b	**Distribution within the State/ region**	**HP:** Chamba, Kangra, Lahaul & Spiti, Kinnaur **UK:** Uttarkashi, Rudraprayag, Tehri, Chamoli, Bagahwar, Pithoragarh
c	**% of global distribution in the State/region**	≈1%
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Kugti WLS, Sechu Tuan (Chamba); Dhauladhar WLS (Kangra); Rohtang, GHNP (Kullu); Rakcham-Chitkul (Kinnaur); Pattan Valley, Miyad Valley, Darcha (Lahaul & Spiti); Chanshal (Shimla). **UK:** Gangotri NP, NDBR, Johar Valley
b	**Elevation Range (m asl)**	3000-4000
c	**Data Quality (Please refer briefing book)**	2 & 3
10	**Extent of Occurrence in Km^2 (EOO)** **[Global]** **[Regional]**	 >20,000 km^2 >20,000 km^2
11	**Area of Occupancy in Km^2 (AOO)** **[Global]** **[Regional]**	 ≈2000 km^2

12 a	Assessment of Population Reduction, if any (pl. tick in appropriate cell)		≥ 80%	50 to 80%	30 to 49%	< 30%
					√	
b	Time /Rate (3 generations or 10 years whichever is longer)		3 Generations			
13	Threats		Over-collection for fuel-wood.			
14	Are the populations in adjoining states facing similar threats/pressures?		Yes			
15	Trade	Names	Hauber			
		Level (s)	Local	Regional	National	
					√	
		Parts traded	Fruits-Seeds			
		Effect on population	Declining			
		Data Quality	2 & 3			
16	Other comments		Locally used for fuel.			
17	Existing Status		-			
	- CITES		-			
	- Legislation (Pl. Specify)		-			
18	Recent field studies (Please site author, year of study, title of study, publications etc.)		Uniyal, S. K., 2009. Rana, B. S., 2005. Jishtu, V., 2006.			
19	Conservation measures under implementation in the State		-			
20	Record of cultivation, if any		-			
21	Criteria based on (Please refer briefing book)		A2c,d			
	Red List Status Assigned		VU			
22	Data sources used in the present CAMP		Flora, Paper, Group discussion.			
23	Recommendations		-			
	Management		-			
	a) *in situ*		PMPs			
	b) *ex situ*		-			
	i) Research		Market survey			
	ii) Cultivation (if agro techniques are available)		-			
	iii) Germplasm banks		Nursery			
24	Compilers		Group-I			
25	Reviewers		WG II & Plenary			

28

Jurinia dolomiaea Boiss.

Low perennial herbs with rosette of radical leaves and aromatic roots. Leaves oblong blunt, pinnately lobed, spinescent, white woolly beneath and with purple mid veins. Flowers purple in sessile or short stalked heads in central domed clusters.

S. No.	Data Items	Details
1	**Basionym / Synonym (s)**	*J. macrocephala* (Royle) Cl.
2	**Family**	Asteraceae
3	**Taxonomic Status**	Species
4	**Vernacular Names**	Dhoop, Dhoop Lakkad, Jari-Dhoop.
5	**Habit**	Prostrate Perennial Herbs
6	**Habitat**	Periodically in Alpine pasture/slopes-frequent in rocky crevices and glacial moraines.
7	**Original Global Distribution**	Pakistan, India, East Nepal & China.
8a	**Recorded Distribution in India (by States)**	Jammu & Kashmir, Himachal Pradesh, Uttarkhand
b	**Distribution within the State/ region**	**HP:** Chamba, Shimla Kangra, Kullu, Kinnaur. **UK:** Chamoli, Uttarkashi.
c	**% of global distribution in the State/region**	≈40% 15% (HP), 10% (J&K), 15% (UK).
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Pangi-Bharmour, Mani Mahesh, (Chamba -2 poplns.); Chandernalah, Chanshal, Gorju, Kalga Pattan, Mural Danda (Shimla-5 poplns.); Dainsar & Thamsar (Kangra-2 poplns.); Parvati Valley, Rorang Thatch (Kullu-2 poplns.); Chitkul, Sangla, Manjiban Kandas (Kinnaur-4 poplns.) **UK:** Garbyang, Lissar Yangi (Darma); Panch Chuli, Ralam, Laspa & Martoli (Johar); Valley of Flowers, Gidara, Kyarki, Harkidoon
b	**Elevation Range (m asl)**	3400-4500
c	**Data Quality (Please refer briefing book)**	2, 3& 4
10	**Extent of Occurrence in Km^2 (EOO)** **[Global]** **[Regional]**	>20,000 km^2
11	**Area of Occupancy in Km^2 (AOO)** **[Global]** **[Regional]**	>2000 km^2

12 a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**		**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
			√			
b	**Time /Rate (3 generations or 10 years whichever is longer)**		10 years			
13	**Threats**		Lf (Loss of habitat-fragmentation), Lp (Loss of habitat-quality), T (Trade)			
14	**Are the populations in adjoining states facing similar threats/pressures?**		Yes			
15	**Trade**	**Names**	Dhoop			
		Level (s)	**Local**	**Regional**	**National**	
			√	√	√	
		Parts traded	Roots			
		Effect on population	Declining			
		Data Quality	2, 3 & 4			
16	**Other comments**		• Over exploited for trade; about 1000-2000 metric tonnes per year (Ref -Demand & Supply of Medicinal Plants in India by Ved, D. K & Goraya, G. S)			
17	**Existing Status**		-			
	- CITES		-			
	- Legislation (Pl. Specify)					
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		Singh, S. K., Chauhan, N. S., Badola, H. K. Verma, R. K. & Kapoor, K. S. -Plant Wealth in Cold Desert, Kinnaur, H.P. Verma, R. K, 2009. Project Report Rakcham-Chitkul WLS.			
19	**Conservation measures under implementation in the State**		NMPB sponsored projects in four Districts of H.P. by H.P. Forest Dept.			
20	**Record of cultivation, if any**		-			
21	**Criteria based on (Please refer briefing book)**		- A2c, d			
	Red List Status Assigned		**CR**			
22	**Data sources used in the present CAMP**		Literture & Field observations. Alpine Meadows of Uttarakhand- Rawat, G. S M&AP of HP –Chauhan, N. S. Demand & Supply of Medicinal Plants in India by Ved, D. K. & Goraya, G. S.			
23	**Recommendations**		Habitat management Monitoring & Evaluation.			
	Management		• Sustainable Harvest recommended, • Marketing Intervention required, • Herb collector should be organized, • Effective Rotational closure of the area recommended.			
	a) *in situ*		**J&K:** In Pir Panjal, Wadwan, Sarthal, Serz **HP:** Pangi (Bharmour), Chhota & Bada Bhangal (Kangra), Parvati Valley (Kullu) **UK:** Dayara (Uttarkashi), Tungnath (Chamoli)			
	b) *ex situ*		-			
	i) Research		-			
	ii) Cultivation (if agro techniques are available)		Agro-techniques should be standardized.			
	iii) Germplasm banks		-			
24	**Compilers**		Group-III			
25	**Reviewers**		WG IV & Plenary			

29

Lilium polyphyllum D. Don

Bulbous branched herbs up to 120 cm tall. Leaves alternate, lower whorled, lanceolate to linear-lanceolate, acute, with hairy margins. Flowers dull greenish yellow spotted with pink within, pendulous, fragrant. Stamens red, protruding. Fruits oblong, 3-angled capsules; seeds winged.

S. No.	Data Items	Details			
1	**Basionym / Synonym (s)**	NA			
2	**Family**	Liliaceae			
3	**Taxonomic Status**	Species			
4	**Vernacular Names**	Kakoli, Kshirkakoli			
5	**Habit**	Herb - perennial			
6	**Habitat**	Forest undergrowth rich in humus.			
7	**Original Global Distribution**	Afghanistan to Uttrakhand			
8a	**Recorded Distribution in India (by States)**	Western Himalaya States (H.P, J&K, U.K)			
b	**Distribution within the State/ region**	**HP:** Haripurdhar, Churdhar (Sirmour), Hatu, Chail, Adugarh (Rampur)			
c	**% of global distribution in the State/region**	≈80%			
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Hatu Park (Narkanda forest), Chail(Solan), Sungri Bali, Adugarh (Rampur). **UK:** Kaddukhal in Tehri, Gangotri NP.			
b	**Elevation Range (m asl)**	2100-3300			
c	**Data Quality (Please refer briefing book)**	2 & 3			
10	**Extent of Occurrence in Km^2 (EOO)** **[Global]** **[Regional]**	>20,000 km^2 <16,000 km^2			
11	**Area of Occupancy in Km^2 (AOO)** **[Global]** **[Regional]**	>2000 km^2 <500 km^2			
12a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**	**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
		√			
b	**Time /Rate (3 generations or 10 years whichever is longer)**	10 years			

13	**Threats**		Lf (Loss of habitat-fragmentation), Lp (Loss of habitat-quality), Hm (Harvest for medicine), Tp (Trade for parts)		
14	**Are the populations in adjoining states facing similar threats/pressures?**		Yes		
15	**Trade**	**Names**	Kakoli		
		Level (s)	**Local**	**Regional**	**National**
			√	√	√
		Parts traded	Bulbs		
		Effect on population	Declining		
		Data Quality	2 & 3		
16	**Other comments**		• Used in Ashtavarga (a combination of 8 rejuvenating drugs in preparation of the famous Ayurvedic tonic -Chyavanprash).		
17	**Existing Status**		-		
	- CITES		-		
	- Legislation (Pl. Specify)		-		
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		M & AP of H P: Chauhan, N. S. Booklet: Sharma, B. D. & Bal Krishan Nature's MP of Uttaranchal Vol. II: Shah, Rakesh.		
19	**Conservation measures under implementation in the State**		-		
20	**Record of cultivation, if any**		-		
21	**Criteria based on (Please refer briefing book)**		A2c,d		
	Red List Status Assigned		**CR**		
22	**Data sources used in the present CAMP**		Goraya, G. S Sharma, B. D Chauhan, N. S. Jishtu, Vaneet.		
23	**Recommendations**		Status survey & conservation of existing sites		
	Management		-		
	a) *in situ*		Protection of existing sites		
	b) *ex situ*		Establishment of germplasm bank		
	i) Research		Status survey & development of propagation techniques, seed studies		
	ii) Cultivation (if agro techniques are available)		-		
	iii) Germplasm banks		To be established		
24	**Compilers**		Group-II		
25	**Reviewers**		WG III & Plenary		

30

Litsea glutinosa (Lour.) C. B. Rob.

Evergreen trees up to 8 m tall, with grey brown rough corky bark. Leaves ovate to elliptic ovate, grey tomentose beneath. Flowers small, yellowish-green, borne in umbel like clusters. Fruit globose, with persistent perianth, turning black when ripe.

S. No.	Data Items	Details
1	**Basionym / Synonym (s)**	*Litsea chinensis* Lam. *L. sebifera* Pers. *Sebifera glutinosa* Lour.
2	**Family**	Lauraceae
3	**Taxonomic Status**	Species
4	**Vernacular Names**	Medh, Menda, Maidalakri. Snehavati, Common Tallow Laruel, Guan (Kangra)
5	**Habit**	Tree
6	**Habitat**	Sub Himalayan Track & Central and Outer Hill Ranges, Common in Moist areas
7	**Original Global Distribution**	India, Srilanka,China, Australia, Malaya
8a	**Recorded Distribution in India (by States)**	Himalaya, Assam, Meghalaya, Deccan Peninsula.
b	**Distribution within the State/ region**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand
c	**% of global distribution in the State/region**	< 1%
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Chamba, Kangra, Sirmour **UK:** Dehradun, Haldwani, Tanakpur, Ramnagar, Rajaji National Park.
b	**Elevation Range (m asl)**	Upto 1000
c	**Data Quality (Please refer briefing book)**	3
10	**Extent of Occurrence in Km^2 (EOO) [Global] [Regional]**	-
11	**Area of Occupancy in Km^2 (AOO) [Global] [Regional]**	-

12 a	Assessment of Population Reduction, if any (pl. tick in appropriate cell)		≥ 80%	50 to 80%	30 to 49%	< 30%
b					√	
	Time /Rate (3 generations or 10 years whichever is longer)		3 Generations			
13	Threats		Hm (Harvest for medicine), Tp (Trade for parts)			
14	Are the populations in adjoining states facing similar threats/pressures?					
15	Trade	Names	Maindalakri			
		Level (s)	Local	Regional	National	
			√			
		Parts traded	Bark			
		Effect on population	Declining			
		Data Quality	3			
16	Other comments		Besides being medicinal, it is known to be used as Jigat.			
17	Existing Status		-			
	- CITES		-			
	- Legislation (Pl. Specify)		-			
18	Recent field studies (Please site author, year of study, title of study, publications etc.)		-			
19	Conservation measures under implementation in the State		-			
20	Record of cultivation, if any		-			
21	Criteria based on (Please refer briefing book)		A2c,d			
	Red List Status Assigned		VU			
22	Data sources used in the present CAMP		3			
23	Recommendations		-			
	Management		-			
	a) *in situ*		-			
	b) *ex situ*		-			
	i) Research		To be taken up for resource augmentation under social forestry.			
	ii) Cultivation (if agro techniques are available)		-			
	iii) Germplasm banks		-			
24	Compilers		Group-IV			
25	Reviewers		WG I & Plenary			

31

Malaxis acuminata D. Don

Gregarious bulbous herbs up to 35 cm tall. Leaves 2-4, ovate lanceolate with wavy margins and prominent veins. Flowers pale yellow to green tinged with purple in the middle, inverted, borne in many flowered spikes. Lip broad ovate, erect, shield like.

S. No.	Data Items	Details
1	**Basionym / Synonym (s)**	*Microstylis wallichii* Lindl.
2	**Family**	Orchidaceae
3	**Taxonomic Status**	Species
4	**Vernacular Names**	Vridhi, Rishabk
5	**Habit**	Terrestrial herbs
6	**Habitat**	Damp & shady forest floors, Tropical to Temperate
7	**Original Global Distribution**	H.P to A.P, Myanmar, SE Asia, China
8a	**Recorded Distribution in India (by States)**	H.P, J&K, U.K, NE, South India, Andaman
b	**Distribution within the State/ region**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand
c	**% of global distribution in the State/region**	≈ 30-40%
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Shimla Hills, Shilly WLS, Chail, Hatu, Sirmour Hills, Churdhar, Narkanda, Khajjiar to Chamba **UK:** Dehradun, Mussoorie, Mandal (Chamoli), Nainital, Pauri, Jaunsar, Gopeshwar, Almora-Ranikhet, Chakrata, Ukhimath
b	**Elevation Range (m asl)**	600-3000
c	**Data Quality (Please refer briefing book)**	2 & 3
10	**Extent of Occurrence in Km^2 (EOO)** **[Global]** **[Regional]**	 >20,000 km^2 <10,000 km^2
11	**Area of Occupancy in Km^2 (AOO)** **[Global]** **[Regional]**	 4000 km^2 1000 km^2

12 a	Assessment of Population Reduction, if any (pl. tick in appropriate cell)		≥ 80%	50 to 80%	30 to 49%	< 30%
					√	
b	Time /Rate (3 generations or 10 years whichever is longer)		10 years			
13	Threats		Lf (Loss of habitat-fragmentation), Lp (Loss of habitat-quality), Hm (Harvest for medicine), Tp (Trade for parts)			
14	Are the populations in adjoining states facing similar threats/pressures?		Yes			
15	Trade	Names	Jeevak/ Rishbak			
		Level (s)	Local	Regional	National	
			√	√	√	
		Parts traded	Tuberous roots			
		Effect on population	Declining			
		Data Quality	2 & 3			
16	Other comments		• Used in Chayawanprash. • Used as aphrodisiac & tonic			
17	Existing Status		VU			
	- CITES		-			
	- Legislation (Pl. Specify)		-			
18	Recent field studies (Please site author, year of study, title of study, publications etc.)		M & AP of H P: Chauhan, N. S. Booklet: Sharma, B. D. & Bal Krishan Nature's MP of Uttaranchal Vol. II: Shah, Rakesh. Flora of Distt. Garhwal N.W. Himalayas: Gaur, R. D. Flora of Chamba Distt.:Singh, H. & Sharma, M.			
19	Conservation measures under implementation in the State		-			
20	Record of cultivation, if any		-			
21	Criteria based on (Please refer briefing book)		A2, cd			
	Red List Status Assigned		VU			
22	Data sources used in the present CAMP		Chauhan, N. S. Sharma, B. D. Kapoor, K. S. Negi, P. S.			
23	Recommendations		Status survey & propagation techniques			
	Management		-			
	a) *in situ*		Protection of existing population			
	b) *ex situ*		Establishment of field gene bank			
	i) Research		Development of propagation techniques			
	ii) Cultivation (if agro techniques are available)		-			
	iii) Germplasm banks		To be established			
24	Compilers		Group-II			
25	Reviewers		WG III & Plenary			

32

Malaxis muscifera (Lindl.) Kuntze

Delicate herbs up to 25 cm tall. Leaves 2, unequal, elliptic to oblong-lanceolate, acute or sub-acuminate, sheathing. Flowers minute, pale yellow-green, numerous, arranged in a lax narrow cylindrical spike.

S. No.	Data Items	Details
1	**Basionym / Synonym (s)**	*Microstylis muscifera* (Lindl.) Ridley *Dienia muscifera* Lindl.
2	**Family**	Orchidaceae
3	**Taxonomic Status**	Species
4	**Vernacular Names**	Jeevak
5	**Habit**	Herb – terrestrial (Orchid)
6	**Habitat**	Temperate moist forests rich in humus in Himalayas
7	**Original global distribution**	Himalayan mountains from Pakistan to Sikkim-Bhutan, China
8a	**Recorded Distribution in India (by States)**	Western Himalayan States of H.P, J&K, U.K & N.E. (Sikkim)
b	**Distribution within the State/ region**	**HP:** Kullu, Kashadhar Range, Sarsu Top, Tundabhoj, Simla Hills, Kinnaur, Chamba
c	**% of global distribution in the State/region**	≈30-50%
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Khashdhar Range (Rohru), Rahla Forest (Kullu), Sarsu Top (Sirmour), Sangla (Kinnaur), Shimla Hills (Shimla, Kufri). **UK:** Govind NP, Kush Kalyani, Kedarnath WLS, Nanda Devi NP.
b	**Elevation Range (m asl)**	1800-3500
c	**Data Quality (Please refer briefing book)**	2 &3
10	**Extent of Occurrence in Km^2 (EOO)** **[Global]** **[Regional]**	 >20,000 km^2 >5,000 km^2
11	**Area of Occupancy in Km^2 (AOO)** **[Global]** **[Regional]**	 2000 km^2 500 km^2

12 a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**		**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
				√		
b	**Time /Rate (3 generations or 10 years whichever is longer)**		10 years			
13	**Threats**		Lf (Loss of habitat-fragmentation), Lp (Loss of habitat-quality), Hm (Harvest for medicine), Tp (Trade for parts)			
14	**Are the populations in adjoining states facing similar threats/pressures?**		Yes			
15	**Trade**	**Names**	Jeevak			
		Level (s)	**Local**	**Regional**	**National**	
			√	√	√	
		Parts traded	Tubers			
		Effect on population	Declining			
		Data Quality	2 & 3			
16	**Other comments**		• Used in Ashtavarga (a combination of 8 rejuvenating drugs in preparation of the famous Ayurvedic tonic-Chyavanprash).			
17	**Existing Status**		-			
	- CITES		Appendix-II			
	- Legislation (Pl. Specify)		-			
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		M & AP of H P: Chauhan, N. S. Vitality strengthening Astavarga Plants: Sharma, B. D & Bal Krishan Res. Paper: R. S. Chauhan *et al*. 2008 MIDS Journal			
19	**Conservation measures under implementation in the State**		-			
20	**Record of cultivation, if any**		-			
21	**Criteria based on (Please refer briefing book)**		A2c,d			
	Red List Status Assigned		**CR**			
22	**Data sources used in the present CAMP**		Chauhan, N. S. Sharma, B. D. Negi, P. S. Sharma, Sandeep.			
23	**Recommendations**		Status survey & development of propagation techniques			
	Management		-			
	a) *in situ*		Protection of existing areas needed			
	b) *ex situ*		Establishment of germplasm bank			
	i) Research		Status survey & development of propagation techniques			
	ii) Cultivation (if agro techniques are available)		-			
	iii) Germplasm banks		To be established			
24	**Compilers**		Group-II			
25	**Reviewers**		WG III & Plenary			

33

Nardostachys grandiflora DC.

Erect perennial herbs up to 40 cm tall with woody rhizomatic and aromatic rootstock bearing tail like brown fibres. Leaves narrowly spatulate, margin entire, apex obtuse. Flowers creamy-white to rosy pale pink, borne in corymbose cymes.

S. No.	Data Items	Details
1	**Basionym / Synonym (s)**	*Nardostachys jatamansi* DC.
2	**Family**	Valerianaceae
3	**Taxonomic Status**	Species
4	**Vernacular Names**	Jatamansi, Masi, Mansi, Machhi, Belchharh, Bhoothkesi.
5	**Habit**	Erect Perennial Herbs; 10 to 60cm tall
6	**Habitat**	Alpine Himalayas in open grassy meadows & on shady moist rocky slopes.
7	**Original Global Distribution**	India, Nepal, SW China, Bhutan, Myanmar
8a	**Recorded Distribution in India (by States)**	Himachal Pradesh, Uttarakhand, Arunachal Pradesh, Sikkim.
b	**Distribution within the State/ region**	**HP:** Kinnaur, Kullu, Shimla **UK:** Chamoli, Uttarkashi.
c	**% of global distribution in the State/region**	≈25% 10% (HP), 40% (UK), 30% (Sikkim), 20% (Arunachal Pradesh)
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Kullu, Sainj & Tirthan Valley (GHNP), Manjiban, Jakha Kanda, Tangan Khai, Dodra Kwar. **UK:** Uttarkashi, Gangotri NP, Govind, Bhilangana, Kedarnath WLS, Panch Chuli, Ralam, NDBR, Valley of Flowers, Gidara &Khatling.
b	**Elevation Range (m asl)**	3000-4000
c	**Data Quality (Please refer briefing book)**	2 & 3
10	**Extent of Occurrence in Km^2 (EOO) [Global] [Regional]**	>20,000 km^2
11	**Area of Occupancy in Km^2 (AOO) [Global] [Regional]**	>2000 km^2

12 a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**		**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
				√		
b	**Time /Rate (3 generations or 10 years whichever is longer)**		10 years			
13	**Threats**		Lf (Loss of habitat-fragmentation), T (Trade), Hm (Harvest for medicine)			
14	**Are the populations in adjoining states facing similar threats/pressures?**		Yes			
15	**Trade**	**Names**	Jatamansi			
		Level (s)	**Local**	**Regional**	**National**	
			√	√	√	
		Parts traded	Roots			
		Effect on population	Declining			
		Data Quality	2 & 3			
16	**Other comments**		• Trade at National & Global level. • Standardize the marketing channels			
17	**Existing Status**		-			
	- CITES		-			
	- Legislation (Pl. Specify)		Negative list of exports.			
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		Badola, H. K. & Pal, M. 2002. Current Science, 83 (7), 797-798. Chauhan, N. S. Kinnaur to Kullu (1984-90) Badola, H. K. (Parvati Valley), Kala, C. P. & Singh, Sanjay K.			
19	**Conservation measures under implementation in the State**		NMPB supported projects in 4 Districts of H.P. Dept. of Ayurveda promoting.			
20	**Record of cultivation, if any**		Cultivations of farmers (NMPB sponsored projects)			
21	**Criteria based on (Please refer briefing book)**		A2c,d			
	Red List Status Assigned		**EN**			
22	**Data sources used in the present CAMP**		Floras, Reports, Articles, RD market observations, Personal Field observations.			
23	**Recommendations**		-			
	Management		Habitat Management (Hm) Survey, Search (S) Monitoring (M) Life History Studies (Lh)			
	a) *in situ*		Protected Area Networks **HP:** Manjivan, Thanunkhai (Shimla) **UK:** Kandara, Thunnag, Khatling. These areas needs to be protected.			
	b) *ex situ*		-			
	i) Research		-			
	ii) Cultivation (if agro techniques are available)		HAPPRC-has the techniques of cultivation. Recommended for Agro-Techniques standardization.			
	iii) Germplasm banks		Forest Nursery, UHF Nauni Research Station.			
24	**Compilers**		Group-III			
25	**Reviewers**		WG IV & Plenary			

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Onosma hispidum Wall. ex G. Don

Perennial bristly hairy herbs with branches up to 70 cm long. Basal leaves long, linear to oblanceolate; stem leaves broader and shorter. Flowers creamish-white to pale-yellow, long tubular in forked elongated clusters with leaf-like bracts.

S. No.	Data Items	Details			
1	**Basionym / Synonym (s)**	NA			
2	**Family**	Boraginaceae			
3	**Taxonomic Status**	Species			
4	**Vernacular Names**	Ratanjot, Khome (Kinnaur)			
5	**Habit**	Herb -perennial			
6	**Habitat**	Dry rocky slopes in Trans Himalaya.			
7	**Original Global Distribution**	Afghanistan, Pakistan, India			
8a	**Recorded Distribution in India (by States)**	Jammu & Kashmir, Himachal Pradesh			
b	**Distribution within the State/ region**	**HP:** Sechu Tuan (Chamba); Dolo Dogri (Kinnaur); Lahaul & Spiti			
c	**% of global distribution in the State/region**	≈50%			
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Sechu Tuan (Chamba); Dolo Dogri (Kinnaur); Gemur (Lahaul & Spiti)			
b	**Elevation Range (m asl)**	2400-4000			
c	**Data Quality (Please refer briefing book)**	2 & 3			
10	**Extent of Occurrence in Km^2 (EOO)** [Global] [Regional]	>20,000 km^2 ≈10,000 km^2			
11	**Area of Occupancy in Km^2 (AOO)** [Global] [Regional]	NA ≈300 km^2			
12 a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**	**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
					√
b	**Time /Rate (3 generations or 10 years whichever is longer)**	10 years			

13	**Threats**		• Habitat loss • Over collection		
14	**Are the populations in adjoining states facing similar threats/pressures?**		Not known		
15	**Trade**	**Names**	Gajwan		
		Level (s)	**Local**	**Regional**	**National**
					√
		Parts traded	Leaves (Aerial parts)		
		Effect on population	Declining		
		Data Quality	2 & 3		
16	**Other comments**		Often mistaken as Ratanjot		
17	**Existing Status**		-		
	- CITES		-		
	- Legislation (Pl. Specify)		-		
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		Goraya, G. S. Jishtu, V.		
19	**Conservation measures under implementation in the State**		-		
20	**Record of cultivation, if any**		-		
21	**Criteria based on (Please refer briefing book)**		A2c,d		
	Red List Status Assigned		**NT**		
22	**Data sources used in the present CAMP**		Flora, Paper, Group discussion.		
23	**Recommendations**		-		
	Management		-		
	a) *in situ*		PMP in Lippa Asrang, Sechu Tuan Nala		
	b) *ex situ*		-		
	i) Research		Status survey & screening of material for chemical.		
	ii) Cultivation (if agro techniques are available)		-		
	iii) Germplasm banks		Yes		
24	**Compilers**		Group-I		
25	**Reviewers**		WG II & Plenary		

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Oroxylum indicum (L.) Kurz

Deciduous trees up to 8 m tall. Leaves very large, 3-pinnate, rachis stout ribbed; leaflets opposite, elliptic-ovate, entire, base oblique or rounded. Flowers yellowish with dark purple tinge, funnel shaped. Fruit an elongated brown woody compressed capsule up to 1 m long. Seeds discoid, yellowish-white with transparent wings.

S. No.	Data Items	Details			
1	**Basionym / Synonym (s)**	*Bignonia indica* L.			
2	**Family**	Bignoniaceae			
3	**Taxonomic Status**	Species			
4	**Vernacular Names**	Shyona, Arlu, Ullu, Shyonaka, Indian Trumpet Flower, Tatpalanga (Kangra), Tat (Kinnaur), Tartar (Lahaul)			
5	**Habit**	Tree			
6	**Habitat**	Sub Himalayan Tract/ Sub Tropical Forest and Central and outer hill ranges			
7	**Original Global Distribution**	India, Sri Lanka, Malaya and Cochin-China			
8a	**Recorded Distribution in India (by States)**	Throughout India.			
b	**Distribution within the State/ region**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand			
c	**% of global distribution in the State/region**	<1%			
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Kullu, Kangra, Una, Hamirpur, Bilaspur, Mandi, Chamba, Solan, Sirmour **UK:** Dehradun, Kotdwara, Pauri, Haridwar, Ramnagar			
b	**Elevation Range (m asl)**	Up to 1200			
c	**Data Quality (Please refer briefing book)**	3 General field survey			
10	**Extent of Occurrence in Km^2 (EOO)** **[Global]** **[Regional]**	-			
11	**Area of Occupancy in Km^2 (AOO)** **[Global]** **[Regional]**	-			
12a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**	**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
			√		
b	**Time /Rate (3 generations or 10 years whichever is longer)**	Three generations (45-50yrs)			

13	**Threats**		Hm (Harvest for medicine)		
14	**Are the populations in adjoining states facing similar threats/pressures?**		Yes		
15	**Trade**	**Names**	Shyonak		
		Level (s)	**Local**	**Regional**	**National**
			√	√	√
		Parts traded	Roots, Bark, Fruits, Seeds.		
		Effect on population	• Population reduction • Lack of regeneration.		
		Data Quality	3		
16	**Other comments**		• Needs to be incorporated in Forest Department Plantation Programme. Kinnnauri people use the seeds to fix on the caps in their cultural functions. • Seeds extensively used in Lahaul, Spiti, Kinnaur & Ladakh for religious ceremonies, especially marriages.		
17	**Existing Status**		-		
	- CITES		-		
	- Legislation (Pl. Specify)		-		
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		Chauhan (1999). ICFRE, EIA Studies. Renuka (2008)		
19	**Conservation measures under implementation in the State**		-		
20	**Record of cultivation, if any**		-		
21	**Criteria based on (Please refer briefing book)**		A2c,d		
	Red List Status Assigned		**EN**		
22	**Data sources used in the present CAMP**		3 Informal field citings.		
23	**Recommendations**		-		
	Management		-		
	a) *in situ*		Good seed sources to be identified Plantation to be carried out.		
	b) *ex situ*		Introduction in Arboratums & Botanical Gardens.		
	i)Research		Resource augmentation in lower areas of HP Also provinence trial to be carried out.		
	ii) Cultivation (if agro techniques are available)		-		
	iii) Germplasm banks		-		
24	**Compilers**		Group-IV		
25	**Reviewers**		WG I & Plenary		

36

Paeonia emodi Wall. ex Royle

Large spreading herbs; leaves alternate, 1-2 ternate, entire or deeply cut, glabrous; lamina pale below. Flowers solitary, large, showy, white with orange yellow stamens. Fruit are curved follicles with brown yellow hairs. Seeds oval, shining black.

S. No.	Data Items	Details			
1	**Basionym / Synonym (s)**	NA			
2	**Family**	Paeoniaceae			
3	**Taxonomic Status**	Species			
4	**Vernacular Names**	Udsalap, Udsalib, Chaudrain, Himalayan Pacony, Chandarya.			
5	**Habit**	Perennial Herbs; upto 70 cm tall.			
6	**Habitat**	Partially open scrub to shady moist woodlands.			
7	**Original Global Distribution**	India, Nepal, China, Pakistan & Afghanistan.			
8a	**Recorded Distribution in India (by States)**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand			
b	**Distribution within the State/ region**	**HP:** Nauni **J&K:** Sonmarg **UK:** Binsar			
c	**% of global distribution in the State/region**	≈35%			
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**UK:** Darma Valley, Panch Chuli, Kedarnath WLS, Khatling.			
b	**Elevation Range (m asl)**	2000-3000			
c	**Data Quality (Please refer briefing book)**	2 & 3			
10	**Extent of Occurrence in Km^2 (EOO) [Global] [Regional]**	>20,000 km^2			
11	**Area of Occupancy in Km^2 (AOO) [Global] [Regional]**	>2000 km^2			
12a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**	**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
				√	
b	**Time /Rate (3 generations or 10 years whichever is longer)**	10 years			

13	**Threats**		Lp (Loss of habitat-fragmentation), Hm (Harvest for medicine), Tp (Trade for parts)		
14	**Are the populations in adjoining states facing similar threats/pressures?**		Yes		
15	**Trade**	**Names**			
		Level (s)	**Local**	**Regional**	**National**
			√		
		Parts traded	Roots & Petals		
		Effect on population	Declining		
		Data Quality	2 & 3		
16	**Other comments**		• Grows in Herbal garden of UHF, Nauni. • Exploitation of this plant is not known.		
17	**Existing Status**		-		
	- CITES		-		
	- Legislation (Pl. Specify)		-		
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		-		
19	**Conservation measures under implementation in the State**		-		
20	**Record of cultivation, if any**		Planted in Nauni Garden.		
21	**Criteria based on (Please refer briefing book)**		A2c,d		
	Red List Status Assigned		DD		
22	**Data sources used in the present CAMP**		Literature, Personal field observation.		
23	**Recommendations**		-		
	Management		-		
	a. in situ		-		
	b. ex situ		-		
	Research		Through survey to locate more populations in the state is recommended.		
	ii) Cultivation (if agro techniques are available)		-		
	iii) Germplasm banks		-		
24	**Compilers**		Group-III		
25	**Reviewers**		WG IV & Plenary		

37

Paris polyphylla Sm.

Erect unbranched herbs up to 70 cm tall with thick rhizomes. Leaves up to 9, whorled at the upper half of the stem. Flowers solitary, terminal, short stalked, yellow-greenish. Fruit a globular capsule, yellow brown when ripe. Seeds enveloped by red, succulent aril.

S. No.	Data Items	Details
1	**Basionym / Synonym (s)**	-
2	**Family**	Liliaceae
3	**Taxonomic Status**	Species
4	**Vernacular Names**	Nag-chhatri, Meeti Bach, Kshir-kakoli, Satva.
5	**Habit**	Perennial Erect Herb, upto 50 cm high
6	**Habitat**	In temperate forests along moist shady places and in moist valleys.
7	**Original Global Distribution**	India, Pakistan, Bhutan, SW China, & in NE India.
8a	**Recorded Distribution in India (by States)**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Mizoram.
b	**Distribution within the State/ region**	**HP:** Shimla, Kinnaur, Kullu, Chamba. **J&K:** Poonch, Bhaderwah, Pir panjal Range. **UK:** Uttarkashi, Ralam, Dodital. **Miz:** Lushai & Aka Hills.
c	**% of global distribution in the State/region**	≈15% 2-5% (HP), 2-5% (J&K), 2% (UK), 2% (Miz.)
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** 5 locations **J&K:** 3 Locations **UK:** (10 locations) Govind WLS, KedarnathWLS, Pindari, Khatling Valley, Namik, Gori Valley, Panch Chuli, Darma Valley, Byans Valley.
b	**Elevation Range (m asl)**	1500-3000
c	**Data Quality (Please refer briefing book)**	2 & 3
10	**Extent of Occurrence in Km^2 (EOO) [Global] [Regional]**	>20,000 km^2
11	**Area of Occupancy in Km^2 (AOO) [Global] [Regional]**	>2000 km^2

12 a	Assessment of Population Reduction, if any (pl. tick in appropriate cell)		≥ 80%	50 to 80%	30 to 49%	< 30%
b				√		
	Time /Rate (3 generations or 10 years whichever is longer)		10 years			
13	Threats		L (Loss of habitat), Hm (Harvest for medicine), H (Harvest)			
14	Are the populations in adjoining states facing similar threats/pressures?		Yes			
15	Trade	Names	Khsir-Kakoli, Satva			
		Level (s)	Local	Regional	National	
			√	√		
		Parts traded	Rhizome			
		Effect on population	Declining			
		Data Quality	2 & 3			
16	Other comments		• The rhizomes are sometimes substituted for that of *Lilium polyphyllum* . • As it is one of the 'Ashtawargha' group it needs to be conserved.			
17	Existing Status		-			
	- CITES		-			
	- Legislation (Pl. Specify)		-			
18	Recent field studies (Please site author, year of study, title of study, publications etc.)		Goraya, G. S. & Kumar, K. Ravi, 2000-2006. HP. Sharama,O, P. 1991, J&K. Kiran, H. S.1990. Sarin, Y. K 1982.			
19	Conservation measures under implementation in the State		-			
20	Record of cultivation, if any		-			
21	Criteria based on (Please refer briefing book)		A2c,d			
	Red List Status Assigned		EN			
22	Data sources used in the present CAMP		Flora & Personal observations.			
23	Recommendations		Survey, Search & Monitor the wild populations			
	Management		-			
	a) in situ		-			
	b) ex situ		-			
	i) Research		-			
	ii) Cultivation (if agro techniques are available)		-			
	iii) Germplasm banks		S. Chandola established a germplasm bank at Nald village in Uttarkashi.			
24	Compilers		Group-III			
25	Reviewers		WG IV & Plenary			

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Picrorhiza kurroa Royle ex Benth.

Perennial mat forming herbs. Rhizomes stout, covered with old leaf bases. Leaves spathulate, toothed, arising in whorls from the root stock. Flowers dark blue-purple, borne in dense cylindrical spikes. Stamens and styles exserted. Fruit is an ovoid capsule.

S. No.	Data Items	Details
1	**Basionym / Synonym (s)**	NA
2	**Family**	Scrophulariaceae
3	**Taxonomic Status**	Species
4	**Vernacular Names**	Kutki, Karwi, Karu, Tikta, Kaud, Kakti, Karui.
5	**Habit**	Perennial rhizomatous herbs
6	**Habitat**	Alpine Himalayas on well drained rocky slopes.
7	**Original Global Distribution**	Temperate Asia, Himalayan regions of Pakistan, Nepal
8 a	**Recorded Distribution in India (by States)**	Jammu & Kashmir, Himachal Pradesh, Uttarkhand, Sikkim.
b	**Distribution within the State/ region**	**HP:** Chamba, Kangra, Kinnaur, Kullu, Lahaul Shimla **UK:** Chamoli, Uttarkashi.
c	**% of global distribution in the State/region**	≈30% 10% (HP), 10% (UK), 10% (J&K)
9 a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Dainsar & Thamsar areas of Chhota & Bada Bhangal (Kangra-2 poplns.); Jutadhar & Manimahesh in Pangi Bharmour (Chamba-2 poplns.); Sangla Pass (Kinnaur-1popln.); Rohtang Pass, GHNP, Parvati Valley (Kullu-3 poplns.); Chansal Ghati (Shimla). **UK:** Byans, Darma, Panch Chuli, Ralam, Johar, Pindari, Valley of Flowers, Kedarnath, Khatling, Shastra Tal, Kyarki, Gidara, Harkidoon (Uttarkashi & Chamoli).
b	**Elevation Range (m asl)**	3200-4500
c	**Data Quality (Please refer briefing book)**	2 & 3
10	**Extent of Occurrence in Km^2 (EOO) [Global] [Regional]**	>20,000 km^2
11	**Area of Occupancy in Km^2 (AOO) [Global] [Regional]**	>2000 km^2

12 a	Assessment of Population Reduction, if any (pl. tick in appropriate cell)		≥ 80%	50 to 80%	30 to 49%	< 30%
			√			
b	Time /Rate (3 generations or 10 years whichever is longer)		10 years			
13	Threats		Lf (Loss of habitat-fragmentation) Lp (Loss of habitat-quality), Hm (Harvest for medicine),Tp (Trade for parts), Ov (Over-exploitation), Hp (Harvest for parts) *Pluria orichalcea* is reported as serious defoliator in nursey raised plants. (Singh & Pandey, 2009. Pest Management & Economic Zoology Vol. 17(1).			
14	Are the populations in adjoining states facing similar threats/pressures?		Yes			
15	Trade	Names	Kutki, Karu, Kauri, Karvi			
		Level (s)	Local	Regional	National	
			√	√	√	
		Parts traded	Roots (Rhizomes & Stolons)			
		Effect on population	Declining			
		Data Quality	2 & 3			
16	Other comments		• Rhizomes highly traded, over collection leads to heavy population decline.			
17	Existing Status		-			
	- CITES		Appendix-II			
	- Legislation (Pl. Specify)		Negative list of Export.			
18	Recent field studies (Please site author, year of study, title of study, publications etc.)		Singh, Tara. Phd Thesis, UHF Nauni, 2005. Verma, R. K. Final Technical Report of Rakcham - Chitkul WLS. Verma, R. K & Kapoor, K. S. Plant Wealth in Cold Deserts, Kinnaur (HP). 2009.			
19	Conservation measures under implementation in the State		NMPB sponsored projects for 4 Districts of H.P. by HP FD & HFRI 2008-2013. Dept. of Ayurveda sponsored projects promoting cultivation through farmers. (2008-2013)			
20	Record of cultivation, if any		NMPB sponsored projects on the multiplication of *P. kurrooa*, operated by HFRI(2009) European Commission sponsored project, (Med. & Aromatic Plants) implemented by an NGO called PRAGYA in Lahual Block since 2005 (DABUR information).			
21	Criteria based on (Please refer briefing book)		A2c,d			
	Red List Status Assigned		CR			
22	Data sources used in the present CAMP		Floras, Reports, Res articles Personal field observations.			
23	Recommendations		-			
	Management		-			
	a) *in situ*		HFRI is currently undertaking studies in chemical screening of elite population for both *in situ* & *ex situ* conservation.			
	b) *ex situ*		-			
	i) Research		Survey, Monitoring, Habitat Mangement, Life history Studies are recommended.			
	ii) Cultivation (if agro techniques are available)		Agro technology already developed by HFRI, UHF Nauni.			
	iii) Germplasm banks		HFRI & Forest department nurseries; UHF Research Station, Herbal gardens of AYUSH.			
24	Compilers		Group-III			
25	Reviewers		WG IV & Plenary			

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Podophyllum hexandrum Royle

Erect, glabrous, fleshy or succulent herbs up to 1 m tall with short, horizontally creeping rhizomes. Stems bear 1-3 leaves that are 3-5 lobed with serrate margins. Flowers single, large white to pale pink, borne at the tip of the plant. Fruit a oblong-ovoid or oblong-ellipsoid berry, turning scarlet-red, pulpy on ripening.

S. No.	Data Items	Details
1	**Basionym / Synonym (s)**	*P.emodi* Wall ex Royle
2	**Family**	Berberidaceae
3	**Taxonomic Status**	Species
4	**Vernacular Names**	Bankakri, Kandari mokri, Giriparpat, Rikhpat, Papra, Purkhalo, Ghyu Churpu, Barkhaal, Ol-Mose.
5	**Habit**	Perennial Erect Herb, 35-60 cm tall
6	**Habitat**	Sub-alpine to temperate regions, moist shady places with humus rich soil.
7	**Original Global Distribution**	India, Nepal, Pakistan, Afganistan, Bhutan, SW China , Myanmar.
8 a	**Recorded Distribution in India (by States)**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand
b	**Distribution within the State/ region**	**HP:** Shimla, Chamba, Kinnaur, Kangra, Kullu, Lahaul & Spiti. **J&K:** Jai, Tongmong, Santhal. **UK:** Dehradun, Uttarkashi, Chamoli, Pithoragarh
c	**% of global distribution in the State/region**	≈20-25% 12% (J&K), 7% (HP), 7% (UK)
9 a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Kharapathar; Dhamrerha, Rohru; Larot (Shimla-3 poplns.); Lakad Mandi, Kalatop WLS, Harsar-Bharmour, Pangi, Khajjiar (Chamba-5 poplns.); Chitkul, Sangla Valley (Kinnaur-1 popln.); Bada Bhangal (Kangra-1 popln.); Rahla (Kullu-1 popln.); Churdhar (Sirmour-1 popln.) **UK:** Kulti in Byans, Bedang in Darma, Panch Chuli, Ralam, Ghangarea (Valley of Flowers), Badrinath, Kedarnath, Gidara, Harkidoon.
b	**Elevation Range (m asl)**	2000-4600
c	**Data Quality (Please refer briefing book)**	2 & 3
10	**Extent of Occurrence in Km^2 (EOO) [Global] [Regional]**	>20,000 km^2

11	**Area of Occupancy in Km^2 (AOO) [Global] [Regional]**		>2000 km^2			
12 a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**		**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
				√		
b	**Time /Rate (3 generations or 10 years whichever is longer)**		10 years			
13	**Threats**		Lf (Loss of habitat-fragmentation), Lp (Loss of habitat-quality)			
14	**Are the populations in adjoining states facing similar threats/pressures?**		Yes			
15	**Trade**	**Names**	Bankakri			
		Level (s)	**Local**	**Regional**	**National**	
		Parts traded	Roots & Rhizome			
		Effect on population	Declining			
		Data Quality	2 & 3			
16	**Other comments**		• Poor natural regeneration due to seed dormancy (HPU, 2002). • Roots & rhizomes are used for drugs by pharmaceutical industry. • Fruits are consumed by Gujjars. • Goats are fond of fruits.			
17	**Existing Status**		-			
	- CITES		Appendix-II			
	- Legislation (Pl. Specify)		Negative list of export, 1998.			
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		• Mahajan, Rajneesh. 2004. Studies on Podophyll toxin content in *P. hexandrum*, thesis work. Verma, R. K. & • Kapoor, K. S. HFRI. Final Tech. Report, 2009. • Cytotoxicity of *in vitro* produced Podophyllotoxin from *P. hexandrum* on human cancer cell. Chattapadhyya, 2004.			
19	**Conservation measures under implementation in the State**		Vansapati Vans in Uttarakhand. NMPB sponsored project for *in situ* & *ex situ* conservation of MPs in four dist. of H.P.			
20	**Record of cultivation, if any**		-			
21	**Criteria based on (Please refer briefing book)**		A2c,d			
	Red List Status Assigned		**EN**			
22	**Data sources used in the present CAMP**		Flora Personal field observation			
23	**Recommendations**		-			
	Management		-			
	a) *in situ*		Protected Area Networks			
	b) *ex situ*		-			
	i) Research		HFRI undertaken projects on survey & collection of seeds/ rhizomes for *ex situ* conservation, 2010.			
	ii) Cultivation (if agro techniques are available)		IHBT, Palampur; Forest Campus, Ranichori & UHF, Nauni developed agro-techniques.			
	iii) Germplasm banks		Forest Dept. Nurseries, HFRI Nurseries, NBPGR, Herbal Gardens of UHF.			
24	**Compilers**		Group-III			
25	**Reviewers**		WG IV & Plenary			

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Polygonatum cirrhifolium (Wall.) Royle

Rhizomatous herbs with stems up to 90 cm tall. Rhizomes creeping, tuber-like. Leaves in whorls of 3 to 6; rarely alternate or opposite in lower part of the stem; elliptic to narrowly lanceolate, tip usually coiled, tendril like. Flowers white, tinged with purple, borne in paired clusters of 2-4. Fruit a berry, 8-9 mm in diameter, red to purple-red.

S. No.	Data Items	Details			
1	**Basionym / Synonym (s)**	*Convallaria cirrhifolia* Wall.			
2	**Family**	Liliaceae			
3	**Taxonomic Status**	Species			
4	**Vernacular Names**	Mahameda, Salam-misri, Shwar (Kinnaur)			
5	**Habit**	Herb - perennial			
6	**Habitat**	Temperate forests, natural blanks & scrubs			
7	**Original Global Distribution**	Himachal Pradesh to S.W. China, N.E. India			
8a	**Recorded Distribution in India (by States)**	Himachal Pradesh, Uttarakhand, North East India			
b	**Distribution within the State/ region**	**HP:** Kinnaur, Shimla, Kullu, Mandi, Chamba, Sirmour **UK:** Kumaon & Garhwal			
c	**% of global distribution in the State/region**	≈80%			
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Shimla, Matiana, Narkanda, Chachiot Block (Mandi), Sangla, Bhabha Valley (Kinnaur), Rahla, Parvati Valley, Kashadhar Range (Rohru), Kalatop (Chamba), Churdhar **UK:** Valley of Flowers (outside Park), Govind WLS, Kedarnath			
b	**Elevation Range (m asl)**	1500-3600			
c	**Data Quality (Please refer briefing book)**	2 & 3			
10	**Extent of Occurrence in Km^2 (EOO)** **[Global]** **[Regional]**	 >20,000 km^2 <5,000 km^2			
11	**Area of Occupancy in Km^2 (AOO)** **[Global]** **[Regional]**	 >2000 km^2 ±200 km^2			
12a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**	**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
			√		
b	**Time /Rate (3 generations or 10 years whichever is longer)**	10 years			

13	**Threats**		Lf (Loss of habitat-fragmentation), Lp (Loss of habitat-quality), Hm (Harvest for medicine), Tp (Trade for parts)		
14	**Are the populations in adjoining states facing similar threats/pressures?**		Yes		
15	**Trade**	**Names**	Mahameda/ Medha		
		Level (s)	**Local**	**Regional**	**National**
			√	√	√
		Parts traded	Rhizome		
		Effect on population	Declining		
		Data Quality	2 & 3		
16	**Other comments**		• Used in Chayawanprash as rejuvenator.		
17	**Existing Status**		-		
	- CITES		-		
	- Legislation (Pl. Specify)		-		
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		M & AP of HP: Chauhan, N. S. Booklet: Sharma, B. D & Bal Krishan Nature's MP of Uttranchal Vol. II: Shah, Rakesh. Medicinal Plants of Dolpo: Lama *et al*. 2001.		
19	**Conservation measures under implementation in the State**		-		
20	**Record of cultivation, if any**		-		
21	**Criteria based on (Please refer briefing book)**		A2c,d		
	Red List Status Assigned		**EN**		
22	**Data sources used in the present CAMP**		Chauhan, N. S. Negi, P. S. Sharma, B. D.		
23	**Recommendations**		Population survey & propagation techniques to be developed		
	Management		-		
	a) *in situ*		Protection of existing sites		
	b) *ex situ*		Establishment of field gene bank		
	i) Research		Seed studies and standardisation of propagation techniques		
	ii) Cultivation (if agro techniques are available)		Agrotechniques to be developed		
	iii) Germplasm banks		Field Gene Bank to be established		
24	**Compilers**		Group-II		
25	**Reviewers**		WG III & Plenary		

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Polygonatum multiflorum (L.) All.

Rhizomatous herbs with stems up to 60 cm tall. Rhizomes creeping, tuber-like. Leaves large, alternate, elliptic, tip subacute to obtuse. Flowers white, borne in stalked, pendulous clusters of 2-4 flowers. Fruit globose, bluish-purple berry.

S. No.	Data Items	Details			
1	**Basionym / Synonym (s)**	*Convallaria multiflora* L.			
2	**Family**	Liliaceae			
3	**Taxonomic Status**	Species			
4	**Vernacular Names**	Salam misri			
5	**Habit**	Herb - perennial			
6	**Habitat**	Forests shades and temperate pastures			
7	**Original Global Distribution**	Pakistan, India, Japan, Temperate Asia, Europe			
8a	**Recorded Distribution in India (by States)**	Western Himalayan States of H.P, J&K, U.K.			
b	**Distribution within the State/ region**	**HP:** Kinnaur, Shimla, Kullu, Sirmour, Kangra, Mandi, Chamba			
c	**% of global distribution in the State/region**	≈30-40%			
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Sangla, Nichar, Bhabha Valley (Kinnaur); Chhajpur, Bagigarh, Hatu, Kashapat, Nankhari, Khashadhar Range (Shimla), Shikari Devi/ Chachiot (Mandi), Haripurdhar, Nauradhar (Sirmour); Kalatop, Lakadmandi (Chamba); Chhota & Bada Bhangal (Kangra) **UK:** Dodital, Belak (Uttarkashi), Mandakini Valley, Garhwal			
b	**Elevation Range (m asl)**	2000-3500			
c	**Data Quality (Please refer briefing book)**	2 & 3			
10	**Extent of Occurrence in Km^2 (EOO)** **[Global]** **[Regional]**	>20,000 km^2 >5,000km^2			
11	**Area of Occupancy in Km^2 (AOO)** **[Global]** **[Regional]**	>2000 km^2 <500 km^2			
12a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**	**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
			√		
b	**Time /Rate (3 generations or 10 years whichever is longer)**	10 years			

13	**Threats**		Lf (Loss of habitat-fragmentation), Lp (Loss of habitat-quality), Hm (Harvest for medicine), Tp (Trade for parts)		
14	**Are the populations in adjoining states facing similar threats/pressures?**		Yes		
15	**Trade**	**Names**	Salam misri		
		Level (s)	**Local**	**Regional**	**National**
			√	√	√
		Parts traded	Rhizome		
		Effect on population	Declining		
		Data Quality	2 & 3		
16	**Other comments**		• Harvested for substitute of other species.		
17	**Existing Status**		-		
	- CITES		-		
	- Legislation (Pl. Specify)		-		
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		Flora of Chamba Distt: Singh, H & Sharma, M. Nature's MP of Uttaranchal: Shah, Rakesh.		
19	**Conservation measures under implementation in the State**		-		
20	**Record of cultivation, if any**		-		
21	**Criteria based on (Please refer briefing book)**		A2c,d		
	Red List Status Assigned		**EN**		
22	**Data sources used in the present CAMP**		Chauhan, N. S. Sharma, B. D. Negi, P. S and Sharma, Sandeep. Jishtu, V.		
23	**Recommendations**		Population status survey and propagation techniques to be developed.		
	Management		-		
	a) *in situ*		Protection of existing sites		
	b) *ex situ*		Establishment of field gene bank		
	i) Research		Seed studies and propagation techniques		
	ii) Cultivation (if agro techniques are available)		Agro techniques to be developed.		
	iii) Germplasm banks		Field gene banks to be established		
24	**Compilers**		Group-II		
25	**Reviewers**		WG III & Plenary		

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Polygonatum verticillatum (L.) All.

Rhizomatous herbs with stems up to 90 cm tall. Rhizomes creeping, tuber-like. Leaves in whorls of 3, 6 or 8; sometimes alternate near base of the stem or opposite near apex, elliptic to narrowly lanceolate, tip acute to acuminate. Flowers pale yellow, borne in 1-2 to 4 flowered bunches. Fruit a berry, turning bright red to dark purple.

S. No.	Data Items	Details			
1	**Basionym / Synonym (s)**	*Convallaria verticillata* L.			
2	**Family**	Liliaceae			
3	**Taxonomic Status**	Species			
4	**Vernacular Names**	Mahameda, Salam-misri			
5	**Habit**	Perennial- herbs			
6	**Habitat**	Temperate open & shady areas of higher Himalayas			
7	**Original global distribution**	Pakistan to S.E. Tibet, West Asia & Europe			
8a	**Recorded Distribution in India (by States)**	North-West Temperate Himalayas			
b	**Distribution within the State/ region**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand			
c	**% of global distribution in the State/region**	≈30-50%			
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Narkanda, Hatu, Pabber Valley, Kashapat, Churdhar, Chitkul, Rakcham, Bhabha Valley, Janjehli, Shikari Tibba, Kamrunag, Kheer Ganga, Tosh Nallah, Kothi Range, Baggarh, Bharmour **UK:** Govind WLS, Kedarnath WLS, Valley of Flowers, Pindari			
b	**Elevation Range (m asl)**	1600-4000			
c	**Data Quality (Please refer briefing book)**	2 & 3			
10	**Extent of Occurrence in Km^2 (EOO)** **[Global]** **[Regional]**	 >20,000 km^2 10,000 km^2			
11	**Area of Occupancy in Km^2 (AOO)** **[Global]** **[Regional]**	 >2000 km^2 <1000 km^2			
12a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**	**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
			√		
b	**Time /Rate (3 generations or 10 years whichever is longer)**	10 years			

13	**Threats**		Lf (Loss of habitat-fragmentation), Lp (Loss of habitat-quality), Hm (Harvest for medicine), Tp (Trade for parts)		
14	**Are the populations in adjoining states facing similar threats/pressures?**		Yes		
15	**Trade**	**Names**	Mahameda, Salam-misri		
		Level (s)	**Local**	**Regional**	**National**
			√	√	√
		Parts traded	Rhizomes		
		Effect on population	Declining		
		Data Quality	2 & 3		
16	**Other comments**		• Used in Chayawanprash and other preparations in Ayurveda.		
17	**Existing Status**		-		
	- CITES		-		
	- Legislation (Pl. Specify)		-		
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		M & AP of H P: Chauhan, N. S. Booklet: Sharma, B. D & Bal Krishan Flowers of Himalayas: Oleg Polunin & Adam Stainton		
19	**Conservation measures under implementation in the State**		-		
20	**Record of cultivation, if any**		-		
21	**Criteria based on (Please refer briefing book)**		A2c,d		
	Red List Status Assigned		**EN**		
22	**Data sources used in the present CAMP**		Chauhan, N. S. Sharma, B. D. Negi, P. S.		
23	**Recommendations**		Population survey & propagation techniques to be developed		
	Management		-		
	a) *in situ*		Protection of existing sites		
	b) *ex situ*		Establishment of field gene bank		
	i) Research		• Seed dormancy studies • Standardization of propagation techniques		
	ii) Cultivation (if agro techniques are available)		- Agrotechniques to be developed		
	iii) Germplasm banks		Field Gene Bank to be established		
24	**Compilers**		Group-II		
25	**Reviewers**		WG III & Plenary		

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Rheum australe D. Don

Tall, glabrous, perennial herbs with thick root stock. Stem hollow, green, sour in taste. Basal leaves very large, orbicular, with 30-45 cm long petiole. Flowers tiny, reddish purple borne in dense branched spikes. Fruit ovoid-oblong, purple, winged, notched at both ends.

S. No.	Data Items	Details
1	**Basionym / Synonym (s)**	*Rheum emodi* Wall. ex Meisn.
2	**Family**	Polygonaceae.
3	**Taxonomic Status**	Species
4	**Vernacular Names**	Revandchini, Doler, Dolu, Rhubarb (Hindi); Gandhini, Pita, Revatchini (Sankrit); Artso (Lahaul); Chuchi (Kullu)
5	**Habit**	Perennial Herb.
6	**Habitat**	Boulders, Hill slopes and grass lands.
7	**Original Global Distribution**	India, Nepal, Pakistan, Sikkim, Myanmar, China.
8 a	**Recorded Distribution in India (by States)**	From Kashmir to Sikkim (3300-5200 m asl)
b	**Distribution within the State/ region**	**HP:** Bada & Chhota Bhangal, Pangi, Bharmour, Parvati Valley, Dodrakwar, Khashadhar, Rohru, Kinnaur & Lahaul & Spiti **UK:** Valley of Flowers, Kedar Valley, Gangotari
c	**% of global distribution in the State/region**	≈ 30%
9 a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Pabber Valley, Pin Valley, Dodra-Kwar, Bada Bhangal, Bharmour, Kinnaur, Lahaul & Shimla **UK:** Govind WLS, Gangotri NP, Kedarnath, Nanda Devi NP, Askot WLS, Uttarkashi, Chamoli, Pithoragarh, Tehri, Bageshwar
b	**Elevation Range (m asl)**	2400-4000
c	**Data Quality (Please refer briefing book)**	3
10	**Extent of Occurrence in Km^2 (EOO) [Global] [Regional]**	-
11	**Area of Occupancy in Km^2 (AOO) [Global] [Regional]**	-

12 a	Assessment of Population Reduction, if any (pl. tick in appropriate cell)		≥ 80%	50 to 80%	30 to 49%	< 30%
					√	
b	Time /Rate (3 generations or 10 years whichever is longer)		10 Years.			
13	Threats		I.f (Loss of habitat-fragmentation), Tp (Trade for parts)			
14	Are the populations in adjoining states facing similar threats/pressures?		Yes			
15	Trade	Names	Revandchini			
		Level (s)	Local	Regional	National	
			√	√		
		Parts traded	Rhizome, Leaves, Stem.			
		Effect on population	Declining			
		Data Quality	3			
16	Other comments		Young stem edible, Roots are traded as Revandchini.			
17	Existing Status		-			
	- CITES		-			
	- Legislation (Pl. Specify)		-			
18	Recent field studies (Please site author, year of study, title of study, publications etc.)		Uniyal & Chauhan, Chauhan N.S. 1999, Singh P.B.1989-91, Singh & Rawat, 2000.			
19	Conservation measures under implementation in the State		-			
20	Record of cultivation, if any		-			
21	Criteria based on (Please refer briefing book)		A2c,d			
	Red List Status Assigned		VU			
22	Data sources used in the present CAMP		3			
23	Recommendations		-			
	Management		-			
	a) *in situ*		Habital management.			
	b) *ex situ*		Herbal Gardens.			
	i) Research		No specific suggestions.			
	ii) Cultivation (if agro techniques are available)		-			
	iii) Germplasm banks		-			
24	Compilers		Group-IV			
25	Reviewers		WG I & Plenary			

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Rheum moorcroftianum Royle

Stemless perennial herbs with a rosette of 3-6 large, orbicular, thick basal leaves having entire margins. Flowers minute, greenish turning red borne in dense, erect cylindrical, unbranched spikes. Fruit ovoid with narrow wings, scarlet red.

S. No.	Data Items	Details
1	**Basionym / Synonym (s)**	NA
2	**Family**	Polygonaceae
3	**Taxonomic Status**	Species
4	**Vernacular Names**	Artso (Lahaul), Archi (Kinnaur), Chukri (Shimla),Tanturi (UK)
5	**Habit**	Herb -perennial
6	**Habitat**	Alpine rocky slopes.
7	**Original Global Distribution**	Afganistan, Paskistan, India, Nepal, China
8 a	**Recorded Distribution in India (by States)**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand
b	**Distribution within the State/ region**	**HP:** Chamba, Kangra, Kullu, Lahaul & Spiti, Kinnaur, Shimla, Mandi
c	**% of global distribution in the State/region**	≈50%
9 a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**H.P:** Sach, Mani Mahesh, Pangi Valley (Chamba); Miyad Valley, Pattan Valley, Pin Valley (Lahaul & Spiti); Sangla, Bari, Rupi-Bhabha WLS (Kinnaur); Dodra-Kwar, Rupin (Shimla), Shikari Devi WLS (Mandi), Rohtang, Chanderkhani (Kullu) **UK:** Gangotri NP, Govind NP, Kedarnath WLS, NDBR, Askot WLS
b	**Elevation Range (m asl)**	3500-5200
c	**Data Quality (Please refer briefing book)**	2 & 3
10	**Extent of Occurrence in Km^2 (EOO) [Global] [Regional]**	>20,000 km^2 >20,000 km^2
11	**Area of Occupancy in Km^2 (AOO) [Global] [Regional]**	NA ≈10000 km^2

12 a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**		**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
					√	
b	**Time /Rate (3 generations or 10 years whichever is longer)**		10 years			
13	**Threats**		Ov (Over exploitation)			
14	**Are the populations in adjoining states facing similar threats/pressures?**		No			
15	**Trade**	**Names**	Revandchini-Bhed			
		Level (s)	**Local**	**Regional**	**National**	
					√	
		Parts traded	Roots			
		Effect on population	Declining			
		Data Quality	2 & 3			
16	**Other comments**		• Used as adulterant of *Rheum australe*			
17	**Existing Status**		EN			
	- CITES		-			
	- Legislation (Pl. Specify)		-			
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		Uniyal, S. K., 2010.			
19	**Conservation measures under implementation in the State**		-			
20	**Record of cultivation, if any**		-			
21	**Criteria based on (Please refer briefing book)**		A2c,d			
	Red List Status Assigned		**EN**			
22	**Data sources used in the present CAMP**		Flora, Papers, Group discussion			
23	**Recommendations**		-			
	Management		-			
	a) *in situ*		Required			
	b) *ex situ*		-			
	i) Research		Screening of chemical constituents.			
	ii) Cultivation (if agro techniques are available)		-			
	iii) Germplasm banks		Required			
24	**Compilers**		Group-I			
25	**Reviewers**		WG II & Plenary			

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Rheum spiciforme Royle

Tall, glabrous, perennial herbs with thick root stock. Stem hollow, green, sour in taste. Basal leaves very large, coriaceous, broadly ovate, with prominent red brown nerves. Flowers tiny, greenish-yellow borne in dense spikes. Fruit broadly ellipsoid or oblong, rounded at the apex; wings membranous, broader than the disk.

S. No.	Data Items	Details			
1	**Basionym / Synonym (s)**	NA			
2	**Family**	Polygonaceae.			
3	**Taxonomic Status**	Species			
4	**Vernacular Names**	Revand Chini, Chunkri, Archa, Chu-rtsa.			
5	**Habit**	Herb - perennial			
6	**Habitat**	Grows in Western Himalyas and Alpine stony slopes (inner dry hills), shrubberies			
7	**Original Global Distribution**	Afganistan, India, Bhutan, China (Taipei)			
8 a	**Recorded Distribution in India (by States)**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand			
b	**Distribution within the State/ region**	**HP:** Kullu, Lahaul & Spiti, Hatu, Pangi, Pin Valley, Rohtang **J&K:** Zanskar, Deorang			
c	**% of global distribution in the State/region**	NA			
9 a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Lahaul & Spiti, Kullu, Rohtang Pass. **UK:** Uttarkashi, Pithoragarh, NDBR, Ashkot WLS.			
b	**Elevation Range (m asl)**	3200-4800			
c	**Data Quality (Please refer briefing book)**	2 & 3			
10	**Extent of Occurrence in Km^2 (EOO) [Global] [Regional]**	-			
11	**Area of Occupancy in Km^2 (AOO) [Global] [Regional]**	-			
12 a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**	**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
					√
b	**Time /Rate (3 generations or 10 years whichever is longer)**	10 Years.			

13	**Threats**		Hf (Loss of habitat-fragmentation), L (Loss of habitat), I		
14	**Are the populations in adjoining states facing similar threats/pressures?**		No		
15	**Trade**	**Names**	Revandchini.		
		Level (s)	**Local**	**Regional**	**National**
			√	√	
		Parts traded	Roots, Leaves.		
		Effect on population	Declining		
		Data Quality	2 & 3		
16	**Other comments**		Revandchini (TR) Needs attention as these are collected from wild. Taxonomic evaluation of R. speciforme & wild populations need to be located.		
17	**Existing Status**		-		
	- CITES		-		
	- Legislation (Pl. Specify)		-		
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		Samant (2007) Dhaliwal & Sharma (1999)		
19	**Conservation measures under implementation in the State**		-		
20	**Record of cultivation, if any**		-		
21	**Criteria based on (Please refer briefing book)**		A2c,d		
	Red List Status Assigned		**NT**		
22	**Data sources used in the present CAMP**		3		
23	**Recommendations**		-		
	Management		-		
	a) *in situ*		-		
	b) *ex situ*		-		
	i)Research		-		
	ii) Cultivation (if agro techniques are available)		-		
	iii) Germplasm banks		-		
24	**Compilers**		Group-IV		
25	**Reviewers**		WG I & Plenary		

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Rheum webbianum Royle

Tall, glabrous, perennial herbs with thick root stock. Stem hollow, green, sour in taste. Basal leaves very large, orbicular, 5-7-nerved. Flowers tiny, creamish white borne in dense branched up to 1 m long spikes. Fruit broadly oblong or orbicular, deep red, winged, notched on both sides.

S. No.	Data Items	Details			
1	**Basionym / Synonym (s)**	-			
2	**Family**	Polygonaceae			
3	**Taxonomic Status**	Species			
4	**Vernacular Names**	Dolu, Archa, Archu, Padamachal, Tatri (Hindi)			
5	**Habit**	Perennial Herb.			
6	**Habitat**	Sub Alpine area, Moist Hill Slopes			
7	**Original Global Distribution**	Pakistan, India, Nepal, China			
8 a	**Recorded Distribution in India (by States)**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand			
b	**Distribution within the State/ region**	**HP:** Tirthan and Sainj Valley, Marhi (Kullu), Chamba, Deling, Garanj, Sangla **UK:** Nilang (Uttarkashi)			
c	**% of global distribution in the State/region**	NA			
9 a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Chamba, Kinnaur, Spiti, Kullu **UK:** Chamoli, Uttarkashi, Pithoragarh,Tehri			
b	**Elevation Range (m asl)**	3200-4600			
c	**Data Quality (Please refer briefing book)**	2 & 3			
10	**Extent of Occurrence in Km^2 (EOO) [Global] [Regional]**	-			
11	**Area of Occupancy in Km^2 (AOO) [Global] [Regional]**	-			
12 a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**	**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
					√
b	**Time /Rate (3 generations or 10 years whichever is longer)**	10 Years			

13	**Threats**		Hf (Harvest for food), Lf (Loss of habitat-fragmentation), T (Trade)		
14	**Are the populations in adjoining states facing similar threats/pressures?**		Yes		
15	**Trade**	**Names**			
		Level (s)	**Local**	**Regional**	**National**
			√	√	√
		Parts traded	Rhizome		
		Effect on population	Declining		
		Data Quality	3		
16	**Other comments**		Revandchini needs attention for conservation as it is collected from wild.		
17	**Existing Status**		-		
	- CITES		-		
	- Legislation (Pl. Specify)		-		
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		Singh & Rawat (2000)		
19	**Conservation measures under implementation in the State**		-		
20	**Record of cultivation, if any**		-		
21	**Criteria based on (Please refer briefing book)**		A2c,d		
	Red List Status Assigned		**VU**		
22	**Data sources used in the present CAMP**		3		
23	**Recommendations**		-		
	Management		-		
	a) *in situ*		Already found in protected areas.		
	b) *ex situ*		-		
	i) Research		-		
	ii) Cultivation (if agro techniques are available)		-		
	iii) Germplasm banks		-		
24	**Compilers**		Group-IV		
25	**Reviewers**		WG I & Plenary		

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Roscoea alpina Royle

Stemless herbs up to 25 cm tall. Leaves lanceolate to ovate-lanceolate, apex subacute; sheaths as long as, or shorter than the leaf blades, forming an apparent stem. Flower dark purple, borne in 1-5 flowered clusters that usually appear before leaves. Calyx tube split on one side to the base.

S. No.	Data Items	Details			
1	**Basionym / Synonym (s)**	NA			
2	**Family**	Zingiberaceae			
3	**Taxonomic Status**	Species			
4	**Vernacular Names**	Kakoli, Meenachori			
5	**Habit**	Herb - Terrestrial			
6	**Habitat**	Grassy shady slopes/ oak-conifer forest			
7	**Original Global Distribution**	Pakistan to S.W China, Myanmar			
8 a	**Recorded Distribution in India (by States)**	N.E to N.W Himalaya region			
b	**Distribution within the State/ region**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand.			
c	**% of global distribution in the State/region**	≈40%			
9 a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Shimla Hills, Churdhar, Shikari Slopes, Jalodi Slopes, Banjar, Dharamshala, Dalhousie, Barot **UK:** Govind WLS, Valley of Flowers, Johar Valley			
b	**Elevation Range (m asl)**	1800-2800			
c	**Data Quality (Please refer briefing book)**	2 & 3			
10	**Extent of Occurrence in Km² (EOO)** **[Global]** **[Regional]**	 >20,000 km² 10,000 km²			
11	**Area of Occupancy in Km² (AOO)** **[Global]** **[Regional]**	 3000 km² 1000 km²			
12 a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**	**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
				√	
b	**Time /Rate (3 generations or 10 years whichever is longer)**	10 years			

13	**Threats**		Lf (Loss of habitat-fragmentation), Lp (Loss of habitat-quality), Hm (Harvest for medicine), Tp (Trade for parts)		
14	**Are the populations in adjoining states facing similar threats/pressures?**		Yes		
15	**Trade**	**Names**	Kakoli		
		Level (s)	**Local**	**Regional**	**National**
			√	√	√
		Parts traded	Tuberous roots		
		Effect on population	Declining		
		Data Quality	2 & 3		
16	**Other comments**		• Used in Chayawanprash. • Used in Muslipak. • Used in general debility.		
17	**Existing Status**		-		
	- CITES		-		
	- Legislation (Pl. Specify)		-		
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		M & AP of H P: Chauhan, N. S. Booklet: Sharma, B. D & Bal Krishan eflora of China&Pakistan		
19	**Conservation measures under implementation in the State**		-		
20	**Record of cultivation, if any**		-		
21	**Criteria based on (Please refer briefing book)**		A2c,d		
	Red List Status Assigned		**VU**		
22	**Data sources used in the present CAMP**		Chauhan, N. S. Sharma, B. D. Goraya, G.S. Negi, P. S.		
23	**Recommendations**		Status survey & propagation techniques		
	Management		-		
	a) *in situ*		Protection to the population sites		
	b) *ex situ*		Field Gene Bank to be established and domestication in farmers field		
	i) Research		Agro-technology to be developed		
	ii) Cultivation (if agro techniques are available)		-		
	iii) Germplasm banks		To be established		
24	**Compilers**		Group-II		
25	**Reviewers**		WG III & Plenary		

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Roscoea procera Wall.

Robust leafy herbs up to 40 cm tall. Leaves lanceolate to oblong. Flowers mauve to purple in terminal spikes. Calyx tube long, split on one side. Corolla tube as long as or longer than the calyx; anterior segment usually incurved.

S. No.	Data Items	Details			
1	**Basionym / Synonym (s)**	*Roscoea purpurea* Smith			
2	**Family**	Zingiberaceae			
3	**Taxonomic Status**	Species			
4	**Vernacular Names**	Kakoli			
5	**Habit**	Herb - terrestrial			
6	**Habitat**	Grassy shady slopes below mixed oak- conifer forests.			
7	**Original Global Distribution**	NE to NW Himalayan region.			
8 a	**Recorded Distribution in India (by States)**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand (NW Himalayan region)			
b	**Distribution within the State/ region**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand			
c	**% of global distribution in the State/region**	≈40-50%			
9 a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Shimla Hills, Manali WLS, Nauradhar, Churdhar, Chail, Shikari Devi WLS, Banjar, Jalodi Slopes, Bir-Billing, Kalatop, Dalhousie **UK:** Bhagirathi Valley, Valley of Flowers (Outside), Pindari			
b	**Elevation Range (m asl)**	1800-2800			
c	**Data Quality (Please refer briefing book)**	2 & 3			
10	**Extent of Occurrence in Km^2 (EOO)** [Global] [Regional]	>20,000 km^2 +10,000 km^2			
11	**Area of Occupancy in Km^2 (AOO)** [Global] [Regional]	5000 km^2 2500 km^2			
12 a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**	**≥ 80%**	**50 to 80%**	**30 to 49%**	–
				√	
b	**Time /Rate (3 generations or 10 years whichever is longer)**	10 years			

13	**Threats**		Lf (Loss of habitat-fragmentation), Lp (Loss of habitat-quality), Hm (Harvest for medicine), Tp (Trade for parts)		
14	**Are the populations in adjoining states facing similar threats/pressures?**		Yes		
15	**Trade**	**Names**	Kakoli		
		Level (s)	**Local**	**Regional**	**National**
			√	√	√
		Parts traded	Tuberous roots		
		Effect on population	Declining		
		Data Quality	2 & 3		
16	**Other comments**		• Used in Chayawanprash as general tonic.		
17	**Existing Status**		-		
	- CITES		-		
	- Legislation (Pl. Specify)		-		
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		M & AP of H P: Chauhan, N. S. Booklet: Sharma, B. D & Bal Krishan Nature's MP of Uttaranchal Vol. II: Shah, Rakesh.		
19	**Conservation measures under implementation in the State**		-		
20	**Record of cultivation, if any**		-		
21	**Criteria based on (Please refer briefing book)**		A2c,d		
	Red List Status Assigned		**VU**		
22	**Data sources used in the present CAMP**		Chauhan, N. S. Sharma, B. D. Kapoor, K. S. Negi, P.S.		
23	**Recommendations**		Status survey & propagation techniques		
	Management		-		
	a) *in situ*		Protection of existing sites		
	b) *ex situ*		Establishment of field Gene banks		
	i) Research		Agro-technology to be developed		
	ii) Cultivation (if agro techniques are available)		-		
	iii) Germplasm banks		To be established		
24	**Compilers**		Group-II		
25	**Reviewers**		WG III & Plenary		

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Saussurea obvallata (D. C) Edgew.

Perennial unbranched highly aromatic herbs up to 45 cm tall. Uppermost stem leaves elliptic or ovate, boat-shaped, membranous, pale yellow with prominent dark red midrib, enclosing purplish flower heads. Receptacle bristly.

S. No.	Data Items	Details
1	**Basionym / Synonym (s)**	NA
2	**Family**	Asteraceae
3	**Taxonomic Status**	Species
4	**Vernacular Names**	Dongar (Kinnaur), Brahma Kamal (Kangra)
5	**Habit**	Herb -perennial
6	**Habitat**	Alpine moist rocky slopes, snow- bed areas.
7	**Original Global Distribution**	Central Asia, Himalaya, Afghanistan, India, Burma, China, Bhutan, Nepal
8 a	**Recorded Distribution in India (by States)**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, Arunachal Pradesh
b	**Distribution within the State/ region**	**HP:** Chamba, Kangra, Kullu, Kinnaur, Shimla **UK:** Uttarkashi, Tehri, Rudraprayag, Chamoli, Pithoragarh
c	**% of global distribution in the State/region**	≈40%
9 a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Mani Mahesh (Chamba); Dhauladhar (Kangra); Chhatri Top, Shrikhand, GHNP, Kheer Ganga (Kullu); Sangla, Ropa Kanda, Kinner Kailash, Pangi Kanda (Kinnaur), Rupin Pass, Chanshal Peak, Mural Danda (Shimla). **UK:** Kedarnath, Hemkund, Harsil
b	**Elevation Range (m asl)**	3500-4500
c	**Data Quality (Please refer briefing book)**	2 & 3
10	**Extent of Occurrence in Km^2 (EOO)** **[Global]** **[Regional]**	 >20,000 km^2 ±5,000 km^2
11	**Area of Occupancy in Km^2 (AOO)** **[Global]** **[Regional]**	 >2,000 km^2 ±1,000 km^2

12 a	Assessment of Population Reduction, if any (pl. tick in appropriate cell)		≥ 80%	50 to 80%	30 to 49%	< 30%
				√		
b	Time /Rate (3 generations or 10 years whichever is longer)		10 years			
13	Threats		Over -collection			
14	Are the populations in adjoining states facing similar threats/pressures?		Yes			
15	Trade	Names	Brahma-kamal			
		Level (s)	Local	Regional	National	
			√			
		Parts traded	Flower, Roots.			
		Effect on population	Decline due to local harvest.			
		Data Quality	2&3			
16	Other comments		• Mainly harvested for religious purpose. • Roots are used to cure cuts & bruises & boils.			
17	Existing Status		CR			
	- CITES		-			
	- Legislation (Pl. Specify)		-			
18	Recent field studies (Please site author, year of study, title of study, publications etc.)		Uniyal, S. K., 2008. Rana, B. S., 2003. P. S. Negi., 2001. Seed germination studies. M & AP of HP., Chauhan, N. S.			
19	Conservation measures under implementation in the State		-			
20	Record of cultivation, if any		-			
21	Criteria based on (Please refer briefing book)		A2c,d			
	Red List Status Assigned		EN			
22	Data sources used in the present CAMP		Flora, Paper, Group discussion.			
23	Recommendations		-			
	Management		-			
	a) *in situ*		• Identify localities & mark as sacred sites • Protection of existing sites			
	b) *ex situ*		To be conserved in high altitude forest nurseries			
	i)Research		• Awareness & linking with eco-tourism • Restriction on eco-tourism to be imposed on sites			
	ii) Cultivation (if agro techniques are available)		-			
	iii) Germplasm banks		To be established at Chitkul WLS & Dhanch (Mani Mahesh)			
24	Compilers		Group-I			
25	Reviewers		WG II & Plenary			

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Selinum connifolium (Wall. ex DC.) Benth. & Hook. f

Erect, glabrous herbs up to 2 m tall. Lower leaves long petioled, 2-3-pinnate, deeply cut into fine linear segments, sheathing, upper leaves shorter; segments lanceolate to oval. Flowers white, in compound umbels, with ca. 30 rays. Bracts with white margins. Fruits compressed, broadest along lateral ridges.

S. No.	Data Items	
1	**Basionym / Synonym (s)**	*Selinum tenuifolium* Wall. ex DC. *Selinum candollii* Edgew. *Peucedanum wallichianum* DC.
2	**Family**	Apiaceae
3	**Taxonomic Status**	Species
4	**Vernacular Names**	Bhutkesi, Mathosol, Nesrawlo, Muramansi
5	**Habit**	Erect Glabrous Herb; upto 50 cm in height
6	**Habitat**	Grows in Alpine meadows.
7	**Original Global Distribution**	India, Pakistan
8 a	**Recorded Distribution in India (by States)**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand
b	**Distribution within the State/ region**	**HP:** Rohtang Pass. **UK:** Uttarkashi, Chamoli.
c	**% of global distribution in the State/region**	≈60% 25% (HP), 25% (UK), 10% (J&K)
9 a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Rohtang Pass **UK:** Uttarkashi, Chamoli, Govind WLS, Gangotri NP, Khatling Valley, Nanda Devi, Valley of Flowers, Askot WLS
b	**Elevation Range (m asl)**	3000-3800
c	**Data Quality (Please refer briefing book)**	2 & 3
10	**Extent of Occurrence in Km^2 (EOO) [Global] [Regional]**	>20,000 km^2
11	**Area of Occupancy in Km^2 (AOO) [Global] [Regional]**	>2000 km^2

12 a	Assessment of Population Reduction, if any (pl. tick in appropriate cell)		≥ 80%	50 to 80%	30 to 49%	< 30%
					√	
b	Time /Rate (3 generations or 10 years whichever is longer)		10 years			
13	Threats		Lp (Loss of habitat-quality), Hp (Harvest for parts)			
14	Are the populations in adjoining states facing similar threats/pressures?		Not known			
15	Trade	Names				
		Level (s)	Local	Regional	National	
			√	√		
		Parts traded	Roots			
		Effect on population	Declining			
		Data Quality	2 & 3			
16	Other comments		• Roots are consumed by Ayurvedic Pharmacy for drug, dhoop & incense.			
17	Existing Status		-			
	- CITES		-			
	- Legislation (Pl. Specify)		-			
18	Recent field studies (Please site author, year of study, title of study, publications etc.)		Aswal & Mehrotra,1994 Flora of Lahaul & Spiti			
19	Conservation measures under implementation in the State		-			
20	Record of cultivation, if any		-			
21	Criteria based on (Please refer briefing book)		A2c,d			
	Red List Status Assigned		VU			
22	Data sources used in the present CAMP		Personal field observation, Literature.			
23	Recommendations		Survey & Monitoring, Evaluation			
	Management		Habitat Management			
	a. in situ		-			
	b. ex situ		-			
	Research		Through survey to locate more populations in the state.			
	ii) Cultivation (if agrotechniques are available)		-			
	iii) Germplasm banks		-			
24	Compilers		Group-III			
25	Reviewers		WG IV & Plenary			

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Selinum vaginatum (Edgew.) C. B. Clarke

Erect, glabrous herbs up to 1.5 m tall. Rootstock aromatic. Lower leaves long petioled with oblong sheathing base; 1-2 pinnate, segments lanceolate, toothed. Flowers white, in long stalked compound umbels; rays ca. 30. Fruits winged, with lateral wings broader.

S. No.	Data Items	Details
1	**Basionym / Synonym (s)**	*Cortia vaginata* Edgew.
2	**Family**	Apiaceae
3	**Taxonomic Status**	Species
4	**Vernacular Names**	Bhutkeshi, Mathosla, Moor, Pushwari
5	**Habit**	Stout Herb; upto 1.5 m tall.
6	**Habitat**	Grows in moist Alpine slopes.
7	**Original Global Distribution**	India, Pakistan
8 a	**Recorded Distribution in India (by States)**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand
b	**Distribution within the State/ region**	Himachal Pradesh, Uttarakhand
c	**% of global distribution in the State/region**	≈ 60% 25% (HP), 25% (UK), 10% (J&K)
9 a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Chhota & Bada Bhangal areas (Kangra); Chamba; Parvati Valley (Kullu); Rampur, Rohru (Shimla). **UK:** Dayara, Gidara (Uttarkashi); Kush-Kalyani, Kedarnath WLS. **J&K:** Kashmir Valley; Basoli, Bhaderwah & Kishtwar (Jammu).
b	**Elevation Range (m asl)**	2700-4200
c	**Data Quality (Please refer briefing book)**	2 & 3
10	**Extent of Occurrence in Km^2 (EOO) [Global] [Regional]**	>20,000 km^2
11	**Area of Occupancy in Km^2 (AOO) [Global] [Regional]**	>2000 km^2

12 a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**		≥ 80%	50 to 80%	30 to 49%	< 30%
					√	
b	**Time /Rate (3 generations or 10 years whichever is longer)**		10 years			
13	**Threats**		Lp (Loss of habitat), Hp (Harvest for parts)			
14	**Are the populations in adjoining states facing similar threats/pressures?**		Not known.			
15	**Trade**	**Names**				
		Level (s)	**Local**	**Regional**	**National**	
			√	√		
		Parts traded	Roots.			
		Effect on population	Declining			
		Data Quality	2 & 3			
16	**Other comments**		• Roots are consumed by Ayurvedic Pharmacy for drugs, dhoop and incense. • As per Wealth of India, it is reported that in Jammu, *Seseli sibiricum* roots are frequently mixed in RD market as adulterant. • The roots of *S. vaginatum* are the cheap substitute for *Nardostychus grandiflora*.			
17	**Existing Status**		-			
	- CITES		-			
	- Legislation (Pl. Specify)		-			
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		Aswal & Mehrotra, 1994. Flora of Lahaul-Spiti) Chauhan, N. S. 2006.			
19	**Conservation measures under implementation in the State**		-			
20	**Record of cultivation, if any**		-			
21	**Criteria based on (Please refer briefing book)**		A2c,d			
	Red List Status Assigned		**VU**			
22	**Data sources used in the present CAMP**		Personal field observation, Literature.			
23	**Recommendations**		NA			
	Management		Survey & Monitoring Habitat Management Evaluation			
	a) *in situ*		-			
	b) *ex situ*		-			
	i) Research		Through survey to locate more population s in the State is recommended.			
	ii) Cultivation (if agro techniques are available)		-			
	iii) Germplasm banks		-			
24	**Compilers**		Group-III			
25	**Reviewers**		WG IV & Plenary			

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Skimmia laureola (DC.) Siebold & Zucc. ex Walp.

Strongly aromatic evergreen shrubs up to 1 m tall. Leaves crowded towards end of branches, oblong lanceolate, thick, gland dotted. Flowers greenish-yellow, borne in terminal clusters. Fruit ovoid drupe, turning bright red on ripening.

S. No.	Data Items	Details
1	**Basionym / Synonym (s)**	*S. anquetilia* Taylor & Airy Shaw
2	**Family**	Rutaceae.
3	**Taxonomic Status**	Species
4	**Vernacular Names**	Ner, Patar, Nera (J&K); Timburnyok (Sikkim); Barru, Shalangli, Patrang, Kasturi, Kathur-chara, Gurlpata, Nair, Nihar, Niyal Pati (UK)
5	**Habit**	Aromatic shrub.
6	**Habitat**	Temperate to Sub-Alpine
7	**Original Global Distribution**	India, Bhutan, China, Nepal, Myanmar
8 a	**Recorded Distribution in India (by States)**	Himachal Pradesh, J&K, Uttrakhand, Sikkim, Meghalaya, Mizoram
b	**Distribution within the State/ region**	**HP:** Shimla, Chamba, Mandi, Kullu **J&K:** Kashmir Valley **UK:** Garhwal and Kamaon **Meghalaya:** Khasi & Jaintia Hills **Sikkim:** Lepcha **Mizoram:** Mishmi & Aka Hills
c	**% of global distribution in the State/region**	≈ 20% 20% (HP), 25% (UK), 15%(J&K), 10%(Meghalaya), 20%(Sikkim), 10% (Mizoram).
9 a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Talra WLS(near Chhajpur); Kalatop, Khajjiar WLS (Chamba); Shikari Devi WLS (Mandi) **UK:** Chakrata (Deoban), Govind WLS, Bhilangana Valley, Kedarnath WLS, Nandadevi NP, Askot WLS
b	**Elevation Range (m asl)**	1800-3000
c	**Data Quality (Please refer briefing book)**	3
10	**Extent of Occurrence in Km^2 (EOO) [Global] [Regional]**	>20000 km^2
11	**Area of Occupancy in Km^2 (AOO) [Global] [Regional]**	>2000 km^2

12 a	Assessment of Population Reduction, if any (pl. tick in appropriate cell)		≥ 80%	50 to 80%	30 to 49%	< 30%
					√	
b	Time /Rate (3 generations or 10 years whichever is longer)		3 Generations			
13	Threats		Hf (Loss of habitat-fragmentation), Lp (Loss of habitat-quality), Hp (Harvest for parts)			
14	Are the populations in adjoining states facing similar threats/pressures?		Yes			
15	Trade	Names	Ner			
		Level (s)	Local	Regional	National	
			√			
		Parts traded	Leaves.			
		Effect on population	Declining			
		Data Quality	3			
16	Other comments		Leaves are fodder of Musk Deer.			
17	Existing Status		-			
	- CITES		-			
	- Legislation (Pl. Specify)		-			
18	Recent field studies (Please site author, year of study, title of study, publications etc.)		Verma, R. K. Project on Kalatop WLS & Talra WLS (2010), ICFRE ongoing project			
19	Conservation measures under implementation in the State		-			
20	Record of cultivation, if any		Wealth of India Vol. M& AP of HP. Dr. N. S. Chauhan.			
21	Criteria based on (Please refer briefing book)		A2c,d			
	Red List Status Assigned		VU			
22	Data sources used in the present CAMP		3			
23	Recommendations		Studies on regeneration and its diversity recommended.			
	Management		Survey and monitoring, Habitat management, Limited resource management			
	a) *in situ*		PANs			
	b) *ex situ*		-			
	i) Research		Recommended			
	ii) Cultivation (if agro techniques are available)		-			
	iii) Germplasm banks		-			
24	Compilers		Group-III			
25	Reviewers		WG IV & Plenary			

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Swertia chirayita (Roxb. ex. Fleming) Karsten

Erect robust, branched herbs up to 1.5 m tall. Leaves opposite, sessile, broadly lanceolate, 3-7 nerved, very bitter. Flowers tetramerous, yellowish-green with purplish tinge inside. Each petal has 2 glands with fimbriate scales at the base. Fruit an ellipsoid capsule with brown minute seeds.

S. No.	Data Items	Details
1	**Basionym / Synonym (s)**	*Gentiana chirayita* Roxb. ex Fleming
2	**Family**	Gentianaceae
3	**Taxonomic Status**	Species
4	**Vernacular Names**	Chirayita (Hindi), Kairata, Anaryatika, Chiratika, Varantaka, Ardhatika, Bhuniba (Sanskrit)
5	**Habit**	Herb - perennial
6	**Habitat**	Moist hill slopes
7	**Original Global Distribution**	Kashmir to Bhutan, Meghalaya
8a	**Recorded Distribution in India (by States)**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand
b	**Distribution within the State/ region**	**HP:** Shimla, Chamba, Dalhousie, Kinnaur, Rupgarh, Rohru, Kotgarh **JK:** Pir Panjal, Jai (Bhardarwah) **UK:** Chakrata Hills, Dayara, Dodital, Valley of Flowers, Kedar Valley, Nainital
c	**% of global distribution in the State/region**	-
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Dhaulthana Dhar, Luwayin Forest, Bagisiad-Janjehli, Kullu, Kangra & Rohru Division. **UK:** Shimla (Mashobra),Chakrata, Dhanolti, Chamoli, Uttarkashi, Nainital, Tehri.
b	**Elevation Range (m asl)**	1200-3000
c	**Data Quality (Please refer briefing book)**	2 & 3
10	**Extent of Occurrence in Km^2 (EOO) [Global] [Regional]**	-
11	**Area of Occupancy in Km^2 (AOO) [Global] [Regional]**	-

12 a	Assessment of Population Reduction, if any (pl. tick in appropriate cell)		≥ 80%	50 to 80%	30 to 49%	< 30%
			√			
b	Time /Rate (3 generations or 10 years whichever is longer)		10 Years			
13	Threats		Hm (Harvest for medicine), Lf (Loss of habitat-fragmentation), Lp (Loss of habitat-quality), Tp (Trade for parts)			
14	Are the populations in adjoining states facing similar threats/pressures?		Yes			
15	Trade	Names				
		Level (s)	Local	Regional	National	
			√	√	√	
		Parts traded	Whole parts.			
		Effect on population	Declining			
		Data Quality	2 & 3			
16	Other comments		Generally all the species of *Swertia* except *Swertia speciosa* are sold in the market in the name of *Swerita chirayita* because all of them are bitter. Sometimes *Andrographis paniculata* is also used as chirayita. Commonly *Swertia ciliata* is collected in place of *S. chirayita*.			
17	Existing Status		-			
	- CITES		Negative list of export.			
	- Legislation (Pl. Specify)		WL (Protection) Act, 2001.			
18	Recent field studies (Please site author, year of study, title of study, publications etc.)		Chauhan, NS (1999) Naithani, H.B (2004-05) UK Kala, R.H (2007-08) UK			
19	Conservation measures under implementation in the State		-			
20	Record of cultivation, if any		-			
21	Criteria based on (Please refer briefing book)		A2c,d			
	Red List Status Assigned		CR			
22	Data sources used in the present CAMP		3			
23	Recommendations		-			
	Management		-			
	a) *in situ*		Good seed source for conservation.			
	b) *ex situ*		Cultivation to be promoted.			
	i) Research		Status of allied spp (*S. alata* & *S. cordata*) need to be assessed along with *S. chirayita*. Population study of site.			
	ii) Cultivation (if agro techniques are available)		Commercial cultivation need to be worked out.			
	iii) Germplasm banks		Establishment of germplasm.			
24	Compilers		Group-IV			
25	Reviewers		WG I & Plenary			

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Symplocos paniculata (Thunb.) Miq.

Medium-sized deciduous trees. Stem and branches rough with grey corky bark. Leaves thin, elliptic or broadly elliptic, with serrate margins. Flowers white, fragrant borne in terminal and axillary branched clusters. Petals 5, spreading, slightly united at base. Stamens numerous, united at the base into 5 fascicles. Fruit ovoid to globose, deep blue, glabrous.

S. No.	Data Items	Details			
1	**Basionym / Synonym (s)**	*Prunus paniculatus* Thunb. *S. crataegoides* Buch.-Ham ex D.Don.			
2	**Family**	Symplocaceae			
3	**Taxonomic Status**	Species			
4	**Vernacular Names**	Lodh, Lodhra, Lodhar, Lojh			
5	**Habit**	Tree			
6	**Habitat**	Moist hills			
7	**Original Global Distribution**	India, Bhutan, Myamar, Japan			
8a	**Recorded Distribution in India (by States)**	North West Central & Eastern Himalaya, Meghalaya.			
b	**Distribution within the State/ region**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand			
c	**% of global distribution in the State/region**	-			
9a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Khara Pathar, Kashadhar, Rohru Range, Parvati Valley, Chur dhar, Mandi, Narkanda, Chhajpur, Dalhousie **UK:** Chakrata, Nainital, Chamoli, Uttarkashi, Tehri, Pithoragarh, Ranikhet			
b	**Elevation Range (m asl)**	900-2400			
c	**Data Quality (Please refer briefing book)**	3			
10	**Extent of Occurrence in Km^2 (EOO)** **[Global]** **[Regional]**	-			
11	**Area of Occupancy in Km^2 (AOO)** **[Global]** **[Regional]**	-			
12 a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**	**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
				√	
b	**Time /Rate (3 generations or 10 years whichever is longer)**	3 Generations (40-50yrs)			

13	**Threats**		Sf (Fire), Hf (Harvest for food)		
14	**Are the populations in adjoining states facing similar threats/pressures?**		No		
15	**Trade**	**Names**			
		Level (s)	**Local**	**Regional**	**National**
			√		
		Parts traded	Bark.		
		Effect on population	Declining		
		Data Quality	3		
16	**Other comments**		Prone to fire.		
17	**Existing Status**		-		
	- CITES		-		
	- Legislation (Pl. Specify)		-		
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		-		
19	**Conservation measures under implementation in the State**		-		
20	**Record of cultivation, if any**		-		
21	**Criteria based on (Please refer briefing book)**		A2c,d		
	Red List Status Assigned		**VU**		
22	**Data sources used in the present CAMP**		3		
23	**Recommendations**		-		
	Management		-		
	a) in situ		-		
	b) ex situ		-		
	i) Research		-		
	ii) Cultivation (if agro techniques are available)		-		
	iii) Germplasm banks		-		
24	**Compilers**		Group-IV		
25	**Reviewers**		WG I & Plenary		

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Taxus wallichiana Zucc.

Tree up to 20 m tall; bark reddish-brown, scaly. Leaves spirally arranged, linear, upper surface green, shiny. Staminate cone solitary, globose, axillary on the underside of branches. Female flowers solitary, axillary, green, with 3 pairs of scales, decussate. Seed olive–green, when young partially surrounded by a red fleshy aril.

S. No.	Data Items	Details
1	**Basionym / Synonym (s)**	*T. baccata* L. spp. *wallichiana* (Zucc.) Pilger
2	**Family**	Taxaceae
3	**Taxonomic Status**	Species
4	**Vernacular Names**	Thuna/ Birmi/ Rakhal/ Nemdal; Yew
5	**Habit**	Tree
6	**Habitat**	Fir-Spruce mixed forest of Temperate Himalaya
7	**Original Global Distribution**	Afghanistan to S.W China, Burma, S.E Asia
8 a	**Recorded Distribution in India (by States)**	H.P, J&K, U.K, N.E States in Arunachal Pradesh & Meghalaya
b	**Distribution within the State/ region**	**HP:** Simla, Kinnaur, Kullu, Sirmour, Mandi, Kangra, Chamba. **UK:** Garhwal & Kumaon. **J&K:** Sanasar, Tangmang, Kangan, Kishtwar, Banihal, Babrishi
c	**% of global distribution in the State/region**	≈30%
9 a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Rakcham, Bari Kanda, Nichar, Bhabha Valley (Kinnaur); Narkanda, Mandi, Dodra kwar, Jalodi Pass, Sandhu, Chaupal, Darang-ghati **UK:** Yamunotri Valley, Dodital, Bhangeli (Uttarkashi), Kedarnath, Nanda Devi.
b	**Elevation Range (m asl)**	2100-3300
c	**Data Quality (Please refer briefing book)**	2 & 3
10	**Extent of Occurrence in Km^2 (EOO)** **[Global]** **[Regional]**	 20,000 km^2 2,000 km^2
11	**Area of Occupancy in Km^2 (AOO)** **[Global]** **[Regional]**	 2000 km^2 <1000 km^2

12 a	Assessment of Population Reduction, if any (pl. tick in appropriate cell)		≥ 80%	50 to 80%	30 to 49%	< 30%
				√		
b	Time /Rate (3 generations or 10 years whichever is longer)		10 years			
13	Threats		Lf (Loss of habitat-fragmentation), Lp(Loss of habitat-quality), Hm (Harvest for medicine), Tp (Trade for parts)			
14	Are the populations in adjoining states facing similar threats/pressures?		Yes			
15	Trade	Names	Talispatra			
		Level (s)	Local	Regional	National	
			√	√	√	
		Parts traded	Needles (Tender shoot)			
		Effect on population	Declining			
		Data Quality	2 & 3			
16	Other comments		• Bark used in local tea, • Needles exploited for fodder, • Mercilessly exploited for anti-cancerous properties.			
17	Existing Status		EN			
	- CITES		Appendix-II			
	- Legislation (Pl. Specify)		-			
18	Recent field studies (Please site author, year of study, title of study, publications etc.)		M & AP of H P: Chauhan, N. S. Flora of J&K: N. P.Singh *et. al.* Flora of Distt. Garhwal N.W Himalayas: Gaur, R. D.			
19	Conservation measures under implementation in the State		Yes			
20	Record of cultivation, if any		Yes, to very small extent.			
21	Criteria based on (Please refer briefing book)		A2c,d			
	Red List Status Assigned		EN			
22	Data sources used in the present CAMP		Chauhan, N. S. Sharma, B. D. Negi, P. S.			
23	Recommendations		Large scale afforestation programmes to be undertaken.			
	Management		-			
	a) *in situ*		Protection to existing population in Daran Ghati WLS.			
	b) *ex situ*		Field demonstration plots to be established.			
	i) Research		Selection of superior genotypes having higher taxol content for promoting commercial plantation.			
	ii) Cultivation (if agro techniques are available)		-			
	iii) Germplasm banks		Needs to be established			
24	Compilers		Group-II			
25	Reviewers		WG III & Plenary			

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Uraria picta (Jacq.) Desv. ex DC.

Erect perennial, undershrubs with pubescent branches. Lower leaves 1-3 foliolate, upper 5-9 foliolate, glabrescent above, pubescent below. Flowers purple or pink borne in long, dense, cylindric racemes. Bracts concealing the bud. Fruit 5-9 mm long pods, with 3-6 jointed segments, glabrous, smooth, polished, folded on one another.

S. No.	Data Items	Details			
1	**Basionym / Synonym (s)**	*Hedysarum pictum* Jacq.			
2	**Family**	Fabaceae			
3	**Taxonomic Status**	Species			
4	**Vernacular Names**	Dabra, Pitvan, Pitavan (Hindi), Prasniparni, Prishthiparni, Chitraparni (Sanskrit)			
5	**Habit**	Herb- perennial			
6	**Habitat**	Grassy hill slopes, Moist and dry Sal forest			
7	**Original Global Distribution**	India, Sri Lanka, Malaya, Philippines & Tropical Africa			
8 a	**Recorded Distribution in India (by States)**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand			
b	**Distribution within the State/ region**	Himachal Pradesh & Uttarakhand			
c	**% of global distribution in the State/region**	NA			
9	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Bilaspur **UK:** Karwapani (Dehradun), Mansa Devi, Haridwar			
	Elevation Range (m asl)	Up to 1500			
	Data Quality (Please refer briefing book)	3			
10	**Extent of Occurrence in Km^2 (EOO) [Global] [Regional]**	NA			
11	**Area of Occupancy in Km^2 (AOO) [Global] [Regional]**	NA			
12 a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**	≥ 80%	50 to 80%	30 to 49%	< 30%
		√			
b	**Time /Rate (3 generations or 10 years whichever is longer)**	Ten Years.			

13	**Threats**		Hm (Harvest for medicine), Lp (Loss of habitat-quality)		
14	**Are the populations in adjoining states facing similar threats/pressures?**		Yes		
15	**Trade**	**Names**			
		Level (s)	Local	Regional	National
		Parts traded	Whole Plant.		
		Effect on population	-		
		Data Quality	3		
16	**Other comments**		It is so rare; in place of *U. picta* other species *U. lagopoides* is supplied.		
17	**Existing Status**		-		
	- CITES		-		
	- Legislation (Pl. Specify)		-		
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		Rawat, G. S. Field Studies.1984. H. P. Naithani, H. B. Field Studies. 2007. UK		
19	**Conservation measures under implementation in the State**		-		
20	**Record of cultivation, if any**		Dabur in Kushinagar has started large scale plantation in U.P.		
21	**Criteria based on (Please refer briefing book)**		A2c,d		
	Red List Status Assigned		**NA**		
22	**Data sources used in the present CAMP**		3		
23	**Recommendations**		-		
	Management		-		
	a) *in situ*		Quality planting material.		
	b) *ex situ*		Cultivation programme should be promoted.		
	i)Research		Natural population should be assesed.		
	ii) Cultivation (if agro techniques are available)		Cultivation technique available with Dabur at Kushinagar.		
	iii) Germplasm banks		To be maintained.		
24	**Compilers**		Group-IV		
25	**Reviewers**		WG I & Plenary		

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Zanthoxylum armatum DC.

Spinescent sub-deciduous, aromatic shrubs with corky bark and stout stem spines. Leaves 3-7 foliolate, pellucid-punctate; petiole and leaf stalk narrowly winged and studded with spines. Flowers axillary, minute, white. Petals absent. Fruit pale red, globose, aromatic and tubercled. Seed rounded, shining black.

S. No.	Data Items	Details			
1	**Basionym / Synonym (s)**	*Zanthoxylum alatum* Roxb.			
2	**Family**	Rutaceae			
3	**Taxonomic Status**	Species			
4	**Vernacular Names**	Timru/ Timber, Timur, Timbru, Tirmir, Tejpal			
5	**Habit**	Prickly/Spinescent Shurb			
6	**Habitat**	Common in grazing slopes, nallah & scrub forests.			
7	**Original Global Distribution**	India, China, Bhutan, SE Asia.			
8 a	**Recorded Distribution in India (by States)**	Hiamlayas, Meghlaya, India.			
b	**Distribution within the State/ region**	Jammu & Kashmir, Himachal Pradesh, Uttarakhand			
c	**% of global distribution in the State/region**				
9 a	**No. of known locations/ subpopulations (Please give the name of location & its extent)**	**HP:** Kullu, Shimla, Mandi, Kangra, Solan, Chamba, Kinnaur, Lahaul & Spiti. **UK:** Chakrata, Uttarkashi, Chamoli, Mussoorie, Pithoragarh, Nainital, Almorah.			
b	**Elevation Range (m asl)**	1100-2500			
c	**Data Quality (Please refer briefing book)**	2 & 3			
10	**Extent of Occurrence in Km^2 (EOO) [Global] [Regional]**	NA			
11	**Area of Occupancy in Km^2 (AOO) [Global] [Regional]**	NA			
12 a	**Assessment of Population Reduction, if any (pl. tick in appropriate cell)**	**≥ 80%**	**50 to 80%**	**30 to 49%**	**< 30%**
			√		
b	**Time /Rate (3 generations or 10 years whichever is longer)**	3 Generations			

13	**Threats**		Hm (Harvest for medicine), Hp (Harvest for parts), Tp (Trade for parts), L (Loss of habitat)		
14	**Are the populations in adjoining states facing similar threats/pressures?**		Yes		
15	**Trade**	**Names**	Tejbal, Tejobal		
		Level (s)	**Local**	**Regional**	**National**
			√	√	√
		Parts traded	Bark, Fruits & Seeds.		
		Effect on population	Declining		
		Data Quality	2 & 3		
16	**Other comments**		• Oil extracted from the seeds. • Also used as walking sticks by Sadhus.		
17	**Existing Status**		-		
	- CITES		-		
	- Legislation (Pl. Specify)		-		
18	**Recent field studies (Please site author, year of study, title of study, publications etc.)**		-		
19	**Conservation measures under implementation in the State**		-		
20	**Record of cultivation, if any**		-		
21	**Criteria based on (Please refer briefing book)**		A2c,d		
	Red List Status Assigned		**EN**		
22	**Data sources used in the present CAMP**		3		
23	**Recommendations**		-		
	Management		-		
	a) *in situ*		-		
	b) *ex situ*		-		
	i) Research		Population Assessment Habitat Management		
	ii) Cultivation (if agro techniques are available)		Status Survey.		
	iii) Germplasm banks		-		
24	**Compilers**		Group-IV		
25	**Reviewers**		WG I & Plenary		

Annexure-IV

IUCN[1] RED LIST CATEGORIES AND CRITERIA

I. Introduction

1. The IUCN Red List Categories are intended to be an easily and widely understood system for classifying species at high risk of global extinction. The general aim of the system is to provide an explicit, objective framework for the classification of the broadest range of species according to their extinction risk. However, while the Red List may focus attention on those taxa at the highest risk, it is not the sole means of setting priorities for conservation measures for their protection.

Extensive consultation and testing in the development of the system strongly suggest that it is robust across most organisms. However, it should be noted that although the system places species into the threatened categories with a high degree of consistency, the criteria cannot take into account the life histories of every species. Hence, in certain individual cases, the risk of extinction may be under-estimated or over-estimated.

2. Before 1994 the more subjective threatened species categories used in IUCN Red Data Books and Red Lists had been in place, with some modification, for almost 30 years. Although the need to revise the categories had long been recognized (Fitter and Fitter 1987), the current phase of development only began in 1989 following a request from the IUCN Species Survival Commission (SSC) Steering Committee to develop a more objective approach. The IUCN Council adopted the new Red List system in 1994.

The IUCN Red List Categories and Criteria have several specific aims:

- to provide a system that can be applied consistently by different people;
- to improve objectivity by providing users with clear guidance on how to evaluate different factors which affect the risk of extinction;
- to provide a system which will facilitate comparisons across widely different taxa;
- to give people using threatened species lists a better understanding of how individual species were classified.

3. Since their adoption by IUCN Council in 1994, the IUCN Red List Categories have become widely recognized internationally, and they are now used in a range of publications and listings produced by IUCN, as well as by numerous governmental and non-governmental organizations. Such broad and extensive use revealed the need for a number of improvements, and SSC was mandated by the 1996 World Conservation Congress (WCC Res. 1.4) to conduct a review of the system (IUCN 1996). This document presents the revisions accepted by the IUCN Council.

The proposals presented in this document result from a continuing process of drafting, consultation and validation. The production of a large number of draft proposals has led to some confusion, especially as each draft has been used for classifying some set of species for conservation purposes. To clarify matters, and to open the way for modifications as and when they become necessary, a system for version numbering has been adopted as follows:

Version 1.0: Mace and Lande (1991)

The first paper discussing a new basis for the categories, and presenting numerical criteria especially relevant for large vertebrates.

Version 2.0: Mace et a/. (1992)

A major revision of Version 1.0, including numerical criteria appropriate to all organisms and introducing the non-threatened categories.

Version 2.1: IUCN (1993)

Following an extensive consultation process within SSC, a number of changes were made to the details of the criteria, and fuller explanation of basic principles was included. A more explicit structure clarified the significance of the non-threatened categories.

Version 2.2: Mace and Stuart (1994)

Following further comments received and additional validation exercises, 'some minor changes to the criteria were made. In addition, the Susceptible category present in Versions 2.0 and 2.1 was subsumed into the Vulnerable category. A precautionary application of the system was emphasised.

Version 2.3: IUCN (1994)

IUCN Council adopted this version, which incorporated changes as a result of comments from IUCN members, in December 1994. The initial version of this document was published without the necessary bibliographic details, such as date of publication and ISBN number, but these were included in the subsequent reprints in 1998 and 1999. This version was used for the 1996 IUCN Red List of Threatened Animals (Baillie and Groombridge 1996) and The World List of Threatened Trees (Oldfield et.al. 1998).

Version 3.0: IUCN/SSC Criteria Review Working Group (1999)

Following comments received, a series of workshops were convened to look at the IUCN Red List Criteria following which, changes were proposed affecting the criteria, the definitions of some key terms and the handling of uncertainty.

Version 3.1: IUCN (2001)

The IUCN Council adopted this latest version, which incorporated changes as a result of comments from the IUCN and SSC memberships and from a final meeting of the Criteria Review Working Group, in February 2000.

All new assessments from January 2001 should use the latest adopted version and cite the version number and/or date.

4. In the rest of this document, the proposed system is outlined in several sections. Section II, the Preamble, presents basic information about the context and structure of the system, and the procedures that are to be followed in applying the criteria to species. Section III provides definitions of key terms used. Section IV presents the categories, while Section V details the quantitative criteria

[1]World Conservation Union, earlier known as The International Union for Conservation of Nature & Natural Resources and which still continues to the famous acronym IUCN

used for classification within the threatened categories. Annex I provides guidance on how to deal with uncertainty when applying the criteria; Annex II suggests a standard format for citing the Red List Categories and Criteria; and Annex III outlines the documentation requirements for taxa to be included on IUCN's global Red Lists. It is important for the effective functioning of the system that all sections are read and understood to ensure that the definitions and rules are followed. (*Note: Annexes I, II and III will be updated on a regular basis.*)

II. PREAMBLE

The information in this section is intended to direct and facilitate the use and interpretation of the categories (Critically Endangered, Endangered, etc.), criteria (A to E), and sub-criteria (1, 2, etc.; a, b, etc.; i, ii, etc.).

1. Taxonomic level and scope of the categorization process

The criteria can be applied to any taxonomic unit at or below the species level. In the following information, definitions and criteria the term 'taxon' is used for convenience, and may represent species or lower taxonomic levels, including forms that are not yet formally described. There is sufficient range among the different criteria to enable the appropriate listing of taxa from the complete taxonomic spectrum, with the exception of micro-organisms. The criteria may also be applied within any specified geographical or political area, although in such cases special notice should be taken of point 14 below. In presenting the results of applying the criteria, the taxonomic unit and area under consideration should be specified in accordance with the documentation guidelines. The categorization process should only be applied to wild populations inside their natural range, and to populations resulting from benign introductions. The latter are defined in the IUCN Guidelines for Re-introductions (IUCN 1998) as '...an attempt to establish a species, for the purpose of conservation, outside its recorded distribution, but within an appropriate habitat and eco-geographical area. This is a feasible conservation tool only when there is no remaining area left within a species 'historic range'.

2. Nature of the categories

Extinction is a chance process. Thus, a listing in a higher extinction risk category implies a higher expectation of extinction, and over the time-frames specified more taxa listed in a higher category are expected to go extinct than those in a lower one (without effective conservation action). However, the persistence of some taxa in high-risk categories does not necessarily mean their initial assessment was inaccurate.

All taxa listed as Critically Endangered qualify for Vulnerable and Endangered, and all listed as Endangered qualify for Vulnerable. Together these categories are described as 'threatened'. The threatened categories form a part of the overall scheme. It will be possible to place all taxa into one of the categories (*see Figure 1*).

3. Role of the different criteria

For listing as Critically Endangered, Endangered or Vulnerable there is a range of quantitative criteria; meeting any one of these criteria qualifies a taxon for listing at that level of threat. Each taxon should be evaluated against all the criteria. Even though some criteria will be inappropriate for certain taxa (some taxa will never qualify under these however close to extinction they come), there

should be criteria appropriate for assessing threat levels for any taxon. The relevant factor is whether any one criterion is met, not whether all are appropriate or all are met. Because it will never be clear in advance which criteria are appropriate for a particular taxon, each taxon should be evaluated against all the criteria, and all criteria met at the highest threat category must be listed.

4. Derivation of quantitative criteria

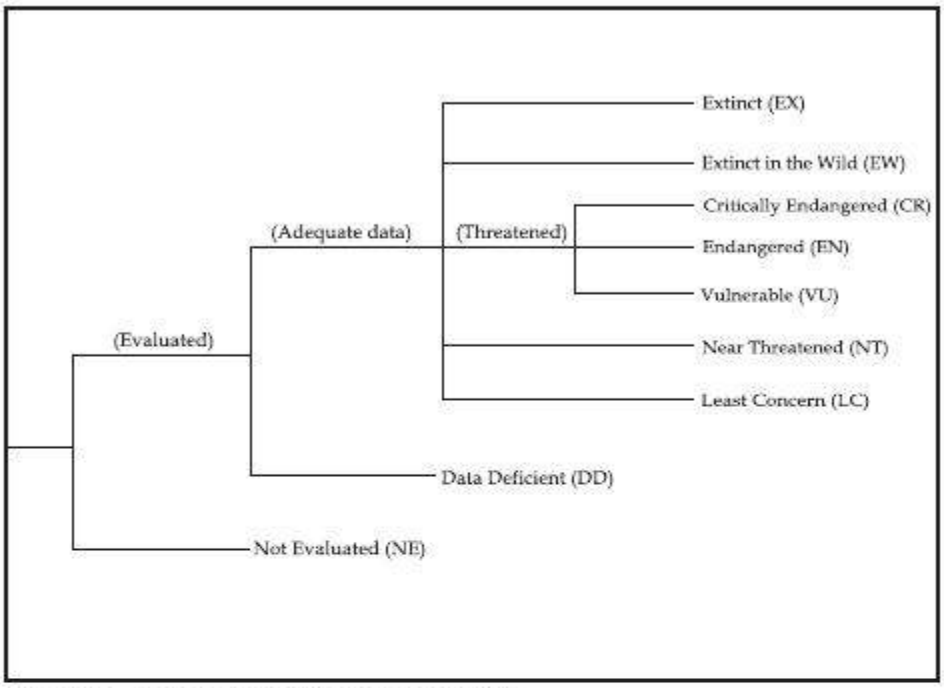

Figure 1. Structure of the categories.

The different criteria (A-E) are derived from a wide review aimed at detecting risk factors across the broad range of organisms and the diverse life histories they exhibit. The quantitative values presented in the various criteria associated with threatened categories were developed through wide consultation, and they are set at what are generally judged to be appropriate levels, even if no formal justification for these values exists. The levels for different criteria within categories were set independently but against a common standard. Broad consistency between them was sought.

5. Conservation actions in the listing process

The criteria for the threatened categories are to be applied to a taxon whatever the level of conservation action affecting it. It is important to emphasize here that a taxon may require conservation action even if it is not listed as threatened. Conservation actions which may benefit the taxon are included as part of the documentation requirements (see Annex 3, point 6).

6. Data quality and the importance of inference and projection

The criteria are clearly quantitative in nature. However, the absence of high quality data should not deter attempts at applying the criteria, as methods involving estimation, inference and projection are emphasized as being acceptable throughout. Inference and projection may be based on

extrapolation of current or potential threats into the future (including their rate of change e.g. habitat area, trade demand), or of factors related to population abundance or distribution (including dependence on other taxa e.g. epiphytes/ parasites), so long as these can reasonably be supported. Suspected or inferred patterns in the recent past, present or near future can be based on any of a series of related factors, and these factors should be specified as part of the documentation.

Taxa at risk from threats posed by future events of low probability but with severe consequences (catastrophes) should be identified by the criteria (e.g. small distributions, few locations). Some threats need to be identified particularly early, and appropriate actions taken, because their effects are irreversible or nearly so (e.g., pathogens, invasive organisms, hybridisation).

7. Problems of scale

Classification based on the sizes of geographic ranges or the patterns of habitat occupancy is complicated by problems of spatial scale. The iner the scale at which the distributions or habitats of taxa are mapped, the smaller the area will be that they are found to occupy, and the less likely it will be that range estimates (at least for 'area of occupancy': see Definitions, point 10) exceed the thresholds specified in the criteria. Mapping at finer scales reveals more areas in which the taxon is unrecorded. Conversely, coarse-scale mapping reveals fewer unoccupied areas, resulting in range estimates that are more likely to exceed the thresholds for the threatened categories. The choice of scale at which range is estimated may thus, itself, influence the outcome of Red List assessments and could be a source of inconsistency and bias. It is impossible to provide any strict but general rules for mapping taxa or habitats; the most appropriate scale will depend on the taxon in question, and the origin and comprehensiveness of the distribution data.

8. Uncertainty

The data used to evaluate taxa against the criteria are often estimated with considerable uncertainty. Such uncertainty can arise from any one or all of the following three factors: natural variation, vagueness in the terms and definitions used, and measurement error. The way in which this uncertainty is handled can have a strong influence on the results of an evaluation. Details of methods recommended for handling uncertainty are included in Annex 1, and assessors are encouraged to read and follow these principles.

In general, when uncertainty leads to wide variation in the results of assessments, the range of possible outcomes should be specified. A single category must be chosen and the basis for the decision should be documented; it should be both precautionary and credible.

When data are very uncertain, the category of 'Data Deficient' may be assigned. However, in this case the assessor must provide documentation showing that this category has been assigned because data are inadequate to determine a threat category. It is important to recognize that taxa that are poorly known taxa can often be assigned a threat category on the basis of background information concerning the deterioration of their habitat and/or other causal factors; therefore the liberal use of 'Data Deficient' is discouraged.

9. Implications of listing

Listing in the categories of Not Evaluated and Data Deficient indicates that no assessment of extinction risk has been made, despite initial attempts, for reasons different (e.g. taxonomic

uncertainty/ confusion) from simpl non-consideration. Until such time as an assessment is made, taxa listed in these categories should not be treated as if they were non-threatened. It may be appropriate (especially for Data Deficient forms) to give them the same degree of attention as threatened taxa, at least until their status can be assessed.

10. Documentation

All assessments should be documented. Threatened classifications should state the criteria and sub-criteria that were met. No assessment can be accepted for the IUCN Red List as valid unless at least one criterion is given. If more than one criterion or sub-criterion is met, then each should be listed. If a re-evaluation indicates that the documented criterion is no longer met, this should not result in automatic reassignment to a lower category of threat (down-listing). Instead, the taxon should be re-evaluated against all the criteria to clarify its status. The factors responsible for qualifying the taxon against the criteria, especially where inference and projection are used, should be documented (see Annexes 2 and 3). The documentation requirements for other categories are also specified in Annex 3.

11. Threats and priorities

The category of threat is not necessarily sufficient to determine priorities for conservation action. The category of threat simply provides an assessment of the extinction risk under current circumstances, whereas a system for assessing priorities for action will include numerous other factors concerning conservation action such as costs, logistics, chances of success, and other biological characteristics of the subject.

12. Re-evaluation

Re-evaluation of taxa against the criteria should be carried out at appropriate intervals. This is especially important for taxa listed under Near Threatened, Data Deficient and for threatened taxa whose status is known or suspected to be deteriorating.

13. Transfer between categories

The following rules govern the movement of taxa between categories:

A. A taxon may be moved from a category of higher threat to a category of lower threat if none of the criteria of the higher category has been met for five years or more.

B. If the original classification is found to have been erroneous, the taxon may be transferred to the appropriate category or removed from the threatened categories altogether, without delay (but see Section 10).

C. Transfer from categories of lower to higher risk should be made without delay.

14. Use at regional level

The IUCN Red List Categories and Criteria were designed for global taxon assessments. However, many people are interested in applying them to subsets of global data, especially at regional, national or local levels. To do this it is important to refer to guidelines prepared by the IUCN/SSC Regional Applications Working Group (Gardenfors et al. 1999). When applied at national or regional levels it must be recognized that a global category may not be the same as a national or

regional category for a particular taxon. For example, taxa classified as Least Concern globally might be Critically Endangered within a particular region where numbers are very small or declining, perhaps only because they are at the margins of their global range. Conversely, taxa classified as Vulnerable on the basis of their global declines in numbers or range might be Least Concern within a particular region where their populations are stable. It is also important to note that taxa endemic to regions or nations will be assessed globally in any regional or national applications of the criteria, and in these cases great caremust be taken to check that an assessment has not already been undertaken by a Red List Authority (RLA), and that the categorization is agreed with the relevant RLA (e.g., an SSC Specialist Group known to cover the taxon).

III. DEFINITIONS

1. Population and Population Size (Criteria A, C and D)

Population is defined here as the total number of adult individuals of the taxon. For functional reasons, primarily owing to differences between life forms, population size is measured as numbers of mature individuals only. In the case of taxa obligately dependent on other taxa for all or part of their life cycles, biologically appropriate values for the host taxon should be used.

2. Sub-populations (Criteria B and C)

Sub-populations are defined as geographically or otherwise distinct groups in the population between which there is little demographic or genetic exchange (typically one successful migrant individual or gamete per year or less).

3. Mature individuals (Criteria A, B, C and D)

The number of mature individuals is the number of individuals known, estimated or inferred to be capable of reproduction. When estimating this quantity, the following points should be borne inmind:

- Mature individuals that will never produce new recruits should not be counted (e.g. densities are too low for fertilization).
- In the case of populations with biased adult or breeding sex ratios, it is appropriate to use lower estimates for the number of mature individuals, which take this into account.
- Where the population size fluctuates, use a lower estimate. In most cases this will be much less than the mean.
- Reproducing units within a clone should be counted as individuals, except where such units are unable to survive alone (e.g. corals).
- In the case of taxa that naturally lose all or a subset of mature individuals at some point in their life cycle, the estimate should be made at the appropriate time, when mature individuals are available for breeding.
- Re-introduced individuals must have produced viable offspring before they are counted as mature individuals.

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[2] The list of botanical classification of the world in to regions & units can be obtained from: Hollis S. & Brummit R. K. (ed., 1992) World Geographical Scheme for Recording Plant Distributions Plant Taxonomic Database Standard No. 2 Version 1.0, International Working Group on Taxonomic databases for Plant Sciences (TDWG), Hunt Institute for Botanical Documentation, Carnegie Mellon University, Pittsburgh.

[3] In popular connotation, number of adults worldwide would reflect the "global adult" population

4. Generation (Criteria A, C and E)

Generation length is the average age of parents of the current cohort (i.e. newborn individuals in the population). Generation length therefore reflects the turnover rate of breeding individuals in a population. Generation length is greater than the age at first breeding and less than the age of the oldest breeding individual, except in taxa that breed only once. Where generation length varies under threat, the more natural, i.e. pre-disturbance, generation length should be used.

5. Reduction (Criterion A)

A reduction is a decline in the number of mature individuals of at least the amount (%) stated under the criterion over the time period (years) specified, although the decline need not be continuing. A reduction should not be interpreted as part of a fluctuation unless there is good evidence for this. The downward phase of a fluctuation will not normally count as a reduction.

6. Continuing decline (Criteria B and C)

A continuing decline is a recent, current or projected future decline (which may be smooth, irregular or sporadic), which is liable to continue unless remedial measures are taken. Fluctuations will not normally count as continuing declines, but an observed decline should not be considered as a fluctuation unless there is evidence for this.

7. Extreme fluctuations (Criteria B and C)

Extreme fluctuations can be said to occur in a number of taxa when population size or distribution area varies widely, rapidly and frequently, typically with a variation greater than one order of magnitude (i.e. a tenfold increase or decrease).

8. Severely fragmented (Criterion B)

The phrase 'severely fragmented' refers to the situation in which increased extinction risk to the taxon results from the fact that most of its individuals are found in small and relatively isolated sub-populations (in certain circumstances this may be inferred from habitat information). These small sub-populations may go extinct, with a reduced probability of re-colonization.

9. Extent of occurrence: EOO (Criteria A and B)

Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon, excluding cases of vagrancy (see Figure 2). This measure may exclude discontinuities or disjunctions within the overall distributions of taxa (e.g. large areas of obviously unsuitable habitat) (but see 'area of occupancy', point 10 below). Extent of occurrence can often be measured by a minimum convex polygon (the smallest polygon in which no internal angle exceeds 180 degrees and which contains all the sites of occurrence). This thus resembles geographical range.

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[4] Subpopulation as defined here is often termed as "(local) population" in popular connotation.
[5] Future population decline may be projected or suspected owing to growing trade demand or newfound uses.

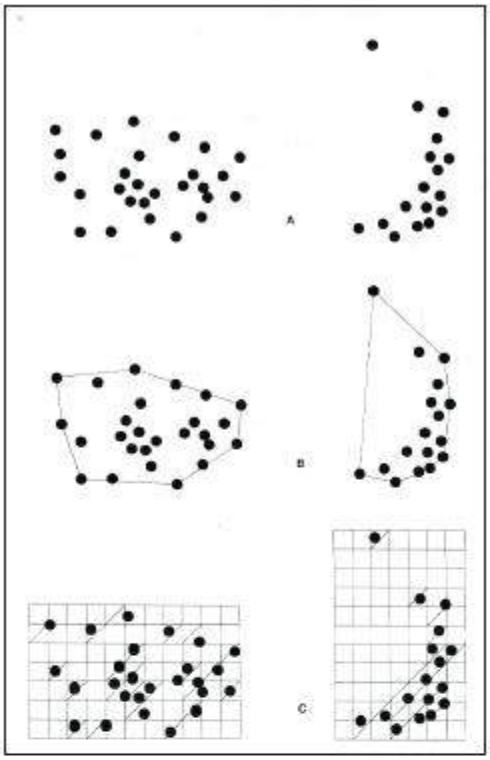

Figure 2. Two examples of the distinction between extent of occurrence and area of occupancy. (A) is the spatial distribution of known, inferred or projected sites of present occurrence. (B) shows one possible boundary to the extent of occurrence, which is the measured area within this boundary. (C) shows one measure of area of occupancy which can be achieved by the sum of the occupied grid squares.

10. Area of occupancy: AOO (Criteria A, B and D)

Area of occupancy is defined as the area within its 'extent of occurrence' (see point 9 above), which is occupied by a taxon, excluding cases of vagrancy. The measure reflects the fact that a taxon will not usually occur throughout the area of its extent of occurrence, which may contain unsuitable or unoccupied habitats. In some cases (e.g. irreplaceable colonial nesting sites, crucial feeding sites for migratory taxa) the area of occupancy is the smallest area essential at any stage to the survival of existing populations of a taxon. The size of AOO will be a function of the scale at which it is measured, and should be at a scale appropriate to relevant biological aspects of the taxon, the nature of threats and the available data (see point 6 in the Preamble). To avoid inconsistencies and bias in assessments caused by estimating area of occupancy at different scales, it may be necessary to standardize estimates by applying a scale-correction factor. It is difficult to give strict guidance on how standardization should be done because different types of taxa have different scale-area relationships. AOO i.e. habitat area is often estimated to be 10% of the geographical range i.e. EOO of the taxon.

11. Location (Criteria B and D)

The term 'location' defines a geographically or ecologically distinct area in which a single threatening event can rapidly affect all individuals of the taxon present. The size of the location

[5] AOO is not simply the habitat area occupied by the taxon but larger than it- the um of the area of the grids occupied by it.

depends on the area covered by the threatening event and may include part of one or many subpopulations. Where a taxon is affected by more than one threatening event, location should be defined by considering the most serious plausible threat. Practically, the location may range across villages or even talukas.

12. Quantitative analysis (Criterion E)

A quantitative analysis is defined here as any form of analysis, which estimates the extinction probability of a taxon, based on known life history, habitat requirements, threats and any specified management options. Population viability analysis (PVA) is one such technique. Quantitative analyses should make full use of all relevant available data. In a situation in which there is limited information, such data as are available can be used to provide an estimate of extinction risk (for instance, estimating the impact of stochastic events on habitat). In presenting the results of quantitative analyses, the assumptions (which must be appropriate and defensible), the data used and the uncertainty in the data or quantitative model must all be documented.

IV. THE CATEGORIES

A representation of the relationships between the categories is shown in Figure 1.

EXTINCT (EX)

A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

EXTINCT IN THE WILD (EW)

A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time-frame appropriate to the taxon's life cycle and life form.

Threatened:

CRITICALLY ENDANGERED (CR)

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (see Section V), and it is therefore considered to be facing an extremely high risk of extinction (50% in 5 years) in the wild.

ENDANGERED (EN)

A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (see Section V), and it is therefore considered to be facing a very high risk of extinction (20% in 20 years) in the wild.

[7] Extinction models have been rarely used in India, regarding taxa such as elephant or tigers where substantial population data exist for simulations

VULNERABLE (VU)

A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see Section V), and it is therefore considered to be facing a high risk of extinction (10% in 100 years) in the wild.

Not-Threatened:

NEAR THREATENED (NT)

A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.

LEAST CONCERN (LC)

A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.

DATA DEFICIENT (DD)

A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. Great care should be exercised in choosing between DD and a threatened status. If the range of a taxon is suspected to be relatively circumscribed, and a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.

NOT EVALUATED (NE)

A taxon is Not Evaluated when it is has been initially proposed but not discussed and not yet been evaluated against the criteria for any reason, including uncertainty about taxonomic or wild status.

V. THE CRITERIA FOR CRITICALLY ENDANGERED, ENDANGERED AND VULNERABLE

A taxon is considered threatened if it meets any 1 of the criteria A to E below. A taxon is assigned highest threat category as per the relavnt criteria, if it meets 2 or more criteria & categories.

CRITICALLY ENDANGERED (CR)

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing an extremely high risk of extinction in the wild:

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[*] Observation: monitoring data, Estimated: casual observation/ perception; Inferred: indicators (habitat area); Projected: considering future demand/threats; Suspected: guesstimates (e.g. trade adulteration).

(CR-) A. Reduction in population size based on any of the following:

A 1. An observed, estimated, inferred or suspected population size reduction of 90% over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are clearly reversible AND understood AND ceased, based on (and specifying) any of the following:

(a) direct observation

(b) an index of abundance appropriate to the taxon

(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat

(d) actual or potential levels of exploitation

(e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.

A 2. An observed, estimated, inferred or suspected population size reduction of 80% over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

A 3. A population size reduction of 80%, projected or suspected to be met within the next 10 years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.

A 4. An observed, estimated, inferred, projected or suspected population size reduction of 80% over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years), where the time period includes both the past and the future, and where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

(CR-) B. Geographic range i.e. either B1 (extent of occurrence)/ B2 (area of occupancy)/ both:
CR- B 1. Extent of occurrence estimated to be above 100 km2, and at least 2 of a-c:

a. Severely fragmented or known to exist at only a single location.
b. Continuing decline, observed, inferred or projected, in any of the following:
   (i) extent of occurrence
   (ii) area of occupancy
   (iii) area, extent and/or quality of habitat
   iv) number of locations or subpopulations
   (v) number of mature individuals.
c. Extreme fluctuations in any of the following:
   (i) extent of occurrence
   (ii) area of occupancy
   (iii) numer of locations or subpopulations
   (iv) number of mature individuals.

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* Time 3 generations would exceed 100 years for many tree taxa & would not have been estimated by any person. Hence, conclusions for this period could be only inference based on habitat decline & indirect information such as historical accounts from the old people who knew the taxon from forefathers.

** Causes reversible: Habitat quality loss (harvests, fires etc.); irreversible: Habitat area loss (encroachment)

(CR -) B 2. Area of occupancy estimated to be below 10 km2, & estimates indicating at least 2 of a-c:

a. Severely fragmented or known to exist at only a single location.
b. Continuing decline, observed, inferred or projected, in any of the following:
   (i) extent of occurrence
   (ii) area of occupancy
   (ii) area, extent and/or quality of habitat
   (iv) number of locations or subpopulations
   (v) number of mature individuals.
c. Extreme fluctuations in any of the following:
   (i) extent of occurrence
   (ii) area of occupancy
   (iii) number of locations or subpopulations
   (iv) number of mature individuals.

(CR -) C. Population size estimated to number fewer than 250 mature individuals and either:

C 1. An estimated continuing decline of at least 25% within three years or one generation, whichever is longer, (up to a maximum of 100 years in the future) OR

C 2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a-b):

(a) Population structure in the form of one of the following:
   (i) no subpopulation estimated to contain more than 50 mature individuals, OR
   (ii) at least 90% of mature individuals in one subpopulation.
(b) Extreme fluctuations in number of mature individuals.

(CR -) D. Population size estimated to number fewer than 50 mature individuals.

(CR -) E. Quantitative analysis showing the probability of extinction in the wild is at least 50% within 10 years or three generations, whichever is the longer (up to a maximum of 100 years).

ENDANGERED (EN)

A taxon is Endangered when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing a very high risk of extinction in the wild:

(EN-) A. Reduction in population size based on any of the following:

1. An observed, estimated, inferred or suspected population size reduction of 70% over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are clearly reversible AND understood AND ceased, based on (and specifying) any of the following:
   (a) direct observation
   (b) an index of abundance appropriate to the taxon
   (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
   (d) actual or potential levels of exploitation
   (e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.

A 2. An observed, estimated, inferred or suspected population size reduction of 50% over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

[11] Any 10 years have been provided (combining past & future) if that can assign the taxon to higher status that considering just the past e.g. a taxon may have recorded 60% decline in the past and qualify to be vulnerable but due to higher future demand, may be projected to incur past+ future loss > 80%, assigning it endangered status

A 3. A population size reduction of 50%, projected or suspected to be met within the next 10 years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.

A 4. An observed, estimated, inferred, projected or suspected population size reduction of 50% over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years), where the time period includes both the past and the future, AND where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

(EN-) B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:

B 1. Extent of occurrence estimated to be below 5000 km2, and estimates indicating at least 2 of a-c:

a. Severely fragmented or known to exist at no more than five locations.
b. Continuing decline, observed, inferred or projected, in any of the following:
   (i) extent of occurrence
   (ii) area of occupancy
   (iii) area, extent and/or quality of habitat
   (iv) number of locations or subpopulations
   (v) number of mature individuals.
c. Extreme fluctuations in any of the following:
   (i) extent of occurrence
   (ii) area of occupancy
   (iii) number of locations or subpopulations
   (iv) number of mature individuals.

B 2. Area of occupancy estimated to be less than 500 km2, and estimates indicating at least 2 of a-c:

a. Severely fragmented or known to exist at no more than five locations.
b. Continuing decline, observed, inferred or projected, in any of the following:
   (i) extent of occurrence
   (ii) area of occupancy
   (iii) area, extent and/or quality of habitat
   (iv) number of locations or subpopulations
   (v) number of mature individuals.
c. Extreme fluctuations in any of the following:
   (i) extent of occurrence
   (ii) area of occupancy
   (iii) number of locations or subpopulations
   (iv) number of mature individuals.

(EN-) C. Population size estimated to number fewer than 2500 mature individuals and either:

(EN-) C 1. An estimated continuing decline of at least 20% within five years or two generations, whichever is longer, (up to a maximum of 100 years in the future); OR

C 2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a-b):

(a) Population structure in the form of one of the following:
(i) no subpopulation estimated to contain more than 250 mature individuals, OR
(ii) at least 95% of mature individuals in one subpopulation.
(b) Extreme fluctuations in number of mature individuals.

(EN-) D. Population size estimated to number fewer than 250 mature individuals.
(EN-) E. Quantitative analysis showing the probability of extinction in the wild is at least 20% within 20 years or five generations, whichever is the longer (up to a maximum of 100 years).
VULNERABLE (VU)
A taxon is Vulnerable when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing a high risk of extinction in the wild:
(VU-) A. Reduction in population size based on any of the following:
A 1. An observed, estimated, inferred or suspected population size reduction of 50% over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are: clearly reversible AND understood AND ceased, based on (and specifying) any of the following:

(a) direct observation
(b) an index of abundance appropriate to the taxon
(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
(d) actual or potential levels of exploitation
(e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.

A 2. An observed, estimated, inferred or suspected population size reduction of 30% over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.
A 3. A population size reduction of 30%, projected or suspected to be met within the next 10 years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.
A 4. An observed, estimated, inferred, projected or suspected population size reduction of 30% over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years), where the time period includes both the past and the future, AND where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.
(VU-) B. Geographic range i.e. either B1 (extent of occurrence)/ B2 (area of occupancy)/ both:
B 1. Extent of occurrence estimated below 20,000 km2, & at least 2 of a-c:
a. Severely fragmented or known to exist at no more than 10 locations.
b. Continuing decline, observed, inferred or projected, in any of the following:

(i) extent of occurrence
(ii) area of occupancy
(iii) area, extent and/or quality of habitat
(iv) number of locations or subpopulations
(i) number of mature individuals.

c. Extreme fluctuations in any of the following:

(i) extent of occurrence
(ii) area of occupancy
(iii) number of locations or subpopulations
(iv) number of mature individuals.

[17] These rarely apply in Indian conditions due to stable climate unlike seasonally snow clad temperate countries

(VU-) B2. Area of occupancy estimated below 2000 km2, & estimates indicating at least 2 of a-c:

a. Severely fragmented or known to exist at no more than 10 locations.

b. Continuing decline, observed, inferred or projected, in any of the following:
   (i) extent of occurrence
   (ii) area of occupancy
   (iii) area, extent and/or quality of habitat
   (iv) number of locations or subpopulations
   (v) number of mature individuals.

c. Extreme fluctuations in any of the following:
   (i) extent of occurrence
   (ii) area of occupancy
   (iii) number of locations or subpopulations
   (iv) number of mature individuals.

(VU-) C. Population size estimated to be fewer than 10,000 mature individuals & either:

C 1. An estimated continuing decline of at least 10% within 10 years or three generations, whichever is longer, (up to a maximum of 100 years in the future) OR

C 2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a-b):

(a) Population structure in the form of one of the following:

(i) no subpopulation estimated to contain more than 1000 mature individuals, OR

(ii) all mature individuals are in one subpopulation.

(b) Extreme fluctuations in number of mature individuals.

(VU-) D. Population very small or restricted in the form of either of the following:

1. Population size estimated to number fewer than 1000 mature individuals.

2. Population with a very restricted area of occupancy (typically less than 20 km2) or number of locations (typically five or fewer) such that it is prone to the effects of human activities or stochastic events within a very short time period in an uncertain future, and is thus capable of becoming Critically Endangered or even Extinct in a very short time period.

(VU-) E. Quantitative analysis showing the probability of extinction in the wild is at least 10% within 100 years

Quantitative Criteria Thresholds (extended form) for Relevant Threat Categories

ANY of the following criteria may be used to assign categories:	CRITICALLY ENDANGERED CR	ENDANGERED EN	VULNERABLE VU
A. Population Reduction (PR)			
Observed/ Estimated/ Inferred or Suspected *Causes clearly reversible AND understood AND ceased*	1) ≥ 90% decline over last 10 years or 3 generations based on any of the following :	1) ≥ 70% decline over last 10 years or 3 generations based on any of the following :	1) ≥ 50% decline over last 10 years or 3 generations based on any of the following :
	(a) direct observation (b) an index of abundance appropriate for the Taxon (c) decline in area of occupancy, extent of occurrence and/or habitat quality (d) actual or potential levels of exploitation (e) effect of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites		
Observed/ Estimated/ Inferred or Suspected *Causes not ceased OR understood OR reversible*	2) ≥ 80% decline over last 10 years or 3 generations based on any of (a) to (e) above	2) ≥ 50% decline / 10 years or 3 generations based on (a) to (e) above	2) ≥ 30% decline / 10 years or 3 generations based on (a) to (e) above
Projected or Suspected	3) ≥ 80% decline within next 10 years or 3 generations (max. 100 years) based on any of (b) to (e) above	3) ≥ 50% decline within next 10 years or 3 generations (max. 100 years) based on (b) to (e) above	3) ≥ 30% decline within next 10 years or 3 generations (max. 100 years) based on (b) to (e) above
Observed/ Estimated/ Inferred/ Projected or Suspected *Causes not ceased* ***or*** *understood* ***or*** *reversible* (Time period includes both past and future)	4) ≥ 80% decline/ 10 years or 3 generations (max. 100 years) based on any of (a) to (e) above	4) ≥ 50% decline/ 10 years or 3 generations (max. 100 years) based on (a) to (e) above	4) ≥ 30% decline/10 years or 3 generations (max. 100 years) based on (a) to (e) above
B 1. Extent of Occurrence (EOO)			

ANY of the following criteria may be used to assign categories:	CRITICALLY ENDANGERED CR	ENDANGERED EN	VULNERABLE VU
	Estimated < 100 km ^{2}, and estimates indicating at least any 2 of (a) to (c) :	Estimated <5,000 km ^{2}, & estimates indicating at least any 2 of (a) to (c) :	Estimated <20,000 km ^{2}, & estimates indicating at le ast any 2 of (a) to (c) :
	(a) Severely fragmented or single location	(a) Severely fragmented or not more than 5 locations	(a) Severely fragmented or not more than 5 locations
	(b) Continuing decline, observed, inferred or projected, in any of the follow ing : (i) extent of occurrence (ii) area of occupancy (iii) area, extent and / or quality of habitat (iv) no. of locations or sub-populations (v) no. of mature individuals		
	(c) Extreme fluctuations in any of the following : (i) extent of occurrence (ii) area of occupancy (iii) no. of locations or sub-populations (iv) no. of mature individuals		
B 2. Area of Occurrence (AOO)			
	Estimated < 10 km ^{2}, and estimates indicating at least any 2 of (a) to (c) :	Estimated < 500 km ^{2}, & estimates indicating at least any 2 of (a) to (c) :	Estimated < 2,000 km ^{2}, and estimates indicating at least any 2 of (a) to (c) :
	(a) Severely fragmented or single location	(a) Severely fragmented or not more than 5 locations	(a) Severely fragmented or not more than 5 locations
	(b) Continuing decline, observed, inferred or projected, in any of the following : (i) extent of occurrence (ii) area of occupancy (iii) area, extent and / or quality of habitat (iv) no. of locations or sub-populations (v) no. of mature individuals		

ANY of the following criteria may be used to assign categories:	**CRITICALLY ENDANGERED CR**	**ENDANGERED EN**	**VULNERABLE VU**
	(c) Extreme fluctuations in any of the following : (i) extent of occurrence (ii) area of occupancy (iii) no. of locations or sub-populations (iv) no. of mature individuals		
C. Population Size			
	Estimated < 250 mature individuals and either :	Estimated <2,500 mature individuals and either :	Estimated <10,000 mature individuals and either :
Estimated continuing decline	1) At least 25% in 3 years or 1 generation (max. 100 years); OR	(1) At least 20% in 5 years or 2 gens. (max. 100 years); OR	1) At least 1 0% in 10 years or 3 gens. (max. 100 years); OR
Continuing decline in no. of mature individuals *Observed/ Projected/ Inferred*	2) At least one of (a) or (b) : (a) Largest subpopulation (i) < 50 OR (ii) ≥ 90% in one sub-population (b) Extreme fluctuations	(2) At least one of (a) to (b) : (a)Largest subpopulation (i) < 250 OR (ii) ≥ 95% in one sub-population (b) Extreme fluctuations	2) At least one of (a) to (b) : (a)Largest subpopulation (i) < 1000 OR (ii) 100% in one sub-population (b) Extreme fluctuations

List of Participants

S. No.	Name & Address of Resource Person	Experience/ Expertise
1	Sh. Vinay Tandon, IFS Pr. Chief Conservator of Forests, Forest Headquarters, Talland Shimla	35 years as Forest Manager. Vice Chair, South Asia, IUCN/ SSC – MPSG
2	Sh. D. K. Ved, IFS Advisor, Foundation for Revitalisation of Local Health Traditions, 74/2, Jarakbande Kaval, Post Attur, Via Yelahanka, Bangalore – 560 106.	35 years as Forest Manager, out of which 17 years dedicated to medicinal plant conservation
3	Dr. G.S. Goray, IFS CCF (Floral Diversity, NTFP & Research Managment) HP Forest Department Sundernagar, Mandi	> 25 years as Forest Manager, Research & Field Botany
4	Dr. S K Srivastava, Jt. Director, BSI, Dehradun	> 25 years in plant taxonomy.
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6	Dr. Vaneet Jishtu, Scientist, RFRI (ICFRE), Jorhat	> 20 years in field botany, especially high altitude Himalayan medicinal flora
7	Dr. K. Ravikumar Dy. Director, Foundation for Revitalisation of Local Health Traditions, 74/2, Jarakbande Kaval, Post Attur, Via Yelahanka, Bangalore – 560 106.	> 25 years in plant taxonomy, with specialization in medicinal flora.
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10	Sh. D. R. Nag, Consultant, Ayurveda Department, Baijnath	> 30 years in medicinal plants of Himachal Pradesh
11	Dr. J. C. Rana, Pr. Scientist, Regional Station, NBPGR, Phagli, Shimla -4	> 25 years in managing germplasm of medicinal flora
12	B D Sharma Amit Niwas, Lower Phagli,Shimla-171 004	> 35 years in managing germplasm of medicinal flora
13	Dr. Sanjay Uniyal IHBT, Palampur	> 10 years research on medicinal plants

14	Dr. Lal Singh, Director Himalayan Research Group, Shimla	> 25 years as researcher. Head of prominent NGO, promoting cultivation of medicinal plants
15	Mrs. Vandana Thaplyal, WWF, Shimla	> 25 years in environment education.
16	Mr. Sanjeev Sharma WWF, Shimla	5 years in environment education.
17	Sh. Mohinder Pal, IFS Director, HFRI, Shimla	> 30 years as forest manager.
18	Dr. K S Kapoor, Scientist, HFRI, Shimla	> 25 years as forest ecologists.
19	Dr. Pitamber Singh Negi, Research Officer, HFRI, Shimla	> 15 years in silviculture research.
20	Dr. R. K. Verma, Scientist, HFRI, Shimla	> 20 years in biodiversity research.
21	Dr. A. Rajasekaran, Scientist, HFRI, Shimla	10 years in NTFP.
22	Dr. Sandeep Sharma, Scientist, HFRI, Shimla	20 years in Silviculture
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25	Dr. H. B. Naithani, Consultant (Ex Scientist), FRI, Dehradun	> 30 years as plant taxonomist; author of various books and papers on flora of different regions in India.
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30	Mr. K. K. Gupta DFO (Hqrs), Sundernagar	> 30 years as forest manager.
31	Mr. O. C. Sharma, DFO (Research), Sundernagar	> 30 years as forest manager.
32	Mr. Jagdish Singh HFRI, Shimla	> 20 years research in NTFP & agro forestry.
33	Dr. M. K. Brahmi Solan	Ayurvedic Physician

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