

Vol. 23. No.01

January- June, 2023

Our New Director



Dr. Jagadish Rane joined as new Director of ICAR-Central Institute for Arid Horticulture, Bikaner-334 006, Rajasthan on 23rd January 2023. He obtained his BSc (Agri) and MSc(Agri) in Crop Physiology from the University of Agricultural Sciences, Dharwad. Following this, he earned his PhD in Plant Physiology from the Indian Agricultural Research Institute, New Delhi. He dedicated 13 years to the Indian Institute of Wheat and Barley Research (IIWBR), served 3 years at the International Centre for Tropical Agriculture (CIAT), Cali, Colombia, leading the plant phenotyping team, and spent 10 years at ICAR-NIASM as the Head of the School. He served as Director In charge of ICAR-NIASM on three occasions spanning nearly a year for carrying forward mandate of this institute for abiotic stress management. His research was focused on applying physiological concepts to screen germplasm of cereals, pulses, oilseeds, and horticultural plants for tolerance to drought, high temperature, and waterlogging. As was an active member of an international team, that could successfully demonstrate method to make IR64, a mega variety of rice, tolerant to drought, as published in Nature Genetics. With keen interest in optimizing plant phenotyping for abiotic stresses, he contributed to establishing a state-of-the-art automated structure for screening wheat germplasm for high temperature tolerance during grain growth stage at IIWBR, Karnal. He played a pivotal role in establishing the National Plant Phenomics facility at NIASM, extending phenomics insights into the stress tolerance traits of field and horticultural crops. During his tenure as Head of the School of Drought Stress Management for almost nine years, he promoted and facilitated use of Plant Phenomics Facility by scientists and research scholars across the country.

He served as member of boards of studies of Department of Agricultural Botany, MPKV Rahuri for two terms and is also

member of board of studies of Department of Biochemistry of same university. He served as member of institute management committees CRIDA, Hyderabad; CCARI, Goa; CSSRI, Karnal; IIRR, Hyderabad and CAZRI, Jodhpur. He was one of the key members of International Expert Group for Plant Phenomics under Wheat Initiatives. He was trained at CIMMYT, Mexico and at University of Western Australia, Perth for application of physiological concepts for improvement of wheat productivity and waterlogging tolerance. He was nominated as visiting scientist at FCRI Giza under Indo-Egypt Collaboration. He deivered invited talk in international symposium and project meetings organized at UWA, Australia; CIMMYT, Mexico; Cali Colombia, EMBRAPA, Goiana, Brazil; IRRI, Manila, Philippines; APARI, Bangkok; Julich and Frankfurt Germany; Montpellier and Paris, France; Arizona and Long Beach, CA, USA etc. He availed Crawford Fellowship for training at UWA, Perth, Australia.

As Academic Coordinator and Director in Charge of NIASM, he could successfully establish academic collaboration with IARI, New Delhi and SAUs across the country facilitating PG research under the guidance of Institute faculty. Further, he guided PG scholars and researchers from 4 SAUs of Maharashtra; IGKV, Raipur; JNKV, Jabalpur; SKAUAT, Srinagar; Banasthali Vidyapeeth, Rajasthan and other institutes in development of affordable phenomics tools to understand responses of plants to abiotic stresses.

As a postgraduate student, he received Gold Medals for academic excellence from UAS, Dharwad, and National Fellowships for MSc and PhD studies by ICAR; Recognized by the International Centre for Tropical Agriculture, Cali, Colombia, for best research. He is a Fellow of the Society for Wheat and Barley Improvement and the Indian Society for Plant Physiology (ISPP). He serves as the Editor of Plant Physiology Reports Journal, reviews manuscripts for reputable journals, and holds the position of President of the Indian Society for Arid Horticulture. He has over 120 research publications in national and international journals, seminar proceedings, and symposia covering different crop plants including fruit and vegetable crops. He has co-authored books on abiotic stress management. His accolades include the Prof Chinoy Gold Medal from ISPP and the Prof Joshi Memorial Lecture Award. He is the member of Research Advisory Committee of Grape Growers Association, Maharashtra.

Editor

Research Spectrum

At H. Q., Bikaner.

Promising pomegranate germplasm for rind and aril quality attributes: Six pomegranate germplasm/ varieties were evaluated for rind and aril quality attributes under hot arid condition. Rind colour was varied from light red in CIAH PG 1, bright red in Bhagwa, dark purple in CIAH PG 4, dark red in Mridula while it was Yellowish with red tinge in both Jalore Seedless and Ganesh. The rind anthocyanin content was found significantly maximum in CIAH PG-4 (915.20 mg/kg) followed by Mridula (509.12 mg/kg) as compared to minimum in Jalore Seedless (39.61 mg/kg). Aril colour was varied from light pink in Jalore seedless and Ganesh to blood red in CIAH PG-1 and Mridula while it is light purple in CIAH PG-4. The juice anthocyanin content was found significantly maximum in Mridula (300.11 mg/kg) followed by CIAH PG-1 (280.24 mg/kg) as compared to minimum in Ganesh (55.27 mg/kg). CIAH PG-1 has boldest aril with maximum 100 aril weight 36.42 g while it was minimum in CIAH PG-4 (26.64 g). TSS was varied from minimum 13.52°Brix in CIAH PG-4 to maximum 16.85°Brix in Jalore Seedless. Acidity was recorded minimum in Jalore Seedless (0.47 %) and maximum 3.87 % in CIAH PG-1. (R. Kumar, M. K. Berwal and J.S. Gora)



Pomegranate CIAHPG-4

Maintenance and performance studies on velvet bean genotype AHVB-1: Conserved seed of Velvet germplasm was studied (10 years old) for maintenance breeding as repeated experiment of rainy-winter season. During 2022-23, the genotype AHVB-1 was characterized and seed enhanced. Vine plants are vigorous in growth and prolific in pod bearing under hot arid climate, and plants are susceptible to frost conditions. This unique genotype and high yielding with bears 12-15 clusters/plant and 7-14 pods/cluster. Mature pods are 32-40 g weight, 11.4-12.6 cm length and 1.9-2.4 cm width. Seeds valued high price due to medicinal uses and value-added products. A package of practices with trellis technology of production is finalized for the promotion as rare vegetable crop of dry-lands (Hanuman Ram, D.K. Samadia, A.K. Verma and P.S. Gurjar).



Velvet bean AHVB-1

Development of improved seedling progenies in date palm through breeding programme .: Despite the high resilience of the date palm tree, there is a need to develop new cultivars that are higher yielding and possess highly valued agronomic traits,

such as fruit quality, disease and pest resistance, and tolerance of extreme environmental conditions. Keeping these objectives in mind, we have started breeding programme in date palm at our institute. Two female parents with superior traits (Halawy, Barhee,) and four quality pollen producing or early maturing male parents (CIAH/DP/M-1, CIAH/DP/M-3, Ghanami, Al-incity) were selected. Pollinated the selected female parents with the male parents in definite combinations. Harvested fruits of the pollinated plants and recorded observations. Maximum no. of fruits per strand were found in combination Barhee × CIAH/DP/M-1, maximum fruit weight in Halawy × CIAH/DP/M-1 followed by Barhee × CIAH/DP/M-1, maximum fruit length was found in Halawy × CIAH/DP/M-1 followed by Halawy × Ghanami (M.K. Choudhary and R.K. Meena)

Growth characteristic for mutant progeny in pomegranate at different periodic interval: Pomegranate variety Jalore seedless seeds were treated with chemicals EMS (con. 0.1, 0.3 and 0.5 %) and Colchicine (con. 0.01, 0.05 and 0.1 %) for different time interval (6 and 24 hrs.). Mutant pomegranate progeny was evaluated at 6 month and 1 year interval for seedling height and collar diameter. Seedling height was reduced with all the treatment in respect of control and minimum height was recorded for T₆ after 6 months as well as 1 year old seedlings. Collar diameter was recorded maximum for T1 followed by T4 and 8 for 6-month-old seedling and it was recorded maximum in T₅ followed by T4treatment. (Pawan Kumar, Ramesh Kumar, M.K. Choudhary, K.L. Kumawat)

Identification of promising genotypes untapped minor fruits of hot arid region: During the reported period of time, identified the promising genotypes of Salvadora oleoides and Cordia gharaf. A survey was conducted in the Bikaner district of Rajasthan and . One promising genotype of Salvadora oleoides was identified from Jodbeed Gadhwala Conservation Reserve (JGCR), Bikaner. Likewise, 3 genotypes of Cordia gharaf were identified from Gagagate Circle, KEM Road, and Udairamsar The morphological traits of selected trees, such as tree height, spread, and circumference, canopy density, etc. were recorded. Leaf and fruit morphological traits were recorded on the spot after collecting leaves and fruits from selected trees.



Salvadora oleoides

Cordia gharaf

Propagation of Cordia gharaf: Different vegetative propagation means were tried for the propagation of Cordia gharaf and success has been achieved in the vegetative propagation of Cordia gharaf through Semi-Hard Wood Cutting using IBA and soilless media. However, it is observed that Cordia gharaf is a difficult-to-root species with very limited success and needs systematic research efforts to achieve desirable success but still the developed method helps in the collection of elite genotype of Cordia gharaf (K.L. Kumawat and P.S. Gurjar).



Callus Initiation (a), over-callusing (b), Initial shoot growth after rooting (c and d), propagated saplings (e)

Longmelon 'Thar Sheetal' variety included in PoP: The fruits are 25-30 cm long, tender and delicious. The fruits are harvested 45-50 days after sowing. The fruits are free from bitterness. The inherent tolerance to high temperature can permit its cultivation even in summer. It can yield 150-200 q/ ha. The variety is recommended by ZREAC Meeting held on 12-09-2022 at ARS, Bikaner to include in PoP of Bikaner Agro-climatic Zone-Ic. (**B.R. Choudhary**)

Callus multiplication, maturation and somatic embryogenesis process in date palm (Phoenix dactylifera L.) cv. Barhee: The callus culture of date palm cv. Barhee was multiplied in different concentrations of NAA+BA media and then sub-cultured on hormone free media. The media supplemented with NAA+BA @ 0.1+0.05 mg/l was found best which multiplied callus culture 4-5 times. ABA+IBA @ 0.5+0.05 mg/l media provides maturity to callus and also there were many pro-embryogenic masses of calli aroused from culture and many somatic embryos had also came out from mature callus culture. Later on these bipolar somatic embryos were inoculated on plant formation media (K. Kumar, D. Singh, Chet Ram, P. Kumar, R.K. Meena, R.P. Meena and Jagadish Rane).



Callus multiplication, embryogenesis and their germination

Resilience mechanism of tolerance and susceptibility of Z. nummularia and Z. mauritiana against concurrent abiotic stresses under hot arid region of Rajasthan: In this study, the research delves into the intricate interplay between tolerance and susceptibility mechanisms of two arid plant species, Ziziphus nummularia and Ziziphus mauritiana, exposed to concurrent abiotic stresses in the hot arid region. The investigation spans a yearly cycle, assessing variations in phytochemical accumulations and enzymatic activities in response to these stressors. The study underscores the significance of cold and drought-heat stress interactions in shaping the tolerance and susceptibility dynamics of these plant species. These findings contribute to our understanding of plant resilience mechanism that governs differential responses to abiotic stresses and vulnerability in arid ecosystems, with implications for conservation efforts, sustainable land management, and agricultural practices in challenging environments (M.K. Berwal and Chet Ram).

DNA fingerprinting of tissue cultured plantlets of date palm:

As providing the services and revenue generation, 144 tissue cultured plantlets of date palm cultivars belongs to Barhee, Medzool, Khuneizi and Ghanami, provided by Commissionerate of Horticulture, Govt. of Rajasthan, Jaipur were characterized for checking the genetic relatedness and clonal fidelity with their corresponding mother plants. By doing DNA fingerprinting of 144 tissue cultured plantlets of date palm cultivars, revenue of Rs. 157584 was generated at the institute (Chet Ram).

Identification of multiple abiotic stress responsive genes in watermelon: Our research delved into the effects of various abiotic stresses (cold, heat, drought, salinity) on watermelon plants. Notable changes were observed across multiple parameters, including leaf length, leaf width, root length, root weight, shoot length, leaf count, biomass, relative water content, MSI, and chlorophyll content in response to different stressors. A thorough analysis of thirteen abiotic stress-responsive genes in watermelon was conducted, leading to the identification of seven genes with up-regulated expression patterns. Notably, three of these genes such as ClaAAT, ClaAOD, ClaAPX exhibited exponential expression patterns at different time intervals during different abiotic stress conditions in watermelon (Fig. 2). These findings open the door to potentially enhancing multiple abiotic stress tolerance in watermelon and other crop species (Chet Ram and M.K. Berwal).

Maturity stage influence bioactive compounds of Khejri (Prosopis cineraria) pods: Khejri tender pods are harvested between 10-25 days after setting to utilize for vegetable, dehydration and pickle purpose. A study was conducted to know the bioactive compounds dynamics during pod developmental stage (at 10, 15, 20, 25, 30 and 45 days after setting). Results revealed that total phenolics (175.83 mg GAE/g), total flavonoids (3.15 mg Cat.E/g) and total antioxidants (174.68 CUPRAC mg AAE/g) were observed significantly high in pods harvested after 10 days of setting. Drastic reduction in bioactive compounds was noticed after 25 days and observed minimum phenols (50.42 mg GAE/g), flavonoids (1.12 mg Cat.E/g) and antioxidants (54.44 CUPRAC mg AAE/g) in 45 days mature pods. Total sugars were quantified minimum (113.41 mg/g) at 10 days, however as the pod's maturity advanced, total sugars were significantly enhanced and reported maximum (270.09 mg/g) at 45 days. Reducing sugars followed opposite pattern, observed maximum at initial developmental stage (63.94 mg/g) and minimum (5.23 mg/g) at ripened stage. Proximate analysis disclosed that crude protein was estimated 17.02%, 15.79% and 18.79% at 10, 15 and 20 days maturity, respectively and significantly reduced (13.86%) at 45 days. Non-significant difference was observed in crude fibre (13.55, 11.44, 12.77, 12.97 %) during initial maturity stages (10, 15, 20 and 25 days), after that significantly high amount of crude fibre was accumulated at 45 days (17.51%). In case of mineral analysis, significantly high accumulation of iron, calcium, sodium and manganese was observed during initial pod development stages as compared to ripened stage. It is concluded from the above study that khejri pods harvested at 10 and 15 days of setting possess maximum amount of therapeutic active biotic compounds, proteins and mineral contents (P.S. Gurjar, M.K. Berwal, D.K. Samadia, A.K. Verma, K.L. Kumawat and H. Ram)

Study on effect of frost injury in ber germplasm: Ber can withstand extreme heat but is susceptible to frost and advective frost is a usual phenomenon in the hot arid region of Western Rajasthan. Frost on the 13th and 14th of January 2023 badly affected horticultural crops. Almost all fruit trees cultivated in the hot arid region of western Rajasthan were impacted by this frost, but the ber is the most heavily impacted economically as the time of frost coincided with the maturity of its fruit. Further, among the different ber cultivars Thai Ber was most severely damaged, and all the sylleptic as well as proleptic shoots were completely dried on plants. The plants were recovered by heavy pruning but as a result of heavy pruning up to primary branches trees lost their shape and canopy. Which certainly will affect its production potential in the coming years (K.L. Kumawat, M.K. Choudhary, D.K. Sarolia and Pawan Kumar)

Standardization of superior rootstock for Thai ber: Assessed biochemical parameters of fruit of Thai ber budded on jharber and deshi ber. Thai ber fruits were recorded higher dry matter, acidity, TSS, sugars, phenolic substances and flavonoids content where jhar ber used as rootstocks, except ascorbic acid. (D.K. Sarolia and M.K. Choudhary)

Innovative pollination (pollen suspension) technique for date palm (*Phoenix dactylifera* **L.):** Traditional pollination methods (inverted male strands, cotton plug & pollen dusting methods)

for date palms are more pollen and timeconsuming as well as labour-intensive. In response to these challenges, we have explored an alternative pollination method, which is the pollen suspension



Pollen suspension method

method. The pollen suspension method involves the direct application of pollen onto the stigma of flowers using a specialized suspension solution without climbing up palms. A suspension solution is prepared, typically consisting of water and pollen. The suspension (3 g of pollen per l of water) is carefully applied to the target flower's stigma using various techniques such as misting or spraying. This method can potentially increase pollination efficiency, especially in date palms, where pollination is very laborious. It allows for targeted pollination, enabling hybridization between specific plant varieties to create desirable traits and efficient fruit production (**Ramkesh Meena**, **D. Singh, M.K. Choudhary, Chet Ram and Jagadish Rane**).

Alternaria leaf spot tolerant varieties of date palm : Date palm crop is infected by *Alternaria* leaf spot caused by *Alternaria alternata* (Fr.) Keissler. This disease is mild to moderate form at date palm germplasm block of the Institute during reported

period. Forty two date palm varieties were screened for tolerance against Alternaria leaf spot under field conditions. The disease incidence was found from 2.72 to 28.53% (PDI) in different date palm varieties.



Minimum disease incidence (<5.0% PDI) was recorded in date palm variety Samran, Hatemi, Khadrawy, Khuneizi, Hatemi, Chip-Chap and Javantri while maximum disease incidence (28.53% PDI) was found in date palm variety 'Medzool' under field conditions (S.K. Maheshwari, Ramkesh Meena and D. Singh).

t CHES, Vejalpur, Gujarat.

Identification of promising genotypes of Guava

CHESG-15: It bears heavily in bunches, fruits round in shape,

medium in size weighing around 150-200 g with pink pulp. It is soft seeded and pulp is rich in lycopene (11.28 mg/100g), total antioxidants (534.56 mg AAE/100g) and ascorbic acid 267.98 mg/100g pulp. Yield potential is high (50-55 kg/tree in 5th year).



H-1(CHESG-15 x Thai): It is prolific bearer (35.50 kg/tree during 4^{th} yr), fruits are round, medium to big in size (250-280

g) with smooth, yellowish green peel and pulp is red. It is high in TSS $(13.67^{0}B)$, acidity (0.48 %) and ascorbic acid (288 mg/100 g). It is suitable for table purpose and processing both. Keeping quality of fruit is good at



ambient storage (6-7 days). It is soft seeded and pulp is rich in β -carotene (0.50 mg/100g FW), lycopene (13.45 mg/100g FW), K (297.35 mg/100g FW) and Total antioxidant activity (549.20 AAE/100g).

Identification of promising genotypes of Acid lime.

CHESL-15: It mostly bears inside the canopy and fruits are

almost free from citrus canker. Average yield/plant is 46.18 kg during 6th year of its age, fruit weight above 40 g, fruit size 46.37mm x 43.08 mm and total number of seed/fruit 8-9. Fruit juice 51.39%, TSS 7.86⁰Brix, acidity 6.87%, TSS: acidity 1.14 and ascorbic acid



38.17 mg/100 ml. Keeping quality of fruits is good at ambient storage (8-10 days) with attractive yellow smooth peel.

Identification of promising genotypes of Jamun.

CISHJ-71: It is seedless accession collected from Ode, Anand, Gujarat having roundish shaped fruit. It ripens in the last week of May, average fruit weight 11.24 g, length 3.09 cm, width 2.45 cm, pulp 95.56%, TSS 15.65°Brix, ascorbic acid 24.60 mg/100g and acidity 0.43% and has better shelf life.

Identification of promising genotypes of Manila tamarind :

CHESM-4: Average yield/plant is 14-18 kg during 5th year of its age, fruit weight 30.70 g, fruit size 12.0 cm x 1.80 cm, pod segment 10-12 no., individual seed weight 0.25g, total number of seed/fruit 8.7, weight of individual aril 1.60g. Fruit juice 46.50%, TSS 22.240Brix, acidity 0.71%, ascorbic acid 63.20 mg/100 ml and total sugar 15.85%. Keeping quality of fruits is good at ambient storage (4 days) with attractive reddish green smooth pod **(D.S. Mishra).**

January-June, 2023

Promising lines of Indian bean

CHESDB-01 (IC-631574): This genotype having attractive long flat & green pod colour. The pods are long having an average pod length of 14.0 cm and an average pod girth of 5.5cm with pod weight of 10.0g. The first harvest of fresh pods starts at 90 to 95 days after sowing. A total of 800-1240 pods per plant with on an average yield of 6.5-6.7 kg/plant of fresh pods are obtained under the dry land semi-



arid conditions. It is found moderately resistance to dolichos bean yellow mosaic virus disease under field conditions.

CHESDB-31 (IC-631578): A unique dolichos bean genotype

having attractive light green colour with cluster pod bearing in nature. The pods are long with an average pod length of 14.0cm and pod girth of 4.20cm with pod weight of 8.5g. It takes 90-91 days for first flowering and 102 to 105 days after sowing for first harvesting. A total of 1000-1265fresh pods per plant obtained with on an average yield of 6.5-7.5



kg/plant of fresh pods under the dry land semi arid conditions. It is found moderately resistance to dolichos bean yellow mosaic virus diseaseunder field conditions (Gangadhara K., L.P. Yaday, V.V. Apparao and A.K. Verma).

Farmers' programmes/extension activities.

1. At H.Q. Bikaner

Farmers trainings/ interaction meets.

• During the reported period of time, eight trainings/ farmers interaction meets were organized (online/offline) on different aspects related to arid horticulture.



- Organized technological interaction meet with respect to arid fruit production technologies with all India farmers and developmental agencies on 23.06.2023 during the 27th AICRP-AZF Research Workers Group Meeting held at ICAR-CIAH Bikaner.
- Organized training-cum-awareness one day farmer programme/meet on PPVFRA on 26.06.2023 in which more than 150 farmers participated which was addressed by Ex.-Secretary DARE and DG ICAR New Delhi, with respect to protection of farmer's rights.





Trainings under SCSP & TSP Schemes.

During the reported period of time 12 SC farmers training programmes under SCSP Scheme were conducted on different topics/aspects related to improved arid horticultural production technologies (M.K. Jatav, S. R. Meena, R.C. Balai, B. R. Choudhary, Anita Meena, M.K. Choudhary)



Trainings under TSP Schemes.

During the reported period of time 07 training programmes Scheme were conducted on different under TSP topics/aspects related to improved arid horticultural production technologies at tribal areas of Udaipur, Dungarpur,, Banswara distt. of Rajsthan (M.K. Jatav, B R Choudhary, Anita Meena and M. K. Choudhary).



Trainings for women empoerment.

Some trainings programmes for empowerment women/ farm were also organized during the reported period of time (Anita Meena, M.K. Jatav, S.R.Meena, B.R. Choudhary, M.K.Choudhary, P.S. Gurjar and R. C. Balai)



***** Front Line Demonstration (FLDs).

• During the reported period of time, 01 FLD of Kachri (AHK-119), 02 of ridge gourd (Thar Karani), 03 of snapmelon (AKS-82), 03 of sponge gourd (har Tapis and 03 of vegetable clusterbean (Thar Bhadvi), wetre conducted. In addition to FLDs, > 30 method demonstration of the production technologies of arid horticulture was also performed.

Technological exhibitions displayed.

• Participated and displayed the technological exhibition of the Institute on 14.01.2023 at NRCC, Bikaner during the International camel Festival.



• Participated and displayed the technological exhibition of the Institute in " *Shri Mallinath Pesu Mela Tilwara, Barmer*" organized by CAZRI, Jodhpur during 21.03.2023 to 22.03.2023.



• Participated and displayed the technological exhibition of the Institute in " State Level Kisan Mela on " *PASAK ANAAJ* - *SAMRUDH KISAN*" organized by SKRAU and ATMA, Bikaner from 27.03.202 to 29.03.2023.



• Participated and displayed the technological exhibition of the Institute on the occasion of "Celebration of 50th in Foundation Day of Arid Region Campus, CSWRI, Bikaner " on 04.04.2023.



• Participated and displayed the technological exhibition of the Institute at State level Farmers Fair at JECC, Sitapura industrial area Jaipur from 15.06.2023 to 18.06.2023.



- Organization/Celebration of days/ weeks/ fortnights/campaign, etc.
- Celebration Republic Day: The Institute celebrated 74th Republic Day of 26.01.2023.
- Celebrated Science Day: The Institute celebrated Science Day 28.02.2023.
- Celebrated the vegetable seeds sale day: The Institute celebrated the vegetable seeds sale day on 10.02.2023.



Celebration of World Intellectual Property Day: The Institue celebrated the world Intellectual property day was celebrated in the institute on 26.04.2023



• Celebration of World Environment Day: The Institute celebrated "World Environment Day" on 05.06.2023



🛠 Farmers Fair/ Kishan Mela

A Kisan Mela was organized at Gram Panchayat Nayakheda and Jawar of Udaipur district on 07.06.2023 and 08.06.2023 under TSP scheme to encourage the horticultural dveloment in tribal areas.



During the above farmers fairs mare than 1000 schedule tribe farmers were benefited with respect to technological knowledge sharing, distribution of vegetable seeds kit for kitchen gardening during the kharif and rabi season, The activities like technological intervention on horticulture crops, nutri-garden and concept of village seed bank were also carried out (Convener- Mukesh Kumar Jatav and Coordinator- Balu Ram Choudhary, Anita Meena and Mahendra Kumar Choudhary).

• Other extension activities at H.Q.

- More than > 350 farmers, students, field workers, supervisors, SMS, dignitaries/ NGO, etc. were visited to Institute during the reported of time.
- Twenty four on/off campus Research- Extension Farmers-Interface- Meetings to inculcate the knowledge and awareness among the farmers about improved production technologies of arid horticultural crops.
- The activities like visit, meetings/group discussion training, interaction, etc., were also organized for empowerment of farm women, particularly in the field of arid horticulture.
- Various farmers' programmes/activities like visit, meetings/group discussion training, interaction, Research-Extension - Farmers- Interface- Meetings (REFIM), diagnostic and problem solving visits, etc., were conducted in adopted villages under MGMG Scheme of the Institute.
- More than >2000 technical folders/literature were distributed among the farmers/ clients during different extension programmes/activities/ exhibitions, occasions.



- Several diagnostic and advisory visits to farmer's fields to solve their problems and provide technical help/suggestions for their better crop production/farming system.
- During the reported period of time, various technological advisory work (One line / telephonic/off line/ discussions/ guidance/Qns.- Ans.) with farmers were also performed (S. R. Meena and R. C. Balai).

2. At CHES, Godhara, Gujarat.

Farmers trainings/ interaction meets.

During the reported period of time, CHES, conducted /organized eighteen farmers training/interaction meets in collaboration of other Govt. and None Govt., organizations

Training sunder SCSP Scheme.

 Conducted three days on campus training programme on "Rainfed horticultural technologies for enhancing livelihood and nutritional security



of resource poor farmers of Panchmahal district" under SC-SP project during March 20-22, 2023 at CHES, Vejalpur.

- Conducted five days training on promotion of dry and horticulture in tribal areas of Panchmahal district under SCSP at ICAR-CHES, Vejalpur during 13-17.03.2023.
- Organized three days on campus training on "Rain-fed horticultural technologies for enhancing livelihood and nutritional security of resource poor farmers of Panchmahal district" under Schedule Caste-Sub Plan (SC-SP) for 15 farmers at ICAR-CHES, Godhra from 20.03.2023 to 22.03.2023.
- A big farmers interaction meet was held on issues and challenges in custard apple during the National webinar on workshop under AICRP-AZF Jadhavwadi Maharashtra, center and custard apple growers association Maharastra on 4th May 2023.

Organization of students' field school

Organized student field school on Organic Kitchen gardening at Jawahar Navoday Vidyalay, Panchmahal under "*Swachta Pakhwara*" on 20.12.2022



In addition to above, several students were visited to the Station and they were acquainted with improved technologies of the Station during the reported period of time. were Students visits:

3. KVK, Panchmahal, Gujarat

***** On Farm Trail and front line demonstrations.

• During period of report three on farm trail and eight front line demonstrations were conducted.

***** Farmers' trainings:

• During period of report 27 (on and off campus) training programmes on various important aspects of agriculture were conducted.



- Activities under NICRA Project: Conducted five training programme, two field day, six farmers meeting and distributed Pearl millet seed, Sprayer, Tree guard, etc to the 330 farmers in Nesda village adopted under NICRA Project.
- Activities under Prakruik kheti Project : Conducted three training programme and two awareness programme were conducted on *Prakrutik Kheti*.

***** Visit of VIPs/Dignitaries at the KVK:

- Visited Director ICAR-CIAH, Bikaner Dr. Jagadish Rane, on the occasion of awareness programme on *prakratik* kheti dated 25.03.2023.
- Visited former Director ICAR-CIAH, Bikaner Dr. G.B. Raturi, on the occasion of awareness programme on *prakratik* kheti dated 13.01.2023.
- Visited Sh. Fatehsinh Chauhan, MLA of Kalol constituency on the occasion of awareness programme on *prakratik* kheti dated 13.01.2023.

Important Meetings held:

• SAC meeting: Organized SAC (Scientific Advisory Committee) meeting in the chairmanship of respected Director, Dr. Jagadish Rane, ICAR-CIAH, Bikaner on dated 29.03.2023.

***** Other extension activities of KVK:

• Other extension activities carried out by KVK, Panchmaha, Gujarat are Advisory Services (126), diagnostic visits (41),fField Day (4), group discussions (8), Kisan Ghosthi (6), film Show (29), Self -help groups (4), Kisan Mela(3), Exhibition (3), Scientists' visit to farmers field (168), Farmers' seminar/ workshop (2), Method Demonstrations (26), Celebration of important days (4), Exposure visits (2), Radio Talk (5), Telephone helpline (360).

Organization of webinar/ Workshop /Seminars/ Conference/ Winter School, etc., by the Institute

The Institute organized 21 days winter school on "Commercialization of arid fruits and vegetables crops through modern approaches" from 01.02.2023 to 21.02.2023.



Institute organized a workshop on IPR and copyright issues in Horticultural Sciences on 21.02.2023.



Institute organized a 21 days Winter School on "Commercialization of arid Fruit and vegetable crops through modern approaches" during 01 to 21st Feb, 2023.

• The Institute organized a workshop entitled as "International year of Millets on the theme of contribution and potential of millets for rural health and economy on 18.03.2023.

Institute organized (virtual) a conference entitled as "International Millets (Shree Anna) for Enhancing productivity and value addition in millets" on 18th March, 2023.



Institute organized All India Coordinated Research Project on Arid Zone Fruits under 27th Research workers group meeting (Virtual) on 21-23 June, 2023.



Institute organized a Webinar on "Natural and Organic farming in arid horticultural crops" under Azadi ka Amrit Mahotsava (AZAM) on 26.05.2023 through virtual mode.



The Institute organized a webinar on "Coarse millets - Shree Anna" on 02.06.2023.

The Institute organized a webinar on "World Environment Day" on 05.06.2023.

January- June, 2023

January-June, 2023



 Institute organized 45 days Summer Training for 03 Biotechnology students (Ms. Soumera Samantaray, Ms. Saumya Surbhi and Mr. Sayan Sinha Babu) belongs to School of Biotechnology (KIIT), Bhubaneshwar, Odisha under the mentorship of Dr. Chet Ram, Scientist, Biotechnology of our institute during from 22.05.2023 to 05.07.2023

Visit of VIPs/Dignitaries at the Institute.

- Shri Sanwar Mal Singaria, Director, Airport Authority, Bikaner visited in the institute on 13.02.2023.
- Sri Sandeep Sharma, Divisional Head, SBI CIFF INS Co CID Bikaner visited in the institute on 13.02.2023.
- Dr. Arun Kumar, Hon'ble Vice Chncellor, SKRAU Bikaner visited in the institute on 21.02.2023
- M/s Vimla Sarolia, Advocate, Raj. High court, Bikaner visited in the Institute on 26.04.2023.
- Prof. S.K. Sharma, Ex. VC HPKV Palampur visited in the institute on 27.04.2023
- Shri. Sumit Singh Chouhan, Assitt. Commissioner, GOI, Sri Ganganagar visited in the institute on 09.05.2023.
- Dr. Amol N Nankar, officer research scientist, Bulgaria visited in the institute on 10.05.2023
- Dr. J.P. Sharma, Ex PS, CAZRI, Jodhpur visited in the institute during World Environment Day on 05.06.2023.
- Shri. M.R. Devra, Chief Commercial Manager NW Railway, Jaipur visited in the institute on 23.06.2023
- Shri Jitendra Sharma, Div. Commercial Manager NW Railway, Jaipur visited in the institute on 23.06.2023.
- Former DG Dr. T. Mohapatra visited in the institute on 26.06.2023 during Farmer's Training cum Awareness Programme on PPVFR Act, 2001 in association with PPV&FR Authority, New Delhi.



Awards/recognition

During the celebration of International Camel Festival organized by NRCC, Bikaner on 14.01.2023, our Institute was awarded with BEST EXHIBITION AWARD.



- During the "Shri Mallinath Pesu Mela Tilwara, Barmer" organized by CAZRI, Jodhpur during 21.03.2023 to 22.03.2023, our Institute was honoured with BEST EXHIBITION AWARD.
- In "State Level Kisan Mela on "*PASAK ANAAJ-SAMRUDH KISAN*" organized by SKRAU and ATMA, Bikaner from 27.03.2023 to 29.03.2023, our Institute was honoured with BEST EXHIBITION AWARD by Chief Guests Hon'ble Agriculture Minister, Sh. Lal Chand Katariya and Hon'ble Education Minister, Sh. Bidi Kalla, Govt., of Rajasthan.



• On the occasion of "Celebration of 50th in Foundation Day of Arid Region Campus, CSWRI, Bikaner" on 04.04.2023, the exhibition of our Institute was awarded with BEST EXHIBITION AWARD.



- Dr. Ramesh Kumar and Dr. J.S. Gora received "Young Scientist Award- 2023" for outstanding contribution and recognition in the field of Horticulture during National Conference on "Millets: Magical crops for Nutritional Sustainability" jointly organized by Jagannath University and AIASA-Rajasthan during 28-29 April, 2023 at Jagannath University, Jaipur, Rajasthan.
- Dr. D.S. Mishra received Fellow of ISHRD Award conferred by Indian Society of Horticultural Research & Development (ISHRD) Uttarakhand during Progressive Horticulture Conclave (PHC 2023) held at GBPUAT, Pantnagar, during 3-5 February 2023.

January- June, 2023

Important Meetings held.

- Research Advisory Committee (RAC) meeting which was held on 27th February,2023 in hybrid mode under the Chairmanship of Dr. V. S. Thakur, Former VC, YSPUH&F, Nauni, Solan (H.P.).
- QRT meeting was held by the institute on 24-26 April, 2023 under the Chairmanship of Dr. Ajit Kumar Karnatak, Hon'ble Vice Chancellor, MPUA&T, Udaipur.



- Organized 27th AICRP-AZF Research Workers Group Meeting (on/off line) on **from 21.06.2023 to 23.06.2023** at CIAH Bikaner.
- Annual Group Meeting of ICAR-All India Coordinated Research Project on Arid Zone Fruits was organized at from 21 to 23 June, 2023 virtually at ICAR-CIAH, Bikaner.



Annual Group Meeting of ICAR-AICRP AZF organized at from21 to 23 June, 2023 virtually at ICAR-CIAH, Bikaner.

- Annual Review Meeting of ICAR-All India Coordinated Research Project on Arid Zone Fruits Annual Group Meeting was organized virtually at ICAR-CIAH, Bikaner on 23rd February, 2023 and all the centre presented progress report virtually.
- A meeting of Nodal Officers AICRP-AZF was organized on 11th April, 2023 at ICAR-CIAH, Bikaner for finalization of Pre-QRT presentations outlines and action taken of last Review Meeting.
- The pre- QRT meeting of AICRP on AZF was organized on 19 April, 2023 at ICAR-CIAH, Bikaner in virtual mode and all the research workers and nodal officers participated.
- Assisted in organization of QRT meeting of AICRP-AZF at ICAR-CIAH, Bikaner on 25th April, 2023 and all the centre spresented progress report (2017-2022) virtually.
- The Nodal Officers virtual meetings of AICRP-AZF were organized virtually from 2-18 May, 2023 at ICAR-CIAH, Bikaner for re-orientation of technical programme and output for each mandate crop/activity as per the advice of the QRT committee.
- Assisted in organization of QRT meeting of AICRP-AZF at ICAR-IIHR, Bengaluru on 31 May, 2023 and all the Nodal Officers presented progress report (2017-2022) virtually.

Published by:

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