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HIMALAYAN NEWS LETTER

Half Yearly



Vol. 2, No.1
January to June, 2022

July, 2022



HIMALAYAN FOREST RESEARCH INSTITUTE

From the Director's Desk

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. Nine training programmes were conducted on different aspects like productivity enhancement and livelihood, cultivation of temperate medicinal plants, eco-restoration of wastelands, preparation of REDD+ action plan, management of forest fire, insect pest management in nursery and plantation 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)

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Research Articles

Temso Lake: A Less Famed Scenic Beauty in Kinnaur, Himachal Pradesh

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Himachal Pradesh is fraught with many precious gifts of nature. The snow-clad enchanting mountain ranges, lofty peaks, lush green valleys, mosaic of forest-types, phenomenal biodiversity, alpine pastures, streams, gushing rivers, wetlands and lakes, all these natural entities imparts unparalleled beauty to the hill state. Lakes are the important features of landscape in Himachal Pradesh and these are known for their immense spiritual and religious importance since ages. Apart from the aesthetic beauty, the lakes constitute the dynamic hydrological ecosystems which provide many goods and services such as regulating river flows, supporting unique floral and faunal diversity. The distribution of these unique hydrological features ranges from the low lying areas to high altitude regions. The prominent natural lakes of the state include Renuka, Machhail, Dal, Khajjiyar, Kumarwah, Rewalsar, Prashar, Nako, Chandertal, Surajtal, Dhankar, Bhrigu, Manimahesh, Gadasaru, Mahakali, Lama, Chandernahan, Kareri, Seruvalsar, etc.

Chandratal Lake has been declared as a Ramsar site and it is present in the cold arid region of district Lahaul & Spiti. Besides, Lahaul & Spiti, Pooh sub-division of district Kinnaur in Himachal Pradesh also part of cold desert.

Kinnaur is a border district and it is enormously beautiful owing to fascinating mountains ranges, snow clad peaks, apple orchards, flamboyant people, strikingly attractive hamlets, traditional life style, rich traditions, deep religious values, and vibrant culture, etc. River Sutlej bisects the district into two longitudinal sections and various charming valleys like Baspa, Ropa, Hangrang extends along the tributaries of River Sutlej. The altitude varies from 1800 m to 6800 m amsl and the climate is temperate to alpine type. Kinnaur is not only known for verdant valleys, fabulous handicrafts and handlooms, and dry fruits like chilgoza (*Pinus gerardiana*), chulli (*Prunus armeniaca*), almond (*Prunus dulcis*) and walnuts (*Juglans regia*), but there are many other beautiful attractions around. The upper regions of this district falls in the rain-shadow area and harbours many glaciers and beautiful high-altitude glacial lakes. These lakes are fed by melting snow. Among these, Nako Lake located on the way from Pooh to Spiti is undoubtedly very famous because of its multi-dimensional significance and sanctity. It is at about 3,662m amsl and visited frequently by tourists and locals. The landscape of Kinnaur district is like a mirror of mystery and apart from, Nako lake there are many more magnificent places which are lesser known.



Temso Lake: A Striking View



Temso lake is one of hidden jewel in upper Kinnaur. It is a scenic high altitude lake, but lesser known and least explored. It can be reached from Labrang, Giabung, Kanam and Lippa villages of Kinnaur. The trek from Labrang village is shortest one. Temso lake is situated at a altitude of 4800m amsl. It is pretty dimension of viable by barren hills. The crystal clear water of the lake presents a charming view. The lake holds immense



religious and spiritual significance and prayer flags can be seen flapping around its circumference. Phulaich is a famous festival of flowers and celebrated with great fervour and festivity in Kinnaur. The festival is held in the Hindu month of Bhadrapada (August and September). Every year, during this festival, local people from different villages visit the sacred lake and offer prayers. Phulaich is also a like a reverence to the nature and there is a belief that best flowers viz., *Saussurea obvallata* (Brahmkamal) and *Delphinium* sp. of season are to be picked during this time and first of all offered to the deities for seeking their blessing . These flowers are locally known as Dongro and Loskar, respectively. These are the

endemic species of NW Himalayas.

The Himalayan Mountains are dotted with many such known and unknown lakes. These unique features provide various ecosystem services. The Himalayan glacier lakes are important natural resources, and play significant role in the hydrology of downstream areas. Despite their multi-fold significance, some of the lakes are less explored due to their remoteness, harsh and inaccessible terrain. Invariably, there is a need to generate substantial information on the ecological aspects of these lakes.



Saussurea obvallata



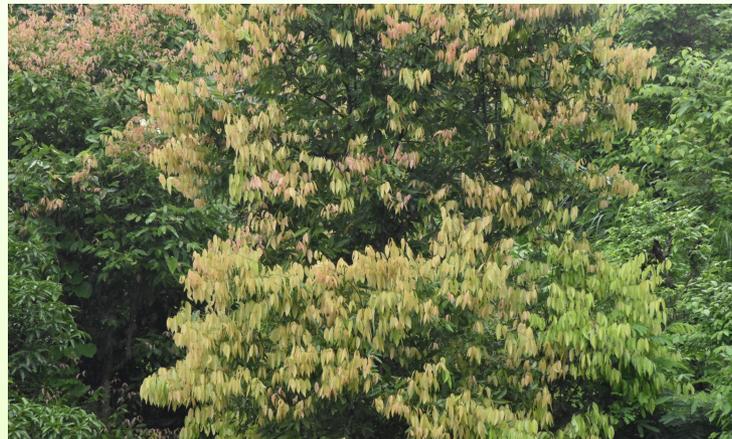
Delphinium sp.



Cinnamomum tamala (Buch.-Ham.) T. Nees: An Endangered Multipurpose Tree Species in Indian Himalayan Region

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Introduction: *Cinnamomum* (Family Lauraceae) has approximately 350 species worldwide. It is represented by twenty species in India. The Himalayan region harbour around eight species: *Cinnamomum bejolghota*, *C. comphora*, *C. glanduliferum*, *C. glaucescens*, *C. impressinervium*, *C. parthenoxylon*, *C. tamala*, and *C. zeylanicum*. Among these, *Cinnamomum tamala* (Buch.-Ham.) T. Nees is the most notable and multipurpose tree species and is frequently used in Indian kitchens to improve the flavour of various foods. The species is also useful for a variety of medicinal purposes. The term *Cinnamomum* is derived from the Greek word "Kinnamomon," which means "spice". The specific epithet '*tamala*' is derived from the plant's local name in India. The vernacular names of *C. tamala* have been given in table 1.



Cinnamomum tamala

Distribution: *Cinnamomum tamala* is native to India. It is distributed in tropical and sub-tropical Asia, South Asia (Indian subcontinent, Indo-China region, Bangladesh, Bhutan, Myanmar, Nepal, and Thailand), Australia, and the Pacific region between 900-2500m amsl. In the Indian Himalayan Region (IHR), the species has been reported from the northwestern, eastern Himalayan regions.

It is found in the Jammu & Kashmir UT (Basantgarh and Rajouri), Himachal Pradesh (Chamba, Kangra, Mandi, Hamirpur, Shimla, Solan, Nahan, Palampur), Uttarakhand (Almora, Bageshwar, Chamoli, Champawat, Dehradun, Nainital, Pauri Garhwal, Pithoragarh, Rudraprayag, Tehri, and Uttarkashi), Assam (North Cachar Hills), Meghalaya (Khasi Hills and Jaintia Hills), Mizoram, and Sikkim. It is cultivated in the Khasi and Jaintia Hills, Garo Hills, Mikir Hills, Manipur, and Arunachal Pradesh, as well as in a few pockets of Kangra District (Himachal Pradesh) and Nainital District of Uttarakhand for its leaves and bark.

Table 1. Vernacular names of *C. tamala*

| | |
|-------------------|---|
| English | Indian Bay Leaf, Indian Cassia Bark, Indian Cassia |
| Hindi | Tejpatta, Tomal Patra, Dalchini, Kikoa, Kirkiria, Silkanthi, Taj kalam, Taj kala-mi, Talispatri |
| Sanskrit | Tamala, Tamalapattra |
| Urdu | Tezpat, Zarnab |
| Himachal Pradesh | Tejpata, Gurpatraj, Patraj, Meethapata, Meethe pate |
| Uttarakhand | Kirkiriya, Dalchini, Tejpata |
| Assamese | Dopattip, Dopatti, Mahpat |
| Bengali | Tejapat, Daruchini |
| Gujarati | Tamaal patra |
| Kannada | Patraka, Patra, Dalchini |
| Malayalam | Tamalapatram |
| Manipuri | Tejbat, Tejbata, Tejpat |
| Marathi | Daalchinitiki |
| Panjabi and Oriya | Tejpatra |
| Tamil | Ilavangapattiri, Pattai, Talishappattiri |
| Telugu | Akupatri, Patta akulu, Talisapatri, Talisha |
| Chinese | La-pi-shu |
| French | Laurier des Indes |
| German | Indisches Lorbeerblatt, Mutterzimt |
| Greek (Old) | Malabathron |
| Japanese | Tamara-nikkei, Tezipatto |
| Latin | Malabathrum |
| Myanmar | Thitchabo, Thitkyabo |
| Nepalese | Shisii |
| Trade Name | Tamal patra, Tejpatra |

Synonyms: *Cinnamomum albiflorum* Nees; *C. cassia* D. Don; *C. lindleyi*; *C. pauciflorum* var. *tazia* (Buch.-Ham.) Meisn.; *C. reinwardtii* Nees; *C. veitchii* Lukman.; *C. zwartzii* Lukman.; *Laurus albiflora* Wall.; *L. sailyana* Buch.-Ham.; *L. soilyana* Buch.-Ham. ex Wall.; *L. soncaurium* Buch.-Ham.; *L. tamala* Buch.-Ham.; *L. tazia* Buch.-Ham.; *L. triplinervia* Reinw. ex Nees; and *Persea tamala* Spreng.



Habitat: It is commonly found on the moist, shady, and riverine slopes, often associated with Oak-Rhododendron forest in sub-montane and montane Himalaya.

Botanical Description: *C. tamala* is a perennial, moderate-sized, evergreen plant with a girth of around 150 cm and a height of 8 to 12 metres. The stems are rough and gray-brown in colour. The bark is soft, wrinkled, and dark brown to greyish red in colour. The bark of the plant is soft and sometimes produces a gum or mucilage. The leaves are ovate-oblong, lanceolate, thick leathery, acuminate, coriaceous, glabrous, glaucous beneath and shining green above, opposite, sub-opposite, or alternate, and short-stemmed, measuring 5-8 inches long and 2-3 inches broad. The midrib is divided into three longitudinal nerves, which are connected by distinct reticulate veins, a distance above the base; panicles are shorter than leaves (Fig. 1). The young leaves are lanceolate, acute, and apparently slightly pinkish tinged. The fragrance and intensity of the leaves varies with chemotype – clove like taste to gentle sweetish; mildly pepper-like fragrance and long-lasting. The bisexual flowers of *C. tamala* are found on the same plant (monoecious). Flowers are whitish, numerous, small, in axillary cymes and terminal pubescent panicles. Pedicels are as long as the calyx. The plant blooms in late March or early April and is typically pollinated by insects such as honey bees. The fruit is a small, pulpy, ellipsoidal drupe (fruit with a seed and thin skin). The fruit grows in an alternating pattern (greater one year, less the next). Ripe fruits are dark purple in colour and have a single brown seed. The seeds require one year to attain maturity. Because of this, seeds from the previous year and flowers from the current year can be seen at the same time. Thus during from April to May, flowers and fruits coexist.

Phytochemical Constituents: Leaves contain cinnamaldehyde, cymene, linalool, limonene and kariyophylene. Distillation of the leaves and bark yields a pale yellow colored essential oil, which is known as Tejpatta oil. The essential oil from bark contains 70-85% cinnamaldehyde, as well as α - pinene, Camphene, Benzaldehyde, β - pinene, L - phellandrene, P - cymene, DL - limonene 1-8 cineole, Linalool 3 - phenyl propanal, α - terpineol, Bornyl acetate, Trans - caryophyllene, and Cinamyl Acetene. Various marker phenylpropanoids have been identified from *C. tamala* oils, including (E)-cinnamaldehyde, (Z)-cinamaldehyde, (E)-cinnamyl alcohol, eugenol, hydrocinnamyl acetate, (Z)-cinnamic acid, (Z)-cinnamyl acetate, and (E)-cinnamyl acetate. The leaf contains three flavonoid components known as quercetin, laempferol, and quercetrin, which are responsible for antioxidant activity.

Indigenous Uses: Tejpatta leaves and bark are frequently used as spices in northern India to flavour meats, sausages, sauces, and tea. The leaves are used as a substitute for betel leaf in Kashmir. Its leaves have traditionally been used to produce green dye. An essential oil is extracted from the leaves and bark. The oil is used to scent soap as well as for medicinal purposes. Bhavaprakasa mentions *C. tamala* as one of three constituents of 'Trijata,' along with *C. zeylanicum* and *Elettaria cardamom*. Trijata is often used in Ayurveda to enhance the fragrance and to increase appetite and digestion in asava and arista preparations. The plant leaves are also used in the Northern Indian spice mixture 'Garam Masala'. Tejpatta, according to Ayurveda, balances all three doshas (disorders) of the human body: Vata (air component), Pitta (fire+water), and Kapha Dosha (earth+water). The plant is utilized for food, fodder, medicine, and timber in the Indian Himalayan Region. Overuse of Tejpatta might cause hyperacidity and mouth ulcers.





Fig. 1. Mature Plant of *C. tamala*

Medicinal Uses: The presence of major phytoconstituents, which are found in all plant parts, makes them effective in treating a wide range of illnesses and conditions, including anorexia, bladder disorders, cancer, cardiac diseases, gastro-intestinal disorders, diabetes, anxiety, depression, ulcer, rheumatism, irritation, boils, conjunctivitis, itching (scabies), piles, and spermatorrhea. It has a wide range of pharmacological properties, including those that are anti-oxidant, anti-flatulent, acaricidal, anti-hypercholesterolemic, anti-hyperglycemic, anti-hyperlipidemic, anti-inflammatory, anti-dermatophytic, anti-diarrheal, anti-fungal, anti-bacterial, anti-microbial, etc.

***C. tamala* Ayurvedic Medicines:** Amirikalp Gold, Arjunin Capsule, Ashwagandharisht, Avipattikar Churna, Avipathi Churna, Babularisht, Bangshil Tablet, Bhrangrajasav, Brahmi Chyawanprash, Chandraprabha Vati, Chavyakarisht, Chitrak Haritaki, Dabur Bhringrajasava Syrup, Dabur Dadimavaleha Syrup, Dadimashtak Churna, Drakshasav, Jeerkadyarisht, Kadhalimadhusnuhee Granules, Kalmeghasav, Kanchnaar Guggul, Khadirarisht, Kumaryasav, Lavabhaskar Churna, Lodhrasav, Lodhrasava (Lodhrasavam), Maha Sudarshan Kwath, Multani Bhaskara Lavana Churana, Multani Madnanand Modak, Punarnavarisht, Rohitkarisht, Sarivadyasava, Thyrocap Capsule, Tricid Tablet, Vasasav, Vidangarisht, Vikramprash, Vyoshadi Vati, and Yograj Guggul.

Threat Status: Endangered in Jammu & Kashmir; Vulnerable in Himachal Pradesh, Uttarakhand, Arunachal Pradesh and Meghalaya.

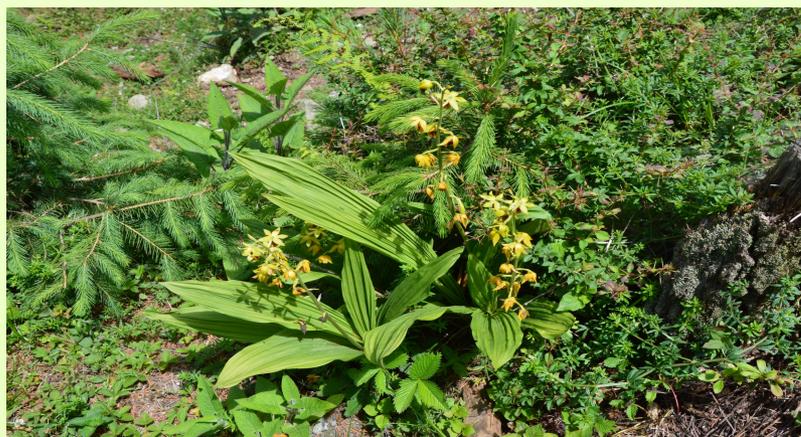


Propagation Techniques: Loamy soil and high moisture content are ideal for plant growth. Plants can also grow on poor and damaged soils. For its cultivation, a temperature range of 15 to 30°C. Propagation can be done through vegetative cuttings and seed. However, the seed method is most commonly used for propagation. Vegetative methods have a 10–15 % success rate, but seeds have a 75–80% success rate in producing plantlets. Ripe seeds are harvested between March and April. After collecting the seeds, the epicarp is removed by rubbing them between palms, and the seeds are dried at room temperature for 4 to 5 days. The viability seeds is three months. It is best to sow it immediately after drying. The best period for sowing is between 15 April and 15 May, right before the monsoon season. The seeds begin to germinate 20 to 25 days after sowing, and seedlings start to appear 30 to 45 days later. After the seed has grown, the plant should be transferred in the shade 4–5 years later.

Harvesting techniques: Leaves are harvested after the rainy season, in dry and warm weather from October to March during the dry season. Rain diminishes the aroma of the leaves and lowers the oil content. Therefore, time of leaf collection is crucial because early and late collection could lead to low quality leaves or essential oils. Every year, leaves are harvested from healthy plants, and every alternate year, leaves are collected from old and weak plants. Collected leaves are shade dried in the sunlight on a tarpaulin or cement floor for 3–4 days to prevent them from fog and frost and to preserve the green colour of the leaves. After drying, these are tied into bundles and placed in gunny bags. To avoid fungal attack, the packed gunny bags are stored in well-aerated areas such as storage depots.

Yield: The yield depends on the age of the plant as well as the size of the tree. The yields from small and large trees are 30–40 and 55–65 kg/tree/harvest, respectively. The last six-month average market price of dry *C. tamala* leaves was Rs. 81.74/kg (<http://www.echarak.in>).

Suggested Management Plans: *C. tamala* is one of the multipurpose tree species in the region with a diminishing wild population, which needs immediate conservation intervention for long-term survival in natural habitats in the Himalayan region. Therefore, frequent monitoring of the populations and habitats of the species; quantum extraction to understand the species level pressure; mass multiplication of elite germplasm by developing propagation protocols; identification of suitable areas of occurrence; restoration of degraded sites and habitats; and awareness generation among the local inhabitants about the ecological and economic importance of the species is essentially required.





Climate Change and Human Development Jeopardizing the Environment of the Indian Cold Desert Forest Ecosystem

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The vegetation cover is consistently shrinking throughout the world including cold desert region of Indian Himalayan region, due to the intertwined and cascading effect of multiple human activities. These human made perturbations are the profound cause behind shrinking of biodiversity on cold desert region, which directly and indirectly diminishes population size of endemic plant species by the pace of climate change (Kattel, 2022).

The Indian cold desert region comprises harsh climate conditions, less precipitation, Low temperature (36°C to -32°C) and arid habitats in fragile ecosystems, including lower atmospheric humidity (Kala, 2011). This ecosystem has remarkable orographic solitariness that provide a suitable habitat for highly specialized, cold-adapted species (Sharma and Samant, 2019). Such physiographic conditions create a unique habitat for floral and faunal diversity (Kala, 2011). However, in the current scenario, this fragile cold desert ecosystem is highly experiencing biodiversity loss due to rapid climate change. The province and its surrounding mountains cover 7,770 km² and hold the most extensive stock of water lakes and glaciers in temperate region of Leh & Ladakh (UT), Jammu & Kashmir (UT), Spiti Valley, Kinnaur, district of Himachal Pradesh, including Uttarakhand and the North-east region; thus often referred to as the 16th Biosphere Reserve of India (Sharma and Samant, 2019).

The Indus, Nubra, Changthang, Zaskar, Spiti valley, Kinnaur region and Suru are rich in regional culture. Thousands of tourists visit this region throughout the year. However, in the last decades, due to increasing the mean temperature, the various places in the cold desert region have been suitable habitats for apple farming, such as Spiti, J&K and Kinnaur valley (Kumar et al., 2022). The temperature of the cold desert has increased, and rainfall/snowfall decreased; consequently, glaciers are shrinking, and permafrost has consistently thawed. The observation by the regional community admitted that land degradation, severe soil erosion and shortage of water, low agricultural productivity, and a decline the forest resources in the pristine three decades have increased (Negi, 2002). The cold desert region is getting warmer and hotter has demonstrated in a new investigation by Singh and Samant (2020) indicates that species above the treeline altitudinal zone (4000 m), including *Juniperus polycarpus* L, are experiencing natural threats by the pace of climate change. A total of 281 species (158 genera, 48 families, 37.04% native, 2.06% endemic, 23.87% near-endemic, 74.44% economically important and 20.28% threatened species) were recorded under the climatic risk. The natural environment plays a crucial role in seed germinations of plant species in terms of intensity of dormancy which may experience vulnerability threats due to increasing the climate. The regional people are also experiencing various consequences of climate change regarding vegetation loss and herbal and water resources scarcity (Negi, 2002).





The concentration of GHG has passed to an average extent throughout the continent; subsequently, it influences the natural cycle of the cold desert region. This GHG help to warm the cold desert region. Earlier analysis figured out the fluctuation in the weather patterns in the cold desert regions over the decades (Shrestha *et al.*, 2012; Meena *et al.*, 2021). In addition, a recent investigation speculated that the mean temperature of the Asian landmass, including the cold desert region of the Indian Himalayan Region, will be increased by 3°C by 2050 and 5°C by 2080 if the appropriate action will not be accepted thoughtfully (Shrestha *et al.*, 2012). Recently Meena *et al.* (2021) concluded that the mean temperature (0.15^o - 0.60^o C) of the cold desert, including the Himalayan region, has increased due to anthropogenic processes. The legacy behind the cold desert manipulation is due to powerhouse, road, and hydropower projects site construction in the core provinces such as Kinnaur cold desert region has been responsible for landslides and soil erosion among forest and non-forest land . Kanwar and Kuniyal (2022) showed that a total of 49.64 km² area is under stress in the Kinnaur cold desert region, and the remaining forest ecosystem has become vulnerable due to climatic variability. A thorough earlier contemplation and available datasets revealed that the cold desert region, especially the Indian continent like the Leh-Ladakh, and Spiti valley areas, are unexplored for assessing impacts of climate change on floral and faunal species. Moreover, there is a need to carry out more work and documentation to fill the gaps and enhance long-term monitoring networks in the cold desert region to deeply understand the impact of climate change on the endemic species. Hence, long-term monitoring sites are compatible with global protocol, i.e., Global Observation Research Initiative in Alpine Environments (GLORIA); such research will emphasize the unknown consequence on the vegetation by the pace of climate change in the cold region. Instead, long-term vegetation monitoring studies sites should be established to determine the significant effect of climate change on cold desert vegetation. There is a necessity for multiple research such as GLORIA protocol long-term monitoring sites to represent vulnerable conditions and the REDD+ Strategy for forest carbon sequestration in the cold region, which will have had mark a new era for strengthening the Himalayan ecological research by the pace of climate change. With such multiple menaces, a strong and impactful policy for combating the desert issues has required prioritising conservation and environmental safety for the cold deserts region through the REDD+ and sustainable strategy. Despite, it also suggests substantial, sustainable policies to the Indian government through harmonising development and conservation with scientific temperament



General View of Cold Desert





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Sparassis crispa- An Important Wild Edible Mushroom with Medicinal Properties

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Introduction: *Sparassis crispa* (Wulf.) Fr is a culinary and medicinally important mushroom, which strongly resembles cauliflower in appearance. The word "crispa" means "waved" or "curled," which perfectly describes the margins of the lobes of fungal sporocarp. It is found throughout in the northern temperate region. On conifers and some hardwoods, especially oaks, it grows as a saprophyte or a weak parasite that causes brown rot. Fruiting bodies are typically found at or close to the base of a tree's trunk. *S. crispa* is consumed as food and used as a home remedy to treat a variety of ailments because of its potential benefits on human health. It has long been a part of traditional culinary practices in China, Japan, and Korea. Since it contains a wide range of pharmacologically active chemicals, it is well known for both its therapeutic potential and being used in a number of dietary supplements. The high glucan content, which accounts for more than 40% of the dry weight of the sporocarp, is principally responsible for the medicinal qualities. It exhibits anti-angiogenic, hematopoietic, immune-stimulating, wound-healing, and antihypertensive properties. Beside this, it also contains sparassol which have antibacterial and antifungal properties.

Common name: Wood Cauliflower, Cauliflower mushroom

Local name: Ban gobhi, Phoolgobhi, Ban bakri, Chhinchhru, Baktu, Bakra

Ecology: *S. crispa* is biotrophic; a weak parasite and saprotroph in nature. It attacks the roots of conifers and some hardwood tree species and cause brown heart rot, which is not lethal. *S. crispa* is only a weak parasite, not causing major harm to the tree, which provides all the essential nutrients for the fungus to grow; the infected trees can live for many years supporting new sporocarps annually. This fungus thrives in forests with fine soil and high moisture. Sporocarps can be found from July to October at the base of host trees.

Morphological features: *S. crispa* possesses lobe-like structures that are reminiscent of brain. The texture is firm, and rather crisp. The short stem is the same colour as the fruiting body. The fruiting body is about 10–30cm tall and up to 10–20 cm across. It is comprised of many leaf-like lobes that are creamy white to yellowish in colour. Leafs are called flabellae; they are densely grouped, flat, waxy, undulating, fleshy, emerging from a branched central base. They are brittle when young and become dark brown and hard at maturity.

Anatomical features: Hyphae septate, thin walled, monomitic, branched, hyaline, 4-6 μm wide, clamp connections present; basidia club shaped, 4 sterigmate, sterigmata 2-5 μm long; basidiospores smooth, thin walled, ovoid, hyaline, with a central guttule, 6.0-7.5 x 4.0-5.0 μm , non-amyloid.

Spore Print: White to cream.





Fig.a, b) Sporocarp of *Sparassis crispa* c. *S. crispa* culture

Edibility and nutritional importance: *S. crispa* is edible when young and fresh; but at maturity, it starts to become brown and loses its flavour. The hardest step of preparation is frequently clearing away all of the debris, some of which the fruit bodies may have grown through. It is usually consumed young and fresh but the sporocarps can also be preserved dry or wet for later use. *S. crispa* is primarily composed of proteins, lipids, carbohydrates and minerals. Among these, the majority part belongs to carbohydrates, which have highest content of β -glucan. It is estimated that more than 40% of the dried sporocarps of *S. crispa* is composed of β -glucan. In addition, it also contains polyphenols, flavonoids, terpenoids vitamins, steroids, alkaloids, phthalides etc. In addition to sporocarps, its mycelia have been said to be nutritionally valuable. *S. crispa* contain high amount of Potassium (K) and appreciable amount of Phosphorus (P) and Sodium (Na). Additionally, this mushroom has a lot of vitamins, particularly vitamin E and B6.

Medicinal properties: The pharmacological potential of *S. crispa* has been compiled by a number of researchers. Numerous curative effects, including anti-tumor, anti-cancer, immune-boosting, hemato-poietic, anti-angiogenic, anti-inflammatory, anti-diabetic, wound-healing, anti-oxidant, and anti-hypertensive, have been reported (Bang and Lee, 2019; Sharma *et al.* 2022). The high β -glucan content of *S. crispa* is primarily responsible for these bioactivities. Some of important bioactivities are compiled below.

- ◆ **Anti-cancer activity:** Anti-cancer activity of *S. crispa* is well established. It work well against various kinds of cancers. 6-branched 1,3- β -D glucan is the active compound identified in *S. crispa*, which shows anti-cancer activity by modulating the immune response.
- ◆ **Anti-hypertensive activity:** High potassium content in *S. crispa* aids to the regulation of high blood pressure. Potassium causes the blood artery walls to relax, thereby regulating or reducing blood pressure.
- ◆ **Anti-inflammatory activity:** *S. crispa* is effective in treating allergic inflammatory conditions like atopic dermatitis, asthma, allergic rhinitis, and food allergies. Sparoside A is found to be the active anti-inflammatory agent from *S. crispa*.



- ◆ **Anti-diabetic and Wound healing:** Diabetic individuals can get benefit from *S. crispa*. It has also been reported to speed up collage biosynthesis and macrophage infiltration in wounds of diabetic patients.
- ◆ **Antimicrobial activity:** *S. crispa* exhibit antimicrobial activity against several gram positive and gram negative bacteria.
- ◆ **Antioxidant activity:** Phenolic compounds present in mushroom are known to have excellent antioxidants. The antioxidants present in this dietary mushroom serve as protective agents to help the human body reduce oxidative damage.
- ◆ **Neuroprotective effects:** *In vitro*, a polysaccharide (SCP-1) produced from *S. crispa* functions as a neuro protective agent. SCP-1 from *S. crispa* may be used to prevent or manage Alzheimer's disease (AD) by altering gut flora and reducing inflammation.

Cultivation: *S. crispa* can be grown on coniferous and hardwood sawdust utilising a variety of techniques, including bottle, bag, and log methods using various solid and liquid media. Optimum temperature for mycelial growth is 20-25°C, optimum pH is slightly acidic (4-7). 90-95% ambient humidity and substrate moisture content of 65% are considered to be ideal for sporocarp production and growth (Chandrasekaran *et al.*, 2011).

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WORKSHOPS/SEMINARS/WEBINAR ORGANIZED

- ◆ Himalayan Forest Research Institute, Shimla organized a webinar on “Guidelines and procedures for clone/variety release of forestry species” on 6.01.2022 as per the recommendation of Annual Review meeting under the ICFRE funded project entitled “Identification, Ecological Assessments for Selection and Screening of Superior and Insect-Pest Resistant Clones of *Salix* for their Cultivation and Conservation in the Cold Deserts of Himachal Pradesh and Jammu & Kashmir”.
- ◆ Dr. Vaneet Jishtu, Scientist-E, as Coordinator, conducted two days Workshop for Capacity Building of Students of Serampore College, Serampore, Hooghly (Kolkata) on 24 and 25 May 2022. Dr. Pawan Kumar, Scientist-E delivered a lecture on “Insect during the workshop 24 May 2022 in HFRI, Shimla.
- ◆ Himalayan Forest Research Institute, Shimla and Forest Research Institute, Dehradun jointly organized Regional Research Conference in hybrid mode on 27 June 2022 on the theme “Forestry Research and Issues in Northern Region of India”. PCCFs of the Northern States/UTs, different stakeholders involving State Forest Departments of Himachal Pradesh, Punjab, Haryana, Uttar Pradesh, Uttarakhand and Union Territories of Jammu & Kashmir, Ladakh, Chandigarh, Delhi, States/ UTs, Agriculture and Forestry Universities and other Universities, Central and State Govt. Organizations, Non-governmental organizations, representatives of the forest-based industries, progressive farmers, tribal youth etc. participated in the conference.





Glimpses of Workshops Organized





Workshops/ Seminar /Webinar Attended

- ◆ Dr. R.K. Verma, Scientist-G and Sh. P. S. Negi, Scientist-D attended one day virtual seminar on “Agroforestry for Wood Production: Issues and Challenges”, organized by FRI, Dehradun on 10 June 2022.
- ◆ Dr. R. K. Verma, Scientist-G and Dr. Pawan Kumar, Scientist-E attended the International Conference on “Innovative and current advances in agriculture and allied sciences ICAAAS 2022” organized by Society for Scientific Development in Agriculture and Technology, Meerut U.P India at H.P. University, Summer Hill Shimla from 12 to 14 June 2022.
- ◆ Dr. Sandeep Sharma, Scientist-’G’, Dr. Jagdish Singh, Scientist-’F’, Dr. Swarn Lata, Scientist-’D’, Sh. P. S. Negi, Scientist-’D’ and other Technical Staff attended one day ‘Regional Research Conference’ online in virtual mode on “Status of Forestry Research with special reference to Agroforestry of Dry Regions” organized jointly by TFRI, Jabalpur and AFRI, Jodhpur on 22 June 2022.
- ◆ Dr. Sandeep Sharma, Director Incharge alongwith Dr. Ashwani Tapwal, Scientist-F attended the Chintan Satra, which was organized by IFRE Dehradun on 30 June 2022 to develop research roadmap of ICFRE for the next 25 years.
- ◆ Dr. R.K. Verma, Scientist-G attended the one day workshop on “Sensitization of Policy Makers and Administrators on Climate Change and its Impacts on the Mountain Ecosystem” on 30 June 2022, organized by State Centre on Climate Change (SCCC) under the AEGIS of Himachal Pradesh Council for Science, Technology & Environment (HIMCOSTE), Shimla Himachal Pradesh at Hotel Holiday Home (HHH), Shimla.
- ◆ Dr. R. K. Verma, Scientist-G and Dr. Vaneet Jishtu, Scientist-E, attended one day Online Workshop on “Sustainable land and Ecosystem Management (SLEM)” organized by ICFRE Dehradun on 1 February 2022. Researchers from institutes of ICFRE and other organizations participated in the workshop.
- ◆ Dr. Pawan Kumar, Scientist-E, Forest Protection Division virtually attended this International webinar on “Bee Pollinators” organized by Zoological Survey of India (ZSI), Kolkata on 2 February 2022.
- ◆ Dr. R.K. Verma, Scientist-G, attended one day Online webinar on “Soil Health: Research and Development”, organized by IFGTB, Coimbatore on 3 February 2022.
- Dr. R.K. Verma, Scientist-G, Dr. Ashwani Tapwal, Scientist-F and Dr. Pawan Kumar, Scientist-E and alongwith Research and Technical support staff of Forest Protection Division attended one day online Regional Research Conference on “Bio-fertilizer and Bio-control Agents- Success, Challenges and Future”, organized by Institute of Forest Genetics and Tree Breeding, Coimbatore on 15 February 2022.
- Dr. R. K. Verma, Scientist-G, attended one day online seminar on “Advances in Forest Hydrology: Challenges and Opportunities”, which was organized by Forest Ecology and Climate Change Division, FRI Dehradun on 18 February 2022.
- Dr. S.S. Samant, Director; Dr. Sandeep Sharma, GCR; Dr. Jagdish Singh, Scientist-F and Sh. P. S. Negi, Scientist-D attended one day webinar on “Energy for Sustainable Growth” organized by MoEF&CC, New Delhi, on 4 March 2022.





- Dr. S.S. Samant, Director, HFRI, Shimla along with his team of Scientists and Technical Officers participated in the release programme of Detailed Project Reports for Rejuvenation of 13 Major Rivers of India prepared by the Regional Research Institutes of Indian Council of Forestry Research & Education, Dehradun. The DPRs were released by Shri Bhupender Yadav, Hon'ble Minister for Environment, Forest & Climate Change, Government of India in the presence of Shri Gajender Singh Shekhawat, Hon'ble Minister, Jal Shakti Mantralay and Shri Ashwani Kumar Chaube, Hon'ble State Minister for Environment, Forest & Climate Change, Government of India on 14 March 2022. Major part of the project i.e., preparation of DPRs for Five Rivers (Beas, Chenab, Jhelum, Ravi & Sutlej) were prepared by Himalayan Forest Research Institute, Shimla under the guidance of ICFRE, Dehradun.
- Dr. Jagdish Singh, Scientist-F attended a virtual workshop on "A Quick Guide to Use Social Media Effectively" organized by Media Division, MoEF &CC, New Delhi on 25 March 2022.
- Dr. Vaneet Jishtu, Scientist-E, participated and delivered a lecture on "Plant Conservation and Sustainable Development Goals - case study of the Western Himalayan Temperate Arboretum" during the two-days International Conference on "Advances and Innovations in Biotechnology and Allied Sciences (AIBAS-22) organized by Chandigarh University in association with the International Plant Propagator Society (IPPA), USA on 24 & 25 March, 2022.
- Dr. S.S. Samant, Director, participated in International Conference-cum-Workshop (Hybrid Mode) on "Agrotechnology, Value Addition, Global Trade and Sustainability of Medicinal/ Neutraceutical Orchids and Orchid Show" organized by the Orchid Society of India (TOSI) in collaboration with Dr. Y.S.R. Horticulture University, Venkataramannagudem in cooperation with BSI, Kolkatta and ICAR-NRC for Orchids, Pakyong at Dr. Y.S.R. Horticulture University, Venkataramannagudem, West Godavari, Andhra Pradesh from 25 to 27 March via online mode. As a Keynote Speaker, Dr. S.S. Samant delivered a talk on "Research Needs of the Assessment and Monitoring of Orchids Diversity in Indian Himalayan Region".
- ◆ Dr. Swaran Lata, Scientist-D attended two days NABARD sponsored International workshop on "Climate Proofing of watershed development Projects with special reference to soil and water conservations Technologies" organized by ICAR -Indian Institute of Soil and Water Conservation, Research Centre, Udhagamandalam (TN) in collaboration with KSCSTE- Centre for water Resource Development and Management, Calicut, Kerala.
- ◆ Dr. R.K. Verma, Scientist-G attended the online webinar on Identification, Analysis and Adulterants of Sandalwood and its Oil on 12 May 2022 organized by IWST Bangaluru.
- ◆ Dr. R.K. Verma, Scientist-G and Sh. P. S. Negi, Scientist-D attended one day virtual seminar on "Agroforestry for Wood Production: Issues and Challenges", organized by FRI, Dehradun on 10 June 2022.
- ◆ Dr. R. K. Verma, Scientist-G and Dr. Pawan Kumar, Scientist-E attended the International Conference on "Innovative and current advances in agriculture and allied sciences ICAAS 2022" organized by Society for Scientific Development in Agriculture and Technology, Meerut U.P India at H.P. University, Summer Hill Shimla from 12 to 14 June 2022.
- ◆ Dr R.K. Verma, Scientist-G and Dr. Swaran Lata, Scientist-D attended the online National webinar on "Traditional knowledge and ethnobotany" organized by Botanical Survey of India, Ministry of Environment Forest and Climate Change in collaboration with Society of ethnobotanist on 20 April 2022.
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Meeting Organized

- ◆ Research Advisory Committee (RAC) meeting for Ph.D. Thesis submission was organized on 18 February 2022 in the Conference Hall of the Institute. Dr. R. K. Verma, Scientist-G, Nodal Officer, HFRI Centre of the FRIDU, Dehradun, Shimla coordinate the meeting.
- ◆ Research Advisory Committee (RAC) meeting was organized by the institute under the chairmanship of Dr. S. S. Samant, Director, HFRI on 25.04.2022 in which 16 Research Scholars (Ph.D students) presented their six monthly report/work. Dr. R K Verma, Scientist-G, Nodal officer FRIDU, HFRI, Shimla coordinated the said meeting.
- ◆ हिमालयन वन अनुसंधान संस्थान शिमला द्वारा दिनांक 25 मार्च 2022 को राजभाषा कार्यान्वयन समिति की तिमाही बैठक का आयोजन किया गया, जिसमें राजभाषा में किए गए कार्यों की समीक्षा के साथ-साथ तिमाही रिपोर्ट का मूल्यांकन भी किया गया। बैठक में राजभाषा विभाग, भारत सरकार व भारतीय वानिकी अनुसंधान एवं शिक्षा परिषद्, देहरादून द्वारा जारी निर्देशों के अनुपालन के बारे में भी विचारविमर्श किया गया ?
- ◆ हिमालयन वन अनुसंधान संस्थान, शिमला द्वारा दिनांक 28 जून, 2022 को राजभाषा हिन्दी का इतिहास, इसकी महत्त्वता, त्रैमासिक प्रगति रिपोर्ट एवं टिप्पण लेखन तथा केन्द्र सरकार के कार्यालयों में इसके कार्यान्वयन के बारे में कार्यशाला का आयोजन किया गया, जिसमें संस्थान से सभी अधिकारियों व कर्मचारियों ने भाग लिया।





Training Organized

- ◆ Himalayan Forest Research Institute, Shimla organized a training programme on “Sustainable Development and Livelihood through Forestry Interventions” on 17 February 2022. About 45 participants including scientists/academician, officers and villagers of the Baragaon



Demo village, Rajahana Panchayat, District Shimla, HP attended the meeting.



Demo village, Rajahana Panchayat, District Shimla, HP attended the meeting.

- ◆ A training programme on “Cultivation of important temperate medicinal plants: an alternative to diversification and income enhancement” at KVK Rohru, Shimla for the farmers, members of Mahila mandals (45 Nos.) etc. was organized by HFRI, Shimla on 20 February 2022.



to diversification and income enhancement” at KVK Rohru, Shimla for the farmers, members of Mahila mandals (45 Nos.) etc. was organized by HFRI, Shimla on 20 February 2022.



- ◆ Himalayan Forest Research Institute, Shimla organized the training programme in collaboration with Krishi Vigyan Kendra (KVK), SKUAST Jammu on “Productivity Enhancement and Sustainable Livelihood through Forest



Technology Interventions” on 26 February 2022 at R.S. Pura, Jammu. The programme was attended by the farmers, mahila mandals, youth clubs (70) etc. from different villages of Jammu region.



Technology Interventions” on 26 February 2022 at R.S. Pura, Jammu. The programme was attended by the farmers, mahila mandals, youth clubs (70) etc. from different villages of Jammu region.



- ◆ HFRI, Shimla organized a training programme on “Eco-restoration of Wastelands” in the component of “Trainings for Capacity Building of Personnel of other services” of MoEF and CC New Delhi scheme “Capacity Building in Forestry Sector” on 2 & 3 March 2022 through online mode. Dr. R. K. Verma, Scientist-G, Forest Ecology & Climate Change Division coordinate the this training programme.
- ◆ हिमालयन वन अनुसंधान संस्थान, शिमला द्वारा बान ओक एवं उच्च परिवर्ती पर्वतीय वनों के कीटों के प्रबंधन पर झुंगी वन परिक्षेत्र, वन मण्डल सुकेत, जिला मंडी में दिनांक 6 मार्च 2022 को एक दिवसीय प्रशिक्षण कार्यक्रम आयोजित किया गया। जिसमें हिमाचल प्रदेश वन विभाग के अधिकारियों, कर्मचारियों के साथ-2 झुंगी पंचायत के प्रतिनिधि सदस्यों एवं किसानों ने भाग लिया।
- ◆ हिमालयन वन अनुसंधान संस्थान द्वारा बान ओक एवं उच्च परिवर्ती पर्वतीय वनों के कीटों के प्रबंधन पर कुल्लू वन मण्डल में दिनांक 9 मार्च 2022 को एक दिवसीय प्रशिक्षण कार्यक्रम आयोजित किया गया, जिसमें हिमाचल प्रदेश वन विभाग के अधिकारियों एवं कर्मचारियों ने भाग लिया।
- ◆ HFRI, Shimla in collaboration with Forest Department Jammu & Kashmir UT organized the training workshop on “Capacity Building of Forest Department of Jammu and Kashmir, UT for preparation of State REDD+ Action Plan” at Convention Centre, Jammu, Government of Jammu and Kashmir UT. Dr. Arun Kumar Mehta, IAS, Chief Secretary, Govt. of J&K UT as a Chief Guest inaugurated the workshop.
- ◆ HFRI Shimla organized the training programme on “Management of forest fire” through online on 14 March 2022, about 75 numbers of participants attend the meeting. Dr. Ranjeet Kumar, Scientist-E & Head, Forest Ecology and Climate Change Division coordinated the training programme.
- ◆ HFRI, Shimla organized one week Compulsory Training Course for Indian Forest Services Officers on topic “Insect Pest Management in Forest nurseries, Plantation and Natural forest” awarded by MoEF & CC, New Delhi to this institute. Dr. Pawan Kumar, Scientist-E, Forest Protection Division coordinated this training programme. IFS Officers from 14 States and UTs attended the training programme.





PARTICIPATION IN TREE GROWERS MELA/ KISAN MELA

Himalayan Forest Research Institute, Shimla participated in the exhibition hosted by the Forest Department, J&K UT for technologies, products and services linked to livelihood on 28 February 2022 and displayed the technologies developed by the institute, NTFPs products, extension material, preserved medicinal plant samples and live samples etc.





PARTICIPATION IN THE MEETINGS

- ◆ Dr. R K Verma, Scientist-G, Forest Ecology & Climate Change Division of HFRI, Shimla attended the one day meeting “4th meeting of Committee on Khudro Drakhtan Areas” on 11.01.2022 at HP Forest Department, Shimla.
- ◆ Dr. S.S. Samant, Director, Dr. Sandeep Sharma, Scientist-G & Nodal Officer, DPR, Dr. Jagdish Singh, Scientist-F, Dr. Ashwani Tapwal, Scientist-F, Dr. Ranjeet Kumar, Scientist-E, Dr. Vaneet Jishtu, Scientist-E, Dr. Joginder Singh, CTO, Shri Akhil Kumar, CTO, Shri Vinod Kumar, CTO and Shri Ashwani Kumar, CTO participated in the meeting of DPR chaired by the DG, ICFRE, Dehradun on 17 January 2022 through Video-conferencing.
- ◆ Dr. Sandeep Sharma, Scientist-G, Dr. Jagdish Singh, Scientist-F and Dr. Vaneet Jishtu, Scientist-E of HFRI, Shimla attended the One Day Online Review Meeting of these AICRPs on 20 January 2022.
- ◆ Dr. Pawan Kumar, Scientist-E, FPD and Ms. Aanchal Verma, PA attended review meeting of “AICRP-31 Pollinator component” on 21 January 2022.
- ◆ Dr. S.S. Samant, Director, Dr. R.K. Verma, Scientist-G and Shri Dinesh Paul, DCF & DDO participated in the Directors’ Meet held on 27 January 2022 through Video-conferencing.
- ◆ Dr. R K Verma, Scientist-G, Shimla attended the one day meeting “5th meeting of Committee on Khudro Drakhtan Areas” on 24 January 2022 at HP Forest Department, Shimla.
- ◆ Dr. R. K. Verma, Scientist-G, attended one day consultation meeting on “Biodiversity Conservation & Rural Livelihood Improvement Projects”, organized by Department of Environment, Science & Technology, Shimla on 9 February 2022.
- ◆ Dr. Swaran Lata, Scientist-D attended the meeting with the National Project Coordinator (NPC) for discussion of quarterly progress under different components for the period October to December and also discussed the action plan of the project for the next quarter in AICRP-10 on 16 February, 2022 through Video Conferencing.
- ◆ Dr. S. S. Samant, Director; Dr. Sandeep Sharma, Group Coordinator Research; and scientist of institute attended the XXII Research Policy Committee (RPC) Meeting of ICFRE held online from 23 to 25 February 2022.
- ◆ Dr. S. S. Samant, Director, HFRI, Shimla alongwith Dr. Sandeep Sharma, Scientist-G & Group Coordinator Research; Dr. Jagdish Singh, Scientist-F and Dr. Joginder Singh, Chief Technical Officer participated in the Consultative Meeting-cum-Discussion on "Forests for Livelihood", organized by Forest Department, J&K UT on 28 February 2022 at Convention Centre, Jammu.
- ◆ Dr. S.S. Samant, Director, HFRI, Shimla, as a Member of Academic Council of the Career Point University, Hamirpur, Himachal Pradesh participated in the Academic Council Meeting organized by the University on 3 March 2022 and gave his valuable inputs for improvement and betterment of education and research activities in the University.
- ◆ Dr. Sandeep Sharma, Scientist-G; Dr. Ranjeet Kumar, Scientist-E; Sh. P. S. Negi, Scientist-D and Dr. Bal Krishna Tiwari, Scientist-B attended quarterly review meeting of CAMPA funded project “National Programme for Conservation and Development of Forest Genetic Resources” reviewed by Dr. H. S. Ginwal, Scientist-G, NPC, FRI, Dehradun for the quarter ending October, 2021 to December, 2021 on 7 March 2022 and presented the progress of work done by HFRI, Shimla.
- ◆ Dr. S.S. Samant, Director, HFRI, Shimla, being a Member of the Himachal Pradesh State Board for Wildlife, participated in the meeting of the State Board for Wildlife convened under the chairmanship of the Chief Minister of Himachal Pradesh on 22 March 2022.



- ◆ Dr. S.S. Samant, Director, HFRI, Shimla, participated in the Progress Review Meeting of Programme Advisory Committee of OEB – Plant Sciences under Science & Engineering Research Board (SERB) held on 22 & 23 March 2022 via Video-conferencing.
- ◆ Sh. P.S. Negi, Scientist-D attended meeting of Standing Consultative Committee for finalization of Working Plans of Ani. Nachan, and Rohru Forest Division of 24 March, 2022 in the O/o PCCF (HoFF) H.P., Talland, Shimla.

PARTICIPATION IN THE TRAINING PROGRAMMES

- ◆ Sh. Dushyant Kumar, Senior Technical Officer, attended the training programme on “Environmental Leadership and Life Skills”, which was organized by IIFM Bhopal through online from 7 to 11 February 2022.
- ◆ Sh. Akhil Kumar, Chief Technical Officer and Smt. Shilpa, Chief Technical Officer attended the DST, New Delhi sponsored training programme on “16th Capacity Building Programme for Technical Personnel (Technical Officer, Senior Technician, Junior Analyst)”, which was organized by Indian Institute of Public Administration, New Delhi from 7-18 February 2022.
- ◆ Dr. R. K. Verma, Scientist-G and Dr. Vaneet Jishtu, Scientist-E, attended the training on “Biodiversity assessment, conservation and development”, which was organized by Wildlife Institute of India through virtual mode from 21 to 25 February 2022.
- ◆ Smt. Savita Kumari Banyal, Chief Technical Officer attended the training programme on 10th T.P. on Science & Societies (Wormen Component) (Scientist & Technologist all levels), which was organized by Indian Institute of Public Administration, New Delhi, sponsored by DST, New Delhi from 21 to 25 February 2022.
- ◆ Dr. Pawan Kumar, Scientist-E attended a training programme on “Bioinformatics and computational biology for Scientists of ICFRE” through online organized by Institute of Forest Genetics and Tree Breeding, Coimbatore from 28 February to 4 March 2022.
- ◆ Dr. Ashwani Tapwal, Scientist-F, Forest Protection Division, HFRI Shimla attended a training programme on “Identification and characterization of microorganism” through online, which was organized by Agharkar Research Institute, Pune from 6 to 11 March 2022.
- ◆ Sh. Pravin Rawat, Scientist-B, attended training programme on “Application of Biochar and Nano- Fertilizers for Quality Planting Stock”, jointly organized by the ICAR-Central Agroforestry Research Institute, Jhansi (UP) and Forest College and Research Institute of Tamil Nadu Agricultural University, Coimbatore, during 7-11 March, 2022.
- ◆ Dr. Jagdish Singh, Scientist-F & Head and Dr. Joginder Chauhan, CTO, Extension Division attended a Online training programme on “Science and Technologies for Rural Societies” (for Scientists & Technologists), which was conducted by Indian Institute of Public Administration (IIPA) New Delhi from 7 to 11 March 2022.
- ◆ Dr. Swarnlata, Scientist-D; Smt. Savita Banyal, CTO; Smt. Shilpa, CTO; Smt. Drishti Sharma, Sr. Technician; Smt. Sonika Sharma, Sr. Technician; Smt. Santosh Jamalta, Librarian; Smt. Sunita Narwal, Assistant from this institute attended the training, on “Sexual Harassment of Women at Workplace (prevention, prohibition and redressal) Act 2013” organized by IFGTB Coimbatore from 10-11 March, 2022.
- ◆ Dr. Balkrishna Tiwari, Scientist-B, attended training on “Advance training in Molecular Biology Techniques and its Application” organized by Forest Protection Division, TFRI, Jabalpur from 21 to 25 March 2022.



Memorandum of Understanding

⇒ A Memorandum of Understanding (MoU) signed between J&K UT Forest Department and HFRI, Shimla in June, 2022.

EXTENSION ACTIVITIES

Special Days Celebration and Awareness Programme

- ◆ Himalayan Forest Research Institute (HFRI), Shimla, under AKAM, Organized a **“Bamboo Plantation and Awareness Programme”** on 17 January 2022 for the benefit of villagers of Rajhana Panchayat, Shimla, H.P. About 30 farmers participated in the programme and 300 Bamboo Seedlings were planted along the banks of the drains near Baragaon and Patti villages of Shimla, H.P
- ◆ Himalayan Forest Research Institute (HFRI) celebrated 73th Republic Day on 26 January 2022 at HFRI Campus, Panthaghati, Shimla. About 50 participants including Scientists, Officers, staff and project staff was present during the occasion. Dr. S. S. Samant Director of the institute unfurled the national flag and thereafter national song was chanted by all. **Anti-Terrorism Day Pledge:** Director HFRI Shimla administered Anti-Terrorism Day oath to all employees of the institute in the conference hall.
- ◆ **International Bio-Diversity Day:** Himalayan Forest Research Institute, Shimla celebrated International Day for Biodiversity on 22 May 2022 in the Institute. About 70 people including scientists, officers, employees and project staff attended the programme.



- ◆ Dr. Vaneet Jishtu, Scientist-E as Coordinator, conducted the **“Nature Awareness programme for School Children”** at the Western Himalayan Temperate Arboretum. The participants included students and teachers of Government Senior Secondary School Baldeyan, Mashobra and Tutu under Shimla Block. Besides, research scholars from the Institute. The Key Note Speaker was Sh. Srinivas Joshi, retired IAS Officer and a reputed and respected eminent citizen of Shimla, associated with theatre, culture and author of numerous books and poems.



- ◆ HFRI, Shimla celebrated **World Environment Day (WED)** on 5 June 2022. Scientists, officers, employees and project staff attended the programme physically and Mr. B. S. Rana (IFS, CCF Retired), Mr. K. S. Krofa (IAS, Retd.) and others attended programme virtually.

- ◆ HFRI Shimla celebrated '**International Yoga Day**' on 21 June 2022 in the HFRI Campus. Director, Scientists, Officers and staff of the institute and their family members attended the Yoga Session.



- ◆ HFRI, Shimla conducted a **Swachhta Abhiyan Programme** on 29th June, 2022 under this programme adjoining areas of Institute was clean.





Celebrated **“Earth Day”** in collaboration with UMANG Foundation at the WHTA, Potter Hill, Shimla. 22.04.2022 with participation of 65 people, including University students and research staff of FE&CC Division, HFRI Shimla. The programme included talks, skits and dance.

Himalayan Forest Research Institute (HFRI), Shimla, observed ‘International **Women’s Day**’ on 8 March 2022 in the conference hall of the Institute. About 80 participants consisting of Scientists, Officers, Technical



Officers, Staff and Research Scholars took active part in the programme. On this occasion Dr. Shramja Munjal as a keynote speaker delivered a very informative and



interesting lecture on ‘Women Empowerment In Science’.

HFRI, Shimla celebrated **International Day of Forests** on 21 March 2022 in the institute. Dr. S. S. Samant,



Director and Dr. Sandeep Sharma, GCR shared their views on importance of conservation of forests for sustainable development. Dr. Savita, Ex PCCF & HOFF delivered a Keynote Address on the theme: Forests and Sustainable



Production and Consumption.



Bharat Ka Amrit Mahotsav

- ◆ Himalayan Forest Research Institute, Shimla, celebrated *Bharat Ka Amrut Mahotsava*- an awareness programme for the villagers on 15 February 2022 at Kot, Shilaru Panchayat, Tehsil Theog, District Shimla on "Eco-friendly Methods for the Management of Pests and Diseases in Coniferous Trees".



- ◆ HFRI, Shimla celebrated Amrit Mahotsav Programme on theme "*Jal Hi Jeevan*" in the Conference Hall of the Institute on 11 March 2022. Scientists, Officers and staff participated in this program. Dr. S.S. Samant, Director briefed about the importance of water conservation for sustainable development. Painting and declamation competitions were also organized on the theme to create awareness about water conservation. Dr. Vaneet Jishtu, Scientist-E delivered a Lecture on the theme "Conservation of Water Resources- Through Forestry" during the event.

- ◆ HFRI Shimla, organized awareness programme on diversity and conservation of medicinal plants in Himalayan region for the villagers of Moolkoti Panchayat, Mashobra, District,



- Shimla (HP) under the programme **Azadi Ka Amrit Mahotsav** on 21st April, 2022. About 30 villagers attended the programme. They were apprised about different aspects of medicinal plants.



- ◆ Under Azadi Ka Amrit Mahotsav programme, Dr. Milap Chand Sharma, Professor J.N.U., New Delhi as a key note speaker delivered a virtual lecture on the topic "Effects of rapid melting of Himalayan glaciers due to climate change" on 5 June 2022.



Invited Talk

Dr. S.S. Samant, Director, HFRI, Shimla as a Resource Person delivered a lecture in the Capacity Building Programme for the students of Department of Environmental Sciences, Sri Venktaswara College, University of Delhi, South Campus, New Delhi in the Indian Himalayan Region on 09.04.2022.

TV (Doordarshan Krishi Jagat Programme Live):

- * डॉ० वनीत जिस्टू, वै०-ई ने दूरदर्शन कृषि जगत प्रोग्राम में उत्तर-पश्चिमी हिमालय का जैव विविधता संरक्षण और उत्तर-पश्चिम हिमालय में पाए जाने वाले महत्वपूर्ण औषधीय पौधों के बारे में जानकारी तथा संस्थान द्वारा पॉटर हिल, शिमला में स्थापित किए जा रही पश्चिमी हिमालय समशीतोष्ण वाटिका/ आर्बोरेटम के बारे में संक्षिप्त जानकारी दी। प्रोग्राम दूरदर्शन द्वारा दिनांक 3 मार्च 2022 को प्रसारित किया गया।
- * Dr. Vaneet Jishtu, Scientist-E delivered a lecture on the theme “स्वच्छ पर्यावरण का अधिकार और सामाजिक दायित्व”, during an event organized by UMANG Foundation on 13 March 2022.
- * Dr. S.S. Samant, Director, HFRI, Shimla, as a Resource Person delivered a lecture on “Biodiversity Conservation and Management in Relation to the Climate Change in Indian Himalayan Region on 14th March 2022 in Biotechnology Refresher Course Tracing the Changes in the Domain of Biotechnology Advancements and Developments organized by the Department of Biotechnology and Human Resource Development Centre (HRDC), Kumaun University Nainital, Uttarakhand.
- * Dr. S.S. Samant, Director, HFRI, Shimla, participated in the International Day of Forest organized by the Department of Science, Technology & Environment, Government of Punjab, Kapurthala through online mode and delivered a talk/ presentation on “Biodiversity Conservation” on 21 March 2022.





RESEARCH PUBLICATIONS



RESEARCH PAPERS

- ◆ Barman, T; Samant, S.S; Jyoti, Dey, Abhijit, Nandy, Sampika; M, Riya; Tiwari, L.M. and Anjana (2022). Sustainable employment of folkloric botanicals and conservation Practices Adopted by the inhabitants of Parbati Valley of North Western Himalaya, India in Healing Substantial Corporeal Disorders, *Advances in Traditional Medicine*, <http://doi.org/10.1007/s13596-021-00605-3>.
- ◆ Jishtu, V., Bhushan, B., Chauhan, A. and Chauhan, M. (2022). Distribution and ecological status of ashtavarga group of plants in Shimla district of Himachal Pradesh, North Western Himalaya. *Indian Forester*, 148 (1), 32-40.
- ◆ Jishtu, V.; Chauhan A., Dolma T. and Thakur, Y. (2021). Medicinal plants of cold desert of Leh district, Ladakh. *Medicinal Plants*, 13(4):663-671.
- ◆ S.Pant; Ahmad Wani, Zishan and Samant, S.S. (2022). Quantification and consumption pattern of fuel wood in mornnaula reserve forest in Kumaun, India Himalaya: Implication for sustainability and conservation, *Indian Forester*: 181-190.
- ◆ Preety, A. (2022). Effect of seed scarification on germination of *Oroxylum indicum* (L) Vent. Seeds, A medicinally important tree. *International Journal of Agricultural Science and Research*. ISSN(P) No. 2250-0057, 12(1):57-62.
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- ◆ Verma, R.K. and Chauhan, H. (2022). Floristic Diversity in Alpine Pasture of Mural Danda of District Shimla, Himachal Pradesh. *Biological Forum- An International Journal*, 14(1):01-06.

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- Harsh, N.S.K; Kumar, R.; Tapwal and A; Sharma, Y.P.; Singh, S.; Kumar, M.; Mohan, V.; Verma, R.K.; Kumar, S. and Sharma, A. (2021). Red list of Macro-fungi of India. Xpressions Print and Graphics Pvt. Ltd. Dehradun, Uttarakhand, 163p.
- Lata, A.R.; Samant S.S. and Ghosh S. (2021). *Betula utilis*, D. Don, A Critically Endangered Timber Line and Multipurpose Angiosperm in Indian Himalayan Region”, Mahindra Publishing House, Dehradun .



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Kumar, P.; Kumar, A., Thakur, P. and Verma, A. (2021). सेलिकस के कीट एवं उनका प्रबंधन। “वन अनुसंधान ई-पत्रिका”। अंक-06 (जुलाई-दिसंबर, 2021): पृष्ठ 7-8.

Swaran Lata and Drishti (2021). वोहिनिया वेरिगेटा (कचनार): एक महत्वपूर्ण बहुदेशीय वृक्ष प्रजाति, वन अनुसंधान ई-पत्रिका, 6:22-24

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NEW INITIATIVES

- ◆ Established VVK at Longani Shibdwala Dharampur, District Mandi, Himachal Pradesh

VISITS OF DIGNITARIES AND SENIOR FUNCTIONARIES

- ⇒ Chief Secretary, Himachal Pradesh and the Addl. Chief Secretary (Forests, GoHP) visited to the Western Himalayan Temperate Arboretum (WHTA) being established by the HFRI, Shimla with funding from the HP Forest Department (Wildlife Wing) on 23rd March 2022.
- ⇒ Shri A.S. Rawat, IFS, Director General, ICFRE, Dehradun visited HFRI, Shimla on 04-05 April, 2022.
- ⇒ PCCF-cum Chief WL Warden and APCCF Wildlife, HP Forest Department visited to the Western Himalayan Temperate Arboretum being established by the Institute.

STAFF NEWS

- ◆ Sh Ramash joined the services of Multi Tasking Staff (MTS) on 27th January 2022.
- ◆ Ms. Parul Choudhary joined this institute on 9th March, 2022 in the post of Lower Division Clerk.
- ◆ Shri Ugrasain, Shri Ankush Kumar, Shri Vikas, Shri Ashish Ranjan and Shri Shubham Malviya joined as Forest Guards, Shri Rohtash joined as MTS in the month of October 2021.



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; 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 one Conservator of Forests, two Deputy Conservator of Forests and 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.



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Azadi Ka
Amrit Mahotsav

HIMALAYAN NEWS LETTER



Published by:

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