

ICAR-CITH NEWSLETTER



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From Director's Desk

ICAR-Central Institute of Temperate Horticulture, Srinagar is only one National Institute working exclusively on temperate horticultural crops. Institute is focusing on development of new varieties, improved technologies, management practices, product development and concepts for improvement of productivity, quality and trade of these crops in the country. Current issue of ICAR-CITH, Newsletter 2022 depicts different achievements in research, extension activities, trainings, publications etc. organized by the Institute. During this period, elite germplasm of temperate horticultural crops with specific traits was collected to further strengthen the existing gene bank. Under the varietal development program, various hybrids were developed in apple for scab resistance and fruit quality improvement and in pear hybrids were developed for disease resistance and self-fruitfulness. Germplasm registration through ICAR-NBPGR and technology transfer through Agrinnovate India Limited was done during this year. Crossing programs for rootstock development of apple rootstock(s) with specific reference to biotic and abiotic resistance/tolerance was further strengthened. Various technologies and varieties of fruits were demonstrated on farmer's field with aim to uplift the socio-economic status of farmers under TSP, SCSP and MGMG schemes. The institute is giving its significant efforts to provide awareness of various technologies generated in temperate horticulture crops to farmers/allied departments/students/entrepre-

neurs/researchers for enhancing their productivity and quality. The institute organized programs for human resource development. The ICAR-CITH is coordinating and regularly organizing training programs, field/crop days, on and off campus trainings, demonstrations, field visits, diagnostic and control measure, discussions, supply of quality planting material/ seeds of elite varieties, publication in local language, giving radio talks, TV programmes, melas etc. I extend my best wishes to the scientists and staff members for their well-deserved promotions during 2022.

I hope that the current issue of this ICAR-CITH, Newsletter reflecting the research, extension, training, development and other activities of ICAR-CITH, Srinagar and its regional stations will enlighten the readers about ongoing activities, status, contribution and development of the institute. Feedback and suggestions for further improvement in the institute activities for upliftment of farming community engaged in temperate horticulture will always be acknowledged.

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RESEARCH HIGHLIGHTS

Temperate horticulture is the backbone of economy of farmers in hilly states and it is the major source of livelihood. ICAR- Central Institute of Temperate Horticulture, Srinagar (J&K) along with its two Regional Stations Mukteshwar (Uttarakhand) and Dirang (Arunachal Pradesh) has focused on generation of need based technologies in different temperate horticultural crops to boost the productivity of quality produce in horticultural crops, because the productivity in temperate horticultural crops in India is still low as compared to advanced countries. To fulfill this requirement of temperate region, Institute is carrying out research on various aspects like varietal improvement, intensive production technologies, integrated management of pests & post-harvest management since its inception. Institute has now become as a technological hub in various temperate horticultural crops. The number of technologies generated at ICAR-CITH is increasing year after year and their implementation at farmer's field is generating significant returns to growers of temperate region of the country.

During 2022, a total of 67 germplasm of different fruit, vegetable and ornamental crops were collected and are being maintained for further evaluation. In apple, genotyping-by-sequencing (GBS) was done in 120 apple genotypes for understanding the genetic architecture of fruit quality traits to target and augment breeding of apple cultivars. Study on combining GBS generated single nucleotide polymorphism (SNP) markers with fruit quality traits. In pear, 8 Asian and 17 European pears were evaluated for various traits and maximum fruit quality was recorded in 'Badshah Nakh'. In case of European pear, maximum fruit quality was shown by 'Max Red Bartlett'. In apricot, 60 varieties/genotypes were evaluated for various fruit traits and 'CITH Aprioc-1' was found superior. In peach and nectarine, 24 varieties/genotypes were evaluated and 'Fantasia' in nectarine and 'Cresthaven', 'Glohaven' & 'Early Grande' in peach were found promising. In plum, 26 varieties were evaluated, cultivar 'Durate', 'Mariposa', 'Friar', 'Santa Rosa' and 'Stanley' were found promising. In olive, out of 18 olive cultivars, 16 were fruited and maximum fruit weight fruit length and fruit diameter were recorded in cultivar 'Cipressino'. In almond, 10 varieties and 17 selections were evaluated for nut and kernel traits. The kernel percentage was highest in 'Pranyaj' (52.69%). Similarly, among 17 selections, highest kernel percentage was recorded in 'CITH-A-10' (39.74%). In walnut, 221 varieties/genotypes were evaluated and six genotypes produced nuts having weight more than 20 g; 60 genotypes having nuts with kernel recovery more than 50 percent. In Pistachio, 5 female selections were evaluated and the selections which produced sound nuts were 'CITH Pistachio 1', 'CITH Pistachio 2', 'CITH Pistachio 3' & 'CITH Pistachio 6'. In pecan nut, four seedling selections fruited and the maximum nut weight (4.4g) was recorded in 'Selection 3' and kernel recovery was recorded to the tune of

52.38% in 'Selection 2'.

In vegetables, germplasm of kale, pea, root and exotic vegetables were evaluated under field conditions and elite genotypes were identified for further studies. In kale, the leaf yield ranged from 11.13-52.94 q/ha with coefficient of variation 10.01 per cent. In radish, 9 varieties were evaluated and 'CITH-R-6' was found best for root yield. In turnip, 27 genotypes including two checks 'Nigeen-1' and 'Pusa Chandrima' were evaluated, yield ranged from 199.41 to 573.46 q/ha with 18 genotypes performing better than better check 'Nigeen-1'. The top three performers were 'Sel-2', 'PTGG' and 'Green Top'. Among leafy, exotic and Brassica crops, Chinese cabbage line 'CITH-CC-1' expressed 434.52 q/ha of net head yield. In broccoli, line 'CITH-Broccoli-1' gave net head yield of 203.26 q/ha; Swiss chard, 'CITH-SC-Green' and 'CITH-SC-Red' yielded 253.61 and 248.22 q/ha leaves. In cabbage, 'Golden Acre' and 'CITH-Cabbage Hybrid-1' were evaluated for head traits and 'CITH-Cabbage Hybrid-1' was found superior.

In characterization and diversity analysis of flowering related gene/ genes in almond, transcriptomic analysis of almond cultivars 'Waris' & 'Ferralise' with differential flowering time was done. In development, hybridization work was carried out in almond and walnut. The evaluation work was carried out for about 42 budded apple mutants were evaluated and more than 30 of them were found superior to parent 'CITH-Ambri-1' with respect to colour and mutant 'AM-51' showed highest "a" value (51.85) against parent 'CITH-Ambri-1' (7.67). The comparative transcriptome reveals specific genes and transcription factors linked to aroma, color, shelf life and crispiness of 'Ambri' ('CITH-Ambri-1') apple. In pear, from the earlier crosses, one hybrid 'CITH-PEAR-H-01' was found superior for various fruit traits compared to parents. In rootstock breeding of apple, the hybrid population was evaluated for multiplication and population was categorized as very weak, weak, medium and strong. Rooting in hybrid rootstocks 'CITH-A-RS-M6m-42', 'CITH-A-RS-M6m-33', 'CITH-A-RS-M6m-40', 'CITH-A-RS-M6m-29', 'CITH-A-RS-M6m-03', and 'CITH-A-RS-M6m-44' was found better.

In development of CMS lines in onion (*Allium cepa* L.), the seeds obtained in 2021 from F₁s created from crossing intermediate day male sterile lines and 'Brown Spanish' in 2020 were sown in 2021 whose bulbs were obtained in 2021 (F₁ bulbs). The seeds from these bulbs were obtained in 2022 after massing (F₂M₁) and sown in 2022 itself to obtain F₂M₁ bulbs in 2023 in order to obtain segregants desirable for yield, bulb trait uniformity and storage.

During 2022, institute has supplied about 16,678 plants of different temperate fruit crops besides the supply of 11,803 scionwood; 876 plants & 6,295 seedlings of flowers; about 30 kg vegetable seeds & 16,760 vegetable seedlings; besides 3 kg onion seeds to different stakeholders, vegetable growers & research organization etc. During the year 2022,

besides above planting material supplied about 3,000 grafted plants of walnut were provided to Uttarakhand Forest Resource Management Project for establishment of mother orchards as well as for planting in farmers field under project 'Promotion of Walnut in Uttarakhand' funded under Japan International Cooperation Agency (JICA). The revenue generated during the financial year from all resources was 69.23 lakhs (2022-23).

In a study on effect of thinning on quality in apple cvs. 'Gala Redlum' and 'Super Chief' the minimum per cent fruit drop and the maximum yield per plant was recorded in treatment 'one fruit per cluster' followed by '2 fruits per cluster'. Under the development of different techniques for enhancing the multiplication rate of temperate fruits under protected/open conditions, technology for vertical expansion of nursery through air layering in open field conditions was tried and five clonal rootstock 'MM-111', 'MM-106', 'M-9-T337', 'M9-Pajam' and 'M-26' were taken for study. Keeping in view the advantages, this technology can be directly replicated by the nursery growers as the increase in production in some rootstocks is almost double or can further be increased if one more tier is tied so that an additional 2-3, rootstocks can be harvested from the same piece on nursery area. In air layering in apple rootstocks raised through cuttings in soil less beds in greenhouse conditions in 'MM 106' rootstock, two additional plants were harvested in comparison to single rootstocks. This technology will be very useful in promoting the vertical expansion of the nursery in greenhouse conditions for rootstock propagated through cutting in soilless beds.

To develop the rootstock proliferation technology for climate resilient agriculture, an experiment was started to study the impact of combined application of phosphorus and silicon on apple rootstock performance under various soil moisture regimes. For the development and evaluation of integrated nutrient management module for high-quality temperate vegetables production, treatments comprising of organics and in organics combinations was under taken in temperate vegetables crops like long day onion, garlic and kale. In the assessment of soil carbon dynamics and carbon sequestration potential of selected temperate fruit crops of Arunachal Pradesh, in canopy architectural engineering experiment in apple; six training systems (vertical axis, cordon, espalier, head & spread, spindle bush and modified central leader system) with two cultivars ('Oregon Spur' & 'Red Delicious') on four rootstocks ('Seedling', 'MM 111', 'MM 106' & 'M 9') were evaluated for various fruit and yield (70.85 t/ha) traits. Among all systems, varieties and rootstocks, the maximum yield was recorded in 'Oregon Spur' on 'MM 111' rootstock trained on vertical axis system. In canopy architectural engineering in pear experiment, 4 varieties ('Red Bartlett', 'Starkrimson', 'William Bartlett' & 'Kashmiri Nakh'), 2 rootstocks ('BA 29 C' & 'Quince-C') and 4 training systems (vertical axis, espalier, tatura trellis and modified central leader system) were used for experi-

mentation. Among all varieties, rootstocks and training systems, highest productivity was recorded in 'William Bartlett' trained on vertical axis on 'Quince-C' rootstock. In the development of almond based intercropping system involving saffron, different type of varieties having varied growth habit viz. erect, semi erect and spreading type were tried along with (1.93 t/h); sole saffron crop. The highest almond yield was recorded in erect type while the highest cumulative yield was recorded under spreading type.

For off-season cultivation of onion in Kashmir valley, a study was conducted at the institute involving different day length responsive varieties collected from other states in combination with different dates of bulb-set planting so as to identify a combination that may allow harvesting commercial bulbs during off-season (i.e., October to December) in the field. In the third year of testing, one more planting date was added to the technical program for evaluation of varietal performance for splitting percentage and marketable yield during offseason. 'Punjab White' harvested the highest marketable bulbs for all the dates.

The seasonal population fluctuation of green apple aphid was studied in medium and high-density apple orchards throughout the year. The incidence of green apple started from the third week of March as occasional colonies, mostly on spots that did not receive delayed dormant horticultural mineral oil spray. The incidence continued as wingless viviparous females for two generations and by the 2nd week of April, the production of winged spring migrants started. The aphid population peaked during mid-June and subsequently decreased towards the third week of August.

In plant protection experiments during 2021 and 2022, total 203 apple cultivars were screened under field conditions for powdery mildew of apple incited by *Podosphaera leucotricha*. Out of these, 88 were found immune; whereas, ten were found resistant, 26 were moderately susceptible, 62 were susceptible and 17 were found highly susceptible. The transmission for ApNMV in mixed infection with ApMV was conducted, through grafting and budding in apple. Eight and three rootstocks were used for grafting and budding respectively with scion wood from ApMV and ApNMV infected apple cultivar 'Golden Delicious'. Development of mosaic symptoms was scored over time and symptoms were first seen on two rootstocks 'MM106' and 'MM111' after 60 and 280 days after grafting and budding respectively. The comparative transmission efficiency of mosaic associated viruses was found more in grafted plants (61.5%) than budded plants (25%) on three rootstocks studied. The results demonstrated that grafting/budding inoculation methods are efficient for transmission of both the viruses (ApMV and ApNMV) and the established protocol will help in maintaining the virus isolates for long term as well as help in screening the germplasm for resistance. In another investigation to detect and quantify ApMV and ApNMV from different plant parts (spatial) in two cultivars ('Oregon Spur' and 'Golden Delicious') of apple trees during different seasons (temporal) for opti-

zation of tissue and time for their rapid and early detection. The morphological and molecular characterization of *Alternaria* spp. associated with *Alternaria* Leaf Blotch disease of temperate fruits was done for thirty isolates from apple, pear, almond and walnut.

In the development of edible coating with enriched anti-microbial bio-active compounds for various stone fruits, the microbial culture development on the storage of cherry in ambient conditions was done and found that the sweet cherry is prone to development of *Penicillium* during spoilage

ICAR-CITH, Srinagar and its Regional Stations are continuously transferring various generated technologies using various extension means for popularization of technologies. During the year, about 19 meetings/events were organized in which Farmers, Kisan Board Members, Development Department Officials and Scientists/Experts Interface meeting at ICAR- CITH, Srinagar and an Apple Day/ Show cum Workshop at ICAR-CITH, RS Mukteshwar were the event. ICAR- CITH, Srinagar has organized 2 training programmes of five days duration each for officers from Department of Horticulture Himachal Pradesh. Five one day training programmes on walnut propagation were conducted. One day training/ visit were organized for participants of short course. A training program of two days duration on 'use of molecular biology techniques in horticulture' under DST- SERB, Scientific Social Responsibility (SSR) initiative was organized for students/ research scholars. Besides this, six training/ visit of one day duration were organized for students of different schools/ colleges. Fourteen more programmes were organized for the farmers sponsored by various agencies and scientists of institute participated in two programmes organized by other agencies as resource person. Similarly at Regional station Mukteshwar, one program for NABARD Officers of Uttarakhand, five students visits and 26 extension programmes (trainings/ demonstrations, etc.) were conducted besides the display of two exhibition at various occasions. At RS Dirang, under NEH scheme, 4 programmes in Meghalaya, 8 programmes in Arunachal Pradesh and 11 programmes in Assam were conducted in which training as well as farm inputs were provided for the farmers of NEH region. In TSP, 3 programmes were conducted in Poonch and Ganderbal district and farmers were provided with farm inputs/ planting material and trainings. The activities were also carried out under MGMG in Uttarakhand in which eight trainings, 2 diagnostic/field visits three demonstrations were conducted and more than 75 farmers of Sunkiya village were benefited. While two programs were organized under SCSP scheme and agricultural inputs were provided to the beneficiaries. Under SCSP scheme, 8 programmes were organized in Jammu & Sambha district of J&K and Bageshwar district of Uttarakhand in which 715 farmers were benefited with the farm inputs/ planting material and trainings. During the year, scientists of Institute published 19 research papers, 3 review papers, one book, 11 book chapters and 10 popular articles/ pamphlets etc. In addition to various appreciations, the sci-

entists of ICAR-CITH, Srinagar received 7 awards during the year. Besides providing need-based information through various social media, scientists of Institute have delivered 22 TV/Radio talks. About 8525 farmers/ visitors visited ICAR-CITH, Srinagar during 2022 which is an increase of 17.04 % compared to last year.

MEETINGS AND EVENTS

Institute is continuously organizing various meetings and events for benefit of stakeholders. During 2022, institute organized majority of meetings and events on physical mode. Institute has organized number of programmes and participated in the programmes organized by other agencies as resource persons.

Kisan Board Members, Development Department Officials and Scientists / Experts Interface Meeting

ICAR-Central Institute of Temperate Horticulture, Srinagar and J&K Advisory Board for Development of Kisans jointly organized Famers, Kisan Board Members, Development Department Officials and Scientists/Experts Interface meeting on 18th May, 2022 at ICAR-CITH, Srinagar. During the meeting vision and progress of ICAR-CITH, Srinagar and future plans for collaborative work with development departments and SKUAST-K, Srinagar were presented and discussed. Additional Chief Secretary, Agriculture Production Department (APD), Sh. Atal Dulloo was the Chief Guest, who during his address reaffirmed the government's commitment with a single focus objective to increase farmers' income manifold through better technological interventions in farming and urged the participating farmers, scientists and



Glimpses of Famers, Kisan Board Members, Development Department Officials and Scientists/Experts Interface meeting

officers of agriculture and allied sectors, in particular to horticulture, to work beyond production and productivity to focus

mainly on value addition, branding, marketing, packaging etc. in collaboration for increasing the farmers income. Vice Chancellor, Sher-e-Kashmir University of Agriculture Sciences & Technology of Kashmir (SKUAST-Kashmir), Prof. (Dr.) Nazir Ahmad Ganai, while addressing the interaction meet said there is enormous support system from the government in agriculture and allied sectors especially for horticulture sector due to which production has increased manifold. Director, ICAR-CITH, Dr. Om Chand Sharma highlighted about the role of the institute for carrying out basic, strategic and applied research on major temperate horticultural crops. He added that the Institute is involved in generation of basic information on the identification and development of high yielding varieties/ hybrids, efficient cropping systems and appropriate production and protection technologies, post-harvest management, production of quality seeds and planting material, demonstration and transfer of technologies. Director Horticulture, Kashmir, Shri Ghulam Rasool Mir and Secretary, J&K Advisory Board for Development of Kisans, Sh. Abdul Hamid Wani complimented ICAR-CITH for the program.

ICAR-CITH and SKUAST-Kashmir & SKUAST- Jammu Entered into MOU for Mutual Cooperation

ICAR-Central Institute of Temperate Horticulture and SKUAST-Kashmir entered into a MoU for mutual cooperation between the two leading Institutes of the region. The Memorandum of understanding was signed by Prof. Nazir Ahmad Ganai, Vice Chancellor, SKUAST-Kashmir and Dr. O.C. Sharma, Director ICAR-CITH on 18th April, 2022.



Signing of MOU between ICAR-CITH Srinagar & SKUAST-K, Srinagar

International Workshop on DUS Testing of Apple and Pear

ICAR-Central Institute of Temperate Horticulture, Srinagar and PPV & FRA, New Delhi jointly organized two days International Workshop on "DUS Testing of Apple and Pear" from 7th to 8th September 2022 at ICAR-Central Institute of Temperate Horticulture, Srinagar (Hybrid Mode) under Indo-German Cooperation on Seed Sector Development.

During the event speeches on DUS testing of apple and pear in India were made by Dr. K.V. Prabhu, Chairperson, PPV & FRA, Dr. T.K. Nagarathna, Former Registrar, PPV & FRA, Dr. Ravi Prakash, Ex-Registrar, PPV & FRA and Dr. Javid Iqbal Mir, PI, DUS Centre on Temperate Fruits & Nuts project and from Germany detailed presentation was made by Dr. Erik Schulte, Head of Regional DUS Testing Station with Focus on Fruits in Wurzen, Germany.



Glimpses of International workshop on DUS testing of apple and pear

Apple Day/ Show-cum-Workshop

ICAR-CITH, RS Mukteshwar organized "Apple Day/ Show-cum-Workshop" on Harvest maturity standards of apple cultivars for quality yield in collaboration with Department of Horticulture, Vikas Bhawan, Bhimtal, Nainital on 26th August, 2022 at Mukteshwar. A large number of farmers and line department personnel participated in the program. An exhibition of different apple varieties was also displayed during the occasion.

18th Institute Research Council Meeting

The 18th Institute Research Council Meeting was held from 6th to 7th June, 2022 under the Chairmanship of Dr. O.C. Sharma, Director, ICAR-CITH, Srinagar. All the scientists of ICAR-CITH, Srinagar, Regional stations and KVK attended the meeting in physical and virtual mode. Project wise presentations were made by different PI's and results/outcomes along with the activities to be taken up in next year were discussed in details. The presentation on Research Projects from Regional Station, Mukteshwar and KVK Bara-

mulla was discussed on virtual mode. The Chairman gave critical inputs on experimentation for obtaining realistic and reproducible results.



Discussion and presentation during 18th IRC meeting

18th Research Advisory Committee Meeting

The 18th RAC meeting of ICAR-CITH, Srinagar was held on 28th December, 2022 in hybrid mode under the Chairmanship of Dr. T.A More, Former Vice Chancellor, MPKV, Rahuri. The research achievements made during last year were presented by Dr. J.I. Mir (Member Secretary). After the presentations there was a detailed discussion on various research aspects and chairman & committee members appreciated the work done by the Institute. The various committee members gave important inputs and suggestions for ongoing research projects and future line of work. After detailed discussion various recommendations were made for future line of action for further submission to council.



Glimpses and discussion during RAC meeting

3rd Bimonthly Structured Meeting of DDM's of NABARD (Srinagar Cell) held at ICAR-CITH, Srinagar

The 3rd Bimonthly Structured Meeting of DDM's of NABARD (Srinagar Cell) was held at ICAR-CITH, Srinagar on 17th October, 2022. The CGM NABARD was the chief guest on the occasion and 20 officers from J&K and Ladakh participated in the program. During the program, Dr O.C. Sharma (Director) highlighted various technologies which can be helpful for the farmers for boosting their production and income and can be funded by the bank.



3rd Bimonthly Structured Meeting of DDM's of NABARD

Kisan Bhagidari, Prathmikta Hamari Campaign

ICAR-Central Institute of Temperate Horticulture, Srinagar organized the 'Kisan Bhagidari, Prathmikta Hamari' campaign on 28th April, 2022 at ICAR-CITH, Srinagar. The campaign was organized under 'Azadi Ka Amrit Mahotsav' in which 85 farmers from Jammu and Kashmir and development department officials from Jammu and Kashmir & Himachal Pradesh participated. Similar program was also organized at ICAR-CITH-RS, Mukteshwar in which 49 farmers and other stakeholders participated.



Glimpses of program on Kisan Bhagidari, Prathmikta Hamari campaign

International Women's Day

International Women's Day was celebrated 8th March 2022 in which 40 women participated. During the program the role of women in various fields were highlighted. In the program, training program for women of adjoining areas related to vegetable kitchen garden, field visit of participants & distribution of vegetable seed was done.



International Women Day at ICAR-CITH, Srinagar

International Yoga Day

ICAR-Central Institute of Temperate Horticulture celebrated 8th International Yoga Day on 21st June, 2022 at ICAR-CITH, Srinagar, Regional Station Mukteshwar (Uttarakhand), Dirang (Arunachal Pradesh) and KVK Baramulla. The theme of the day was Yoga for Humanity. Farmers also performed various yoga practices during the programmes.



8th International Yoga Day Celebration at ICAR-CITH, Srinagar

Hindi Diwas and Hindi Week-2022

The Hindi Diwas and Hindi Saptah-2022 were observed from 14th to 21st September, 2022 at ICAR-CITH, Srinagar. On 14th September, 2022, Hindi Diwas was celebrated and official language pledge was taken by the staff. The importance of language was discussed in detail by Director who stressed for improving work in Hindi. From 15th to 21st September various programs and competitions were conducted such as extempore competition, poetry, dohe & shayari competition, essay writing competition, translation competition, poster presentation and Antakshri. Hindi Week was also celebrated at ICAR-CITH, R S Mukteshwar and permanent and contractual staff participated in different programmes.



Glimpses of various programmes during Hindi week at ICAR-CITH, Srinagar

Vigilance Awareness Week

Institute observed Vigilance Awareness Week from 31st October to 6th November, 2022. The theme of the Vigilance Week was Corruption free India for Developed Nation. The program was started with welcome address and importance of vigilance week by Vigilance Officer on 31st October, 2022 followed Director's address to adopt various practices for achieving transparency, accountability and cor-

ruption free governance. The vigilance awareness week was also celebrated at ICAR-RS Mukteshwar.



Inaugural of Vigilance Awareness Week-2022 at ICAR-CITH, Srinagar

National Unity Day/ Rashtriya Ekta Diwas

The National Unity Day/ Rashtriya Ekta Diwas was celebrated at ICAR-CITH, Srinagar on 31st October, 2022 and all staff of ICAR-CITH attended the program. During the program Dr O.C. Sharma highlighted the commitment of the Sardar Vallabhbhai Patel towards work and about his life. He said that Unity Day is celebrated on the occasion of birth anniversary of Sh. Sardar Vallabhbhai Patel. He also highlighted and acknowledged the struggle and sacrifices of Sardar Vallabhbhai Patel and importance of Unity Day. The major reforms made in his life were also discussed. Lastly, Director urged the staff to work for integration and development of the Nation.



Integrity Pledge Ceremony - National Unity Day

World Soil Day

ICAR-CITH, Srinagar celebrated World Soil Day on 5th December, 2022 with theme as "Soils where food begins". Participants from different categories viz. Scientists, staff, research scholars and farmers participated in the program. The program started with the importance of the soil for future and

Importance of soil in Agriculture and Human Life by various speakers. A total of 67 participants participated in this program.



Glimpses of World Soil Day organized at ICAR-CITH, Srinagar

Constitution Day

Institute and its Regional Stations at Mukteshwar & Dirang celebrated Constitution Day on 26th November, 2022. At 11 am, physical & online program was organized in which all staff members from main and Regional Stations participated and took pledge. Director, ICAR-CITH, Srinagar highlighted the history of the Day and discussed importance of Constitution and contribution of Dr Bhimrao Ambedkar for equality. After that Preamble was read in Hindi and all staff took the pledge in Hindi.



Preamble/pledge ceremony for permanent staff

Har Ghar Tiranga Campaign

On the occasion of celebration of 75 year of Independence, ICAR-CITH, Srinagar, ICAR-CITH, RS Mukteshwar, ICAR-CITH, RS Dirang and KVK Baramulla celebrated the week from 13th to 15th August, 2022. Detailed discussions were held regarding importance of week. The National Flags

were provided to all staff of ICAR- CITH, main campus, Regional Stations and KVK Baramulla which were hoisted by the staff at their homes from 13th to 15th August.



Glimpses of Har Ghar Tiranga Campaign

Kisan Samman Diwas

The Kisan Samman Diwas was observed on 23rd December, 2022 at ICAR-CITH, Srinagar and its Regional Stations (Mukteshwar, Uttarakhand and Dirang, Arunachal Pradesh). During this, the farmers were invited to visit institute or else farm visit was organized. The plantation drive for farmers was also organized followed by the planting material distribution. In Regional Station Mukteshwar (Uttarakhand), scientist-farmers interaction was organized in which total fifteen farmers participated. They also organized Farmer awareness program (FAP) on management and maintenance of high-density apple orchards. Regional Station Dirang (Arunachal Pradesh), organized program for farmers in which twenty-two farmers were invited and input material such as water pipe, secateurs, spades and pruning saws were distributed to honour and appreciate their contribution to nation building.



Scientist-Farmer Interaction at IACR-CITH, Srinagar



Farmers facilitation at RS-Dirang (A.P.)

Gandhi Jayanti & Special Campaign 2.0

Under the Special Campaign 2.0, from 2nd October to 31st October, 2022 various activities were conducted in the institute to make the institute cleaner and greener. The campaign started with celebration of "Gandhi Jayanti" to commemorate the birth anniversary of respected Sh. Mahatma Gandhi Ji. On this occasion, a program regarding importance of cleanliness was organized for Air Force Family Welfare Association (AFWWA), Srinagar in which 78 participants participated. During Special campaign 2.0, cleaning and sweeping drives were organized in various locations of institute



Paying homage to Mahatma Gandhi Ji



Cleaning and arrangement of stationary

Swachhta Pakhwada

ICAR-CITH Srinagar along with its Regional Station Mukteshwar observed Swachhta Pakhwada to strengthen cleaning drive operations, with a particular focus on issues and practices associated with Swachhta Abhiyan, by participation of all institute employees. Swachhta Pakhwada events included a Swachhta pledge ceremony, cleaning of various

locations. All of the employees eagerly participated and dedicated themselves to Swachhta drives. "Kisan Samman Diwas" was also observed at the institute during Pakhwada.

EXTENSION AND HRD

Extension Activities

The main aim of any research program in agricultural sciences is to improve the production of quality produce with minimum/judicious use of farm inputs, thus reducing the cost of cultivation and improving the net returns. This is possible only by generating farm friendly technologies by research organizations and their dissemination/ popularization among farmers/ stakeholders. ICAR-CITH has emerged as a hub for generating farmer-friendly technologies which in turn are boosting the productivity of quality produce and benefits the farmers with higher returns. The Central Institute of Temperate Horticulture, Srinagar and its regional stations are putting continuous efforts to make the farmers / officers of line departments and other stakeholders apprised about various new technologies generated in temperate horticultural crops for improving the productivity of quality produce through various extension means. Institute and its Regional stations are actively organizing various training programmes, demonstrations, participating in kisan melas / goshthies, TV & radio programmes, print media, advisories through various social media etc. for the benefit of farmers. Several programmes were organized during the year for officers, farmers and students and details of various programmes organized by ICAR-CITH during 2022 are presented under various heads.

ICAR-CITH, Srinagar

Training programmes for officers

Five days programme organized for Horticulture Officer

A five days training program was organized on Modern interventions for enhancing productivity and quality of temperate fruit crops under high density plantation for officers from Deptt. of Horticulture, Govt of Himachal Pradesh from 18th to 22nd April, 2022 at ICAR-CITH, Srinagar. Total 19 Subject Matter Specialist (SMS), Horticulture Development Officers (HDO), Horticulture Extension Officers (HEO) etc. participated in the program. The course Director for the program was Dr. O.C. Sharma and co coordinators were Dr W.H. Raja, Dr S.U. Nabi & Sh. Puneet Kumar.

Five days programme for Horticulture Officer

Institute organized a five days training program on Technological advances in temperate fruit production for enhancing productivity of quality produce for Officers from Deptt. of Horticulture, Govt of Himachal Pradesh from 25th to 29th April, 2022. Total 20 Subject Matter Specialist (SMS), Horticulture Development Officers (HDO), AHDO & Hor-

ticulture Extension Officers (HEO) etc. participated in the program. Dr Mohd. Abas Shah, Dr Vishal Dinkar & Dr Sudhakar NR coordinated the program and Dr O. C. Sharma was course director for the program. The researchable issues of farmers as well as the problems faced by the officers in the field were also discussed in detail, so that institute can plan future research work accordingly.



Glimpses of five days training from held at ICAR-CITH, Srinagar from 25th to 29th April, 2022 for Horticulture officers from Himachal Pradesh

Five training programmes of one day duration organized for staff of UFRMP & Department of Forest, Uttarakhand

During 2022, five training programmes of one day duration were organized in different nurseries of Deptt. of Forest, Uttarakhand. Total 130 participants from Deptt. of Forest, Staff of UFRMP, Self Help Group & some farmers participated in the programmes. These programmes were organized on mother orchard management and walnut propagation techniques. The location of the programmes was at Maldevta, Magra, Sony, Ladiyakata, and Silalekh in Uttarakhand.

Training-cum-Distribution Program under NEH scheme in North eastern Region of India

Several Training cum distribution programs were held in various states of north eastern region of India viz., Arunachal Pradesh, Meghalaya, Mizoram and Assam under NEH scheme of ICAR, Govt. of India. On 17th of March 2022, the training program of farmers of Dirang region

was conducted in which they were acquainted with modern aspects of temperate fruit production and their cultivation practices. At the end of the program apple, walnut and almond plants were distributed among the beneficiaries. Total 40 farmers participated in the said program held at ICAR-CITH, RS Dirang. On 19th of March three training cum distribution programmes were conducted in Meghalaya state and aim of the programmes were to acquaint the farmers about the cultivation of vegetables through organic practices. In this connection, the first program was conducted at ICAR-CPRI RS-Shillong in which 64 farmers participated. The seeds of hybrids of tomato and chilli were distributed along with organic manure among the farmers. Similarly, two more programmes were conducted in villages Tynring and Keshpyndeng, East Khasi district of Meghalaya in which 110 and 78 farmers respectively participated. At both the places seeds of tomato and chilli along with organic manure was distributed. On 21st of March, training cum distribution program was conducted at ICAR-Research complex NEH Umiam in which 107 farmers participated. The seeds of tomato and chilli along with organic manure were again distributed among the farmers. On 24th of March training cum distribution program was conducted at KVK Sonitpur Assam in which 150 farmers participated and were acquainted with litchi cultivation practices. At the end of the program litchi plants were distributed among the beneficiaries. Total six thousand Litchi plants were sent to Department of Horticulture Mizoram for distribution among the beneficiaries. During all the programmes, farmers actively participated in discussion and showed great interest in learning the basic aspects of temperate fruit production and organic farming.



Glimpses of various programmes organized under NEH

Implementation of Tribal Sub Plan (TSP)

District Poonch, Rajouri and Ganderbal

The tribal sub plan was executed by ICAR-CITH for the benefit of tribal farmers in notified districts and areas under execution in early years. Three programmes like trainings, interaction, demonstrations and planting material distribution for enhancing their farm income were organized during 2022.

Quality planting material and agriculture kits distributed to 100 tribal farmers

The ICAR-Central Institute of Temperate Horticulture, Srinagar, Jammu & Kashmir in collaboration with the Krishi Vigyan Kendra, Poonch of SKUAST, Jammu distributed the planting material and kits to 100 Tribal Farmers of Poonch District on 11th February, 2022. The Institute distributed the free planting materials of Apple, Almond, Peach Apricot and Cherry along with the tool kit consisting of Pruning Saw, Secateur and Tarpaulin to 100 tribal farmers of the District from Villages - Nangali, Degwar, Chella, Gali Pindi and others Panchayats.

One day training and planting material distribution program for tribal farmer at FTEC Ganderbal

On 15th of December, one day training and planting material distribution program for tribal farmers was organized for tribal farmers of District Ganderbal and Srinagar "under Tribal sub plan (TSP) at Farmers training and education centre (FTEC) Ganderbal, in collaboration with Department of Agriculture, Govt. Of J&K. Total 59 tribal farmers/beneficiaries participated in the program from tribal areas of Fakir Gujri (Srinagar), Chonth Wali War and Andarwan (Ganderbal). At the end of the program plants (Apple, almond, peach and apricot) along with pruning tool (Secateurs) were distributed among 50 beneficiaries.



One day training program organized for tribal farmers of Babanagri, Ganderbal

To improve the livelihood of the Tribal population in Kashmir region, ICAR-Central Institute of Temperate Horticulture, Srinagar organized Planting material Distribution Programmes in March, 2022. One day program was organized in the Babanagri, Ganderbal tribe dominated areas of Jam-

mu & Kashmir under TSP Scheme. Apple planting material and tomato seeds were distributed among 41 tribal farmers in the Babanagri village on date 26th March, 2022.



Glimpses of training programme and planting material distribution at Babanagari

Schedule Caste Sub Plan (SCSP)

The ICAR-Central Institute of Temperate Horticulture, Srinagar, Jammu & Kashmir executed the Schedule Caste Sub Plan (SCSP) during 2022. A series of programs were organized in SC-dominated areas of Jammu and Kashmir and Uttarakhand under the SCSP Scheme

Training-cum-Farm Input Distribution Programmes under SCSP Scheme organized

On 05th March, 2022, two training programmes were organized for the beneficiaries of Bishnah region of the Jammu district at Chak Avtara Panchayat and Naugram Panchyat. In another program, a demonstration was held for the popularization of low-chill apples in warmer areas of J&K in the Bishnah tehsil. Quality planting material of low and medium chill apples was distributed among 15 progressive farmers from SC community. On 26th March, 2022, ICAR-CITH-Regional Station Mukteshwar, Nainital (UK) organized a training-cum-farm input distribution program at Odalohar and Simsyari villages of district Bageshwar (UK). On 28th March, 2022, the Institute organized two more training-cum-farm input distribution programs at Suchet Garh and Kutub Nizam villages of R.S. Pura area of Jammu district. On 29th March 2022, an exposure visits for 50 progressive SC farmers of Bageshwar district to ICAR-CITH- Regional Station, Mukteshwar was organized. On 2nd August 2022 in SC-dominated areas of Samba district under SCSP Scheme, in collaboration with KVK, Samba. In the first program, 75 beneficiaries from panchayat halqas Sarna, Mandi Kehli, Tapyal, Sarhti Kalan and Abtal were appraised about sustainable cultivation of fruit crops. Quality planting material of litchi (375), guava (235) and lime (375) were provided to the beneficiaries along with one each of manual knapsack sprayer and spade. In second pro-

gram, 75 beneficiaries from panchayat halqas Druee, Papar Avtara, Taloor and Naran were appraised about economic benefits of fruit cultivation. Quality planting material of litchi (425), guava (225) and lime (375) were provided to the beneficiaries along with one each of manual knapsack sprayer and spade. In the third program, 50 beneficiaries from panchayat halqas Harsath, Samlah and Sangwali appraised about modern techniques of fruit cultivation. Quality planting material of litchi (500), guava (150) and lime (250) were provided to the beneficiaries along with one each of manual knapsack sprayer and spade.



Glimpses of different programmes organized under SCSP in Jammu Division of J&K



Glimpses of different programmes organized under SCSP by ICAR-CITH, Rs Mukteshwar in Uttarakhand

Mera Gaon Mera Gaurav Programme

Eight trainings, 2 diagnostic/field visits three demonstrations were conducted in Sunkiya village adopted under Mera Gaon Mera Gaurav in which total more than 75 farmers participated. The farmers of the village were also supported with different technological literatures on temperate fruits and vegetables. Further, three Swachhata Campaign and waste decomposition awareness program were conducted. Also

provided technical support to the farmers of the village as and when approached.

AWARDS AND RECOGNITIONS

Dr Geetika Malik, Scientist SS (Vegetable Science)

- Received 2nd best paper (poster) presentation award in International Conference on Advances in Agricultural, Veterinary and Allied Sciences for Improving Livelihood and Environmental Security organized by ICAR-IFGRI, RS, Srinagar from 28th to 30th September, 2022 held at Gandhi Bhawan, University of Kashmir, Srinagar (J&K).
- Received best oral presentation award in International Conference on Existing Climate Change Scenario and its Arising Risks organized by SKUAST-J, Chatha, Jammu from 21st, 22nd Oct, 2022.

Dr Sajad Un Nabi, Scientist (Plant Pathology)

- Received Best oral presentation award for paper entitled "Spatial and temporal distribution of Ilarviruses ApMV and ApNMV associated with mosaic disease of apple" for optimization of tissue and time for real time detection during IPSCONF 2022 held at SKNAU, Jobner Rajasthan from 23rd to 26th March, 2022.
- Received Young Scientist Award in International Conference on Advances in Agricultural, Veterinary and Allied Sciences for Improving Livelihood and Environmental Security (AAVASILES-2022), held at Gandhi Bhawan, University of Kashmir Srinagar (J&K) from



Dr. Sajid U Nabi Receiving Young Scientist Award in 3 Days International Conference

28th to 30th September, 2022.

- Received Best oral presentation award for paper presentation on recent advances for Detection and Diagnosis of Plant Viruses Affecting Temperate Fruit Crops: a case study of Apple (*Malus domestica*) in National symposium on, Impact of climate change on emerging plant

diseases organized by Indian Phytopathological Society, North Zone at SKUAST-K Shalimar Srinagar from 28th to 29th of October 2022.

Dr. Arun Kishor, Scientist-SS (Fruit Science)

- Received Best article award for article entitled Hill farming in Uttarakhand region of Himalaya (In References to Fruit &Vegetables) authored by Dr Arun Kishore & Y. Kumar published in Agriculture & Food -e Newsletter, ISSN 2581-8317, 2022, 4(7); pp. 631-635

Sh. Puneet Kumar, Scientist (AS&PE)

- Received second best poster award in poster presentation on Electro hydrodynamic: applications in food processing during international conference on sustainable approaches in food engineering and technology (SAFETY-2022) organized by Department of Food Engineering & Technology, Tezpur, University Assam and Department of Soils, Water & Agricultural Engineering, Sultan Qaboos University, Oman in association with AFST(I) Tezpur from 18th to 19th October, 2022.

TRANSFERS / PROMOTIONS

New Joining

- Sh. Vishal Balasaheb Mhetre joined as Senior Technical Officer at ICAR-CITH, Regional Station Dirang

(Arunachal Pradesh) on 21st November, 2022

Transfers

- Sh. Madhu G S, Scientist (Plant Pathology) transferred from ICAR-CITH, Srinagar to ICAR-IIHR Bengaluru on 7th April, 2022(A/N)
- Sh. J L Kaul, Assistant (on deputation) was relieved from ICAR-CITH Srinagar to join back ICAR-IVRI, Bareilly on 31st August, 2022.


Promotions



- Dr Muneer Ahmad Sheikh was promoted from Technical Officer (T-5) to Sr. Technical Officer (T-6 -Field/ Farm) w.e.f.28th Dec, 2021
- Sh. Mehraj Ud Din Meer was promoted from UDC to Assistant at ICAR-CITH, Srinagar w.e.f. 12th May, 2022.
- Sh. Pushpendra Kumar was promoted from LDC to UDC at ICAR-CITH, RS Mukteshwar w.e.f. 13th May, 2022.

Probation

- Probation of Sh. Madhu GS, Scientist (Plant Pathology) was confirmed w.e.f.27th January, 2022.
- Probation of Sh. K. R. Vashisht, LDC was confirmed w.e.f.20th December 2021.

Technologies ready for certification and commercialization

Technology-I	Development of cost-effective methodology for producing quality feathered plants in apple
Contributors	Kishan Lal Kumawat, Wasim Hassan Raja, Javid Iqbal Mir, Om Chand Sharma, Sajad Un Nabi, Mahendra Kumar Verma, Shoab Nissar Kirmani and Puneet Kumar
About the technology	For high density planting systems that depend on significant second- and third-year yield, the quality of nursery trees plays important role in to the economic success. Application of 6-benzyladenine alone or in combination with gibberellins play an important role in overcoming apical dominance and therefore in production of well feathered apple nursery tree. It is economical to apply three spray of 500 ppm BA during second vegetative growth at one week interval for acceptable feathering in one year old apple nursery tree. Feathered trees with large caliper and preformed canopy will quickly establish, grow and fill their allotted space in orchard and consequently improve total light interception in early life of orchard. Moreover, feathers form flower buds in the second year of nursery production and facilitate the tree to bear fruit in the first year after planting and will reach to full production potential after few years.
	

Technology-II	Architectural engineering to Tall Spindle System for enhancing yield and quality in apple	
Contributors	Javid Iqbal Mir, Wasim Hassan Raja, Sajad Un Nabi, Om Chand Sharma, Kishan Lal Kumawat, Mahendra Kumar Verma, Muneer Ahmad Sheikh, Desh Beer Singh & Sudhakara NR	
About the technology	<p>Tall spindle system of canopy architectural engineering in apple improves yield and quality significantly. Yield enhancement is due to increase in vertical space and scaffold density throughout the length and breadth of the apple plants grafted on M-9 clonal rootstock. Plants are allowed to reach the height of 14 feet with weeping scaffolds distribute across the length of the plants planted at the spacing of 3.0m x 1.0 m and thus accommodating 3333 plants per ha. Quality improvement in apple under this system is due to two-dimensional planer nature of canopy leading to higher penetration and distribution of light. Management of canopy under this system is farmer friendly owing to ease of operation and limited thinning and least heading back procedures. This system is having the yield potential of about 50-60 t/ha with more than 95% A grade fruits.</p>	
Technology-III	Breakthrough technology for multiplication of clonal rootstocks of apple.	
Contributors	Wasim. H. Raja, Javid. Iqbal Mir, Sajad Un Nabi, Om Chand Sharma, M. K. Verma, K. L. Kumawat, Mohd Abbas and Arun Kishore	
About the technology	<p>The technology for the vertical expansion of the nursery was developed during 2019-22, in order to utilize the vertical space available in the greenhouse and to exploit the vertical growth of plants. The vertical expansion through air layering has been accomplished in commercially important clonal rootstocks including (M9-Pajam, M-9-T337, M-9-T339, MM-106, MM-111, B-9, P-22, and M-27) by using this technique. Those plants having a diameter of (5mm and above) at 30 cm (1.0 ft) above ground level are to be selected. The technology involves the induction of the wound followed by the supplementation of suitable media and phytohormones at a specified time and position. Through this technology, we can obtain an additional four good-quality rootstocks within one year which thus increases the multiplication rate significantly and saves the time as nursery cycle is also reduced. This technology has immense potential for commercialization and immediate adoption by farmers due to its simplicity in operation and maximum returns.</p>	

Technology-IV	Optimization of tissue, time and technique for real time and robust detection of four viruses (ApMV, ApNMV, ASGV and ASPV) in apple
Contributors	Sajad Un Nabi, Javid Iqbal Mir, Wasim H. Raja, Om Chand Sharma, Madhu GS, Salwee Yasmin, Muneer Ah. Sheikh and Vishal Dinkar
About the technology	Apple crop is infected with many viruses especially apple mosaic virus (ApMV), apple necrotic mosaic virus (ApNMV), apple stem pitting virus (ASPV) and apple stem grooving virus (ASGV). Both ASPV and ASGV are latent viruses and ApMV and ApNMV titer varies with temperature, tissue and time. To confirm the latent viruses from apple germplasm along with the viruses whose titer varies with temperature, optimization of time, tissue and technique becomes imperative and compulsory for real time detection of all the four abundant viruses in apple for proper indexing of germplasm and production of virus free planting material. All the three Ts (Tissue, Time and Technique) for ASPV and ASGV include bark, leaf (Tissue) during Spring season with technique DAS-ELISA and RT-PCR were optimized for real time detection of both the viruses. The three Ts were validated on 7 cultivars of apple collected from farmer's fields. The technology will benefit the nursery growers, research organizations across the globe for proper indexing of germplasm and production of virus free planting material. This technology will help in proper indexing of apple germplasm at proper time with proper technique for certification of planting material at quarantine stations. This technology will play an important role in recently devised project by Govt. of India on clean plant programme as ultimate aim of the programme is supply of virus free clean plants to farmers
Technology-V	Offseason cultivation of kale and its seed-to-seed production in Kashmir valley
Contributors	Geetika Malik, Javid Iqbal Mir, Om Chand Sharma, Desh Beer Singh and Mahendra Kumar Verma
About the technology	New genotypes and dates of sowing and transplanting of kale were identified for offseason cultivation of kale in Kashmir valley so that availability of kale may be ensured throughout the year. Seed-to-seed production technique was also developed to cut short seed production time from 1 year to only 7 months along with circumvention of resource expenditure on ex-situ seed production field establishment or in-situ seed production care.

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