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From the Director's Desk

ICFRE-HIMALAYAN FOREST RESEARCH INSTITUTE

ICFRE-Himalayan Forest Research Institute (HFRI), Shimla has responsibilities for conducting research in the state of Himachal Pradesh and Union Territories of Jammu & Kashmir and Ladakh. At HFRI, considerable importance is given for extension of research finding to their prospective users. The institute reaches out of the stakeholders through capacity building programmes. Training programmes were conducted on different aspects like nursery technique, medicinal plants, biofertilizer, management of insect etc.

The Himalayan Newsletter aims to enrich the reader's knowledge on the research and extension activities of the institute. I sincerely hope that the information provided in our Newsletter would be of interest of researchers. We sincerely look forward to your suggestions and feedback and seeks your support and cooperation.

Dr. Sandeep Sharma
Director (Incharge)

In this issue

Research Articles

Malus baccata (L.) Borkh. – An Important Agroforestry Species in Lahaul Valley, North Western Himalaya, India

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Introduction: *Malus* (Rosaceae) has approximately 313 species worldwide, out of which only 65 species have been accepted by the World Flora Online database. The Himalayan region harbours *M. sikkimensis* (Wenz.) Koehne, *M. domestica* (Suckow) Borkh. and *M. baccata* (L.) Borkh. Only *M. baccata* among them is found in the cold desert area of Lahaul Valley, North Western Himalaya. *M. baccata* is one of the most important agroforestry species and wild edible fruit in the Lahaul Valley. The term *Malus* is derived from the Latin word "Malum" which means "an apple tree" and the specific epithet *baccata* means "berry-like".

Synonyms: *Malus baccata* var. *baccata*; *M. baccata* f. *baccata*; *M. baccata* var. *sibirica* (Maxim.) C.K. Schneid.; *M. baccata* var. *xiaojinensis* (M.H. Cheng & N.G. Jiang) Ponomar.; *M. cerasifera* Spach; *M. domestica* subsp. *cerasifera* (Spach) Likhonos; *M. pallasiana* Juz.; *M. rossica* Medik.; *M. sibirica* Borkh.; *M. xiaojinensis* M.H. Cheng & N.G. Jiang; *Pyrus baccata* L.; *P. baccata* var. *sibirica* Maxim.

Vernacular Name: English: Siberian crab apple, Crab Apple Palti, Siberian crab, Manchurian crab apple, Himalayan crab apple, Chinese crab apple, Berry apple and Wild apple; Lahauli: Leejho, Leuho, Liho. Sheed Palek, Palanu and Palek are the names of the fruit in Himachal Pradesh.

Description: It is a 10-14 m tall tree with reddish-brown overhanging branches. The leaves are elliptical with long petioles. In the spring, the tree produces white-pink, non-hairy (glabrous) flowers along its glabrous branches. Fruits have a sphere form and are red in colour. It blooms in the spring and bears fruit from September to November in Himachal Pradesh.

Distribution: *Malus baccata* is native to the temperate regions stretching from Russia (Siberia) Mongolia, Japan, Korea, China, and south to the Himalaya (Kashmir to Assam, Nepal and Bhutan) between altitudinal range 1800-3600 m amsl. It is native to much of northern Asia, but it is often grown as an ornamental tree elsewhere distributes in ..... The species has been recorded from the Salgran, Madgram, Kishori, Jahalama and Kirting villages in the Lahaul valley.

Habitat: In general, species prefer to grow in mixed forests on hilly slopes, among shrubs in valleys, forest edges, meadows, marginal agricultural land and fields. The species has usually been found in the marginal agricultural area in the Lahaul valley.

Indigenous Uses: Fruits are edible and consumed fresh or dried. Additionally, it is being used for the grafting and breeding of other crab apples and domesticated apples. *M. baccata* is commonly grown as an ornamental tree due to its flowers and fruit. The species are widely used as an apple rootstock because of its tolerance to cold and resistance to pest species. The leaves of the species have been fed to the sheep and goats.

The plant is also used as a pollinizer. The fruit is eaten to obviate constipation, diarrhoea and dysentery in infants. Nutrient profile Pulp Serine-9.06 µg/mg; alanine-8.03 µg/mg; tyrosine (10.33 µg/mg; and cysteine-76.86 µg/mghistidine 3.96 µg/mg; palmitic acid 0.89%; ethyl palmitate 0.56%; methyl petroselinate 0.90%; and linolein 3.93%.

Phenolic composition: Procyanidin B_1, Quercetin glycosides, Phloridzin, Anthocyans, Chlorogenic acid, Phloretin, (–)-Epicatechin, Caffeic acid, Cinnamic acid, and (+)-Catechin.Suggested Management Plans: Wild edible fruits are getting more popular as a source of nutraceuticals with numerous health benefits. Many bioactive compounds, such as organic acids, phenolic compounds, and dietary fibres, are found in their phytonutrients. Many studies, however, have shown that wild edible fruits have an unrevealed and under-evaluated potential for human health and nutrition. The main occupation of farmers in the dry and steep hills of Himachal Pradesh is apple production. *M. baccata*, on the other hand, grows in the wild and produces small, irregularly shaped, and poorly pigmented fruits. As a result, the fruit could not even fetch a reasonable market value and went to waste. The fruits of *M. baccata* are rich in dietary fibres and phenolic compounds, which have significant antioxidant properties, and can be utilized, in human nutrition. The fruits contain high amounts of vitamin C and pectin. Therefore, the development of an appropriate strategy for the conservation and management of the species and habitats, development of value-added products (i.e., fruit bar/ gelatinized layers, jam, etc.), development of propagation protocols and establishment in *ex-situ* and *in-situ* conditions with the help of the forest department, NGOs, local research institutions, community-based organization are urgently required for the conservation of species and uplifting the economy of the tribal communities living in the region.

A mature tree of *Malus baccata* at Salgran village, Lahaul-Spiti, Himachal Pradesh

Senegalia catechu (L.f.) P.J.H.Hurter & Mabb.- Cutch tree

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Senegalia catechu (L.f.) P.J.H.Hurter & Mabb.

Introduction

S. catechu is a moderate sized, gregarious thorny and deciduous tree with a feathery crown attaining a height of 12 to 15 m. Bark is dark brown to dark grey, nearly 12 to 15 mm in thickness, rough, exfoliating in long narrow rectangular flakes. Leaves pinnate, with a pair of recurved prickles at the base of the rachis. Flowers are pale-yellow in cylindrical spikes. Pods are glabrous, flat and oblong. Fully developed pods are about 5 to 10 cm long and 1.0 to 1.5 cm broad. This tree yields good quality timber, which is very strong and durable. Sapwood is yellow ish in colour and heartwood is dark or light red in colour.

Synonym: *Acacia catechu* (L.f.) Wild.

Family: Fabaceae

Common name: Hindi - Khair, Khayar; **English** - Cutch tree, Black catechu, catechu;
Sanskrit - Khadira, Gayatrin; **Punjabi -** Khair; **Gujrati -** Kherio-baval.

Distribution

It is widely distributed throughout India excepting the moist humid and dry regions. In drier regions, it ascends up to 900 m and in some areas, it is also found at 1,200 m. The species grows on variety of geological formations (granite, gneiss, schist, quartzite, shale, basalt, limestone, conglomerate and laterite) but it thrives best on porous, sandy and alluvial soils. Because of its adaptability on shallow soils with kankar, it forms almost pure stands on poor hard soils. It is frequently mixed with a variety of deciduous species viz. *Dalbergia sissoo, Bombax ceiba, Phyllanthus emblica, Zizyphus jujuba* and others.

Phenology

Leaf shedding occurs during February and March in north India,. New leaves appear during April to May. Flowers appear along with new leaves. The tree continue to flower until July or even August. Pods start developing after one month and attain full size by September or October. Pods change colour from green to reddish green and finally to brown during November and December or early January and dehisce soon after ripening.

Seeds in the pods of *S. catechu*

Seeds of *S. catechu*

S. catechu tree

Bark of *S. catechu*

Branches of *S. catechu*

Leaves of *S. catechu*

Leaf pattern of *S. catechu*

Leaves and pods of *S. catechu*

Reproduction

The pods should be collected before the seeds are fully ripe because the seeds are very susceptible to insect attack. The seeds collected during first fortnight of December from trees of 20 to 30 cm dbh give highest germination percentage. Cold water soaking at room temperature for 24 hours enhances germination percentage. Also seeds immersed in boiling water and allowed to cool gradually for 12 hours, helps in softening hard seed coat, remove inhibitors and reduce germination time.

Nursery and plantation techniques

Sowing of seed is done in February or March in nursery beds at 1.5 cm depth in rows at a distance of 4 to 5 cm between seeds and 20 cm between rows. Regular irrigation and weeding is required for obtaining uniform and healthy seedlings. Germination starts in about a week's time and is completed in three weeks. Seedlings attain plantable size by July when they are three to four months old and attain height of about 30 to 40 cm. Planting out is done either of the entire plants or of stumps or of the seedlings raised in polythene containers. Planting should be started with the onset of monsoon in July and should be completed by mid August. Seedlings should be planted in pits of 30 cm^3 dug about two months in advance to allow sufficient time for weathering of soil with a spacing of 2.5 x 2.5 m. For row planting along the fields, spacing between 4 to 5 m be adopted.

Plant protection

Ganoderma lucidum causes root rot disease, which occurs in areas where residual roots and stumps are not properly cleared; and in order to control this problem, plantation must be raised along with *Bombax cieba* and *Ailanthus excels* *(Reference to be added)*. *Fomes badius,* a wound parasite causes heart rot and the infection occurs through points of mechanical injuries and damage caused by animals; and control is by preventing injury resulting from the lopping of trees, removal of all infected trees, small or large, during felling and tending operations.

Yield and utilization/economic importance

Katha is a main ingredient used in the preparation of pan/beetle leaf and pan masala, obtained from the heartwood. It has cooling and digestive properties so it is used for released condition of throat, mouth, gums, cough and diarrhea. It is externally applied as astringent and as a cooling application to ulcers, boils and skin eruptions and also used in ointment for itch, syphilis and burns.

Cutch or dark catechu is another product obtained from khair is mainly used in dyeing cotton and silk, and in calico-printing. It is also used in the dyeing of ship sails and mail bags.

Kheersal, a white crystalline product is also obtained sometimes while cutting of fully mature trees of khair for katha extraction, which is used in Ayurvedic medicines.

It has got catechin as an active ingredient, which possesses vitamin P activity resulting in prevention of certain types of diseases, related to blood capillaries.

Taxus wallichiana Zucc.-An Important Himalayan Conifer Species

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Introduction

Taxus wallichiana Zucc.-is commonly known as the Himalayan Yew or the Chinese Yew. It is a species of evergreen coniferous tree native to the Himalayas and other parts of East Asia. Himalayan yew is locally known as 'Rakhal or Thuner' in various parts of the Western Himalaya. It is a member of the Taxaceae family and is known for its long lifespan, slow growth, and highly toxic berries. It has high economic and medicinal value than the other gymnosperms. This species is entitled Endangered in the Red Data Book of IUCN and is listed in Appendix II of CITES. The Himalayan Yew can grow up to 20 meters in height, with a trunk diameter of up to 1 meter. It thrives at altitudes between 1800 to 3300 m in Western Himalaya and in the hills of Meghalaya and Manipur at an altitude of 1500 m. The tree contains Taxol, a potent anti-cancer drug that is used in the treatment of ovarian, breast, and lung cancer. Currently, the Himalayan yew is facing several threats, including habitat loss, overexploitation, and climate change. It has suffered a severe decline of wild population (up to 90%) in the Indian Himalayan Region (IHR), primarily due to overexploitation for medicinal properties, particularly for commercial extraction of the anti-cancer drug Taxol.

Distribution

Globally, the occurrence of Taxus has been reported in North America, East Asia, and Europe. Species like *T. baccata* (European Yew or English Yew), *T. brevifolia* (Pacific Yew), *T. canadensis* (Canadian Yew), *T. chinensis* (Chinese Yew), *T. cuspidata* (JapaneseYew), *T. floridana* (Florida Yew), *T. globosa* (Mexican Yew), *T. sumatrana* (Sumatran Yew), and *T. wallichiana* (Himalayan Yew) are among the most prominent species. In Asia, *T. wallichiana* (Himalayan Yew) is distributed mostly in the Himalayas stretching into Afghanistan, Bhutan, China, India, Indonesia, Malaysia, Myanmar, Nepal, Pakistan, the Philippines, and Vietnam. In the Indian Himalayan Region, the occurrence of the species has been reported from the states of Arunachal Pradesh, Himachal Pradesh, Jammu and Kashmir, Manipur, Meghalaya, Nagaland, Sikkim, Uttarakhand, and West Bengal.

Morphological Characterstics

It has a narrow crown with short, flat, needle-like leaves that are dark green on top and lighter on the bottom. The leaves are linear, small, only 2-3 cm long and 2-3 mm wide spirally arranged. Each leaf possesses a single strong vein and recurved margins, tapering to a petiole-like base. The bark is reddish-brown and becomes furrowed with age. Twigs are green and irregularly alternate; buds are very small, with dark-brown bud scales that are rounded, imbricate, and tightly appressed. Reproductive structures are green and are borne in the leaf axils. Tree is usually dioecious whereas monoecious plants are unusual. Flowering occurs from March to May and seeds ripen between August

and November of the same year. Male organs are in little cones 2-4 mm in diameter composed of 6-14 stalked peltate microsporophylls with 4-9 pollen sacs per microsporophyll, with strobili grouped into groups of up to 30 around branch ends. In leaf axils on the underside of shoots, female structures measuring 1.5 to 2.0 mm long, solitary or in pairs, do not form cones and are made up of multiple imbricate scales, the highest of which is fertile and contains a single ovule.

The aril, which resembles a soft, brilliant red berry is long and wide open at the end, and matures within 6 to 9 months of pollination. The aril has a jelly-like consistency, tastes sweet, and is not harmful. Fleshy fruit has a solitary seed, half enclosed in aril. Seeds are ovoid, smooth and shiny, brown-yellow. A three-layered seed coat protects *Taxus* seeds. The top layer is thin and dark that quickly separates. The innermost layer is squishy, whereas the middle layer is hard and rocky. An aril with a red color covers the maturing seeds.

Figure 1 *T. wallichiana* tree

Figure 2 Foliage of *T. wallichiana*

Figure 3 Bark of *T. wallichiana*

Phenology

Seeds require shelter and moist shady areas for germination and do not survive in open areas. It is closely associated with *Picea smithana, Abies pindrow, Acer caesium*, and *Pinus wallichiana*, and also found in small patches under the *Quercus oblongata, Q. floribunda, Q. semecarpifolia, Lyonia ovalifolia* and *Rhododendron arboreum*. Pollination anemophilous although honeybees have been observed collecting pollen.

Figure: 4 and 5 Flowering in *Taxus wallichiana*

Figure : 6 Fruit of *T. wallichiana*

Natural Regeneration and Propagation

Seeds are easily dispersed by birds and animals. Low seed viability caused by a prolonged dormant phase and poor seedling establishment in the natural environment is detrimental to this species. When *T. wallichiana* seeds have gone through the digestive system of birds, their natural germination is enhanced. Yew seed seldom sprouts in the first year. While seeds can survive for up to four years, the majority of germination occurs in the second or even third year. Germination of seeds is epigeal. The seeds contain two cotyledons that are up to 2 cm long with rounded apices and bands of stomata on top. Above the cotyledons, three to four opposite pairs of leaves are generated, and on robust plants, a few alternate leaves are developed around the terminal bud. The seedling is typically 2-8 cm in height by the end of the first season. In the first year, a robust tap root develops with a few lateral forms. The following 4-5 years there is sluggish development, frequently less than 2.5 cm annually. This species has also been multiplied by vegetative means by utilizing stem cuttings and tissue culture techniques (Nandi et al. 1997), with the success of 15%-55% establishment of cuttings. This priceless Himalayan species can also be regenerated and conserved via air layering propagation (Kishor et al.2015). Regeneration of Himalayan yew plants via shoot organogenesis from callus cultures is derived from zygotic embryos. (Datta et al.2006)

Insect Pests and Diseases

The yew tree has high resistance to insect pests; only a small number of insects, such as the yew scale (*Lecaniinae, Parthenolecanium pomeranicum*) and some mites (*Eriophyoidea*), attack its needles. *Laetiporus sulphureus,* also known as "Chicken of the woods," is the most prevalent heartwood rot fungus. Under yew trees, *Suillus tridentinus* is frequently found. *Phytophthora* sp. can cause damping off in seedlings.

Uses

Various parts of this species are used for food, medicine, fuel, and other domestic purposes. The leaves and bark of *T. wallichiana*, and other Taxus species have been used for the extraction of taxol (Paclitaxel, as commonly called) which is the diterpenoid alkaloid. Taxol was first isolated from the bark of the Pacific yew, but the Himalayan yew has been found to contain even higher concentrations of the compound. Because the species is a major source of several taxoids that are advertised as extremely efficient anticancer treatments, particularly ovarian and breast cancer, it has suffered the weight of excessive leaf and bark removal. Taxus leaves have many different types of

medicinal properties which help in treating diseases like epilepsy, lung disorders, hysteria, nervousness, malaria etc, and is frequently used in the Unani system of medicine. In parts of Jammu and Kashmir, Ladakh and Himachal Pradesh *Taxus* bark is used for preparation of "Namkeen Chai or Cha Cha" a popular herbal remedy for treating cold extremities and dehydration. After removing the poisonous seed, the aril's pulp can be used into cosmetic products including hair lotions, rinses, beauty and shaving creams, and dentifrices since it is gelatinous and has a very sweet flavor. Ingesting the seeds can cause severe gastrointestinal distress, convulsions, and even death. The tree's toxicity has made it a subject of folklore and mythology in many cultures, with stories of its use as a poison or as an ingredient in love potions. The wood is dense and hard, making it ideal for carving and construction. It has been used to make furniture, flooring, and tool handles, as well as bows and arrows. The bark has been used for tanning leather, and the tree has been used to make dye and ink. Cattle and especially horses can suffer quick and fatal effects from eating yew twigs or bark, so it's not a recommended fodder.

Conclusion

Taxus wallichiana is a fascinating tree with a rich cultural and medicinal history. While its toxicity and slow growth make it a challenging species to work with, the tree's value as a source of taxol and its importance in traditional medicine and culture make it a species worth protecting. Without any knowledge of its population status in the wild and ample knowledge about its ecological requirements, the extensive use of the plant for commercial purposes is enough to drive the species toward its extinction. Thus there is dire need for the conservation and sustainable management of this valuable tree for continuously getting the ecosystem and other livelihood benefits.

Documentation of Wild Plants Used for Vegetable in Kiran Pargana, Shimla District, Himachal Pradesh

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Introduction

Edible wild plants form an important constituent of traditional diets for thousands of years in Himalayan regions, mainly in the remote and rural areas even today. Communities in Himachal Pradesh are also dependent on the natural resources for their day-to-day needs. Wild vegetables are those plants found growing naturally in diverse wild habitats or wilderness areas which are used as dietary supplements and also play an important role in meeting the dietary needs of the peoples living in and around these areas. Wild vegetables often serve as a substitute to staple food during scarcity. The traditional knowledge accumulated by the communities through trial and error is getting depleted, with the advent of modern education and cultural changes. Hence, documentation of ethnobotanical knowledge is of utmost importance. Several efforts have been made to document the traditional ethnobotanical knowledge of the people in Himalayan region (Gaur and Semwal, 1983; Kapahi, 1990; Sood *et al*, 2001; Sundriyal and Sundriyal, 2003, Kala, 2007). Ethno-botanical studies conducted in Himachal Pradesh have also documented information on edible wild plants (Chauhan and Chauhan, 1998; Negi and Subramani, 2002, Bhalla, 2004; Singh *et al*, 2008; Gautam *et al*., 2009; Singh *et al*., 2014, Singh *et al*., 2016,). In spite of the various studies, information about the traditional uses of plants in remote regions needs more exploration. Hence, the present study was undertaken with the objective to document the wild plants used for vegetable purposes in Kiran Pargana, a remote area of Shimla district. Kiran Pargana is part of Throach forest range Chopal forest division district Shimla and lies between 30° 38' – 31° 3' North latitude and 77° 26' –77° 54' East longitude. It lies on the right bank of Tons, a tributary of river Yamuna. It is surrounded by Jaunsar Pargana of Dehradun district of Uttranchal in southern and eastern boundaries and Jubbal on the western side. The altitudinal range varies from 1000 m – 2400 m above mean sea level. The climate of the area is subtropical to temperate. The average annual rainfall of the area is around 1200 mm; the maximum annual average temperature goes up to 33° C in the month of June and average minimum annual temperature falls to 5° C in the month of January. Most parts of the area receive winter snow except some lower regions. The area is mountainous, having moderate to steep slope. Vegetation of the area is subtropical to temperate type (Anon., 1910). The populations mainly consist of 'Kanets' and are divided into various classes such as Rajput, Brahmin, Turi, Koli, etc. and all are agriculturists. The people of the region use wild plants for edible purposes.

Materials and Methods

Surveys were conducted in villages such as Kashak, Telor, Thithrouli, Ramdara, Shilgaon and Maneoti of Kiran Pargana, Shimla district. Information of wild plants used for vegetable was recorded by interviewing people using a semi-structured questionnaire. Men and women of different age groups,

especially older were interviewed. The uses were cross-checked with the informants. Efforts were made to identify these plants in the field itself and those, which couldn't be identified in the field, were identified with the help of regional Flora (Collett, 1984) and herbarium at HFRI Shimla.

Results and Discussion

A total of 28 wild plant species belonging to 25 genus and 19 families were documented. Of the 19 families recorded, Brassicaceae and Fabaceae were the dominant family with 04 species each, while Asteraceae, Alliaceae and Chenopodiaceae had 02 species each and remaining families had one species (Fig. 1). Twenty five species (89.29%) were herbs, two trees (7.14%) and one shrub species (3.57%, Fig 2). Leaves of the most of the plants are used for vegetables. In case, of *Indigofera pulchella* and *Bauhinia variegata* floral buds are used for vegetable. Root powder of *Angelica glauca* and bulbs of *Allium* spp are used for spices. During the discussion local people showed interest to share knowledge about plants used for vegetable purposes. The edible wild plants are collected from agricultural field as they grow as weed in and around agricultural fields. The wild edible plants used for vegetable are rich in vitamins. Studies on nutritional values of these species should be undertaken. Such studies are of special significance for India, where a sizeable rural population still depends on these plants for their nutritional needs. It is also observed that younger populations do not possess the knowledge about edible wild. It is, therefore important to document traditional knowledge about plants uses from rural areas before it is lost. The plants with botanical names, local names, families, part used and uses have been given in Table 1.

Fig 1. Wild edible plant families

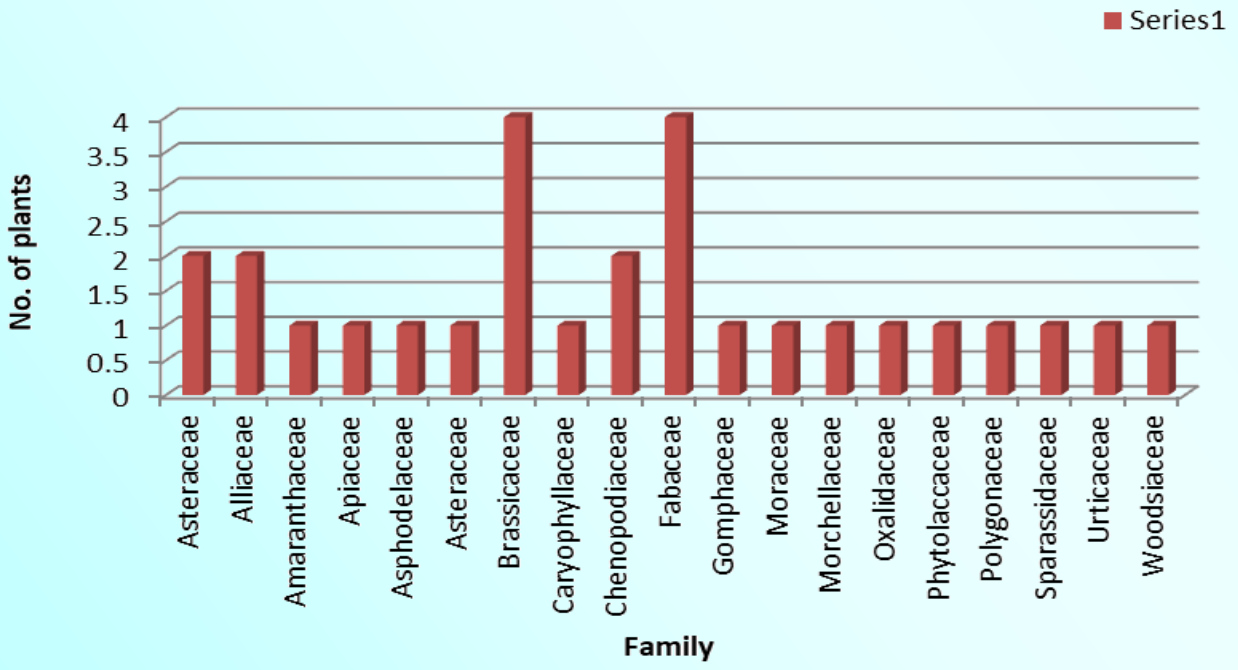

Fig 2: Habit of wild plants used for vegetables

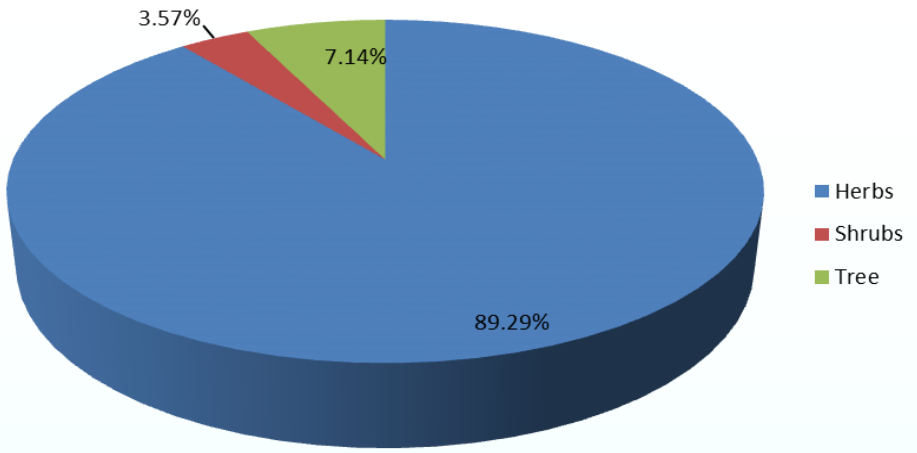

Table 1: Wild plants used for vegetable in Kiran Pargana, District Shimla, Himachal Pradesh

S.No	Botanical Name (Family)	Local Name	Habit	Parts Used & Uses
1.	*Allium caesium* Schrenk *(*Alliaceae)	Jangali pyaaz	H	Leaves are used for making vegetable, either with other vegetables or alone. Leaves and bulbs are also used as spices.
2.	*Allium wallichii* Kunth (Alliaceae)	Jangali Lahsun	H	Leaves are used for making vegetable, either with other vegetables or alone. Leaves and bulbs are also used as spices.
3.	*Amaranthus caudatus* L. (Amaranthaceae)	Jangali Chauli	H	Tender leaves are mixed with chopped onion and made into vegetable
4.	*Angelica glauca Edgew.* (Amaranthaceae)	Chora	H	Root powder is used as spices, especially for flavoring meat.
5.	*Bauhinia variegata* Linn. (Caesalpiniaceae)	Koral / Kachnar	T	Floral buds are used to make vegetable.
6.	*Brassica juncea* (Linn.) Hook.f. & Thoms. (Brassicaceae)	Sarson	H	Tender leaves are used for making vegetables.
7.	*Capsella bursa-pastoris* Medic. (Brassicaceae)	Harjaal Sabji	H	Tender leaves are used for making vegetables.
8.	*Cardamine hirsuta* Link (Brassicaceae)	Sabji	H	Tender leaves are used for making vegetables.
9.	*Chenopodium album* Linn. (Chenopodiaceae)	Bathu	H	Tender leaves are used for vegetables.
10.	*Chenopodium botrys* Linn. (Chenopodiaceae)	Bethu	H	Tender leaves are used for vegetables.

SN	Botanical Name (Family)	Local Name	Habit	Parts Used & Uses
11	*Cicer microphyllum* Benth. (Fabaceae)	Harjaal Sabji	H	Tender leaves are used for vegetable are eaten by children.
12	*Diplazium esculentum* (Retz.) Sw. (Woodsiaceae)	Lingad	H	Tender, fresh shoots are used for vegetable.
13	*Eremurus himalaicus* Baker (Asphodelaceae)		H	Tender leaves are used for making vegetable.
14	*Ficus palmata* Forsskal (Moraceae)	Fedu	T	Tender leaves and tender fruits are used for vegetables.
15	*Indigofera gerardiana* Wall. (Fabaceae)	Kathi	Sh	Floral buds are boiled, water decanted and fried in oil for making vegetables.
16	*Lactuca sativa* Linn. (Asteraceae)	Harjaal Sabji	H	Tender leaves are used for making vegetables.
17	*Lactuca scariola* Linn. (Asteraceae)	Harjaal Sabji	H	Tender leaves are used for making vegetables.
18	*Lathyrus sativus* Linn. (Fabaceae)	Matri	H	Tender leaves are used for making vegetable and immature seeds are eaten by children.
19	*Morchella esculenta* Fr. (Morchellaceae)	Chiaun, Guchhi	H	Fresh as well as dried fruiting bodies are used for making vegetables. But people rarely used it for vegetables since fruiting bodies are sold in market. It fetches high price of ₹ 7000-20000/kg
20	*Nasturtium officinale* R. Br. (Brassicaceae)	Bolgu,	H	Fresh leaves are cut, washed and fried in oil to prepare vegetables.
21	*Oxalis corniculata* Linn. (Oxalidaceae)	Almori	H	Leaves pleasantly sour in taste and refreshing are eaten raw like salad or made into *Chutney.*
22	*Phytolacca acinosa* Roxb. (Phytolaccaceae)	Jorba	H	Tender leaves are used for making vegetable. However, mature leaves are considered toxic.
23	*Ramaria botrytis* (Pers.Fr.) Ricken (Gomphaceae)	kupar	H	Fresh fruiting bodies are used for making vegetables. These are also dried and stored for winter uses.
24	*Rumex hastatus* D. Don (Polygonaceae)	Almora	H	Leaves pleasantly sour in taste and refreshing are eaten raw like salad or made into *Chutney.*
25	*Sparassis crispa* Fr. (Sparassidaceae)	Chichhayi	H	Fresh fruiting bodies are used for making vegetables.
26	*Stellaria media* (Linn.) Vill. (Caryophyllaceae)	Harjaal Sabji	H	Fresh tender leaves are used for making vegetables.
27	*Taraxacum officinale* Wigg. (Asteraceae)	Dudali	H	Fresh tender leaves are used for making vegetables.
28	*Urtica dioica* Linn. (Urticaceae)	Karla, Bichhu Butti	H	To prepare a vegetable, leaves are boiled with some rice in water for about ten minutes and then salt and chili powder are added.

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Wild plants used for vegetable in Kiran Pargana, District Shimla,

Morchella esculenta: Economically and medicinally important morel of NW Himalaya

Neha Sharma and Ashwani Tapwal
Forest Protection Division, ICFRE-HFRI

Introduction

People have been collecting and consuming wild edible mushrooms for thousands of years all over the world. Mushrooms were thought to provide strength to warriors in battle by the ancient Greeks, and the Romans recognised them as "Food of the Gods." The tribal and local inhabitants of non-tribal areas still have ethnic knowledge in mycology. *Morchella esculenta* (L.) Pers. (Guchhi) is one of the most important commercially exploited wild edible fungi in Himachal Pradesh. It grows across the temperate regions as saprophyte or in mycorrhizal relationship with hardwood and conifers in the cool foothills of the Himalaya including Himachal Pradesh, Uttarakhand and Jammu and Kashmir Union Territory. It can be harvested from wild during March to May and August to October.

The technology for commercial cultivation of *M. esculenta* is not available and the entire supply is being met by the collections made from natural habitats. Recent molecular studies revealed the existence of about 50 species of *Morchella* across the world (Kuo et al., 2012).

Classification

Kingdom: Fungi
Division: Ascomycota
Subdivision: Pezizomycotina
Class: Pezizomycetes
Order: Pezizales
Family: Morchellaceae
Genus: *Morchella*

Species: *esculenta*
Common Name: True morel, Yellow morel, Sponge morel
Local Name: Guchhi, Dhunghloo, Chaeu, Jamchu, Chunchroo, Chuahar khukh, Rangmuts, Jangmuts, and Bhuntu.

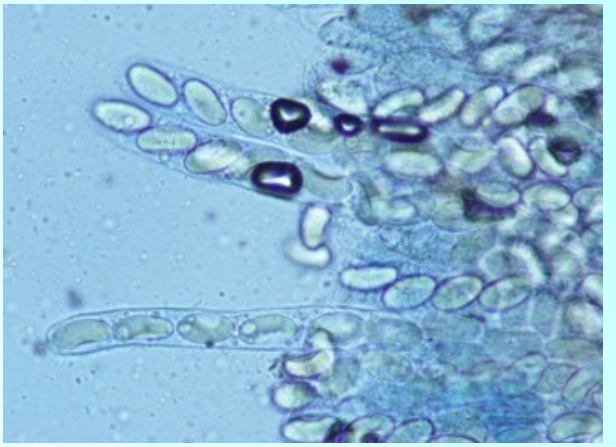
Description

Pileus: The upper part of sporocarp is known as pileus or cap, which is about 3 to 8.5 cm long, 2 to 6 cm wide, yellow or pale brown in colour. Pileus is hollow on the inside, and has many ridges and depressions (pits) caused by unequal hymenium growth, giving it appearance of sponge or honeycomb. The ridges are sterile whereas the pits are fertile.

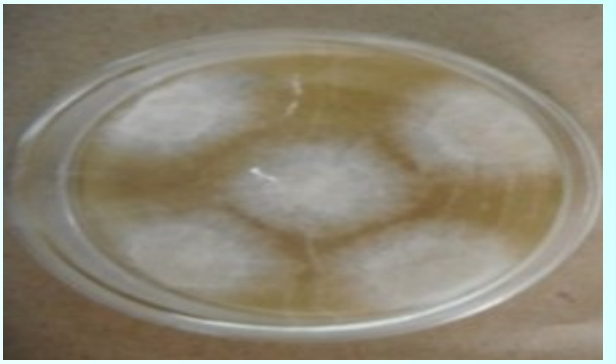
Stipe: The stalk or stipe is the lower part of the sporocarp. It measures approximately 1.0 to 4.0 cm long and 0.5 to 3.0 cm in diameter. The stipe is whitish to pale grey in colour, but it eventually turns greyish brown. Stipe is hollow and brittle on the inside, and slightly enlarged at the base.

Asci: The hymenium lines the pits and bears numerous asci. The asci are cylindrical or sub-cylindrical in shape, with an obtuse apex. The asci are 239-300 x 18-22 µm in size and each ascus contains eight spores.

Spores: Spores are ellipsoid, smooth, creamish-yellow and 17.1 -22.6 x 9-11 µm in size.



Culture characteristics: *Morchella esculenta* cultures were isolated on PDA by tissue culture from the fresh sporocarps on potato dextrose agar (PDA). The fungus appears on media within 3-4 days of inoculation and attains colony diameter of about 3.5-5.0 cm in 8-10 days. The pure cultures were maintained on PDA slants for future reference and study.



Ethnomycology

The inhabitants of remote areas are heavily reliant on folk medicines and household remedies. Indigenous herbal medicine practises have been passed down from generation to generation. Himachal Pradesh's indigenous people have myths and stories about wild *Morchella*, that it appear during lightning and thundering. *Morchella* has been collected for culinary purposes only for a long time due to its delicious taste and medicinal value. However, due to the high price, people have begun collecting them as a source of livelihood and income. *Morchella* sporocarps are used in the prevention and treatment of various diseases by the local population. *Morchella* species have traditionally been used in Himachal Pradesh to treat colds, joint pain, and wounds. *Morchella esculenta* soup is used to treat colds and sore throats. Kada, which is made by combining *Morchella* and spices, is used as a healing medicine to treat wounds and joint pain.

Production

Morchella production on a global scale is approximately 150 tonnes dry weight, or nearly 1.5 million tonnes fresh weight. Pakistan and India are two of the world's major morel producers, producing about 50 tonnes of dry morels per year, the most common of which is *Morchella esculenta*. (FAO, 2002).

Harvesting and collection

Morchella species are very delicate in nature and should be harvested with caution. People sometimes harvest or pull the entire sporocarp and associated mycelia, which can disrupt the underground hyphal network and lead to crop decline in the future. Therefore, it is recommended that *Morchella* species should be harvested by cutting at the base of the sporocarp with a knife or scissor, leaving mycelium in the soil. Do not pick all of the fructifications; leave some sporocarps at each site to ensure the inoculum for the next crop.

Drying and storage

The sporocarps of *Morchella* species collected from the wild should be consumed within day, because they have very short shelf life due to high moisture content. The sporocarps can be preserved by sun-drying, smoke drying, or salting to prevent deterioration and long-term storage. People in Himachal Pradesh generally make morel 'garlands' and dry them indoor by hanging above the fireplace and outdoors in sun. This drying method aids in the long-term preservation of *Morchella* and protects them from insect and mould attack.

Causes of spoilage

The hot and humid conditions can make the sporocarps vulnerable to insect and fungal attack. Fresh sporocarps can spoil due to suffocation if kept in airtight plastic bags. The fructification if get injured during growing period, they become very hard and turn black after drying and are considered of inferior quality.

Toxicity

Although *Morchella* spp. are edible mushrooms, they should be cooked properly because they can cause severe allergic reactions, stomach pains, and sickness in mycophobic people. *Morchella esculenta* can be confused with the deadly poisonous Fake Morel *Gyromitra esculenta*, which has a cap with a brain-like surface rather than a pitted surface and is just as dangerous.

***Morchella* production in Kinnaur District:**

The information collected from the Kinnaur Forest Department for the period between 2014-2019 revealed variable harvest/production in Kinnaur district of Himachal Pradesh. The harvest of *Morchella* species from wild was highest in 2017-2018 (350 kg), followed by 2018-2019 (220 kg), 2015-2016 (105kg), 2016-2017 (90 kg) and least in 2014-15 (16 kg).

Nutritional importance

Morchella esculenta is high in protein, fibre, and minerals like iron, copper, phosphorus, manganese, zinc, potassium etc. It also contains essential amino acids, vitamins B and D, as well as bioactive compounds like organic acids, phenolic compounds, and tocopherols. They are low in fat and

cholesterol-free. Its mycelia, in addition to fruiting bodies, have been reported to have nutritional value. Mushroom nutraceuticals are terms used to describe medicinal mushrooms.

Nutrient content

Dried sporocarp of *Morchella esculenta* contains, **Protein:** 31.2%, **Carbohydrates:** 36.2%, **Fats:** 1.8%, **Fibre:** 17.1%, **Ash:** 9.2%, **Vitamin A:** 2%, **Vitamin D:** 11%, **Ca:** 0.72%, **Na:** 0.11%, **Mg:** 0.045%, **K:** 0.009%, **Mn:** 0.047%, **Fe:** 0.012%, **Zn:** 0.002%, **P: 0.**187 %.

Medicinal Importance of *Morchella esculenta*

Antimicrobial properties: *M. esculenta* exhibit antimicrobial activity against several gram positive and gram negative bacteria.

Anti-inflammatory properties: *M. esculenta* inhibits both acute and chronic inflammation. Its methanolic extract acts as an anti-inflammatory agent and reduces pain.

Antioxidant potential: M. esculenta mycelia contain beta-carotene and linoleic acid, both of which have antioxidant properties. It also contains fatty acids and phenolic compounds, which have high antioxidant activity and free radical scavenging abilities.

Antitumor properties: *M. esculenta* stimulates messenger cells in the immune system and exhibits significant antitumor activity.

Vitamin D: Fruiting bodies of *M. esculenta* contain vitamin-D., which help to regulate blood pressure. It also plays a vital role in the absorption of calcium which is essential to maintain bone health.

Immunity enhancer: Sporocarps of *Morchella* species contain galactomannan, which act as an immune-stimulatory property, and may work as an immunity enhancer by increasing macrophage activity.

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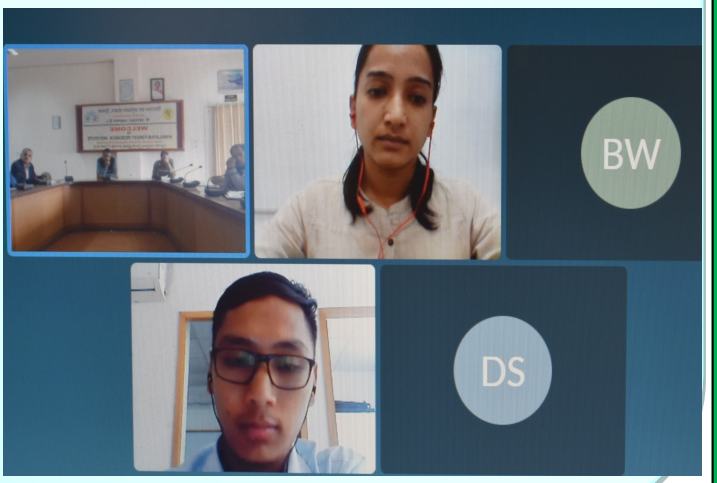
WORKSHOPS/SEMINARS/WEBINAR ORGANIZED

ICFRE-Himalayan Forest Research Institute, Shimla, organized an online workshop on **"Improving Research Writing Using Grammarly"** on 9 November, 2022 in the institute. 50 participants of the Institute actively participated in this workshop. Dr. Jagdish Singh, Head of Extension and convener of the workshop, welcomed all the participants as well as Sh. Pongu TH and Miss Manisha of Bridge People Technology Solutions Pvt. Ltd from Banglore. He

hoped that this workshop will prove to be very useful for the improvement of academic writing. Dr. Sandeep Sharma, Director, HFRI, Shimla, appreciated the efforts of the organizer and Bridge People in organizing this workshop for the benefit of the research staff of the institute. He added that this workshop is the need of the hour to write quality research papers. He urged all the participants to use Grammarly software to write error-free research papers. Mr. Pongu TH and Ms. Manisha gave a detailed presentation on Grammarly. In the end, an interactive session was held where all the questions of the participants were answered by an expert opinion.



Workshops/ Seminar /Webinar Attended

⇒ Dr. R.K. Verma, Scientist-G attended this online Virtual Seminar on Bioassay Guided Probing of Plants for Therapeutic Application, organized by FRI, Dehradun.

⇒ Sh. P.S. Negi, Scientist-D and Swaranlata. Scientist-D participated in one day workshop on "Different Dimensions of Rural Livelihood in Himalayan Region" through virtual mode on 14 July, 2022 organized by Govind Balabh Pant National Himalayan Environment Institute Dr. Swaranlata also presented the research paper on the various issues /subjects.

⇒ Dr. R K Verma, Scientist-G, attended Online Webinar on Plant Functional Traits Based Evaluation of Forest Ecosystem Services on 26 July, 2022 organized by FRI Dehradun.

⇒ Dr. Sandeep Shrama, Director-in Charge, Dr. Jagdish Singh, Scientist-F & Head Extension, and Dr. Pravin Rawat, Scientist-B, participated in the workshop "Promotion of Agroforestry in J&K: Opportunities and Challenges" organized by JK Forest Department in collaboration with Sher-e-Kashmir University of Agricultural Sciences and Technology (SKUAST), Jammu, on 25th August, 2022, at

Auditorium, Veterinary College, R.S. Pura Jammu. Dr. Sandeep Sharma, Director, Co-chaired the Technical Session-II of the workshop. Dr. Pravin Rawat, Scientist-B delivered a talk on "Integration of Bamboo and Fodder Species in Agroforestry for Productivity Enhancement and Sustainable Income Generation through Linkage with the Industries during the workshop.

⇒ Dr. R.K. Verma, Scientist-G, Forest Ecology and Climate Change Division participated in online seminar on the topic "Agrofrestry for Climate Change Mitigation" organized by ICFRE-Forest Research Institute (FRI), Dehradun on 26 August, 2022.

⇒ Dr. Sandeep Sharma, Director Incharge, HFRI and Sh. Dinesh Paul, DCF, Extension Division attended the workshop on "Human *Rhesus macaque* Interface to discuss the various issues pertaining to Monkey problem in the state" organized by Himachal Pradesh Wildlife Department at Aranaya Bhawan, Talland, Shimla on 15 November, 2022 .

⇒ Dr. R.K. Verma, Scientist-G; Dr. Balkrishan Tiwari and Dr. Pravin Rawat attended the workshop on "Pan- India Workshop on Tree Improvement Programme" organized by IFGTB Coimbatore through online mode on 18 November, 2022.

- Dr. Balkrishna Tiwari, Scientist -B from this institute online participated in the Species wise Consultation meeting for drafting of Breeding Program organized by IFGTB, Coimbatore on 22 & 23 November 2022.
- Dr. Sandeep Sharma, Director Incharge, HFRI alongwith Dr. R.K. Verma, Scientist-G; Dr. Ranjeet Kumar, Scientist-E and Dr. Vaneet Jishtu, Scientist-E attended the meeting on Meeting of the Knowledge Partners and Collaboration from ICFRE for planning and preparing framework and timelines for G20 Studies Restoration of Abandoned Mine Sites and Restoration of Forest Fire Impacted Areas organized by ICFRE Dehradun on 23 November, 2022.

- Dr. Sandeep Sharma, Director Incharge, Dr. R.K. Verma, Scientists-G, Dr. Jagdish Singh, Head, Extension Division and Dr. Vaneet Jishtu, Scientist-E attended the National Conference – "HIMSAMWAAD" – Trans Himalayan Conference on Localised Solutions and Implementation Strategy from 19-21 December, 2022 at UHF Nauni organized by SEWA International, Dr. YS Parmar University of Horticulture and Forestry, The Indian Ecological Society, Indian Oil Corporation, MoEF&CC and NMHS. A Power Point presentation titled "Trans Himalayan Landscape of Ladakh: Challenges to Combat Desertification" on 21 December 2022, was also made by Dr. Jishtu.

- Dr. Vaneet Jishtu, Scientist-E, FE&CC Division made a presentation on "*Trend Analysis of Meteorological Variables over Alpines in Chamba District of Himachal Pradesh, NW Himalaya, India"* in the International Conference on Natural Science and Green Technologies for Sustainable Development (NTSD-2022) held from 30 November to 2 December 2022 at Goa university, Goa.

Meeting Organized

- Annual Review meeting of "ICFRE Funded Plan Projects" was held at HFRI, Shimla on 7 July 2022 under the Chairmanship of Sh. R. Arun Kumar, IFS, ADG (M&E), ICFRE, Dehradun, wherein, progress made by PIs under 09 PLAN projects was reviewed by the ADG (M&E). All the PIs presented the progress of their Plan Project through power point presentations. He also reviewed the field activities of All India Coordinated Research Projects No. 17, 20, 27 and 29. ADG (M&E) also inspected the laboratories of the institute and visited the Field Research Stations of Shillaru and Brundhar, Jagatsukh, Kullu of the Himachal Pradesh.
- ICFRE-HFRI, Shimla organized a Monthly Research Seminar on "Cultivation of Important High Altitude Medicinal and Aromatic Plants: An option for diversification and augmentation of rural income" under the theme "Managing forests and forests products for livelihood support and economic growth" in Conference Hall on 22 July 2022, wherein, Dr. Jagdish Singh, Scientist-F made a presentation on said topic. During the seminar, Dr. Yashpal Sharma, Professor, UHF, Nauni also made a presentation.
- Himalayan Forest Research Institute (HFRI), Shimla organized Monthly Seminar on the topic "Ecofriendly Management of Insect pests of Forests in NW Himalaya: Challenges and Opportunities" under the theme "Managing forests the held at on 29 August, 2022. Dr. Pawan Kumar, Scientist-E delivered a lecture on the above topic during the seminar.
- Himalayan Forest Research Institute (HFRI), Shimla organized Monthly Seminar on "Application of modern Molecular Techniques in Forest Genetics and Tree Improvement" under the theme "Managing forests and forests products for livelihood support and economic growth" on 31st October, 2022.. Dr. Balkrishna Tiwari, Scientist-B delivered a lecture on the above topic during the seminar.
- Himalayan Forest Research Institute (HFRI), Shimla organized Monthly Seminar under the theme "Managing forests and forests products for livelihood support and economic growth" on 29 November, 2022. Dr. Jodinder Singh Chauhan, CTO, Extension Division delivered a lecture on Conifers of Western Himalaya: Status, problems and prospects during the seminar.
- Dr. Pravin Rawat, Scientist –B, Genetic and Tree Improvement Division delivered a lecture on Tree Improvement for forest productivity enhancement during the monthly seminar held on 29 December, 2022.
- ICFRE-HFRI, Shimla organized XXII Research Advisory Group (RAG) Meeting on 10 October, 2022 in the Conference Hall of the Institute. Meeting was also attended by Scientists, Chief Technical officers and Technical officers of the Institute. In the meeting, six new project proposals were presented by the Scientists of the Institute.
- Research Advisory Committee (RAC) meeting was conducted in the Conference Hall of the institute on 27 October, 2022 for evaluated the Synopsis of 10 Ph.D. Research Scholar, registered with ICFRE-HFRI Centre of FRIDU Dehradun.

Training Organized

- ICFRE-HFRI, Shimla organized a training programme on "Cultivation of Mahameda and other Important Temperate Medicinal Plants" under NMPB sponsored project at VVK Jagatsukh, Manali, District Kullu HP on 9 July 2022. About 35 farmers of Kullu region attended the training. Sh. R. Arun Kumar, ADG (M&E), ICFRE Dehradun inaugurated the training programme and emphasized the need of conservation of Himalayan medicinal plants through ex-situ cultivation for protection and sustainable livelihood income generation. Dr. Sandeep Sharma, Director Incharge gave a presentation on Mahameda, organic farming and marketing issues of medicinal plants. Sh. Amar Chand Sharma, Ex-PCCF, HPSFD and Sh. Nand Lal Sharma, CEO, Nanda Herbal Plants also graced the occasion.
- Himalayan Forest Research Institute (HFRI), Shimla organized one day training program on *"Forest Technologies for Productivity Enhancement Livelihood"* for the farmers, NGO's and frontline line staff of Leh Forest Division at the National Institute of Sowa Rigpa (NISR) Leh, UT Ladakh

- Sh. P. S. Negi, Scientist-D organized one day training programme on "Nursery and Plantation Technique of Shukpa (*Juniperus polycarpos*)" for the frontline line staff of Kargil Forest Division at Divisional Forest Office, Kargil, UT Ladakh on 22nd August 2022 and imparted training on seed collection, processing, nursery and plantation technique of *Juniperus polycarpos*.
- Under the *Azadi Ka Amrit Mahotsav,* Sh. Pitamber Singh Negi, Scientist-D, organized one day training programme on "Nursery and plantation technique of *Juniperus polycarpos*" at Krishi Vigyan Kendra, Reckong Peo, Kinnaur, H. P. on 02.12.2022 under CAMPA Extension Head in collaboration with Krishi Vigyan Kendra, Reckong Peo, Kinnaur. 25 participants comprising frontline officials of Kinnaur Forest Division and progressive farmers from Kalpa, Pooh and Nichar Blocks of Kinnaur district, Himachal Pradesh.
- Himalayan Forest Research Institute, Shimla organized a one day training programme on "Application of AM biofertilizers in organic cultivation of medicinal plants" at Van Vigyan Kendra Jagatsukh, Distt. Kullu on 12 December, 2022. The training was primarily focused on creating awareness among farmers on organic cultivation of temperate medicinal plants by using AM biofertilizers. Dr. Ashwani Tapwal, Scientist- F, HFRI, Shimla was the Coordinator of the training programme. Mother cultures of AM biofertilizers were also distributed to the participants.
- Under the Extension of Research outcomes initiatives, ICFRE-HFRI, Shimla organized a one-day training program on "Cultivation of Important Temperate Medicinal Plants: An Option for Diversification and Income Augmentation" at VVK, Jagatsukh, Manali Kullu on 13 December, 2022.

- Dr. Pawan Kumar, Scientist–E and Head Forest Protection division ICFRE-HFRI Shimla as a Co-ordinator organized a three days training program "Application of Bio-fertilizers & Bio-pesticides in forestry practices" for "Other Stakeholders" funded by MoEF&CC, Govt. of India *w.e.f.* 14-16 December, 2022 at HFRI, Shimla. A total of 30 participants which included Research scholars from Himachal Pradesh University and St. Bedes College Shimla, Members of Pujarali and Rajhana gram panchayat, School teachers and Medical officers participated in training programme. The main aim of the training programme was to create awareness among the participants about the importance of Bio fertilizers and Bio pesticides.

- Under the Extension of Research outcomes initiatives, HFRI, Shimla organized a training program on "Scientific Management of Forest Fires" at Kobag Pashog, Sirmaur. Dr. Ranjeet Kumar, Scientist-E conducted the training programme on 21 December, 2022 at Bag Pashog, Pacchad, Sirmour HP. A total of 36 participants attended the Training Programme.

- Dr. Pawan Kumar, Scientist–E and Head Forest Protection division ICFRE-HFRI Shimla as a Co-ordinator organized one day training programme on "Capacity Building on Promoting Practices for Conservation of Native Pollinators and their Food Plants through Community Based Approach" funded by NABARD at Kalpa, Distt. Kinnaur on 24 December, 2022. 85 participants include Farmers, Panchayat members and locals of surrounding villages along with forest officials participated in training programme. The main aim of the training programme was to apprise the locals and farmers about the importance of local pollinators and their role in the environment.




PARTICIPATION IN TREE GROWERS MELA/ KISAN MELA

◊ Dr. Sandeep Sharma, Director In-charge and Dr. Jagdish Singh, Scientist-F as a special invitee participated in "Apple Kisan Mela" organized by Dr. Y.S. Parmar University of Horticulture and Forestry, Nauni Solan at Mashobara, Shimla on 8 August, 2022.

◊ ICFRE-HFRI Shimla organized Kisan Mela at VVK Dharmpur, District Mandi, Himachal Pradesh on 18 September, 2022. Sh. Mohinder Singh Thakur, Honourable Jalshakti Minister, Govt. of Himachal Pradesh was Chief Guest of the occasion and Sh. Arun Singh Rawat, DG, ICFRE was Guest of Honour. About 300 farmers from seven Panchayats of Dharampur participated in the Kisan Mela. Exhibition stall of different departments viz., Forest, Agriculture, Horticulture, College of Horticulture and forestry, Neri Hamirpur and HFRI were also installed.

◊ As a special invitee, Dr. Sandeep Sharma, Director, HFRI and Dr. Jagdish Singh, Scientist-F & Head Extension attended the 'KRISHAK MELA-2022' on the theme 'Diversification in Agriculture for Self-Reliant India' organized by SKUAST, Jammu. On 17 November, 2002, Dr. Sandeep Sharma chaired the technical session on the theme 'Natural farming: Principles and Advantages' and Dr. Jagdish Singh, delivered a lecture on 'Diversification through medicinal and aromatic plants for income generation., Dr. Sharma briefed about Natural Farming as being practiced in Himachal Pradesh.

PARTICIPATION IN THE MEETINGS

- Dr. Sandeep Sharma, Director Incharge, ICFRE-HFRI, Shimla attended the Director's Meeting held under the Chairmanship of Director General, ICFRE on 7 July, 2022 through online mode.
- Sh. P. S. Negi, Scientist-D attended quarterly review meeting of CAMPA funded project "Developing seed testing and seed storage protocols of selected forestry species from diverse forest types (AICRP-10)" reviewed by NPC, Dr. Manisha Thapliyal, Scientist-G, FRI, Dehradun 14 July 2022.
- Dr. Swaran Lata attended quarterly progress review meeting of "Sustainable management of NTFP's through conservation and value addition AICRP-29" on dated 25 August, 2022.
- Dr. R.K. Verma, Scientist-G, Forest Ecology and Climate Change Division attended the meeting at Vigyan Bhawan, Bemloe, Shimla, organized by Himachal Pradesh Council for Science, Technology & Environment, Shimla
- Dr. Sandeep Sharma, Director – Incharge participated in the review meeting of "Western Himalayan Temperate Arboretum (WHTA)" organized by the Wildlife Wing of Himachal Pradesh Forest Department on 2 September, 2022. The meeting was chaired by the PCCF (Wildlife), Himachal Pradesh and attended by the members of Expert Committee. Discussed progress of WHTA as per the Annual Plan of Operation (APO) of 2021-22 and also discussed and finalized APO for the year 2022-23.
- Dr. Swarn Lata, Scientist-D attended 76th meeting of the Project Screening Committee (PSC) for "R&D" organized by NMPB New Delhi on dated 6 September, 2022 and presented progress of project entitled "Survey, mapping, development of cultivation techniques, evaluation of selected germplasm and economics of *Fritillaria roylei* Hook.f., (Kakoli) an important plant of the Ashtavarga Group of Medicinal and Aromatic Plants".
- Dr. Pravin Rawat, Scientist -B attended phase 2 of "Building Community Resilience to Climate Shocks in the Himalayan Region" Workshop held at Hotel Ramada, Dehradun, Uttarakhand, organized by IUPUI, Purdue University, Indianapolis USA and TERI, School of Advanced Studies, Delhi.
- Dr. Sandeep Sharma, Director – Incharge, Himalayan Forest Research Institute, Shimla participated in the Directors' Meet held on 9 September, 2022 and presented and discussed the agenda items of HFRI, Shimla placed before the ICFRE administration.
- Dr. Swaran Lata, Scientist-D attended meeting on "Purchase percentage by GeM Portal" through Hybrid mode (online) under the chairmanship of Dy. Director General (Admin), ICFRE on dated 19^{t} September, 2022.

- Dr R.K. Verma, Scientist-G attended "Technical /Scientific Review Committee" meeting organised by Himachal Pradesh Council for Science Technology & environment (HIMCOSTE) on 23/09/2022.
- Dr. Sandeep Sharma, Director – Incharge and Dr. R.K. Verma, Head of Office, ICFRE-HFRI, Shimla participated in the meeting held with Shri Pravir Pandey, IA&AS, Additional Secretary & Financial Advisor (AS&FA), Ministry of Environment, Forest & Climate Change (Government of India) visited institute and briefed about the Institute, ongoing research, education and extension activities; budget position and procurement through GeM.
- Dr. Ashwani Tapwal, Scientist-F attended a meeting on "Stakeholders Consultation for Climate Change Projects in Himachal Pradesh" organized by Department of Environment, Science & Technology, Govt. of Himachal Pradesh at Hotel Marina, near Mall Road, Shimla (H.P) on 27 September, 2022.
- Dr. Ranjeet Kumar, Scientist- E attended the meeting on D.V. Garish versus Union of India & Ors. -reg. (Carrying capacity assessment) for NGT and Citizen of India held on 27 September, 2022 at Hotel Marina, Shimla
- Dr. Sandeep Sharma, Director – Incharge, Dr. R.K. Verma, Scientist-G, Dr. Jagdish Singh, Scientist-F and Mrs. Savita Banyal, Chief Technical Officer attended online meeting on "Institute Ranking" on 30.09.2022.
- Dr. Sandeep Sharma, Director – Incharge, ICFRE-HFRI, Shimla; Dr. Jagdish Singh, Scientist-F along with Dr. D.R. Bhardwaj, Professor, College of Forestry, Dr. Y.S. Parmar University of Horticulture & Forestry, Nauni, Solan, Himachal Pradesh; Dr. Lalit Mohan Gupta, Professor, SKUAST – Jammu and Dr. Joginder Singh, CTO participated in the meeting organized through virtual mode for extension of technologies developed by the Institute on 30 September, 2022 .
- Dr. Sandeep Sharma, Director – Incharge, ICFRE-HFRI, Shimla participated in the meeting for discussion on Draft National Forest Policy- 2022 as organized by the ICFRE Headquarters on 12 September, 2022 through virtual mode.
- Dr. Ashwani Tapwal, Scientist-F attended "86th meeting of State Expert appraisal Committee" on 15-16 September, 2022 at Department of Environment, Science & Technology, Paryawaran Bhawan near US Club Shimla a Review Meeting of "AICRP 11" on 19 September, 2022.
- Dr. R.K. Verma, Scientist-G and Head of Office attended the Project Screening Committee (PSC) at Hotel HHH organized by Himachal Pradesh Council for Science Technology & environment (HIMCOSTE) on 10 & 11 October, 2022.
- Dr. Vaneet Jishtu, Scientist-E attended the Sustainable Mountain Development Summit at Leh on 11 and 12 October 2022 at the Sindhu Sanskriti Kendra, Leh.

- Dr. Vaneet Jishtu, Scientist-E attended the Research Advisory Group Meeting chaired by the PCCF (WL) cum-Chief Wildlife Warden for reviewing Research Projects submitted to the WL Wing of HPSFD, through online mode and made contributions on 19 October, 2022.
- Dr. Sandeep Sharma, Scientist-G, Dr. Pawan Kumar, Scientist-E attended the Special Review Meeting under the Chairmanship of Director General, ICFRE and ADG (M&E), ICFRE Dehradun on 28 October, 2022.
- A meeting on various issues pertaining to implementation of Detailed Project Reports prepared by HFRI, Shimla for Rejuvenation of **Beas, Ravi** and **Sutlej** Rivers through Forestry Interventions was held with the Officers and staff of Government of Punjab on 1 December, 2022.

- Dr. Balkrishna Tiwari, Scientist -B attended the Consultative meeting on drafting of Breeding program of *Cedrus deodara* organized by IFGTB, Coimbatore on 30 November to 2 December, 2022.
- Sh. P. S. Negi, Scientist-D attended the quarterly review meeting of CAMPA funded project "Developing seed testing and seed storage protocols of selected forestry species from diverse forest types (AICRP-10)" reviewed by NPC, Dr. Manisha Thapliyal, Scientist-G, FRI, Dehradun virtually on 1 December, 2022.
- Sh. P. S. Negi, Scientist-D attended 5th six monthly review meeting of CAMPA funded project "Developing seed testing and seed storage protocols of selected forestry species from diverse forest types (AICRP-10)" reviewed by Project Evaluation Group (PEG), ICFRE, Dehradun on 08 December, 2022.
- Dr. Sandeep Sharma, Director Incharge, HFRI attended the meeting of Standing Consultative Committee Meeting for approval of i) Preliminary Working Plan Report of Dehra Forest Division in Hamirpur Forest Circle and ii) Working Plan of Joginder Nagar Forest Division in Mandi Forest Circle in the Conference Room of O/o Pr. CCF (HoFF) HP, Talland, Shimla on 27 December, 2022. The meeting was chaired by Sh. Ajay Srivastava, IFS, Pr. CCF and HoFF, Himachal Pradesh.
- Dr. Swarn Lata, Scientist-D attended review meeting of Himachal Pradesh State Biodiversity Board for preparation and updating of People's Biodiversity Register (PBRs) in 592 Biodiversity Management Committees (BMCs) by the Technical Support Group (TSGs) in different districts of the State and also presented progress of PBR project on dated 27 December, 2022 at Conference hall of Department of Environment, Science & Technology, Near US Club, Shimla.

PARTICIPATION IN THE TRAINING PROGRAMMES

- Dr. Ashwani Tapwal, (Scientist-F) attended a Training Program on "Role of Technology in Community Level Disaster Mitigation" for scientists and Technologists" organized by LBSNAA at Mussoorie, Uttarakhand from 25 to 29 July, 2022
- Dr. Ashwani Tapwal, (Scientist-F), attended a Training of Trainers (ToT) on "Participatory Climate Change Adaptation planning & Execution" (25-27 August, 2022) at H.P State Institute of Rural Development, Fairlawns, Shimla.
- Dr. Swarn Lata, Scientist-D attended online "Competition Commission of India Advocacy Event 2022" organized by Sate Resource Person CCI, Uttarakhand for the officials engaged in activity of procurement for Government Officials of Uttarakhand on 2 December, 2022.
- Dr. Swarn Lata, Scientist-D attended online training on "STQC-CISP-STQC Certified Information Security Professional (An ISMS implementation programme based on ISO/IEC27001 & 27002)" organized by Electronics Test & Development Center, Indian Institute of Quality Management, Jaipur from 19-23 September, 2022.
- Sh. Shyam Sunder, Senior Technician and Sh. Jiya Lal, Technician attended five days training programme on "Advance Techniques in soil, plant and water analysis" for Technical staff of ICFRE, Dehradun wef 19 - 23 September, 2022 at ICAR-Indian Institute of Soil Sciences, Bhopal, M.P.
- Sh. Jawala Prasad, STO attended a training programme on "Computer and Internet Applications" w.e.f. 19-23 September, 2022 at IFP, Ranchi.
- Dr. Pawan Kumar, Scientist- E attended a five days Training programme on "Invasive Weed Management" organized by ICAR- Directorate of Weed Research, Jabalpur (MP), funded by ICFRE, Dehradun wef 26-30 September, 2022.
- Dr. Ashwani Kumar, CTO attended a training programme on "General Forestry" for Technical Staff of ICFRE wef 26-30 September, 2022 at Silviculture and Forest Management Division, FRI, Dehradun.
- Dr. Ashwani Tapwal, Scientist-F and Dr. Balkrishna Tiwari, Scientist -B attended a Training program on "Harnessing Intellectual Properties: From Innovation to Economic Growth" on 30 September, organized by IFGTB, Coimbatore on virtual mode.
- Dr. Swarn Lata, Scientist-D, Sh. Akhil Kumar, CTO, Sh. Badri Sen Negi, Assistant, Sh. Raman Kumar, UDC and Sh. Rohit Kumar, UDC attended one day training programme on "e-Procurement and Purchase Management in Government Store Keeping and Record maintenance including GST Act, 2017, Balance Sheet and Accounting Procedures" on 26 December, 2022 in virtual mode.

Glimpses of Traning Programmes

Memorandum of Understanding (MoU)

* ICFRE-HFRI Shimla signed memorandum of agreement (MoA) with NABARD at NABARD HQ office Shimla Himachal Pradesh in the presence of Dr Sandeep Sharma, Director HFRI Shimla and Dr. Sudhansu KK Mishra Chief General Manager NABARD on 12 August, 2022. The MoA was signed to conduct program on Capacity building on promoting practices for conservation of native pollinators and their food plants through community based approach in the selected forest ranges of Kinnaur district, Himachal Pradesh funded by NABARD. NABARD also agreed in principle to collaborate in other programs like intervention in medicinal plants, upscaling of Chilgoza program, and other intervention involving community based approach.

* In a bid to foster the forestry research and maximum reach-out, a MoU was signed between HFRI, Shimla and SKUAST, Jammu in the VC office of SKUAST, Jammu on 26 August 2022. The MoU was signed by Honorable Prof. J.P. Sharma, VC, SKUAST, Jammu and Dr. Sandeep Sharma, Director-in- Charge, HFRI, Shimla On this occasion both the parties held a discussion on future collaborative Research, Education and Extension activities. Honorable VC, SKAUST termed it as a historic moment and hoped that this will lead to sustainable development of forestry sector and rural livelihood.

* A MoU was signed between HFRI, Shimla and PCCF & HoFF, Jammu and Kashmir Forest Department on 16 June 2022, has been physically exchanged between Dr. B. Balaji, IFS, Chief Conservator of Forests and Dr, Sandeep Sharma, Director-in- Charge, HFRI, Shimla on 26 August 2022.

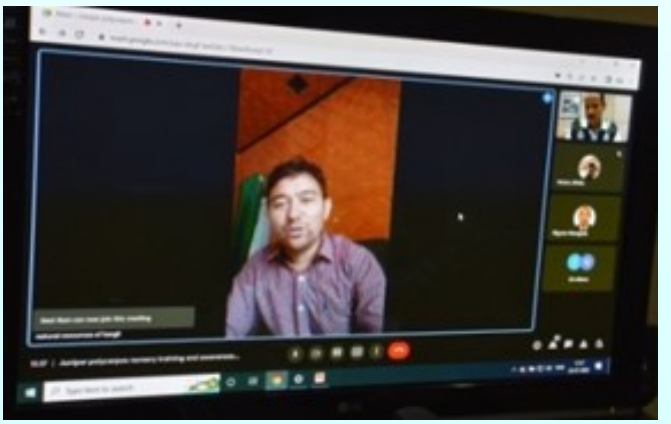
♦ HFRI Shimla, H.P., signed a MoU with Dr. Y.S. Parmar University of Horticulture and Forestry (YSPUHF), Nauni, Solan, H.P., to provide a framework for the proposed collaboration for pursing quality research and building a new generation of highly skilled human resource and livelihood opportunities, etc. on 21 December, 2022. Dr. Sandeep Sharma, Director and witness Dr. Jagdish Singh, Scientist-F & Head Extension & Dr. Vaneet Jishtu, Scientist-E from the HFRI and Dr. Sanjeev Chauhan, Director Research and witness Dr. A.K. Joshi, Student Welfare Officer & Dr. C.L. Thakur, Dean, College of Forestry from YSPUHF, side signed the MoU in the gracious presence of Dr. Rajeshwar Singh Chandel, Vice Chancellor, UHF, Solan; Sh. Maneri Panlop Rinpoche, Maneri Monestry, Dolangi, Solan; Padma Shri Jadav Payeng; Padma Shri Dr. Kshama Metri and Sh. Shyam Parande, Secretary, Sewa International.

EXTENSION ACTIVITIES

ACTIVITIES UNDER AZADI KA AMRIT MAHOTSAVA

- ICFRE-HFRI, Shimla organized a one day training and awareness program on "Hill Bamboo: A means of livelihood" at Regional Horticulture Research and Training Station, Mashobra, Shimla on 13 July, 2022. 35 farmers from villages of Mashobra region participated.

- HFRI Shimla organized Training cum Awareness programme on "Nursery and Plantation technology of *Juniperus polycarpos*" on 22 July 2022. 50 frontline field staff of forest department from



Kinnaur, Lahaul & Spiti and Ladakh, UT regions participated virtually. Dr Jagdish gave presentation on medicinal plants of cold deset regions. Sh. P. S. Negi, Scientist-D delivered key note lecture on "Nursery and Planting Technique of *Juniperus polycarpos* (Himalayan Pencil Cedar" during training programme.

⇒ ICFRE-HFRI, Shimla celebrated 73rd Van Mahotsav on 3 August, 2022 at Tutikandi, Shimla along with the local residents and HP Forest department. Scientists/officers/employees of the institute and villagers participated in the plantation programme.

⇒ As a part of activities for Azadi Ka Amrit Mahotsav Indian Council for Cultural Relations (ICCR) organized exposure visit for the 25 delegates from Colombia, Germany, Panama, Dominican Republic and Senegal and India. This team led by Sh. Kamal Jeet Singh, Senior Program Director,

Visitors Program Section, Indian Council for Cultural Relations, Ministry of External Affairs, Government of India visited HFRI on 18 October 2022. Dr. Sandeep Sharma, Director, HFRI, Shimla welcomed the visiting team and briefed about activities of ICFRE & HFRI. Dr. Vaneet Jishtu, Senior Scientist and his team apprised the team about the important flora of western Himalayas through a power point presentation and also organized a knowledgeable walk of the adjoining forest.

⇒ As a part of AKAM, institute celebrated International Mountain Day – 2022, under the theme "Women move mountains" in the conference Hall of the Institute on 11 December, 2022.

⇒ ICFRE-HFRI Shimla, organized an awareness program on “Agroforestry for productivity enhancement and income generation” at Koti, Shimla, H.P on 18 December, 2022.

⇒ A one-day awareness programme on "Impact of climate change in the Himalayan region” was organized at HFRI in which 80 participants attended the same. Dr. Vaneet Jishtu made a presentation on *Our Warming Planet -What the World is doing to combat Climate Change & Global Warming* during the Awareness Programme on dated 28 December, 2022.

SPECIAL DAYS CELEBRATIONS AND PRAKRITI PROGRAMME:

- HFRI, Shimla under Prakriti Initiative, organized an interactive and awareness programme at Kendriya Vidyalaya, Choglamsar, Leh on 21st July 2022. 75 students actively participated in the programme. Dr. Vaneet Jishtu, Scientist- E, delivered a detailed and pictorial presentation on "Right to Clean Environment & Social Responsibility" apprising them about their right to clean environment and also stressing upon the young lot to be socially more responsible. The principal of the school Sh. Phuntsog Wangial appreciated the 'Prakriti' initiative and was grateful to the team from the Himalayan Forest Research Institute, Shimla, H.P. for organizing the programme.

- HFRI, Shimla organized an interactive session at Jawahar Navodaya Vidyalaya, Saboo in Leh on 25 July 2022**.** 71 students actively participated in the programme. Dr. Vaneet Jishtu, Scientist-E of this institute made a pictorial presentation on "Students Role towards Environment Protection". He apprised the students about the status of the environment in the cold desert of Ladakh.
- ICFRE-HFRI organized an interactive and awareness programme at Government Senior Secondary School, Beolia, Shimla on 25 July 2022. 35 students including faculty members attended the programme. Participants were sensitized on plastic hazards and its disposal, monkey menace. Planted 25 seedlings of Kafal (*Myrica esculenta*), Juniper (*Juniperous polycarpos*) and Pajja (*Prunus padus*).

- AGNII Mission (Accelerating Growth of New India's Innovations) team visited Himalayan Forest Research Institute, Shimla on 3 and 4 August, 2022
- ICFRE-HFRI Shimla celebrated 76th Independence day on **15 August, 2022** at ICFRE-HFRI Campus. Dr. Sandeep Sharma, Director In-charge unfurled the national flag. Thereafter national anthem was chanted. Children entertained all by singing patriotic song, reciting patriotic poems and stories.
- ICFRE-HFRI, Shimla organized Parthenium (*Parthenium hysterophorus*) awareness week on 22 August 2022. Scientists, officers & research staff of the institute participated in the program. Besides, Parthenium eradication drive was carried out at VVK Dharampur, H.P; VVK Jammu, UT, and FRS, Nalagarh, H.P.
- **हिमालयन वन अनुसंधान संस्थान, शिमला द्वारा प्रत्येक माह स्वच्छता अभियान** कार्यक्रम **स्वच्छता अभियान** कार्यक्रम का आयोजन किया जाता है जिसके अन्तर्गत संस्थान द्वारा **स्वच्छता अभियान** का आयोजन किया गया । संस्थान के स्टाफ द्वारा एचएफआर आई केम्पस के आस-पास के क्षेत्रो की साफ-सफाई की गई ।



- HFRI, Shimla organized an **Awareness Campaign** on 06 September, 2022 at Government College Seema (Rohru), under nature program. Dr. Vineet Jishtu, Scientist-E of the Institute gave a presentation on Clean Environment – Our Rights and Social Responsibility.
- Dr. Vaneet Jishtu, Scientist-E as Guest Speaker, delivered talk on the topic entitled "A case study of Western Himalayan Temperate Arboretum, Shimla" from 27th August- 5th September 2022 organized by Govt. Madhav Sadashiv Rao Golbalkar College, Rewa, M.P. about 50 participants attended the programme.

- HFRI, Shimla celebrated **Himalayan Day** at the Institute on 9th September, 2022.
- हिमालयन वन अनुसंधन संस्थान, शिमला द्वारा दिनांक 14 सितम्बर, 2022 से 29 सितम्बर, 2022 तक हिन्दी पखवाड़ा का आयोजन किया गया । इस आयोजन के दौरान संस्थान द्वारा राजभाषा के प्रचार एवं प्रसार हेतु विभिन्न कार्यक्रमों एवं प्रतियोगिताओं का आयोजन भी किया गया । जिसमें विभिन्न प्रतियोगिताओं के विजेताओं को पुरस्कार देकर सम्मानित किया गया ।

- स्वच्छता अभियान कार्यक्रम के अंतर्गत हिमालयन वन अनुसंधन संस्थान, शिमला द्वारा सितम्बर माह के प्रत्येक सप्ताह को स्वच्छता अभियान कार्यक्रम का आयोजन किया गया तथा परिसर के समीप के क्षेत्रों की सफाई की गई ।

- Students of B.Sc. Final year (Zoology Major) from St. Bede's College, Shimla, along with two faculty members visited Forest protection Laboratory of Himalayan Forest Research Institute, Shimla on 13 September, 2022. Dr. Pawan Kumar (Scientist E& Head, Forest Protection Division) apprised the students about the ongoing activities of the projects. He explained the procedure of insect taxonomy and identification along with demonstration to the students.

- Himalayan Forest Research Institute, Shimla celebrated the *'Rashtriya Ekta Diwas'* on October 31

October 2022 to mark the Birth Anniversary of Sardar Vallabhbhai Patel: The Iron Man of India who played an important role in the unification of India. All the participants, took an oath of Integrity Pledge (*Rashtriya Ekta)* in the Conference Hall of the Institute. On this occasion, a Unity Rally was taken out from the HFRI, office to lower Panthaghati, Shimla.

- हिमालयन वन अनुसंधान संस्थान, शिमला में दिनांक 31 अक्टूबर से 2 नवम्बर 2022 के मध्य "सतर्कता जागरूकता सप्ताह-2022" का आयोजन किया जा रहा है । इस अवसर पर दिनांक 31 अक्टूबर 2022 को संस्थान के निदेशक महोदय द्वारा सभी अधिकारियों एवं कर्मचारियों को शपथ भी दिलाई गई ।
- हिमालयन वन अनुसंधान संस्थान, शिमला में दिनांक 31 अक्टूबर से 6 नवम्बर 2022 के मध्य "सतर्कता जागरूकता सप्ताह-2022" का आयोजन इस वर्ष की थीम "भ्रष्टाचार मुक्त भारत- विकसित भारत" को मध्यनजर रख कर किया गया । इस अवसर पर दिनांक 31 अक्टूबर 2022 को संस्थान के निदेशक महोदय द्वारा सभी अधिकारियों एवं कर्मचारियों को शपथ भी दिलाई गई । इस दौरान विभिन्न प्रतियोगिताओं का आयोजन भी किया गया जिसमें समापन दिवस दिनांक 6 नवम्बर 2022 को संस्थान के निदेशक महोदय डॉ० संदीप शर्मा द्वारा विजेताओं को पुरस्कार भी दिए गए ।
- ICFRE-HFRI, Shimla organized an awareness program on "Agro-forestry" at Badagaon, Shimla on 7 December, 2022. 40 progressive farmers of Demo Village Badagaon, Rajhana Panchayat, Shimla (H.P.) participated in this programme.
- ICFRE-HFRI organized one day awareness program on "Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013" on dated 08/12/2022 in which scientists, officers, technical, non-technical and research support staff (46) of the institute participated. Sh. Jawala Prasad, Senior Technical Officer also gave a brief talk on Sexual Harassment of Women at Workplace.
- Himalayan Forest Research Institute (HFRI) Shimla celebrated International Mountain Day – 2022, under the theme "Women move mountains" in the conference Hall of the Institute on 11 December, 2022.
- . Shri Srininwas Joshi, Retired IAS delivered talk on the theme. 60 participants attended the programme A batch of 37 B.Sc Forestry (Hons), students of College of Forestry, Navsari Agricultural University, Gujarat along with two faculty members visited on 26 December 2022. Sh. Akhil Sharma, CTO apprised students about research achievements and ongoing activities of the institute through power point presentation.

- HFRI, Shimla celebrated Constitution Day - 2022 at the Institute's conference hall. On this occasion, Sh. Yashwant Singh Chogal, Retired Judge and Member, Himachal Pradesh State Regulatory Commission delivered a lecture on the topic on "Constitutional Values and Fundamental Principles on 26 November, 2022.

AWARENESS AND DEMONSTRATION PROGRAMME AND EXPOSURE VISITS

- M.Sc. Students (50 Numbers) from the St. Bedes College, Shimla, visited the Western Himalayan Temperate Arboretum (WHTA), **Potter Hill**, Summer Hill, Shimla on 20th October, 2022. A MoU has been signed between St. Beds College and HFRI, Shimla. Their visit was organized by Dr. Vaneet Jishtu, Scientist-E and Incharge WHTA.
- Dr. Padma Gurmet, Director, National Institute of Sowa Rigpa, Leh Ladakh visited this Institute on 27 & 28 October 2022 and held discussions regarding the collaborative project being undertaken in Ladakh, funded by the NMPB, Ministry of AYUSH, Government of India.
- HFRI, Shimla organized a visit of the members of Amateur Garden & Environment Society (SAGES) to the Western Himalayan Temperate Arboretum (WHTA) at Potters Hill The visitors numbering around 70, had the representation of students, teachers, academicians, lawyers, businessmen, eminent retired bureaucrats, etc. Dr. Vaneet Jishtu, Scientist-in-charge for the arboretum, apprised the about the importance of the arboretum and its various thematic sections. Dr. Sandeep Sharma, Director, Himalayan Forest Research Institute, Shimla presided as chief guest and apprised the SAGES members about the important ecosystem services provided by forests.
- As part of an educational tour, twenty B.Sc, forestry students of Forestry College and Research Institute, Hyderabad, visited Himalayan Forest Research Institute (HFRI), Shimla. Mrs. Savita Kumari Baniyal, CTO gave a detailed presentation of HFRI's activities.

- Exposure visit of villagers of Demo Village Badagaon was organized on 22 September 2022 to Nauni Panchayat Solan and Dr. Y.S. Parmar University of Horticulture and Forestry, Nauni, Solan. The objective was to create awareness among the villagers. Sh. Madan Sharma Panchayat Pradhan of Nauni apprised villagers about the rain water harvesting and water conservation model adopted and works of waste management in his panchayat. Farmers also visited to farm of Floriculture, vegetable, Dairy & Silviculture and to the museum of the university. They were apprised by concerned resource persons of the department about the achievements and ongoing activities.
- Under Fit India Freedom Run 3.0 Campaign 2022 ICFRE-HFRI, Shimla organized a run on 15 October 2022 at 7:00 am in which the Director, scientists, officers and the employees of the institute participated.

- Fit India Freedom Run 3.0 Campaign 2022 was organized by HFRI Shimla on 19 October, 2022 by conducting Fit India Freedom Run 3.0 from the campus of the Institute to Panthaghati from 9:30 am onward, in which the Director of the Institute, scientists, officers and employees participated (50 no.'s) and in total 250 km distance was covered.

- ICFRE-HFRI Shimla celebrated Ghandhi Jayanti on 2 October, 2022 in the conference Hall of the Institute. Dr. Sandeep Sharma, Director paid floral tribute to Mahatma Gandhi Ji the Father of the Nation. Dr. Sharma, shared important information about Gandhiji's life and called upon everyone to adopt his high and noble ideals. After this, all the Officers and Officials actively participated in the cleanliness drive in the office premises.
- A batch of 42 Forest Range Officers Trainees along with two faculty members from Forest Training Academy Haldwani, Uttarakhand visited the HFRI, Shimla on 7 October, 2022. Dr. Sandeep Sharma, Director In-charge in his addressed the activities of ICFRE-HFRI and also briefed the important points for making plantation a success. Dr. Balkrishan Tewari, Scientist-B, gave a detailed power point presentation on mandate, objectives, achievements and activities of the Institute.
- Dr. Sandeep Sharma, Director (Incharge), ICFRE-HFRI, Shimla, participated as the Chief Guest on 17 October, 2022 in the "**Diwali Utsav Mela** - Exhibition of Products of Self-Help Groups (SHGs) and Farmers, Producer Association organized for 5 days from 14th to 18th October 2022 at the famous Ridge, Shimla. During his address, Dr. Sharma highlighted the importance of civil society and Self-Help Groups in the development and implementation of various schemes of Government of India and State Government in the present-day scenario. Dr. Swaran Lata, Scientist-D also participated in Diwali Utsav Mela- Exhibition of Products of Self Help Groups (SHG's) Farmers and Producer Association at the Famous Ridge Shimla organized by NABARD Shimla for 5 days.
- हिमालयन वन अनुसंधान संस्थान, शिमला द्वारा प्रत्येक माह स्वच्छता अभियान कार्यक्रम स्वच्छता अभियान कार्यक्रम का आयोजन किया जाता है जिसके अन्तर्गत संस्थान द्वारा नवम्बर माह में दिनांक 18 नवम्बर, 2022 को स्वच्छता अभियान का आयोजन किया गया । संस्थान के स्टाफ द्वारा सभागार, एचएफआर आई केम्पस, रास्ते व आस-पास के जंगल की साफ-सफाई की गई ।

Glimpses of Special Days Celeberations

RESEARCH PUBLICATIONS

RESEARCH PAPERS

Kumar P, Thakur TS, Deepika and Sharma N. (2022*).* Diversity studies on insect pests of high altitudinal transitional zones of North-western Himalayas. Nusantara Bioscience 14: 203-210.

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Kumar, P., Negi, P. S. and Chandra, S. (2022). New host record of *Aulacophora indica* (Coleoptera: Chrysomelidae) on *Juniperus polycarpos* C. Koch in district Kinnaur, Himachal Pradesh. *International Journal of Entomology Research,* 7(9):42-45.

Gangotia, R. and Kumar, P. (2022). Assessment of diversity pattern of butterfly fauna in Chail Wildlife Sanctuary, Himachal Pradesh: An appraisal for Conservation Management. *Progressive Research: An International Journal*; 17(2): 98-103.

Negi, P.S., Tapwal, A., Prasad, J., Monika and Sharma, A. 2022. Influence of seed sources on germination and seedling vigour of *Pinus gerardiana*. Indian Journal of Forestry. 45(1): 20-23.

Negi, P. S., Tapwal, A. Prasad, J., Monika and Sharma, A. (2022). Influence of seed sources on germination and seedling vigour of *Pinus gerardiana* Wall. *Indian Journal of Forestry,* 45(1): 20-23.

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ABSTRACT

Lats, S. (2022). ““हिमाचल प्रदेश में स्थानीय समुदायों द्वारा अत्यधिक उपयोग किए जाने वाले खाद्य वृक्ष प्रजातियाँ” .Abstract published in Abstract book of one day national workshop on ““हिमालयी क्षेत्रों में ग्रामीण आजीविका के विभिन्न आयाम organised by Govind Ballabh Pant ‘National institute of Himalayan Environment’ (NIHE) on 14 July 2022 (Hybrid mode).

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VISITS OF DIGNITARIES AND SENIOR FUNCTIONARIES

- ADG (M&E), ICFRE Dehradun during his visited to ICFRE-HFRI, Shimla FRS Shillaru, District Shimla and Brundhar, Jagatsukh, District Kullu and monitored the research activities of research projects.
- दिनांक 15.07.2022 (पूर्वाह्न) को गृह मंत्रालय राजभाषा विभाग के सहायक निदेशक (कार्यन्वयन), श्री नरेंद्र सिंह मेहरा ने हिमालयन वन अनुसंधान संस्थान, शिमला के कार्यों का राजभाषा हिंदी संबंधित निरीक्षण किया तथा संस्थान में किए जा रहे उतकृष्ट कार्यों की सराहना की तत्पश्चात (अपराह्न) सतलुज जल विद्युत् निगम लि0 के निदेशक (कार्मिक) श्रीमती गीता कपूर की अध्यक्षता में नगर राजभाषा कारयन्वयन समिति (नराकास), शिमला (कार्यलय–2) की छमाही बैठक का आयोजन किया गया जिसमें गृह मंत्रालय राजभाषा विभाग के सहायक निदेशक (कार्यन्वयन), श्री नरेंद्र सिंह मेहरा, हिमालयन वन अनुसंधान संस्थ. ान, शिमला के निदेशक (प्रभारी) डा0 संदीप शर्मा एवं अन्य सरकारी कार्यालयों उपकर्मियों तथा बैंकों से 42 वरिष्ठ अधिकारियों ने भाग लिया। इस बैठक में सरकारी कार्यालयों में हिन्दी के प्रयोग की समीक्षा की गई एवं लक्ष्यों को प्राप्त करने की दिशा में विचार विमर्श किए गए।
- Prof (Dr.) P.L. Gautam, Pro Chancellor Carrier Point University (CPU), Hamirpur and Ex Director NBPGR New Delhi along with Dr. Sanjeev Sharma, Vice Chancellor, CPU, Hamirpur visited HFRI on 20 October, 2022. Dr. Gautam briefed about the mandate and agenda of CPU, Hamirpur. He expressed hope that agenda in earlier signed MoU between HFRI, Shimla and CPU, Hamirpur will be taken care of for the benefit of both the organizations. Dr. Sandeep Sharma Director, HFRI welcomed Pro Chancellor and VC and briefed about ongoing research activities of the institute and assured them about collaborative research work particularly in the field of forest genetic resources and medicinal plants to be carried out in future.

- 09 Nos. of Members of National Youth Environment Parliament Team from Ministry of Environment & Climate Change, New Delhi visited HFRI Shimla. Team Leader, Sh. Sandeep Balyan, Mentor of the team, briefed about the motive of the visit to Himachal Pradesh and a presentation was also given by a member of the team.

PH.D. AWARDED

Dr. Pravin Rawat, Scientist-B has successfully completed the research work on titled "*Ex-situ* conservation of *Schleichera oleosa* (Lou.) Oken. through seeds" and awarded degree of Doctor of Philosophy (PhD) in Forestry (Silviculture) by Forest Research Institute (Deemed to be University) Dehradun.

STAFF NEWS

- Dr. Pawan Kumar, Scientist – E, ICFRE-HFRI Shimla, Appointed as Member of committee in Himachal Pradesh State Biodiversity Bord (SBSAP) for technical guidance on upgradation, validation and implementation of HP biodiversity strategy and action Plan.

विभागीय पदोन्नति समिति की सिफारिशों के आधार पर निम्नलिखित कर्मचारियों को वन दरोगा से उपराजिक के पद पर नवम्बर, 2022 का पदोन्नत प्राप्त की

- श्री मोहिन्द्र सिंह, वन दरोगा
- श्री मूरत सिंह, वन दरोगा
- श्री विरेन्द्र कुमार, वन रक्षक

Popularizing Forestry through All India Radio/ Doordarshan:

- On Invitation, Dr. Vaneet Jishtu, Scientist-E participated as Resource person in the Live show on Doordarshan, titled "**Krishi Darshan**" on the subject – **औषधीय पौधे व उनकी खेत** aired live on 20 December 2022 at 5.30 – 6.00 PM.

Glimpses of Activities of the Institute

HIMALAYAN NEWS LETTER

ABOUT HFRI

Himalayan Forest Research Institute (HFRI) was initially established as High Altitude Conifer regeneration Centre in May 1977 and upgraded as Himalayan Forest Research Institute (HFRI) in 1998. The Institute has been declared as "Centre of Advanced Studies for Cold Desert Afforestation and Pasture Management" by ICFRE with the National mandate of eco-restoration of cold deserts. The mandate of the Institute is to undertake research on natural regeneration of coniferous and broad - leaved species; assess the populations of threatened, endemic and economically important species and develop Ecological Niche Model; standardize cost effective nursery techniques of various coniferous and broadleaved species; identify quality seed sources and planting material of various species and establish seed orchards; study ecological aspects of stress sites and cold deserts and work out models for their eco-rehabilitation; study diseases and insect pests of important tree species and suggest their control measures; study on mycorrhizal and other beneficial microbes, assess conservation status of important non-wood forest products in the region and standardize their cultivation techniques; develop suitable agro-forestry models for various zones of Himachal Pradesh state and J&K and Ladakh Union Territories; demonstrate the technologies in the Field Research Stations and educate the stakeholders; and build capacities of stakeholders and disseminate research findings to them.

The Institute has well developed infrastructure of laboratories, library, herbarium at its main campus and nurseries and experimental field areas of conducting research and training programmes in the state of Himachal Pradesh and Union Territories of Jammu & Kashmir and Ladakh. The faculty for imparting training by the institute consists of highly qualified, experienced, skilled professionals and researchers. The Institute has about 155 staff including Contractual and Research Staff at present, which is headed by a Director, who is assisted by a team of 11 Scientists having expertise in the field of Ecology, Biodiversity Conservation. Silviculture, Forest Genetics, Medicinal Plants, Forest Protection and Agro-forestry & Extension, and supported by the Technical Staff. Research Coordination Division, coordinates the research activities of these research divisions under the guidance of Director of the Institute. The Institute has four Van Vigyan Kendras, Six Field Research Stations and Two Demo villages.

HIMALAYAN NEWS LETTER

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