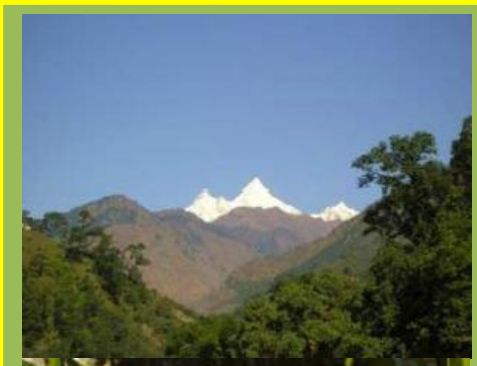

A Community Initiative f Orchid Conservation in Gori Valley, Western Himalaya, India

Project Technical Report

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Project Advisor: Prof. G.S. Raw

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****

Summary

Gori valley is situated at the junction of Western and Central Himalaya. Wide altitudinal gradient, habitat diversity and close affinity with Eastern Himalaya make Gori valley an important orchid hotspot in the Western Himalaya. Much of the Gori valley lies in the sub-tropical belt. It has a rich and moist riverine forest that is essential for the growth of orchids. Some of the riverine localities are very rich of orchids in term of species number and abundance. About 50 % of the species are concentrated in the stretch between Balamra to Bangapani. The local communities are unaware of significance of orchids. Lopping of the host species mainly for personal consumption forms the major threat to the survival of orchids. Hence, it is imperative to generate awareness among locals about the importance of orchids. The first seven months were spent for survey, photography and preparation of educational materials. Rests five months were spent for awareness programs, workshops in different villages and report writing. A voluntary group was created and one month time was spent for their orientation programmes. For awareness creation among the local community simple posters, brochures, T-shirt, drawings and banners on orchids in local language (Hindi) and English were prepared. Four groups of volunteers, having four members in each team were selected for conservation awareness. As a follow up of the conservation programme, local communities were also involved in *in situ* restoration of orchids in their localities. A total 71 species of these 21 terrestrial and 50 epiphytic were recorded in flowering and non flowering conditions. Host species like *Toona ciliata, Engelhadrtia spicata, Quercus leucotrichophora* and *Mangifera indica* are most favourable for epiphytic orchids in this valley. Based on our questionnaire survey revealed that out of 508 individuals only 38 % including both male and female knew about orchid and they called these as "***Bhalu Ka Kela***" that means Bear's banana or "***Harjojan***' meaning bone jointer. A series of popular talks were delivered in the four workshops. During these workshops a total 449 villagers participated and showed their interest.

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INTRODUCTION

Conservation is “the maintenance of essential ecological processes and life-support systems, the preservation of genetic diversity, and the sustainable utilization of species and ecosystems” (Talbot, 1980). Community based conservation is not a new thing in India. Several Governmental and Non-Governmental organizations are actively involved in this work since long. Most of the community conservation work is only focused towards medicinal plants. Very few attempts have been made to involve local people in the conservation of orchids in India because the need to conserve orchids has taken a minor place in conservationist’s priorities. Plants lack the general appeal of other mammalian group and money is far more easily available from the public for animal conservation projects.

Orchids are highly evolved group of plants occupying a top position in the plant kingdom, owing to their co-evolution with fungal partners (mycorhizae), pollinators and as indicators of environmental health. In India, they are represented by 186 genera and 1,141 species (Kumar and Manilal, 1994). About 60% of Indian species of orchids are epiphytic, while the rest are terrestrial. The orchids are partiality distributed in moist and sub-humid zones of India. The orchids show maximum diversity in the Eastern Himalaya, including the North-Eastern region, Western Ghats and eastern part of Western Himalaya (Kumaun Himalaya). In spite of the great orchid diversity in the country a number of orchids are rare and threatened due to over-exploitation and habitat destruction. The commercial exploitation of ornamental orchids over several decades has considerably depleted their natural populations in wild. A number of species are listed in the IUCN Red data Book as well as The Red data Book of Indian plants.

Orchids are in fact a proud possession of the hobbyists, nurserymen and are a symbol of royalty in many countries. In South-east Asian country, Thailand earns enormous revenue by selling commercial orchids; on the one hand the local communities in Gori Valley of eastern Uttaranchal continue to exploit their forests which harbour a large number of beautiful orchids. A number of orchid species found in this area are rare and threatened because of destruction of natural habitats. The developmental activities, such as road construction and power projects coupled with rising population have put enormous pressure on the species and habitats. Major pressures like lopping of host trees for fuel wood and fodder by the local community of the valley has posed tremendous pressure on orchid habitats.

The local community, who are well known for their knowledge of various plants, need to involved in conservation and management. Now the policy makers in India have realized the importance of involving local communities in conservation of forest resources (Anon., 1998, 1998a). Though the

orchids of Gori valley are not giving any direct benefit to the local people, there is opportunity in future to develop horticulture and ecotourism, this can generate revenue for local community. Gori Valley in eastern part of Uttaranchal has been recognized as one of the orchid hotspots in Western Himalaya, offers an excellent opportunity to work with the local communities towards orchid conservation. The present project is a community initiative towards the orchid conservation through local people. We are grateful to the Rufford Foundation, UK for funding this project. Although the present project duration has ended, we are still looking for funds to continue our community awareness orchid conservation programme in the Gori valley and other part of the Western Himalaya where orchids are abundant.

PROJECT OBJECTIVES:

The main goals of the project were:

- Preparation of educational material such as posters, films, slides, exhibits.
- Creation of voluntary groups and interested persons for educational programmes.
- Series of workshops and identification of orchid rich sites.
- Community involvement in orchid conservation.

APPROACH TO ACHIEVE THE OBJECTIVES:

- Survey the entire Gori valley in seven months period by regular visit with help of two field assistant.
- During survey photographs of orchids taken besides this threat to orchids noted.
- Questionnaire survey was also done during the survey in different villages.
- Contact the village heads and enthusiastic people and form four groups of volunteers.
- Interact with the forest departments.
- Educational material prepared in the local languages and distributed among the local community.
- Contact schools and colleges for conservation education

PROJECT SITE LOCATION:

The Gori valley is located in the eastern Kumaun Himalaya (29° 5’-30° 10’N latitudes and 79° 45’-81°5’E longitudes). The valley is bounded in the north by the Tibetan plateau and in the south-east by the kingdom of Nepal which is separated by river Kali. The Panchachuli group of peaks forms the north-

eastern boundary. The upper part of the study area falls under Askote musk dear sanctuary (Fig.1). The valley represents three geological sub-divisions i.e., Lesser, Greater and Trans Himalaya. The steep valleys with vertical concave wall are formed by the river crossing this valley. The total catchment area of Gori valley is 2230 sq. km. This is about 4% of the area of the State of Uttaranchal. The basin as such is unique with respect to the status of the forests. It is estimated that about 88% of the area is under protected forests (including 64.24% of village commons). About 347 Km^2 of Askot Wildlife Sanctuary falls within the Gori Basin. Because of the great compression of life-zones in a small geographical area, this valley presents a diversity of landscape and ecosystems. The altitude ranges from about 600 m at Jauljibi to above 5500m in the Milam glacier region representing Subtropical to subpolar life zones. The vegetation in the area is mainly sub-tropical to alpine meadows. The valley possesses more than 85% of the reported forest communities of Western Himalaya. The upper part of the valley falls under alpine habitat and dominated by the grasslands of *Danthonia cachemyriana* in the lower and mid alpine region. Lower part of the valley is mainly dominated by the Sal (*Shorea robusta*) forest and distributed up to 800m. Other tree species are *Acacia catechu, Aegle marmelos, Albizia chinensis, A. lebbeck, Alnus nepalensis, Bauhinia retusa, B. variegata, Bombax ceiba, Erythrina suberosa, Ficus religiosa, Grewia oppositifloia, Lannea cormondelica, Litsea monopetala, Marcanga pustulata, Mallotus philippensis, Mangifera indica, Sapium insigne, Syzigium cumini, Terminala alata* etc. Towards higher altitudes pure patches of *Pinus roxburghii* and oaks (*Quercus glauca* and *Q. leucotrichophora)* can be seen. The common shrubs are *Adhatoda zeylanica, Berberis lyceum, B. asiatica, Callicarpa arborea, Calotropis procera, Casearia tomentosa, Maesa indica, Murraya koenigii, Lantana camara, Rubus ellipticus,* and *Woodfordia fruticosa.* The herbaceous vegetation in the region is represented by *Achyranthes aspera, Alysicarpus* spp., *Amaranthus spinosus, Argemone mexicana, Cordispermum halicacabum, Chenopodium album, Rumex hastatus* and various others. Common ferns area *Ampelopteris prolifera, Athyrium pectinatum, Asplenium dalhousiae, Diplazium esculentum, Nephrolepsis cordifolia, Pteris vittata,* and species of *Polystachum, Equisetum, Selaginella* and *Hypodematium.*

SOCIO-ECONOMIC SCENARIO

There are 171 revenue villages within the whole upper and lower Gori valley, with population of 43,542 individuals (FES, 2003). The valley is a remote part of the state of Uttaranchal. Most of the villages are situated very far from the main towns and these areas are so remote and underdeveloped that it takes days together to reach those distant spots. Permanent human habitations occupy the lower valley and seasonally some people migrate to the alpine valleys for six months. Among the people who inhabit the valley are *Rajputs* (agriculturists), the *Shaukha* or *Bhotia* (mostly traders), and the schedule castes or

Shilpkar (domestic labourers).

The economy of the people largely depends on agriculture and animal husbandry. The majority of the lad holdings are small and marginal, and they are highly fragmentised between successive generations. The livelihood of the people of Gori valley is largely conditioned by the topography of the terrain and harsh climatic conditions. The cropping choice is restricted by the availability of water to irrigation and crucial technological inputs. The major agricultural crops of the valley are Paddy, wheat, maize, millets, pulse, oil seeds, barely and buck wheat that are grown in different seasons. There are two distinct seasons for agriculture i.e. summer and winter. Crops grown in summer are paddy, potatoes, millets, soybean and a variety of vegetables. In winter, wheat, barley, mustard and peas are grown. The principle livestock in the valley are cows, buffaloes, sheep and goats. All livestock populations need a proper check and management of livestock in the areas is of prime consideration in order to reduce pressure on the natural habitats representing the orchid wealth in the valley (Plate 1).

Women play a play a vital role in the agricultural economy. Women's contribution in various cropping activities right is higher than men's, both with respect to number of tasks performed and in terms of time spent. Their knowledge has been the mainstay of crop production, animal husbandry, dairy and forestry. They have excellent knowledge about collection, storage and use of seeds. From the collection of leaf litter for bedding, and grass for fodder, to transport of these products to the household, this work is handled by women. They look after livestock needs entirely, while providing the agricultural system with compost, which women carry to the fields and work in to the agricultural land.

STATUS OF ORCHIDS IN GORI VALLEY:

Out of 255 species of orchids so far known to occur in the western Himalaya 121 species in 45 genera (78 species are epiphytic, 42 terrestrial, one saprophytic) are recorded from the Gori Valley alone (Seidenfaden and Arora, 1982; Malhotra and Balodi, 1984 and Deva and Nathani, 1986). The valley therefore represents an orchid hot spot in the Western Himalaya. 36 species are facing danger, like anthropogenic pressure, destruction of forests habitat for timber, fuel and fodder extraction and developmental activities. Botanical Survey of India has published a list of rare threatened species (Hajra, 1983) and compiled Red Data Sheet of such species. These are the list of species which are facing various threats:

S.N	Species
1	*Ascocentrum ampullaceum* (Roxb.) Schltr
2	*Brachycorthis obcordata* (Buch. *ex* D. Don.) Summerh.
3	*Bulbophyllum helenae* (Kze.) J. J. Smith
4	*Bulbophyllum hookeri* (Duthie.) J. J. Smith
5	*Bulbophyllum leopardinum* (Wall.) Lindl.
6	*Bulbophyllum polyrhizum* Lindl.
7	*Bulbophyllum secundum* Hook. *f.*
8	*Bulbophyllum reptans* (Lindl.) Lindl.
9	*Cleisostoma aspersum* (Reichb. *f.*) Garay
10	*Corallorhiza trifida* Chatelain
11	*Cymbidium eburneum* Lindl.
12	*Cymbidium hookerianum* Reichb. *f.*
13	*Cymbidium iridoides* D.Don
14	*Dactylorhiza hatagirea* (D.Don) Soo
15	*Dendrobium heterocarpum* Wall. *ex* Lindl.
16	*Dendrobium primulinum* Lindl.
17	*Eria occidentalis* Seidenf.
18	*Eria reticosa* Wight
19	*Flickingeria fugax* (Reichb. *f.*) Seidenf.
20	*Gastrochilus acutifolius* (Lindl.) O.Ktze.
21	*Gastrochilus calceolaris* (Buch.-Ham. *ex* Sm.) D.Don
22	*Gymnadenia orchidis* Lindl.
23	*Habenaria arietina* Hook. *f.*
24	*Hrminium mackinnonii* Duthie.
25	*Kingidium deliciosum* (Reichb. *f.*) Sweet.
26	*Kingidium taenialis* (Lindl.) Hunt
27	*Nervilia mackinnonii* (Duthie) Schltr.
28	*Oberonia pyrulifera* Lindl
29	*Oberonia prainiana* King & Pantling
30	*Sunipia bicolor* Lindl.
31	*Thelasis longifolia* Hook. *f.*
32	*Thunia alba* (Lindl.) Reichb. *f.*
33	*Tropidia pedunculata* Bl.
34	*Vanda alpinia* Lindl.
35	*Vanda pumila* Hook.*f.*
36	*Vandopsis undulata* (Lindl.) J.J.Smith.

Endemic species of the valley:

1. *Bulbophyllum reptans var. acuta*
2. *Corallorhiza trifida*
3. *Dendrobium normale*
4. *Eria occidentalis*
5. *Eria reticosa*
6. *Flickingeria hesperis*
7. *Nervilia mackinnonii*

The great varieties of orchid species in the valley have economic potential for the local community around the region. Some of the species like *Dendrobium normale*, *Dendrobium craysanthum*, *Coelogyne cristata* and *Dendrobium hookerinum* are quite ornamental and have a considerable potential as cut flower trade. Orchids are locally called ***Bhalu ka Kela*** which means ***Bear's banana*** or ***Harjojan*** which means bone jointer.

METHODOLOGY

The proposed project was for a period of one year duration. The first seven months were spent for photo-documentation of orchids of Gori valley and based on that, educational materials were prepared. Voluntary groups were created and four weeks orientation programme was organized for them. The rest four months were spent for campaigning for orchid conservation in Gori valley that includes awareness programmes, workshops in different villages and approach to children at school level.

FIELD SURVEY

For initiating actual conservation approach in the Gori Valley, we have stated a general survey of the valley. Systematic survey of orchids was conducted in the entire valley covering different terrains and forest types. The survey was conducted from mid September 2005 to March 2006. We have selected a base camp in the village Bangapai (1000 MSL). This locality is situated in the lower Gori valley near the Gori River. Approximately 900 km was traversed on foot in the various localities of the valley. Two local resource persons were selected for assisting us during field survey. Villagers were interviewed through simple questionnaires (enclosed as appendix-I). We have started our field survey for village Jauljibi (600 MSL) up to the alpine portion of the Gori valley at an altitude of 3500 MSL. During the survey, we have collected information on orchids. Photographs of orchids and video clippings were done for photo documentation and preparation of posters and educational materials on orchid conservation. During the field work, villagers were interacted about the distribution and orchid rich sites for identification of orchid sites for future conservation programmes. GPS locations were overlaid in the land set imagery to know the distribution pattern of orchid species in the Gori valley region.

AWARENESS MATERIALS:

For awareness generation among the local community, simple posters, brochures, T-shirt, drawings and banners on orchids in local language (Hindi) and English were prepared.

FORMATION OF VOLUNTEER GROUPS:

Four voluntary groups with four members in each team were selected for conservation campaigning. In each voluntary group, one person was selected as group leader. These volunteers were selected from different villages irrespective of caste, creed and educational background. The age group of these volunteers was between 20-40 years. These groups were trained on the importance of orchids before the campaigning was actually begun. Subsequently, several smaller workshops were conducted which includes slide shows and poster exhibitions at different villages and in primary and senior schools. As a follow up of the conservation programme, local communities were also involved in *in situ* restoration of orchids in their localities. For this, local communities were trained with the help of volunteers on the method of restoration of the orchids that falls or detached from the host plants due to natural or anthropogenic pressures.

ACTIVITIES UNDERTAKEN:

FIELD SURVEY:

A total of 71 species of orchids including 21 terrestrial and 50 epiphytic were recorded in flowering and non flowering conditions (Appendix-II). We found that the epiphytic orchids were mainly concentrated in the lower part of the valley around the human settlement areas (Fig. 2). For the epiphytic orchids, availability of moisture and host species is the crucial factors for their growth and regeneration. The moisture (humidity) appears to be more important for growth of epiphytic orchids so that the epiphytic orchids are mainly concentrated along the riverine areas and pockets of moist forests where they can find the suitable habitats for their growth, development and regeneration. Various host species were seen heavily loaded with epiphytic orchids in the riverine area and cultivated land. Host species like *Toona ciliata, Engelhadrtia spicata*, *Quercus leucotrichophora* and *Mangifera indica* are most favourable for epiphytic orchids. In some localities we have reported more than 27 epiphytic orchids in a single *Toona ciliata* tree. The terrestrial orchids were mainly concentrated in the temperate grassy slopes and alpine area (Fig. 3). In alpine and sub alpine area, the terrestrial orchids are facing threat mainly due to heavy grazing pressure. The maximum host species were lopped by the local user group for their day today needs for fodder and fuel wood. Also most of the orchid rich area used by shepherd for camping. One species in the upper valley, *Dactylorhiza hatagirea* is commercially exploited by the local people. For better survival of the orchids, the protection of host species is equally important and future conservation plan should focus on host species also.

QUESTIONNAIRE SURVEY

A simple questionnaire was prepared and conducted along the field survey, workshops and village level meetings. During the questionnaire survey, the number of households, population, proportion of male and female members, employees in the village in public and private sector and total livestock in the village were also taken into account (Appendix-III). Total 41 villages visited in the valley, a total 508 individuals were interviewed. Out of 508 persons interviewed, 55% were male and 45% were female, belonging to three different age groups [below 20 years (41), 20-40 years (240) & above 40 years (227)]. The questionnaire survey revealed that only 38 % including both male and female know about orchid in this area which they locally identify with the name "***Bhalu Ka Kela***" that means bear's banana or "***Harjojan***' meaning bone jointer. These vernacular names were probably derived from the external appearance of the orchids.

WORKSHOP FOR AWARENESS:

A series of workshops were conducted in the Gori valley for awareness among villagers. We have selected four villages for conducting workshop *viz.* Umergadha, Bangapani, Bagichabager and Baram. Before conducting the workshop, villagers were informed at least one week before about such an event to be organized. Talks were delivered to the local people and posters on orchids were displayed for providing information on orchids to the villagers. A total 449 villagers were participated in four workshops conducted. The maximum number of participants were from Bagichabager village (57%) and lowest in Bangapani (8%) of which 63% were male participant (see Fig.2 & 3). Nevertheless, female were also found to show their interest towards orchids, although the attendance was only 37%. This may be because of the reason that most of the house hold activities were done by the female in this valley. Female were mainly engaged in the regular activities like fodder collection, fuel wood collection and agriculture practices. Besides this we have made an attempt to gather and aware maximum women as and when possible. Maximum female representation in the Bagichabager (42%) and minimum in the Baram (21%) was observed. Similarly, male representation were maximum in the Baram (78%) and minimum in the Bagichabager (57%) (see Fig. 4). During the workshop, educational material *viz.* posters, brochures and stickers were distributed among the local community. T-shirts were also distributed to some enthusiastic volunteers for encouraging orchid conservation in their area.

***AD-LIBITUM* APPROACH:**

During the regular field visits to the valley, local people were contacted and discussions on the forests and orchids were held with them. In the villages, brochures on orchid conservation were kept in the grocery and other frequently accessible community centres for distribution among the villagers.

RECOMMENDATIONS

Based on the experiences gained while executing this project, following recommendations are given for the conservation of orchids in the Gori valley:

1. The maximum 50% of species were mainly concentrated in the lower Gori valley; however the stretch between Baram to Bangapani had maximum species diversity. We would like to emphasize more conservation awareness campaigns in this area.

2. During our survey we have selected four localities one in the Reserve forest and another three in the village forest for orchid rehabilitation programme. These patches will be monitored by the village volunteers and head of the village.

3. We report a number of host species which are loaded by epiphytic orchids, these are dead and decaying and may fall any time. We would like to suggest that a rehabilitation centre may be established, where we can keep all the fallen and ditched orchids. After that with the help of local people we can rehabilitate all orchids in the suitable riverine patches.

4. Three villages in the Gori Valley viz., Lumti, Baram and Bans Bagar need further conservation awareness campaign and identification of volunteers for conservation of orchid rich patches.

5. The Uttaranchal Government needs to establish an Orchidarium in the valley for the propagation and relocation of rare and threatened orchids in the suitable habitats. The Orchidarium should also include an interpretation centre so as to spread further awareness among the locals.

6. The plantation of the popular host species should practiced in the valley which would help in rehabilitation of epiphytic orchids.

FUTURE PLAN

In next phase of the project the following work will be taken up, if further sponsorship is provided by the funding agency.

1. An identification manual both in Hindi and English will be brought out, so that the local people can identify easily the orchid species. This identification manual will also circulated to the forest department.

2. Orchid rehabilitation programme will be conducted in this valley, for this we have already selected area where we can establish the rehabilitation centre.

3. More such awareness campaigning program will be run in Gori valley and we will try to extend this program with the help of volunteers.

4. A detailed project has been submitted to the forest department of the state for establishment of a small orchid reserve in the reserve forest, where the orchid rehabilitation can be done in the future.

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Appendix-I

QUESTIONNAIRE

Rufford Foundation, UK
Orchid Conservation project, Gori valley

Sl. No……. Date……

Name of village……

S.N	Head of the Family	Family members	Male	Female	Occupation		Total livestock
					Agriculture	Govt. employee	
1.	Mr. Karan Singh	4	2	2	√	X	13
2.	Mr Sobhan Singh	8	3	5	√	X	23
3.	Mr. Kheem Singh	7	5	2	√	1	7
4.	Mr. Jagat Singh	8	3	5	√	2	22
5.	Mr. Gagan Singh	6	2	4	√	X	9

Name of the interviewed person……..

Age…… Sex……..

1. Do you know orchid? YES/NO
2. If ‘yes’ what do you call it locally?
3. Where did you see orchids? Tree/Ground
4. Are you interested in conservation of orchids in your area?

Appendix-II

List of orchid species and their status documented during the survey

S.N.	Species	Habit	Status
1	*Acampe carinata* (Griff.) Panigr.	Epiphytic	Common
2	*Acampe rigida* (Buch.-Ham. *ex* J.E.Sm.) P.F.Hunt	Epiphytic	Rare
3	*Aerides multiflora* Roxb.	Epiphytic	Common
4	*Aerides odorata* Lour.	Epiphytic	Common
5	*Ascocentrum ampullaceum* (Roxb.) Schltr	Epiphytic	Common
6	*Bulbophyllum affine* Lindl.	Epiphytic	Common
7	*Bulbophyllum careyanum* (Hook.) Spreng.	Epiphytic	Common
8	*Bulbophyllum cariniflorum* Reichb. *f.*	Epiphytic	Common
9	*Bulbophyllum polyrhizum* Lindl.	Epiphytic	Rare
10	*Bulbophyllum reptans* (Lindl.) Lindl.	Epiphytic	Common
11	*Bulbophyllum secundum* Hook. *f.*	Epiphytic	Rare
12	*Bulbophyllum triste* Reichb. *f.*	Epiphytic	Common
13	*Bulbophyllum umbellatum* Lindl.	Epiphytic	Common
14	*Coelogyne cristata* Lindl.	Epiphytic	Common
15	*Coelogyne ovalis* Lindl.	Epiphytic	Common
16	*Coelogyne stricta* (D.Don) Schltr.	Epiphytic	Common
17	*Cymbidium aloifolium* (L.) Sw.	Epiphytic	Common
18	*Cymbidium iridoides* D.Don	Epiphytic	Rare
19	*Cypripedium elegans* Reichb.*f.*	Terrestrial	Rare
20	*Dactylorhiza hatagirea* (D.Don) Soo	Terrestrial	Common
21	*Dendrobium amoenum* Wall. *ex* Lindl.	Epiphytic	Common
22	*Dendrobium bicameratum* Lindl.	Epiphytic	Common
23	*Dendrobium chryseum* Rolfe.	Epiphytic	Common
24	*Dendrobium monticola* Hunt & Summerh.	Epiphytic	Common
25	*Dendrobium normale* Falc.	Epiphytic	Common
26	*Dendrobium primulinum* Lindl.	Epiphytic	Common
27	*Epipactis helleborne* (L.) Crantz.	Terrestrial	Common
28	*Eria pubescens* (Hook.) Lindl. *ex* Steud	Epiphytic	Common
29	*Eria spicata* (D.Don) Hand.-Mazz.	Epiphytic	Common
30	*Flickingera hesperis* Seidenf.	Epiphytic	Common
31	*Gastrochilus acutifolius* (Lindl.) O.Ktze.	Epiphytic	Common
32	*Gastrochilus inconspicum* (Hook. *f.*) O.Ktze.	Epiphytic	Common
33	*Goodyera procera* (Ker-Gawl.) Hook.	Terrestrial	Common
34	*Goodyera repens* (L.) R. Br.	Terrestrial	Common
35	*Habenaria edgeworthii* Hook.f. *ex* Collett	Terrestrial	Common
36	*Habenaria intermedia* D.Don.	Terrestrial	Common
37	*Herminium josephii* Reichb. *f.*	Terrestrial	Common
38	*Herminium laceum* (Thunb. *ex* Sw.)Vuijk.	Terrestrial	Common
39	*Herminium monorchis* (L.) R. Br.	Terrestrial	Common
40	*Herminium pugioniforme* Lindl. *ex* Hook.*f.*	Terrestrial	Rare
41	*Kingidium taenialis* (Lindl.) Hunt	Epiphytic	Common
42	*Liparis caespitosa* (Thou.) Lindl.	Epiphytic	Common
43	*Liparis glossula* Reichb. *f.*	Terrestrial	Common
44	*Liparis viridifolia* (Bl.)Lindl.	Epiphytic	Common
45	*Liparis. rostrata* Reichb. *f.*	Terrestrial	Common
46	*Listera teunis* Lindl.	Terrestrial	Common
47	*Luisia zelyanica* Lindl.	Epiphytic	Commo
48	*Malaxis acuminata D.Don*	Terrestrial	Common
49	*Malaxis cylindrosthyca (Lindl.) O.Ktze.*	Terrestrial	Common
50	*Malaxis muscifera (Lindl.) O.Kze.*	Terrestrial	Common
51	*Malaxis purpurea (Lindl.) O.Ktze.*	Terrestrial	Common

52	*Nervilia mackinnonii (Duthie) Schltr.*	Terrestrial	Rare
53	*Oberonia ensiformis (Sm.) Lindl.*	Epiphytic	Common
54	*Oberonia falconeri Hook.f.*	Epiphytic	Common
55	*Oberonia myosurus Lindl.*	Epiphytic	Common
56	*Oberonia pachyrachis Reichb.f.*	Epiphytic	Common
57	*Oberonia prainiana King & Pantling*	Epiphytic	Rare
58	*Oberonia pyrulifera Lindl*	Epiphytic	Common
59	*Oreorchis indica (Lindl.) Hook. f.*	Terrestrial	Rare
60	*Ornithochilus difformis (Wall. ex Lindl.) Schltr.*	Epiphytic	Common
61	*Peristylis duthiei (Hook. f.) Deva & Naithani*	Terrestrial	Common
62	*Pholidata articulata Lindl.*	Epiphytic	Common
63	*Pholidota imbricata (Roxb.) Lindl.*	Epiphytic	Common
64	*Pteroceras suveolens (Roxb.)Holtt.*	Epiphytic	Common
65	*Rhynchostylis retusa (Lindl.) Bl.*	Epiphytic	Common
66	*Satyrium nepalense D.Don*	Terrestrial	Common
67	*Smithandia micrantha (Lindl.) Holtt.*	Epiphytic	Common
68	*Thunia alba (Lindl.) Reichb. f.*	Epiphytic	Common
69	*V. testacea (Lindl.) Reichb.f.*	Epiphytic	Common
70	*Vanda cristata Lindl.*	Epiphytic	Common
71	*Vandopsis undulata (Lindl.) J.J.Smith.*	Epiphytic	Rare

Appendix-III

Number of villages which surveyed during the field work

S.N.	Name of villages	Total family	Total population	Govt. employee	Agriculture	Male	Female	Total livestock
1	Gargia tham	12	79	6	73	35	44	155
2	Basoda	17	91	9	82	54	37	177
3	Chifaltara	13	71	5	66	38	33	60
4	Balmara	45	247	2	245	128	120	184
5	Ghat	4	25	0	25	16	9	18
6	Sera	26	148	10	138	72	76	215
7	Khertoli	30	171	4	167	90	81	343
8	Siling	36	236	9	227	132	104	485
9	Toli	53	249	15	234	138	111	114
10	Khenpera	15	86	0	86	41	45	82
11	Ghattaberger	22	133	3	130	70	63	96
12	Banderkhet	36	212	5	207	107	105	216
13	Shirtola	56	340	9	331	176	164	577
14	Baram	113	767	42	725	406	361	653
15	Kalika	23	139	7	132	74	65	129
16	Chami	51	271	4	267	139	132	223
17	Lumti	56	318	11	307	163	155	286
18	Chamibager	10	55	1	54	28	27	66
19	Hoorkibager	16	98	3	95	48	50	140
20	Tallaghouri	9	56	2	54	31	25	57
21	Mallghouri	19	131	13	118	70	61	167
22	Mankote	20	129	4	125	64	65	187
23	Garthi	8	56	3	53	28	28	122
24	Sera Ghat	8	38	2	36	18	20	26
25	Tamakhani	9	55	0	55	31	24	107
26	Umergada	13	79	1	78	39	40	59
27	Tallamori	12	73	6	67	39	34	87
28	Mallamori	23	144	1	143	74	70	181
29	Bansbager	13	97	1	96	45	52	152
30	Kotdhar	8	71	5	66	38	35	146
31	Tallabekote	14	100	3	97	45	55	134
32	Mallabekote	11	94	7	87	47	47	103
33	Choribager	78	429	48	381	211	218	143
34	Mawani Dawani	39	212	10	202	114	98	182
35	Fasherkote	10	61	1	60	26	35	89
36	Khiluagaun	12	63	2	61	31	32	185
37	Gargia	21	99	4	95	48	51	59
38	Gothani	8	51	1	50	26	25	89
39	Shani	11	72	3	69	41	31	62
40	Shangalitara	44	212	5	207	109	103	165
41	Fagua	5	18	0	18	8	10	18
Total		**1029**	**6076**	**267**	**5809**	**3138**	**2941**	**6739**

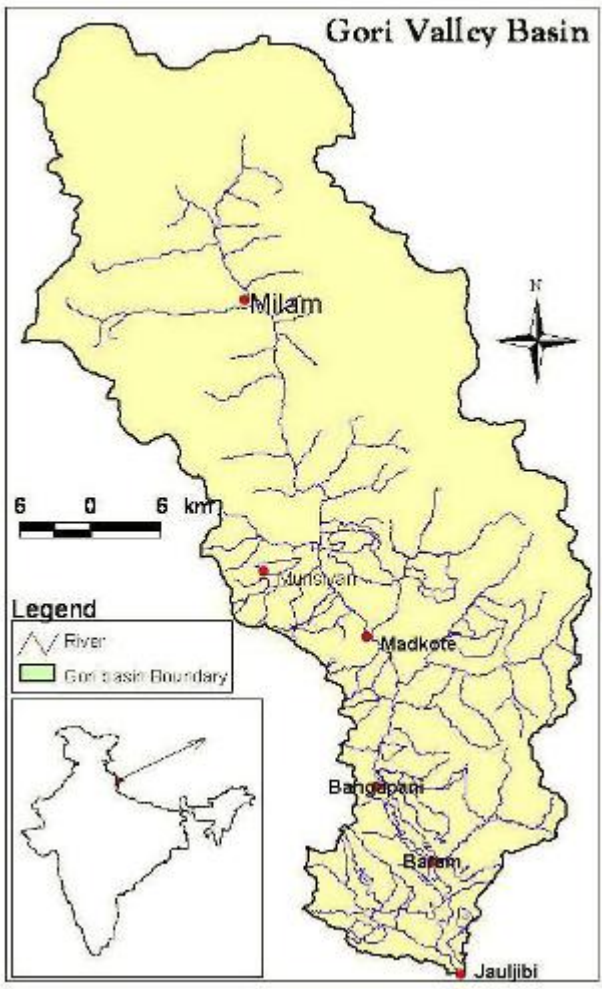


Fig. 1 Location map of Gori valley

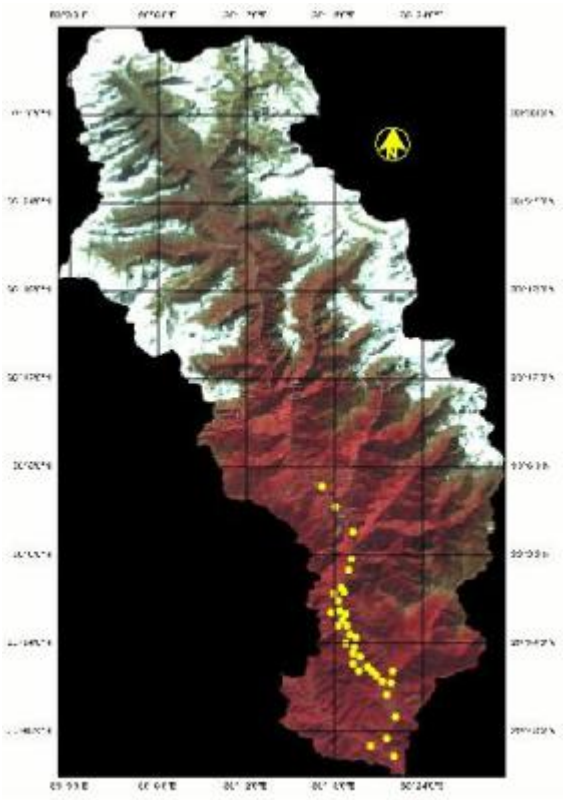


Fig. 2. Distribution map of epiphytic orchids

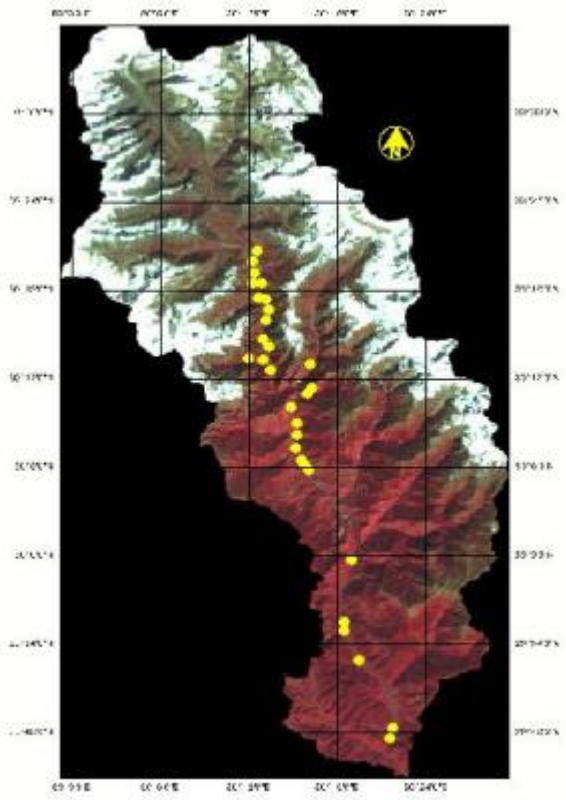


Fig. 3. Distribution map of Terrestrial orchids

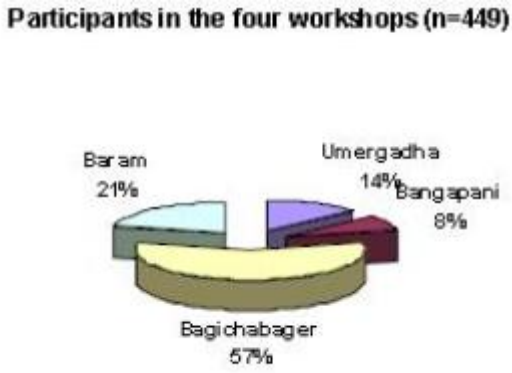


Fig.-4

Fig.-5

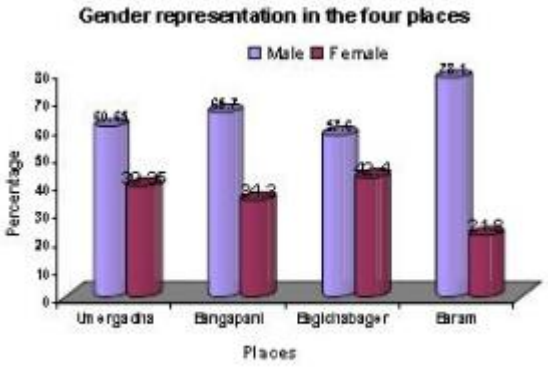


Fig.-6

Demographic profile of the participants

Plate-1

Panoramic view of village Gori valley

A village community settlement

Women collecting fodder

A villager ploughing fields

A typical village setting and crop fields

A traditional water mill

A ropeway used for river crossing

A few families subsist by weaving carpets

Close observation of orchid in the field

Project leader (centre) along with other field members

While discussing with volunteers on orchid restoration techniques

Coelogyneovalisone of the abundant orchid found in the moist riverine forest

Coelogynecristataan epiphytic and lithophytic orchids commonly occurs in this valley

***Bulbophyllumumbull atum*an epiphytic orchids common in the streatch between Lumtito Baram**

Dactylorhizahatageria **locally known as Salam Panja commercially exploited in the alpine parts of this valley**

Cyperipediumelegans**l isted in the Red data book of Indian plants, a rare orchid grow in the sub alpine area**

Habenariaintermedia **abundant in the temperate grasslands and tubers of this plant used in the traditional medicine**

Posters used during awareness programmes

Villagers in a workshop

Four leaders of volunteer groups (L-R) Kundan Singh, Khushal, Devendra and Surendra Singh, who were instrumental in this project

Local people showing their interest during the conservation awareness workshop in Umergadha village

During 14th November (Children's Day). The School principal invites us for giving conservation message among the school children

A young student distributing orchid stacker among the children

An old man and his son showing their interest on orchids and their conservation in this valley

Women were also involved during the orchid conservation workshop

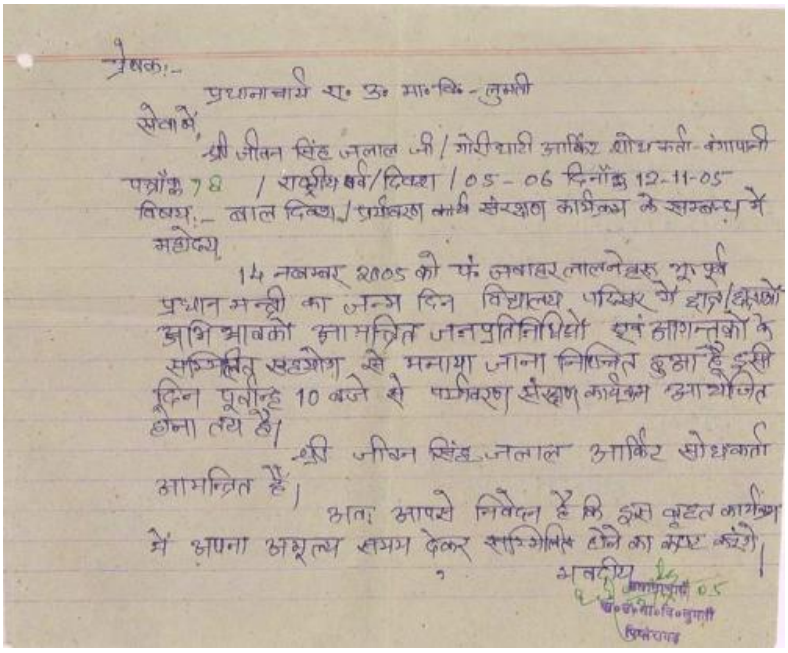
Women were actively participated in the orchid conservation programme

School children were encouraged through various activities on orchids

Conservation awareness programme in a school

All aged group were actively participated in the conservation programme

Durga Singh is one of the volunteer of the Lumti Village, collecting fallen orchids near by the village and rehabilitating on a host tree



प्रेषक:-
प्रधानाचार्य रा० उ० मा०वि०-लुमती

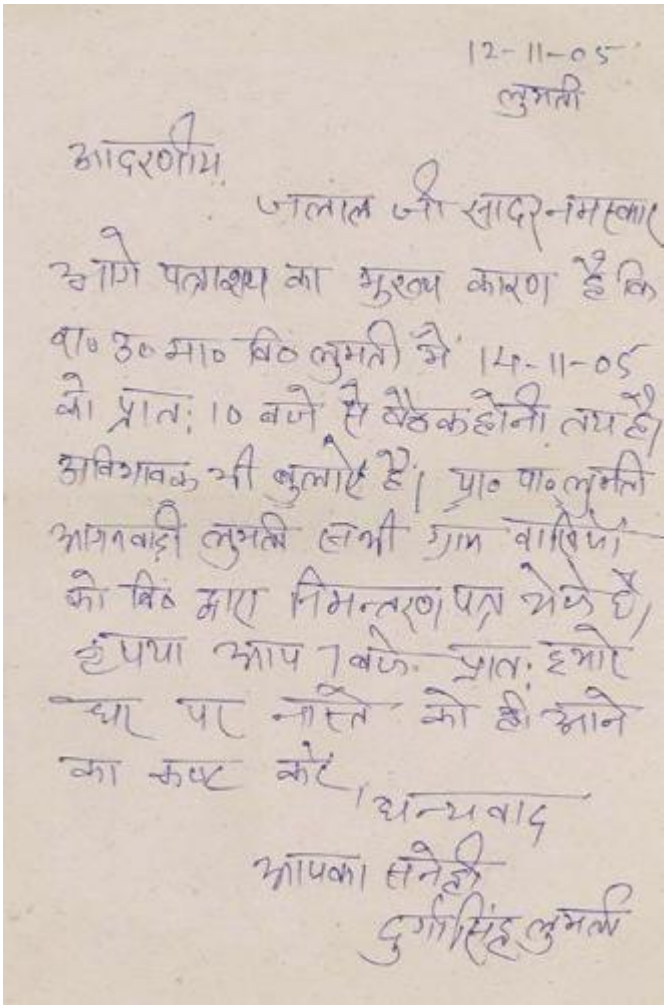
सेवा में,
श्री जीवन सिंह जलाल जी / गोरीघाटी आर्किड सोधकर्ता-केशापानी

पत्रांक 78 / राष्ट्रीय पर्व/दिक्षा / 05-06 दिनांक 12-11-05

विषय:- बाल दिवस / पर्यावरण एवं संरक्षण कार्यक्रम के सम्बन्ध में

महोदय,
14 नवम्बर 2005 को पं० जवाहर लाल नेहरू भूतपूर्व प्रधान मन्त्री का जन्म दिन विद्यालय परिसर में छात्र/छात्राओं अभिभावकों आमन्त्रित जनप्रतिनिधियों एवं आगन्तुकों के सक्रिय सहयोग से मनाया जाना निश्चित हुआ है इसी दिन पूर्वाह्न 10 बजे से पर्यावरण संरक्षण कार्यक्रम आयोजित होना तय है।
श्री जीवन सिंह जलाल आर्किड सोधकर्ता आमन्त्रित हैं।
अतः आपसे निवेदन है कि इस पुनीत कार्यक्रम में अपना अमूल्य समय देकर सम्मिलित होने का कष्ट करें।

भवदीय



12-11-05
लुमती

आदरणीय,
जलाल जी सादर नमस्कार
आगे पत्राक्षय का मुख्य कारण है कि रा० उ० मा० वि० लुमती में 14-11-05 को प्रातः 10 बजे से बैठक होनी तय है। अभिभावक भी बुलाए हैं। प्रा० पा० लुमती आंगनवाड़ी लुमती सभी ग्राम वासियों को वि० मार्ग निमन्त्रण पत्र भेजे हैं, कृपया आप 7 बजे प्रातः इधर का पत्र लेते को ही आने का कष्ट करें।
धन्यवाद
आपका स्नेही
दुर्गासिंह लुमती

Invitation letters which received from the village Head and School Head for organizing conservation awareness programme on orchids

Dead decaying Host of orchids in Gori valley

***Engelhardtiaspicata*is one of the favorable host trees cut by the villagers for fuel wood**

About the project leader

Dr. Jeewan Singh Jalal obtained his Master degree in Botany for Kumaun University, Nainital in the year 2002 and subsequently Ph.D in Botany in 2005. He has a special interest in taxonomy and phytogeography of orchids of Himalayas. Dr. Jalal has already completed a small grant project on the survey of orchids in this Gori valley funded by the SAN DIEGO COUNTY ORCHID SOCIETY, USA. He has organized several workshops on the orchid and their conservation in different parts of Uttaranchal in India. He has long term vision for conservation of rare and threatened orchid species and their habitats in India involving various government and non-government organizations. Dr. Jalal is currently working in All India Coordinated Research Project on Taxonomy of Orchids sponsored by Ministry of Environment & Forests, Government of India.