



CIAH NEWSLETTER



ICAR-Central Institute for Arid Horticulture

Beechwal, Bikaner-334 006, Rajasthan

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OUR NEW DEPUTY DIRECTOR GENERAL (HORTICULTURAL SCIENCE)



Dr. A. K. Singh Joined as Deputy Director General (Horticultural Science), Indian Council of Agricultural Research, New Delhi on 27.05.2017. He completed his M. Sc. and Ph. D. degree courses from ICAR-Indian Agricultural Research Institute, Pusa, New Delhi. He completed his Post-Doctorate programme from Saga University, Japan and University of California, USA. Earlier, he worked at Tata Energy Research Institute, New Delhi (1991-98); Senior Scientist at ICAR-IIVR, Varanasi, UP (1998-2000); Senior Scientist at ICAR-IARI, New Delhi (2000-2006) and subsequently as Principal Scientist (2006-2015) and Head, Division of Fruits & Horticultural Technology, ICAR-IARI, New Delhi (2007-2015). Dr. Singh earlier served as Managing Director, National Horticulture Board; Chairman, Coconut Development Board and Executive Director, National Oilseeds and Vegetable Oils Development (NOVOD) Board, Ministry of Agriculture and Farmer's Welfare, Government of India. His major research areas are genetic improvement, plant tissue culture, plant molecular biology of horticultural crops, transcriptome analysis of fruit crops, etc. He has spearheaded major research work and published more than 112 research papers in national

and international scientific journals. He is recipient of many awards, which include the Mombusho Award by the Japanese Government, Award of the Ministry of Human Resources, Government of India, Visiting Scientist Award from the Association of International Education, Japan and the DBT Overseas Associateship Award. The other recognitions in his credit are Visiting Scientist, Saga University, Japan; Gold Medal, Horticulture Society of India; Gold Medal, Delhi Agri-Horti. Society; International Registrar-*Mangifera* (Mango); Commission for Nomenclature & Cultivar Registration, ISHS, U.K. (2007-2015). He has been honoured with Fellow of National Academy of Agricultural Sciences; Horticulture Society of India (2008); Hill Horticulture Development Society, Uttarkhand (2005) and National Academy of Biological Sciences (2012). We, CIAH family, firmly believe that under his visionary and dynamic leadership horticulture science will scale new heights.



Hon'ble Union Minister for Agriculture and Farmers' Welfare, Sh. Radha Mohan Singh and other dignitaries visiting the exhibition stall of ICAR-CIAH, Bikaner during Western Regional Agriculture Fair at SKRAU, Bikaner (Raj.) 18.02.2017.



Dr. A. K. Singh, DDG (Agricultural Extension and Horticultural Science), Indian Council of Agricultural Research, New Delhi, the Chief Guest and Dr. W. S. Dhillon, ADG (Horticultural Science), Indian Council of Agricultural Research, New Delhi, the Guest of Honour, Prof. B. R. Chhipa, Hon'ble Vice-Chancellor, SKRAU, Bikaner, the Chairman and Prof. P. L. Saroj, Director, ICAR-CIAH, Bikaner during inaugural function (05.03.2017) of Annual Research Workers Group Meeting of AICRP on AZF.

RESEARCH SPECTRUM

Evaluation for morphological characters and nutritional value of tissue cultured vegetable type cactus pear under greenhouse conditions: Vegetable type (spine less) genotype of cactus is better for human consumption because it contains high levels of betalains, taurine, calcium, magnesium and antioxidants which is nutraceutically rich and important for nutritional security and human health point of view. Morphological evaluation on growth and development of vegetable type cactus pear was undertaken in greenhouse conditions at ICAR-CIAH, Bikaner. It was observed that nopales (tender cladode) of vegetable type cactus pear can be harvested regularly at an interval of 15-20 days when they reach 10 to 15 cm in length and average weight of 30 g/nopal which can provide an average yield of 1.5 kg tender nopales/plant/year. It was noted that one plant of cactus pear yielded 5 nopales of above described characteristics in a period of one month. These cactus nopales were evaluated for their nutritional composition. It was found that they contains 91-93% moisture and only 7-9% dry matter, ash 13-15% (DWB) and 1.0% (WWB), mucilage 15-22% DWB, total phenolics 4.5-7.0% (DWB), flavonoids 190-220 µg/g and total antioxidant activity 10-16 mg equi. Vit C/g (DWB) (Dr. Kamlesh Kumar, Dr. M. K. Berwal and Dr. D. Singh)



Fig.: Tissue cultured vegetable type cactus pear ready for harvest grown under greenhouse.

Introduction and performance studies on different improved varieties of potato: The introduction and performance studies on different improved varieties of potato was conducted at ICAR-Central Institute for Arid Horticulture, Bikaner in collaboration with ICAR-Central Potato Research Institute, Shimla (HP) to find out suitable potato cultivars for processing as well as for the table purpose under the harsh climatic conditions of the Western Rajasthan. During Rabi (winter) season 2016-17, seven potato cultivars viz., Kufri Khyati, Kufri Garima, Kufri Chipsona-4, Kufri Pukhraj, Kufri Frysona, Kufri Surya and Kufri Jyoti were grown under sprinkler as well as drip irrigation system. Under sprinkler irrigation, Kufri Chipsona-4 gave highest yield (534.8 q/ha) followed by Kufri Frysona (479.7 q/ha) and Kufri Jyoti (465.1 q/ha), while minimum yield was observed in Kufri Pukhraj (338.9 q/ha) and Kufri Khyati (387.6 q/ha). Kufri Garima and Kufri Surya gave intermediate yields 430.9 and 398.6 q/ha, respectively. Under drip irrigation system, Kufri Frysona

gave highest yield (435.37 q/ha) followed by Kufri Chipsona-4 (428.67 q/ha) and Kufri Garima (374.45 q/ha) and minimum yield was observed in Kufri Pukhraj (203.99 q/ha) and Kufri Jyoti (344.58 q/ha). Processing varieties Kufri Chipsona-4 and Kufri Frysona were considered suitable and proved to possess high dry matter content and was the most efficient variety in hot arid region. The Kufri Garima and Jyoti cultivars gave higher yield and these varieties can be suitable for processing as well as for table purpose and cultivation in north western Rajasthan (Dr. M. K. Jatav and Dr. P. L. Saroj)



Fig.: Field view of different varieties of potato.

Bottom-up effects of different host plant resistance germplasm accessions of lasora against *Dictyla cheriani* (tingid bug): Based on Kaiser Normalization method, three germplasm accessions were found to be resistant; 3 accessions were moderately resistant; 2 accessions were moderately susceptible; 2 accessions were susceptible and three accessions were found highly susceptible to *D. cheriani* infestation. Free amino acid had positive correlation with infestation, whereas phenols, tannin, alkaloid and flavonoid contents had significant negative correlation with infestation. The infestation had significant negative correlation with leaf length and width. Phenols and flavonoid contents explained (96.9 and 96.1 %, respectively) of the total variation in bug infestation and bug density per leaf. The one principal component was extracted explaining cumulative variation of 90.07% in infestation. The flavonoid, alkaloid, tannins, phenols content, roughness and hairyness were the novel antibiosis and antixenotic characters found in Lasora accessions, which were resistant to *D. cheriani*. Lasora accessions variability can improve plant fitness via bottom-up effects on leaf infestation. Growers can adopt potential accessions of Indian cherry as identified for resistance (AHCM-22-1, AHCM-25 and AHCM-34 accessions) with minimal financial investment for obtaining higher yields (Dr. S. M. Haldhar).

Management of gall midge in khejri: The galls were solid, hard, woody brown structures caused by a chalcid, *Pediobopsis* sp. in khejri during flower and fruiting stage. Galls measured 11.2-45.2 mm in length and 11-42 mm in breadth. Each gall has an oval larval chamber in the centre, which opened externally through a small pore in the periphery through which the adults ultimately escaped. For the management of gall midge in khejri, one spray of insecticide thiomethoxam 25 WG @ 0.4 ml per litre of water at panicle emergence and



second spray of dimethoate 30 EC @ 1.5 ml per litre of water at flowering stage was found the best approach for the management of gall midge (**Dr. S. M. Hadhar**).

Antioxidant activity and total phenolic content of ker (*Capparis decidua*) fruits at different maturity stages:

Ker fruits of different maturity stages (tender to fully ripe) were harvested from ICAR-CIAH farm and analyzed for changes in their fruit weight, dry matter, total phenolic content and total antioxidant activity. It was observed that dry matter content was continuously decreased from 30.30% (Tender stage) to 23.55% (fully ripe stage), while both total phenolic content and total antioxidant activity increased from tender stage to ripe stage. Total phenolic content increased from 2.59 mg/g to 3.15 mg/g, while total antioxidant activity increased from 0.638 mg equi. Vit.C/g to 1.570 mg equi. Vit.C/g respectively from tender to fully mature fruits (**Dr. M. K. Berwal**).



Preparation of Kachri based curry powder: Kachri is one of the drought hardy underexploited vegetable growing abundantly in hot arid and semi-arid regions, particularly in the Thar desert areas of the western Rajasthan. Mature fruits are used in various culinary preparations like pickles, chutneys and as garnishing vegetable salad. Mature kachri fruits are often dehydrated for utilization during the off-season. The kachri powder is also used as a souring agent in various traditional cuisines of north-west India. Hence, an attempt was made to develop ready-to-use Kachri based curry powder using various nutritive ingredients. The dehydrated kachri fruits with highest recovery percentage were used for the preparation of ready-to-use cooking powder. The base material used for making this product was kachri powder. Other ingredients used in the preparation of this product were powder of moringa leaves, powder of curry leaves, powder of dehydrated slice of snapmelon (khelra), coriander, cumin, fenugreek, ajwain, fennel, blackpepper, mustard and cinaamon. The proportion of these components used for making this product has been standardised (**Dr. SVR Reddy, Dr. D. K. Samadia, Dr. R. K. Meena**).



Fig.: Ready-to-use (RTU) Kachri based curry powder

Effect of ethrel application in promoting uniform ripening in Phalsa fruits: Phalsa fruits exhibit typical pattern of staggered ripening and they demand continuous harvesting on alternate days. In order to address this problem, three different concentrations of ethrel (0, 500 and 1000 ppm) were sprayed over the phalsa fruits at the time of

physiological maturity of fruits. The ethrel treatments significantly promoted the ripening of phalsa fruits which was evident within 3rd day after spraying. The ripening percentage was 55.44 and 88.55 in 500 and 1000 ppm treatments, respectively while the untreated control fruits exhibited only 10.77 percentage of ripening. The quality parameters such as dry matter accumulation (30 %), total soluble solids (19.32°B), ascorbic acid content (6 mg/100 g FW), phenols (1.74 mg catechol equi. wt/g FW), and antioxidant activities viz. CUPRAC (4.56 mg Vit C equi./ g FW), DPPH (1.87 mg Vit C equi./ g FW) were found to be higher in the untreated ripe fruits compared to the treated fruits. However, the pH (3.33) and titratable acidity (2.69 %) were found to be maximum in the fruits subjected to 1000 ppm ethrel treatment. (**Dr. SVR Reddy, Dr. M.K. Berwal, Dr. D.K. Sarolia and Dr. R.K. Meena**).

Performance of kachri as intercrop in citrus orchard using organic and inorganic source of nutrient: Kachri vegetable produces higher dry matter/ unit area and time offers excellent opportunity for inter-cropping with citrus orchard. Inter-cropping allows complimentary use of available resources like water, space, light and nutrients for conversion to biomass more efficiently as a result of difference in competitive ability of different inter-crops for these resources. Integrated Nutrient Management (INM) implies the most efficient use and management of organic



Fig.: Intercrop of kachri under control



Fig.: Intercrop of kachri under treatment

and inorganic sources of nutrients to attain higher levels of kachri productivity along with maintaining the fertility of the soil. Maximum vine length (cm), number of branches, fruits/plant and fruit production/plant (gm/plant) of kachri were observed when organic and inorganic sources at equal proportion. Application of 50% NPK from inorganic fertilizers and 15 t/ha FYM gave the highest kachri yield (114.47 q/ha), which was significantly higher than all other treatments. The increase in total yields were 76.41, 96.18, 107.07, 76.34 and 71.65% higher over control by the application of 100% NPK from inorganic fertilizers, 75% (I)+7.5 t/ha FYM, 50%(I)+ 15 t/ha FYM, 25%(I)+ 22.5 t/ha FYM and 30 t/ha FYM, respectively. (**Dr. M. K. Jatav and Dr. S. R. Meena**).

Conservation and use of kakri variability and production technology under hot arid agro-climate: The kakri genotype namely AHC-2 and AHC-13 were studied with 10 years stored material and varying production situations. With normal sown crops, seeds took 5.6-7.4 days for germination (52.5-65.4 %) and exhibited good plant growth and uniformity. Both the varieties are early in flowering and fruit setting (37.6 DAS) and first harvesting of tender fruits (47.8 DAS). Tender fruits of AHC-2 are long-slender, non-



Fig.: Tender fruits of
Kakri AHC -2

Fig.: Tender fruits of
Kakri AHC 13

furrowed, 168.6-222.4 g weight and vine bears 9-12 fruits with 2.75 kg marketable yield. The fruits of AHC-13 are small, oblong, 75.8-94.5 g weight and plant bears 22-25 fruits with 2.18 kg marketable yield. Similarly, bigger sized 300-400 g fruits are excellent for cooked vegetable. Kakri can be grown successfully during June-July and February. About 1.0 kg/ha seed is enough and were soaked in water for 1-2 hours and also treated with fungicide prior to sowing. Seeds were sown at 50 cm distances at inner down slope of the channels or near to drippers. The crop was irrigated at 6-8 days intervals by flood method only in channels and 2-3 days intervals for 1.0 hours with drip technology (laterals 16 mm and 4 l ph in-line emitters) under sandy soils with limited water (Dr. D. K. Samadiah).

Tunnel cultivation: A climate resilient technology for cucurbits: In hot arid region, the advancement in growing crop under low tunnel cultivation is the best option to get quality produce with low cost. This technology escapes the crop from low temperature during January-February and advances the crop by 45-50 days. It increases the concentration of carbon dioxide inside tunnels, thereby enhance the photosynthetic activities and ultimately yield. The success of tunnel technology in arid region includes selection of site, drip irrigation system, fertigation and integrated crop management (ICM) practices. It is



Fig.: A view of cultivation of cucurbits under tunnel technology

recommended to prepare 45-60 cm deep trenches to increase height of tunnel so that temperature inside tunnel can be 8-10°C higher than outside temperature. The best time of sowing was found to be last week of December to first week of January. Biodegradable plastic sheet of 30-50 micron is recommended as covering material. The plastic sheet should be completely removed in II or III week of February when outside temperature raises (10- 12°C). It was observed that tunnel cultivation of muskmelon, longmelon, watermelon, bottle gourd, ridge gourd, tinda, summer squash, etc. in hot arid region offers good opportunity for successful early season cultivation with B: C ratio of 2.21 to 2.43. (Dr. B.R. Choudhary and Dr. A.K. Verma)

Effect of environmental factors on development of Fusarium wilt in muskmelon: Six muskmelon genotypes (Durgapura Madhu, RM-50, Kashi Madhu, AHMM/BR-46,

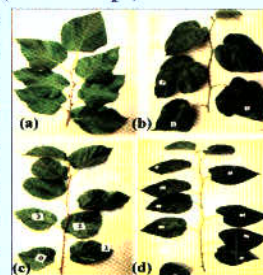
AHMM/BR-48 and AHMM/BR-52) were sown in the field on 20th February, 2017 during summer season at Pathology Block of the Institute. Fusarium wilt was noted in muskmelon genotypes to varying extent depending on genotypes and climatic conditions. Studies on effect of environmental factors on Fusarium wilt were carried out. During summer season, Fusarium wilt was first appeared in the field on 14th standard week of 2017 in muskmelon genotypes. Weekly observations were taken on wilt disease (per cent disease index) and meteorological data. It was found that range of minimum PDI (3.56-7.11%) of Fusarium wilt was recorded at average maximum temperature (37.90°C), minimum temperature (20.60°C), av. maximum RH (50.1%) and minimum RH (15.9%) and av. rainfall (0.0 mm) on 14th standard week, while maximum PDI (14.22-33.33%) was found at average maximum temperature (39.40°C), minimum temperature (24.50°C), av. maximum RH (66.1%) and minimum RH (27.1%) and rainfall (18.8 mm) on 17th standard week of 2017 in muskmelon genotypes (Dr. S K Maheshwari)

Evaluation of date palm varieties/genotypes:

Conservation and evaluation of sixty four germplasm of date palm was carried out under hot arid conditions. Delay in spathe emergence/ flowering was observed in male in comparison to female palms during the year due to prevailing climate in January- February month. The flowering/fruiting were observed in 30 cultivars/genotypes out of 64 germplasm and rest plants are under vegetative growth stage. Three germplasm introduced from ICARDA, Jordan were started flowering and fruiting in 50 per cent plants after two years of planting. Due to rains in the month of June during 2017, maturity in fruits was delayed. One elite male palm was identified for better pollen production. Data on fruit yield and quality characters are in progress (Dr. R. S. Singh).

Phyllotaxy as a methodology of morphological characterization in mulberry (*Morus sp.*):

A distinct variation was recorded regarding leaf arrangement (phyllotaxy) in 10 mulberry genotypes available at Mulberry Germplasm Block of the Institute. Phyllotaxy was noted to be either alternate or spiral. The orders of spiral phyllotaxy were $\frac{1}{2}$, $\frac{1}{3}$, or $\frac{3}{8}$. Phyllotaxy; thus, can be considered as a morphological trait for characterization in mulberry (Dr. Hare Krishna and Dr. D. Singh).



Phenomenon of phase change in ber : The phenomenon of 'Phase Change' has been noted in budded ber saplings of cv. Gola, which can be defined as a change from the juvenile to the adult phase of vegetative shoot development, when the plant acquires reproductive competence. Initially, emerged leaves, following bud sprout, had glabrous leaves in cv. Gola. On the other hand, leaves which emerged at later stages had tomentose leaves (typical of adult ber plants of cv. Gola). In this case, change in leaf morphology may be considered as a good indication of phase change in ber (Dr. Hare Krishna)

Unusual fruit bearing habit 'Cauliflori' in lasoda:

Inflorescence of lasoda is axillary as well as terminal on primary, secondary and tertiary branches. However, cauliflori fruiting habit (producing flowers/ fruits from the main stem or older branches) has been noted, which is a rare sight in lasoda (**Dr. Hare Krishna and Dr. R.S. Singh**)

**EXTENSION PROGRAMMES/ACTIVITIES**

- **Front line demonstrations/adaptive trials:** During the period, 04 frontline demonstrations of improved varieties of arid vegetable crops viz- AHS-82 (snap melon) and AHK- 119 (Kachri) were conducted at Sarahrupayat village of Bikaner district and KVK, Chomu of Jaipur district. Twenty field demonstration/ adoptive trials of 07 improved varieties of potato were also conducted of farmers' fields. In addition, 26 method demonstrations about improved agro-techniques of arid fruits and vegetable production, value addition, in-situ budding, etc. were given to visiting farmers/ clients.
- **Farmer's training:** During this period, 04 farmers' training programmes were conducted.
- **Organization of Technological Exhibitions:** Three technological exhibitions of the Institute were organized/ displayed.
- **Visit and interaction/ meetings at the Institute :** A total of 372 farmers, students and agricultural supervisors, officers, professionals, teachers, scientists/ trainees, etc. visited and interacted at the Institute during January to June, 2017.
- **Visit to farmer's fields and interaction/meetings with them:** More than 100 farmers' fields were visited and several technological interactions/meetings with farmers were held.
- **Research-extension-farmers-interface meetings:** Eight Research-Extension-Farmers-Interface meetings were held with 08 groups of farmers during their exposure visit at the Institute. Moreover, 05 Farmer's Interest Groups /Commodity Interest Groups/ Self-Help Groups were also organised at the different sites/ locations/ villages of Bikaner district (Rajasthan).
- **Empowerment of farm women:** To empower/ educate the farm women of the hot arid region about arid horticultural crop production > 100 farm women of local villages and visited to the Institute and had research-extension-farmers-interface meetings with them. They were exposed to modern arid horticultural crop production technologies, value addition techniques of arid fruits and vegetables during their visits, exhibitions and off campus interactions, etc. (**Dr. S. R. Meena, Dr. R. S. Singh, Dr. D. K. Samadia and Dr. D. K Sarolia**)
- **Mera Gaon Mera Gaurav programmes :** During the reported period, 18 visits, 57 online guidance, 52 on farm guidance, 34 method demonstrations, 01 field day

and 02 farmers trainings were organized in adopted villages of the Institute viz., Khinchiya village, Sarahrupayat, Dholera, Bachchhasar and Kolasar village of the Bikaner district, Rajasthan.

ORGANIZATION/ CELEBRATION OF DAYS / WEEKS.**Celebration of Foundation Day on 25 April, 2017:**

During the reported period of time, the Institute celebrated 24th Foundation Day on 25 April 2017. Padam Vibhusan Dr. R. S. Paroda, Former Secretary, DARE & DG, ICAR was Chief Guest of the function and Prof. B. R. Chhipa, Vice Chancellor, SKRAU, Bikaner as Special Guest and Prof. Bhagirath Singh, Vice Chancellor, MGSU, Bikaner as Guest of Honour graced the function. More than 100 participants including Dean, Director, Professor, Students and Progressive Farmers attended the function. At this occasion, Prof. (Dr). P. L. Saroj, Director, ICAR-CIAH, Bikaner presented a brief research and development activities of the



Fig.: Padam Vibhusan Dr. R. S. Paroda, Former Secretary, DARE & DG, ICAR, New Delhi., Prof. B. R. Chhipa, VC, SKRAU, Bikaner, Prof. Bhagirath Singh, VC, MGSU, Bikaner and Prof. (Dr). P. L. Saroj, Director, ICAR-CIAH, Bikaner.

Institute. Dr. B. R. Chhipa, VC & Special guest of the function, appreciated the work done by ICAR-CIAH, Bikaner. Prof. Bhagirath Singh VC & Guest of Honour emphasized the research work on indigenous plant and its importance. Padam Vibhusan Dr. Paroda first of all congratulated to staff members of Institute for celebration of the foundation day. Further, he appreciated the progress of research and development activities carried at the Institute. He emphasized that more research attention should be paid to local crop species and water use efficiency to increase the income of the farmers. The Thar Shobha variety of khejri developed by Institute should be popularized and quality seed and planting material should also be produced by the Institute for the benefit of farmers/clients.

POPULARIZATION AND COMMERCIALIZATION OF TECHNOLOGIES: SUCCESS AND FEEDBACKS.

Feedback on an impact of adoption of improved variety of snapmelon (AHS-82): Presently, farmers are earning net income of Rs. 108000 to 167000/ha/season by adopting/growing improved variety of snapmelon: AHS- 82. More than 13000 farmers are growing it during rainy (Kharif) season and about 3200 farmers during summer season; thereby, covering more than 4000 ha. and 1600 ha area, respectively. More than > 60% farmers of the hot arid regions want grow it on their fields. Some of the farmers (2-

3%) have started to multiply and production its seeds at a small scale. After adoption of this variety, an increase of 28% in market demand and 22% supply for better quality of snapmelon in local markets have been witnessed. Increased (21-26%) earning of the farmers from value added products of the snapmelon. Increased the awareness, interest and knowledge among more than 32,000 farmers about scientific cultivation and benefit of this variety. More than 80 % farmers responded that growing improved variety (AHS-82), maintaining the mild agro-climate of the crops field, significant reduction (54 %) in soil erosion and it increases in organic matter of the soil (**Dr. S.R. Meena**).

Celebration of International Yoga Day and organization of a seminar:

International Yoga Divas programme was organized in collaboration with Smt. Phoosi Devi Yoga and Naturopathy Institute, Bikaner on 21-06-2017. On this occasion, a seminar on the topic "*Yog Prakratic Chikitsa Evam Satvik Aahar*" was also organized at ICAR-CIAH, Bikaner. In the seminar more than 150 participants including Dean, Director, Professors, Head of the ICAR Institutes



Fig.: Prof. B. R. Chippa, Hon'ble, VC, SKRAU, Bikaner, Chief Guest, Mahant Shri Kshamaramji Maharaj, Pethadhiswar, Sinthal, Bikaner, President of the inaugural function of the seminar organized on International Yoga Diwas, Prof. (Dr.) P. L. Saroj, Director, ICAR-CIAH, Bikaner and Dr. Deva Ram Kakar, Director, Yoga & Naturopathy Institute, Bikaner.

situated in Bikaner, SKRAU, farmers and local peoples attended the same. During the seminar, lectures on different topics were arranged. Prof. B. R. Chippa, Hon'ble, VC, SKRAU, Bikaner was Chief Guest and Mahant Shri Kshamaramji Maharaj, Pethadhiswar, Sinthal, Bikaner was President of the function. Prof. (Dr.) P.L. Saroj, Director, ICAR-CIAH, Bikaner emphasized that the regular Yoga and balanced diet play crucial role in healthy and long life with positive thought. Yoga practices should be the regular feature of our daily life. Dr. Deva Ram Kakar, Director Yoga & Naturopathy Institute, Bikaner explained to participants about the Prakratic Chikitsa and importance of Yoga in human health.

● **Swachchh Bharat Abhiyan (Campaign):** During the reported period, the Swachchhta Bharat Abhiyan (Campaign) was carried out in the Institute from time to



Fig.: The employee of the Institute engaging in Swachchha Bharat Abhiyan at the Institute.

time and all the employee/staff of the Institute contributed a lot in cleaning the Institute's premises.

VISIT OF VIPS/DIGNITARIES AT THE INSTITUTE

Visit of the ASRB Chairman: Dr. Guru Bacchan Singh, Chairman, ASRB, ICAR, New Delhi, visited the Institute on 21.01.2017 and seen the experimental blocks and laboratories of the Institute. He held a meeting with scientists and staff of the Institute and discussed with them about progress and prospects of R & D activities of the Institute. Dr. Guru Bacchan Singh also inaugurated the water storage tank (Diggi) No. 04 of the Institute during his visit.



Fig.: Dr. Guru Bacchan Singh, Chairman, ASRB, ICAR, New Delhi, inaugurating the water storage tank (Diggi) No. 04 of the Institute in the presence of Prof. (Dr.) P. L. Saroj, Director of the Institute.

- Dr. A. K. Singh, DDG (Agricultural Extension and Horticultural Science), ICAR, New Delhi, visited the Institute on 05.03.2017
- Dr. B. R. Chhipa, Hon'ble Vice Chancellor, SKRAU, Bikaner visited the Institute on 05.03.2017
- Dr. W. S. Dhillon, ADG (Hort. Science-I), ICAR, New Delhi, visited the Institute from 05.03.2017 to 07.03.2017.
- Dr. H. P. Singh, Former DDG (Horticultural Science), visited the Institute from 17th and 18th May, 2017
- Dr. W. S. Dhillon, ADG (Hort. Science-I), ICAR, New Delhi, visited the Institute from 17th and 18th May 2017
- Dr A. K. Mehta, Former ADG (AE) ICAR, New Delhi visited the Institute from 17th and 18th May 2017

- Dr. Mathura Rai, Former Director, ICAR-IVRI, Varanasi (UP) visited the Institute from 17th and 18th May 2017
- Dr. N. Kumar, Ex-Dean, College of Horticulture, TNAU, Coimbatore (TN) visited the Institute from 17th and 18th May 2017
- Dr. S. Kumar, Ex-Head and PS (Plant Pathology) HARP, Ranchi, Jharkhand, visited the Institute from 17th and 18th May 2017
- Dr. V.N. Sharda, Member, ASRB, ICAR, New Delhi visited to the Institute on 21.01.2017
- Scientist Team from Palestine visited to the Institute on 25.01.2017
- Kisan Channel Team, New Delhi visited to the Institute on 24.05.2017

IMPORTANT MEETINGS HELD

QRT meeting

The QRT meeting was held under the Chairmanship of Dr. H. P. Singh, Former Deputy Director General (Horticultural Science) on 17th and 18th May 2017 at ICAR-CIAH, Bikaner. The members of the QRT, Dr A. K. Mehta, Dr. Mathura Rai, Dr. N. Kumar, Dr. S. Kumar, Prof. (Dr.) P. L. Saroj, Director, ICAR-CIAH, Bikaner and Dr. B. D. Sharma, Member Secretary of the QRT and all scientists of the Institute were present during the QRT Meeting. The QRT visited Research Farm of the Institute and appreciated the



Fig. : The QRT Chairman, Dr. H. P. Singh, Former Deputy Director General (Horticultural Science) discussing with members of QRT and scientists.

research and developmental activities made by the Institute during the period of last six years. After field visit, team held meeting and discussion with the scientists of the Institute. The Chairman in his opening remarks highlighted that the objective of QRT and emphasized on canopy management in ber and pomegranate to optimum light interception and enhancing the productivity and dissemination of the technologies to the farmer's fields. For khejri, the Chairman suggested that in depth studies in terms of plant spacing and lopping for biomass production should be taken up. He also suggested that in date palm, assessment of somaclonal variation needs to be taken up in tissue culture plants.

Annual Research Workers Group Meeting of All India Coordinated Research Project on Arid Zone Fruits : Annual Research Workers Group Meeting of All India Coordinated Research Project on Arid Zone Fruits was held from 5th to 7th March, 2017 at ICAR- CIAH, Bikaner (Rajasthan). Dr. A. K. Singh, DDG (Agricultural Extension and Horticultural Science), ICAR, New Delhi was the Chief

Guest and Dr. B. R. Chhipa, Hon'ble Vice Chancellor, SKRAU, Bikaner Chaired the inaugural function of the workshop. Dr. W. S. Dhillon, ADG (Hort. Science-I), ICAR, New Delhi was the Guest of Honour. In the Inaugural session, Prof. (Dr.) P. L. Saroj, Director of the Institute and PC, AICRP on AZF presented the progress report of one year of the AICRP on AZF.

Dr. A. K. Singh, DDG (Agril. Ext & Hort. Sci.), ICAR, New Delhi stated in his remarks that during 2003-2016, the income of the farmers in the field of horticulture has increased more than three times, however, the cost of inputs have also increased during the same period. About 12 per cent of the country's geographical area comes under arid conditions, which has immense potential for horticulture development. He emphasized on production of quality seed and planting materials to encourage the horticultural development in hot arid and semi-arid regions of the country. He also said that there is utmost need to pay attention on the value addition of arid fruit and vegetables and technological know-how developed by scientist should be disseminated to the farmers' fields.

Organization of a press conference: A press conference was also held at the Institute on the occasion of Annual Research Workers Group Meeting of All India Coordinated Research Project on Arid Zone Fruits on 5th March, 2017.



Fig. The press and media persons discussing with Dr. A. K. Singh, DDG (Agricultural Extension and Horticultural Science), ICAR, New Delhi and dignitaries / scientists during the press conference held.

During the press conference, the press and media persons discussed at length about the progress and the prospects of horticultural development in hot arid regions of the country with Dr. A. K. Singh, DDG (Agricultural Extension and Horticultural Science), ICAR, New Delhi., Prof. B. R. Chhipa, Hon'ble, VC, SKRAU, Bikaner, Dr. W. S. Dhillon, ADG (Hort. Science-I), ICAR, New Delhi, Prof. (Dr.) P. L. Saroj, Director of ICAR-CIAH, Bikaner and other dignitaries/scientists attended the conference.

Visits/meeting attended by the Director of the Institute.

- (a) Professor (Dr.) P. L Saroj, Director of the Institute, attended/ participated in the following meetings/ workshops/ confereces during January - June, 2017.
- During 03-09 January, 2017, Director of the Institute attended the AICRP workshop on fruits at Anantapur and also attended a seminar at IIHR, Bengaluru.

- He attended Director's Conference at A.P. Shinde Hall, NASC Complex, Pusa, New Delhi on 14-15 February, 2017.
- He participated in the meeting of State Level Coordination Committee (SCC), organized at MPUAT, Udaipur on 5-6 April, 2017 and presented "Strategies for doubling production through horticulture interventions."
- Director participated in the preliminary meeting of QRT at ICAR, New Delhi with DDG (Hort. Sci.) and ADG (Hort. Sci.) on 10.04.2017 and visited SMD (Hort. Sci.), ICAR, KAB-II, New Delhi for official matters on 11.04.2017.
- Director participated in the meeting of EFC/SFC at ICAR, New Delhi on 11.05.2017.
- Director visited and discussed about the Institute's official matters with DG, DDG (Hort.) and Senior Officers of the ICAR at Krishi Bhawan, New Delhi on 12.05.2017.
- Director attended the interface meeting on "Enhancing the preparedness for agricultural contingencies" during kharif-2017, at Jaipur on 16.06.2017

(b) Professor (Dr.) P. L. Saroj, Director of the Institute visited the following AICRP centres/other places during January - June, 2017.

- Director visited the AICRP-AZF Centre Anantapur on 03-09 Jan., 2017.
- Director visited the Regional Centre of the Institute, CHES, Vejalpur, Godhra on 03 Feb., 2017.
- Director visited to DKMA (ICAR), New Delhi to held discussions for publication and print work the CIAH Profile on from 16-17 February, 2017.
- Director visited New Delhi to held discussion about the official matters with FA, ICAR, Secretary, ICAR & ADGs (Hort. Sci.) at ICAR, New Delhi from 21-22 March, 2017.
- Director visited AICRP on AZF Centre Jobner (Rajasthan) on 17.06.2017.

PERSONALIA

Awards/Prizes/Recognition

- Prof. (Dr.) P. L. Saroj, Director of the Institute acted as panelist during Technical Session on Production Management during the seminar held at IIHR, Bengaluru on 08.01.2017.
- Director of the Institute acted as Member in an Interview at ASRB, ICAR, New Delhi on 23-24 January, 2017.
- Dr. Vijay Rakesh Reddy, S. received best oral presentation award for the paper entitled 'Ethylene management for reduction of postharvest losses in fruits' at National seminar on Zero Hunger Challenges- For Hunger free India, held during January 2017 at Govt. College for Women (A), Guntur, Andhra Pradesh.
- Director of the Institute acted as Member in a interview at ASRB, ICAR, New Delhi on 01 February, 2017.
- Director of the Institute acted as Chairman, SAP Meeting, KVK, Panchmahal (Gujarat) on 02 February, 2017.
- Dr. S. M. Haldhar recognized with associate editor of International Journal of Agriculture Sciences (<https://bioinfopublication.org>).

FROM THE DIRECTOR'S DESK.....



It gives me immense pleasure in bringing out this six monthly newsletter of ICAR-Central Institute for Arid Horticulture, Bikaner, Rajasthan. Ever since its inception, ICAR-CIAH is leading in carrying out R & D activities for developing suitable strategies to overcome different environmental, edaphic and biological barriers, which delimit the horticultural production in hot arid and semi-arid regions of the country. The Institute is actively engaged in research activities such as improvement of varieties, which are able to give high quality yield under prevailing abiotic and biotic pressures and development of horticultural practices, which aims to mitigate the stresses and enhance the yield. The long term goal of the Institute is to turn the barren and unproductive lands of the hot arid and semi-arid parts of the country, spread over the thousands of hectares, into rewarding horticultural belts so as to reinforce the socio-economic status of rural inhabitants of the regions. The Institute has developed several tailor-made techniques, varieties and scientific approaches to encourage the horticultural development in hot arid and semi-arid regions. These desirable improved technologies are regularly disseminated to the farmers in order to achieve the goal of doubling farm income. The major efforts made by the Institute during the last six months in above senses are being narrated in this *Newsletter* in brief.


(P. L. Saroj)
Director

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