



CIAH

NEWSLETTER



ICAR-Central Institute for Arid Horticulture Beechwal, Bikaner-334 006, Rajasthan

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FROM THE DIRECTOR'S DESK



I am feeling immense pleasure by bringing out this six monthly Newsletter of ICAR-Central Institute for Arid Horticulture, Bikaner, Rajasthan. Primarily, this Institute is dealing with R & D issues of horticultural growth and development in hot arid and semi-arid regions of the country. The Institute identifies the researchable issues and strategies for the growth and development of arid horticulture. Keeping this fact in view, the major emphasis is given on genetic improvement for high yielding and quality production, drought-frost tolerance and disease-pest resistance in horticultural crops. To achieve these goals, various plant breeding tools and techniques, biotechnological methods, physiological approaches, plant health management techniques are being developed. Of course, the scope of value addition in the field of arid horticulture is very wide and there is urgent need of the same for up-liftment of the rural poor of the hot arid regions. Hence, the Institute is taking care and trying to standardize technologies for proper handling, maturity standards, processing, value addition and post harvest management of arid horticultural crops. The Institute is being provided technological help/interventions to the farmers of hot arid/semi-arid regions of the country to earn their life in better way. The major efforts made by the Institute during last six months in above sense are being narrated in this *Newsletter* in brief.

(S. K. Sharma)
Director

RESEARCH SPECTRUM

1. At Bikaner

Performance evaluation of advance lines of longmelon :

During rainy season of 2014, the available advance lines of longmelon were evaluated for growth and yield attributes. Among the evaluated lines, AHLM-2 was early to produce 50% female flowering (40-45 days after sowing) on lower nodes. The fruits at marketable stage were tender, non-bitter, light green, 25-30 cm long and 1.8-2.2 cm in diameter weighing 60-80 g per fruit. The plants of this genotype were vigorous and profusely branched. (Dr. B.R. Choudhary)

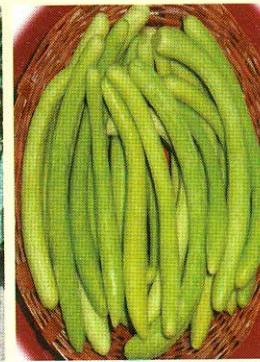
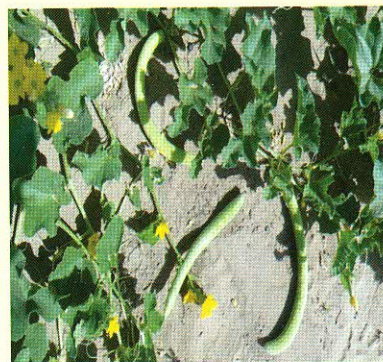


Fig.: View of longmelon (AHLM-2)

Development of DUS test guidelines of watermelon and muskmelon:

Developed the DUS test guidelines of muskmelon and watermelon under the project 'Validation of DUS test guidelines for cucurbits i.e. watermelon and muskmelon' funded by PPV&FRA, New Delhi and submitted to the funding agency (Dr. B.R. Choudhary).

Date Palm Tissue Culture: The micro shoots developed in Halawy and Khalas cultivar were experimented for development of root formation in MS media containing NAA and BA at different concentrations with several additives of activated charcoal, agar, thiamine, glycine, etc. Quality root formation in terms of number of roots and size of roots were recorded with media composition containing high concentration of NAA devoid of activated charcoal whereas MS media containing charcoal produced thinner roots. (Dhurendra Singh and P.N. Sivalingam)

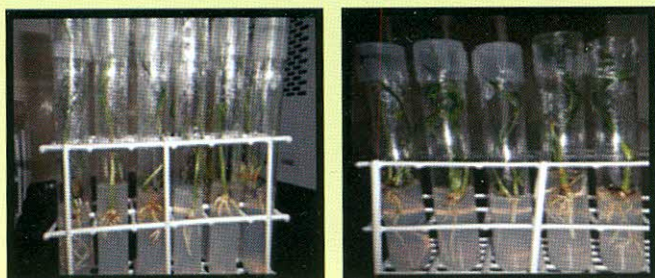


Fig : Quality root formation in micro-shoot of date palm cv. Halawy and Khalas

Raising of tissue cultured plants of date palm under Net Work Project: Under a network project on “Production & demonstration of tissue culture raised plants under three locations, collection & maintenance of elite germplasm of date palm” 160 date palm tissue culture plants of local elite genotype were received from Anand Agricultural University, Anand, Gujarat and planted for field evaluation at CIAH, Bikaner during month of September, 2014. The observations were recorded with respect to plant height, number of open leaves per plant and canopy of plants. The initial height of plants at the time of planting was 45 cm with 6-7 opened leaves. After 05 month of planting, no mortality in the plants was observed. All the plants are surviving well and it is evident from the observation that the plants attained satisfactory growth (**Dhurendra Singh and P.N. Sivalingam**)



Fig : Field view of date palm tissue culture plants of local elite genotype planted at CIAH, Bikaner

Studies on generated material of sponge gourd and maintenance for conservation: Sponge gourd is popular cucurbit vegetable but not much exploited for developing varieties suited to abiotic stress and high temperature conditions in the hot arid region. As a result of systematic germplasm collection and utilization from 1996–2010 at CIAH, the material (22) was generated and studied during 2014 for characterization and identification of promising lines under abiotic and biotic stresses. The seeds enhancement work of the same was also done for maintenance and conservation of them. The generated

material exhibited wide range of variations for days to appearance of first male flower (36.4–67.2 DAS), number of node to first male flower (4.8–21.4), days to appearance of first female flower (43.3–71.7 DAS), number of nodes to first female flower (9.8–32.5), days to first harvesting of tender fruits (51.6–88.5 DAS), tender fruit length (12.2–32.7 cm), tender fruit diameter (2.2–4.3 cm), tender fruit weight (58.4–169.6 g), number of tender fruits/plant (14.8–32.4), marketable fruit yield/plant (1.23–3.12 kg), vine length (2.15–3.65 m), mature fruit length (27.2–48.4 cm), mature fruit diameter (5.4–8.6 cm), number of seeds/fruit (79.4–353.5), weight of seeds/fruit (11.2–37.5g), seed length (1.02–1.23 cm), seed width (0.52–0.91 cm) and seed test weight (8.72–12.56 g). These were also studied for fruit quality and intensity of fruit fly infestation (8.2–76.5 %) under abiotic stresses of hot arid agro-climate. Based on over all performance, the progeny from germplasm line AHSG-4 and white seeded progeny of cross combination [(P₅ x P₄) x P₄] were found to be most potential for utilization in trait specific crop improvement (**Dr. D. K. Samadia**).



Fig.: Variability in fruits at marketable stages in generated material of sponge gourd

Karonda (cv. CIAH Selection-1) as a source of natural dye:

In order to diversify the use of crop produce from the plants being grown under fruit based diversified cropping system and keeping in view the fact that a renewed interest has arisen among the end users for natural dyes due to increased awareness of the environmental and health hazards associated with the use of synthetic dyes. Use of *karonda* fruits was explored as a source of natural dye. *Karonda* is hitherto remained a neglected crop and is mostly used as a bio-fence. To some extent, it is also used for processing. However, *karonda* genotype, CIAH Selection-1, grown under cropping system, turns dark red upon maturity; thereby, indicating its alternative use, other than consumption, as a source of natural dye for its potential industrial application. Dye was extracted either with water or ethanol. However, dyestuff extracted through ethanol yielded better results. Premordanting with mordants such as PEG, tannic acid, ferrous sulphate and cupric sulphate followed by natural dyeing gave various

shades like grey, yellow and red to cotton fabrics (Dr. Hare Krishna)



Fig. : Cotton fabric dyed with colour obtained from *karonda* and fixed with different premordant. Inset: Dark fruited ripe *karonda* fruits.

Infection of *Alternaria* sp. in *ber* : Infection of *Alternaria* sp. in *ber* was noted during the fruiting season. Infection was manifested as dark greyish-black colonies of the fungus on leaves of all the major *ber* varieties. The major site of infection was ventral side of leaves. However, some infection was also noted on dorsal side too. Infection was quite prominent during foggy days. Initially, there were no leaf spots but at later stages, the infected surface turns grey; probably due to interruption in photosynthesis at the site of infection by the fungus growth. (Dr. Hare Krishna and Dr. S.K. Maheshwari)



Gummosis or gum disease in *Lasora* (*Cordia myxa* Roxb.) : *Lasora* (*Cordia myxa* Roxb.) is an important underutilized fruit of Thar desert of Rajasthan. *Lasora* plants infected by gummosis were observed at Pathology Block of this Institute. The disease symptom appears as water soaked lesions, which coalesce and form large patches area on the portion of the stem above ground level. Bark on the lower part of trunk is highly susceptible to infection. This disease develops on the trunk and branches as high as 2-6 feet from the ground level. On scraping the dead bark of the patches, a light brown to black area can be seen. Such patches start oozing gum from the trunk and branches as brownish black oozing called gummosis disease. Initially, the bark is firm but with ageing of the lesion, it shrinks and cracks, leading to shredding. In severe cases, the bark is destroyed around the trunk resulting in the girdling of the affected tree. This eventually may lead to the death of tree. Further, involvement of the pathogen in this disease is to be ascertained. (Dr. S. K. Maheshwari and Dr. Hare Krishna)



Fig.:Gummosis on *lasora* trunk (Inset: an affected branch)

Response of sponge gourd genotypes for resistance against diseases: Fourteen genotypes (Pusa Sneha, AHSG-16, AHSG-17, AHSG-18, AHSG-20, AHSG-21, AHSG-22, AHSG-24, AHSG-27, AHSG-28, AHSG-29, AHSG-30, AHSG-32 and AHSG-34) of sponge gourd were screened for resistance against diseases under field conditions during rainy season of 2014. Among them, only *Alternaria* leaf blight was observed in the field. Disease severity of *Alternaria* leaf blight was recorded from 4.70 to 34.30% in different genotypes of this crop. Minimum severity of this disease was noticed in Pusa Sneha, AHSG-16, AHSG-28 and AHSG-29 (Dr. S. K. Maheshwari and Dr. B. R. Choudhary).

Antixenotic and allelochemical resistance traits of watermelon against fruit fly (*Bactrocera cucurbitae* (Coquillett)): During the experiment the varieties/genotypes, Asahi Yamato (12.73%), AHW/BR-16 (15.10%) and Thar Manak (18.27%) were found resistant; Durgapura Lal (23.03%), Sugar Baby (26.67%), AHW/BR-12 (29.73%), Arka Manik (34.15%), Charleston Grey (38.70%), AHW-65 (35.80%), AHW-19 (48.97%) were found moderately resistant and IC 582909 (53.18%), AHW/BR-60 (55.52%), BSM-1 (59.10%), AHW/BR-137 (60.58%) and AHW/BR-9 (67.37%) were found the susceptible varieties/genotypes to fruit fly infestation. The significant positive correlation ($r = 0.99$ $p < 0.01$) was observed between percent fruit infestation and larval density per fruit. The percent fruit infestation and larval density had significant positive correlation with fruit length ($r = 0.57$ & 0.55) and days to first fruit harvest ($r = 0.75$ & 0.76) and negative correlation with length of ovary pubescence ($r = -0.91$ & -0.91), rind hardness ($r = -0.86$ & -0.87) and rind thickness ($r = -0.77$ & -0.75). Maximum variation in fruit infestation and larval density was explained by length of ovary pubescence (82.50 and 83.60%, respectively) followed by fruit length (4.3 and 3.0% respectively) and rind thickness (3.2 and 2.0%, respectively). Free amino acid was lowest in resistant (Asahi Yamato) and highest in susceptible variety/ genotype (BSM-1), whereas, phenols, tannin, total alkaloids and flavonoid contents were highest in resistant and lowest in susceptible varieties/genotypes. Flavonoid and total alkaloid contents explained (88.4 and 92.0%, respectively) the total variation in fruit fly infestation and in larval density per fruit (Dr. S. M. Haldhar and Dr. S. R. Meena)

A comparative study between two *Amaranthus* species viz. *Amaranthus tricolor* and *Amaranthus viridis* : During the reported period, a comparative study between two amaranthus species viz., *Amaranthus tricolor* and *Amaranthus viridis* was undertaken in green house at the Hi-Tech nursery of the Institute during July-October, 2014. Both the germplasm were procured from authentic source in West Bengal. At initial stage both the species had profuse growth, however at maturity stage *A. viridis* (green leaf) failed to set seeds. Both the species were ready for edible maturity within 20-25 days of sowing. Total chlorophyll content in the green type was double to that of the red type. But the chlorophyll content in *A. tricolor* (red type) was comparable to the green type till mid stage of development. The red type was having just double amount of anthocyanin pigments as compared to the green type. Oxalic acid was initially high in the green type but at later stages of growth, it was at par with the red type. Total phenol contents from the raw leaf extract showed that a significant difference exists between the two species, *A. viridis* having a higher value than *A. tricolor* (Dr. Pinaki Acharyya and Dr. R. Bhargava)

Fig. : *Amaranthus viridis*Fig. : *Amaranthus tricolor*

Evaluation of Date palm germplasm: Conservation and evaluation of sixty one germplasm of date palm was done under hot arid environment. The flowering/fruitletting was observed in 30 cultivars/genotypes out of 61 germplasm. The number of bunches varied from 2 to 11 in above date palm germplasm. The maximum number of bunches/ plant (11) were observed in Sabiah, Bikaner Local, Sayer, Bint-A-Isha followed by 10 bunches per plant in Sewi and Chip-chep cultivars. The maximum number of berries (30 per strand) was observed in cv. Zahidi followed by cv. Sewi (25), Khunezi and Dayari. Maximum fruit yield at *doka* stage was observed in cv. Khalas (69.0kg/tree) followed by Halawy (62kg), Zahidi (42kg). Chip-chep (40kg/tree), The first time flowering/fruitletting was observed in cv. Amhat introduced from Egypt during 2009 after four years of planting. The low fruit yield (0.500g/plant) was observed in cv. Amhat due to young stage of plant. A very late maturing plant was identified in which fruits were not fully ripened even in last week of August. (Dr. R. S. Singh).

Evaluation of Bael germplasm : Out of 18 evaluated germplasm of bael, flowering and fruitletting was observed in 09 germplasm during the period. However, fruitletting in seedling types varied from 1 to 29 fruits per plant. The performance of two seedling germplasm was found better with respect to number of fruits/plant (26 to 29) and fruit shape and size. However, there was no cracking in fruits up to December month (Dr. R. S. Singh).

Technological improvement/ refinement: processes/ products and value addition of arid fruits and vegetables : During the reported period some of the unique processes of value addition and value added products of arid fruits and vegetables like dry slice and dry spicy chutney of *kachri*, spicy dry slice of snapmelon, nutraceutical bael *Supari*, sweet *beal* powder, pickle of *karonda* and some of the products of *Kinnow*, *aonla*, local *ber*, etc., were prepared, refinement and standardized for the commercial purpose on the basis of innovative hypothesis, concepts and ideas generated and collected from different sources (Dr. S. R. Meena, Dr. S. K. Maheshwari and Dr. B. D. Sharma)

Fig. Nutraceutical bael *Supari* Fig. : Pickle of *karonda*

The concept of "metre height *in-situ* budding in khejri": During the different front line demonstrations of improved variety (*Thar Shobha*) of khejri on farmers' fields, it was observed that the growth of nursery based budded plants of *Thar shobha* were very slow and the height of the same was also small which reduce the practical utility of the orchard of *Thar shobha* on farmers' field conditions or as a component of the farming system followed in hot arid zones of western Rajasthan. Keeping the above facts in mind, the budding of improved variety of khejri "*Thar shobha*" was tried on *in-situ* (on farmers' fields) local plants of khejri having different heights. It was found that the budding of improved variety of khejri "*Thar shobha*" which was done at the "metre height" on *in-situ* plants were best with respect to successfulness of budding, growth of plant with smooth trunk and desirable height of the so budded plants (Dr. S. R. Meena)

2. At Godhra (Gujarat)

Identification of Thar Kamal variety of Karonda : The Thar Kamal variety of Karonda was identified and tested under field conditions for 9 years (2005-2014). The performance of selection was tested in respect of flowering pattern, fruitletting and fruit quality attributes. It is spreading type, starts flowering in 3rd year, regular bearer, ripens in the month of June and recorded 4.97 g average fruit weight, 93.64 per cent pulp and 9.54° Brix TSS. Fruit yield per plant was recorded 13.00 kg during 9th year of orchard life under rainfed conditions of hot semi-arid ecosystem (Dr. S. Singh)



Fig. : Mature fruits of Thar Kamal variety of Karonda

Salient features of identified promising genotypes of bael :

Genotype "CHESB-5" : An identified promising genotype CHESB-5 was collected from Uttar Pradesh State and *in-situ* budding was performed during 2006. It is superior genotype with desirable characters like earliness, compact growth, medium height, very less spine, better yield with quality fruits and pleasant flavour with attractive colour of pulp. It started flowering and fruiting from 4th year of budding. Plant height, stem girth, plant spread was recorded 5.75 m, 44.62cm and 5.55 m, respectively during 7th year of orchard life. Average yield 68.11 kg in 7th year, fruit weight 1.60 kg, fruit size 21.60 cm x 15.18 cm, fruit girth 45.69 cm, shell thickness 2 mm, total number of seed 130, per seed weight 0.15g, total seed weight 33.10g, fibre weight 64 g, shell weight 260g, locules in cross section 13-16, pulp 69.50%, TSS pulp 35⁰B, TSS mucilage 49.50⁰B, acidity (0.27%) and vitamin C 19.80 mg / 100 g pulp were recorded. It is an early maturing variety (2st fortnight of February). The fruits of this genotype is less affected by sun scald owing to compact and luxuriant growth of plant. It is highly suitable for dryland conditions.

Genotype "CHESB-8" : An identified promising genotype CHESB-8 was collected from Uttar Pradesh State and *in-situ* budding was performed during 2008. It is superior genotype with desirable characters like earliness, compact growth, medium height, spiny, better yield with quality fruits and pleasant flavour with attractive colour of pulp. It started flowering and fruiting from 3rd year of budding. Plant height, stem girth and plant spread were recorded 4.45 m, 37.42 cm and 4.10 m, respectively during 6th year of orchard life. Average yield per plant 48.13 kg in 6th year, per fruit weight was 2.15 kg, fruit size 16.12 cm x 16.05 cm, fruit girth was 51.50 cm, shell thickness 0.19cm, total number of seed 72, per seed weight 0.25g, total seed weight 22.15g, fibre weight 120.18 g, shell weight 365.12g, locules in cross section 13-16, pulp 69.50%, TSS pulp 39⁰B, TSS mucilage 49.90⁰B, acidity (0.28%) and vitamin C 19.80 mg / 100 g pulp were recorded. It is an early maturing variety (1st week of March). The fruits of this genotype is having good flavour and aroma. It is highly suitable for *sherbat* and squash and powder making.

Genotype "CHESB-11" : An identified promising genotype CHESB-11 was collected in 2009 from Uttar Pradesh State and *in-situ* budding was performed during 2009. It is a superior genotype with desirable characters like compact growth, medium height, spiny, better quality fruits and very

excellent flavour with attractive yellowish orange colour of pulp. It started flowering and fruiting from 3rd year of budding. Plant height, stem girth, plant spread was recorded 3.98 m, 34.15cm and 3.70 m, respectively during 2014. Average yield per plant 41.30 kg in 5th year, fruit weight 1.58 kg, fruit size 15.15 cm x 15.55 cm, fruit girth 46.50 cm, shell thickness 0.24cm, total number of seed 82, seed weight 0.22g, total seed weight 25.45g, fibre weight 140.68 g, shell weight 250.12g, locules in cross section 14-17, TSS pulp 38⁰B, TSS mucilage 48.80⁰B, acidity (0.27%) and vitamin C 21.80 mg / 100 g pulp were recorded. It is a medium maturing variety (1st week of April). The fruits of this genotype is having good flavour and aroma. It is highly suitable for *sherbat* and *murabba* making (Dr. A. K. Singh)

EXTENSION ROGRAMMES/ACTIVITIES

1. At Bikaner

Visit and interaction/ meetings at the Institute : During the reported period > 100 farmers, students and agricultural supervisors, professionals, lecturers, teachers, scientists/trainees, etc. were visited to the Institute.

Visit to farmer's fields and interaction/meetings with them: More than 12 of farmer's fields were visited. They were interacted and provided with technical guidance / assistance to overcome their problems related to arid horticultural crop production.

Research-extension-farmers-interface meetings: During the reported period, there were held 09 Research-Extension-Farmers-Interface Meeting with 09 groups of farmers during their exposure visit at the Institute, farmer's field visits, during survey work, at the site of front line demonstrations, exhibitions and during the other programmes. Moreover, some of the Farmer's Interest Groups / Commodity Interest Groups/ Self-Help Groups were also organised at the different sites/ locations/ villages of Bikaner district (Rajasthan).

Front line demonstrations/ adaptive trials: During the reported period, two frontline demonstrations of each improved varieties of vegetable crop *viz.*, - AHS-82 (snap melon), AHK- 119 (Kachri) and two frontline demonstrations of improved variety of khejri (Thar Shobha) were conducted on farmers fields. In addition, 11 method demonstrations on improved agro-techniques of arid fruits and vegetable production were given to visiting farmers/ extension functionaries or during farmer's field visits/ interaction.

Farmer's trainings: During the reported period, four farmer's training programmes (on/off campus) were organized.

Organization of Technological Exhibitions : During the reported period, 02 exhibitions of improved technologies of arid horticulture was organized (at *Jalwali* village of Bikaner district on 16.07.14 on the occasion of celebration of ICAR Foundation day and Lunkarnsar, Bikaner on 03.10.2015).

Providing technical literature: More than 150 copies of technical folders and bulletins (technical literature) were provided to the farmers /extension workers/ NGOs, during their visit, farmer's fair, exhibitions, meetings, etc.

Mobile advisory service/ ICT based/ e-extension based activities: During the reported time, various farmers were answered & guided using mobile service, online telephonic

conversation to solve their existing problems related to horticultural crop production. Some advance farmers were rendered technical guidance through e-mails. Besides, other activities included Institute's film show on computer system/TV for client's knowledge, production of online (Institute's website) technological news through six monthly news letter, providing CD/DVD of the Institute's film and other programmes to needy clients, etc.

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, off campus interactions, etc. **(Dr. S. R. Meena, Dr. R. S. Singh, Dr. D. K. Samadia and Dr. D. Singh)**

At Godhra (Gujarat)

KVK Programmes and activities: During the reported period, Krishi Vigyan Kendra, Panchmahal (Godhra), Gujarat working under the ICAR-CIAH, Bikaner (Rajasthan) conducted 08 On Farm Trials (OFT), 14 Front Line Demonstrations (FLD) with 220 method demonstrations on various crops. The KVK conducted 38 training programs also on Agricultural and allied fields through which altogether, 775 farmers benefited, out of them 515 were male and 260 were female beneficiaries.

Other extension activities: Field Days (02 Nos.), Farmer Scientist interaction (03Nos.), Kisan Goshthi (02No.), Exhibition (03 Nos.), Film Shows (35 Nos.), method demonstrations (15), farmers' visit to KVK (20), scientists, visit to farmers' fields (28), advisory service (1060, animals' health camp (2), lectures delivered in training programmes (1500, radio talk (12), production of extension literatures (12), telephonic help lines (250), review meeting (03), etc.

Celebration of days/ programmes

- **Celebration of ICAR Foundation day:** ICAR Foundation day was celebrated at *Jalwali* village of Bikaner district on 16.07.14 in collaboration of NRCC, Bikaner, RRS of CSWRI, Bikaner, RRS of CAZRI, Bikaner, RRS Equine, Bikaner.
- **Celebration of Agriculture Education Day:** On 23.07.14 the *Agriculture Education Day* was celebrated in the Institute in which about 60 students and teachers from different schools of Bikaner were participated.
- **Celebration of Farm Innovators Day:** The Farm Innovators Day was celebrated in *Sinthal* village of Bikaner district on 09.10.2014 in which more than 200 farmers and students participated.
- **Celebration of ICAR Industry Day:** The ICAR Industry Day was celebrated at the Institute on 18.12.2014
- **The celebration of foundation day of KVK:** The foundation day of KVK Godhra, Gujarat was celebrated on 01.10.2014.

Visit of VIPs/ Higher Dignitaries at the Institute

- Dr. S.L. Mehta, Ex. V.C., MPUAT, Udaipur visited the Institute on 19-20.08.2014
- Dr. B.B. Vashishtha, Ex. Director, NRCSS, Ajmer visited the Institute on 19-20.08.2014
- Dr. Y.N. Reddy, Member, Ex- Principal Scientist & Head, IIHR, Bangalore visited the Institute on 19-20.08.2014
- Er. M.D. Singh, Ex. Principal Scientist, CISH, Lucknow, U.P visited the Institute on November, 2014
- Dr. M.M. Roy, Director, CAZRI, Jodhpur visited the Institute on 15 November, 2014
- Dr. S.K. Malhotra, Horticulture Commissioner, Govt. of India, New Delhi visited the Institute on 05.11.2014
- Dr. Govind Singh, Director of Research, SKRAU, Bikaner visited the Institute on 25.11.2014

Important Meetings held

XIXth Research Workers Group Meeting of All India Coordinated Research Project on Arid Zone Fruits : XIXth Research Workers Group Meeting of All India Coordinated Research Project on Arid Zone Fruits was held w.e.f. 12th to 14th December, 2014 at Sri Karan Narendra Agriculture University, Jobner-Dist., Jaipur (Rajasthan). Dr. NK Krishna Kumar, Deputy Director General (Horticulture Science), ICAR, New Delhi was the Chief Guest and Dr. G. L. Keshwa, Dean, SKNCOA, Jobner has presided over the inaugural function of the meeting. Dr. K. Rama Krishna, Director of Research, SKNAU and Dr. S. K. Sharma, PC, AICRP on AZF were the Guest of Honour in the function. Dr. S. K. Sharma, PC, AICRP on Arid Zone Fruits has presented the progress report of last one year of the project. Dr. NK Krishna Kumar, Deputy Director General (Horticulture Science), ICAR, New Delhi has stated in his address that production of horticultural produced is nearly 282 million tones which is more than the production of cereal crops in the country. The horticulture particularly, arid and temperate horticulture are the hope of the country where quality production and productivity can be enhanced. These horticultural crops require less water and give more income to the growers in comparison to cereal crops. He called the scientists working in the scheme to develop less water requiring varieties, tissue culture protocol of hard to root crops, grading, packaging of post harvest produce, bio-food safety standards, and efficient use of water and nutrient of arid horticultural crops. Dr. K. Rama Krishna, Director of Research, SKNAU also addressed about the production potential of the arid fruits of the area. Dr. G. L. Keshwa, Dean, SKNCOA, Jobner in his presidential address has expressed his view that this meeting will be beneficial for the students, research scholars and scientists of this university. In the function, two publications namely *Three decades of Research in Arid Zone Fruits (1984-2014)* and *Production Technology of Arid Fruits* were released by the dignitaries. After discussion at length, six recommendations have been emerged out. The technical programmes of different experiments were also finalized for the next year in the meeting.



Fig.: Dr. N. K. Krishna Kumar Deputy Director General (Hort. Sci.) addressing at the inaugural session of the meeting.

RAC Meeting: The Research Advisory Committee meeting of the Institute was held during 19-20 August, 2014 at the Institute under the Chairmanship of Dr. S. L. Mehta, Former Vice Chancellor (MPUAT, Udaipur), DDG (Education.), ICAR, New Delhi. The committee critically reviewed the achievements and plan strategy for development of the institute. The Chairman was of the opinion that the major thrust of the Institute should be on the development of protocol for date palm tissue culture, water budgeting and pressurized irrigation, production of hybrids in vegetables, use of solar tunnel dryer for dehydration, processing and value addition in crops handled by the institute and production of demand based quality planting material of budded grafted *Khejri* and other crops.

Visits/ meeting attended by the Director of the Institute.

(a) Dr. S. K. Sharma, Director of the Institute visited the following AICRP centres during the reported period

- Anantapur centre from on 26-29th January, 2015.
- Ambajogai Centre from 6-7th February, 2015.

(b) Dr. S. K. Sharma, Director of the Institute monitored the work progress/ attended/ participated in the following meetings during the reported period

- Participated in the Meeting of ICAR Foundation Day and Vice Chancellors and Directors conference held at NASC Complex, New Delhi during 29-30 July, 2014.
- Visited Delhi and met to Director (Works) ICAR, New Delhi regarding vetting of works under the Plan Scheme and to DDG (Hort. Sci.) ICAR, New Delhi, regarding Institute matters on 04.09.2014. Visited Krishi Bhawan regarding Compound Wall of Institute on 05.09.2014 and attended a meeting at NASC, New Delhi on 08.09.2014.
- Participated in the Regional Committee-VI Meeting at AAU, Anand on 13.09.2014.
- Participated in the meeting related to Vision-2050 at KAB-II, New Delhi on 25th November, 2014 under the chairmanship of DDG (Hort. Sci.) and attended the meeting pertaining to Vision-2050 on 26-27th November, 2014 under the chairmanship of Hon'ble DG & Secretary, DARE, ICAR, Krishi Bhawan, New Delhi.

- Conducted Research Workers Group Meeting of AICRP on Arid Zone Fruits, at Jobner (Jaipur) during 12-14th December, 2014.

HRD ACTIVITIES

(a) Organization of winter school/ short course

- Organization of a ICAR Sponsored 21 days winter school on Hi-tech interventions in fruit production for enhancing productivity, nutritional quality and value addition at the Institute during 05- 25 November, 2014

• Organization of 10 days short course training:

Organization of a ICAR Sponsored 10 days short course training programme entitled "Advances in water management and fertigation for fruit and vegetable crops in hot arid region of India" at the Institute during 22nd September to 01st October, 2014.

(b) Participation/ attending the training programmes/ seminar/ symposium/ workshops, etc.

- Dr. Dhurendra Singh participated in workshop on "Disposal of appeal under Right to Information" on 14-08-2014 at ISTM, Deptt. of personnel, public grievances & pensions, Govt. of India, New Delhi.
- Dr. P.N. Sivalingam participated in "Second International Conference on Bio-resource and stress management" at Hyderabad during 07-10 January 2015 and presented research work on "Differential expression of transcripts during low moisture stress in *Ziziphus nummularia*."
- Dr. Hare Krishna participated in "Silver Jubilee Symposium on Strategic Approaches for Horticulture Research, Education and Development-Way Forward" from 26.12.2014 to 27.12.2014 at NAAS, New Delhi.
- 2. Dr. Hare Krishna participated in Regional Regional Training & Awareness Program on J-Gate@CeRA at NASC, New Delhi on 29.09.2014.
- Dr. Raj Kumar, SMS (Hort.), KVK, Godhra, Gujarat, participated in winter school entitled "Hi-tech intervention in fruit production for enhancing productivity, nutritional quality and value addition "organized at Central Institute for Arid Horticulture, Bikaner (Rajasthan) 334006 from 5th to 25th November 2014.
- Dr. S. K. Sharma, Director of the Institute, visited CAZRI, Jodhpur for monitoring the progress of Date Palm Tissue Culture Project; acted as Chief Guest in the Model Training Course on "Efficient Supply Chain Management and Marketing of Horticulture Produce in Dry Region"; deliver inaugural address on "Scope of horticulture in arid region" on 01 September, 2014.
- Dr. S. K. Sharma, Director of the Institute Participated and acted as Co-Chair in the Technical Session on NRM during National Seminar on "Emerging Problems in Potatoes" w.ef. 1-2 Nov., 2014.
- Dr. Raj Kumar, SMS (Hort.), KVK, Godhra, Gujarat, participated in short course entitled "Advances in water management and fertigation for fruit and vegetable crops in hot arid region of India" sponsored by ICAR, conducted at CIAH, Bikaner from 22nd September -01st October, 2014.

- Dr.A. K. Rai, SMS (Soil Science), KVK, Godhra, Gujarat, participated in short course entitled Advances in water management and fertigation for fruit and vegetable crops in hot arid region of India” organized by Central Institute of Arid Horticulture, Bikaner (Rajasthan) 334006 from 22nd September to 1st October, 2014.
- Dr. S. K. Sharma, Director of the Institute visited CSWRI, Avikanagar for participating in National Sheep and Wool Fair-2014 on 12.11.2014.
- Dr. S. K. Sharma, Director of the Institute deliver a lecture in the National Symposium at Ludhiana on 18.11.2014
- Dr. Pinaki Acharyya participated in the “Refresher Course on Agricultural Research Management” at NAARM, Hyderabad during July 14-26, 2014.
- Dr. S. K. Sharma, Director of the Institute attend the National Seminar on Underutilized fruits at CHES Chettalli and delivered a lecture to the participants during 30th November to 03rd December, 2014.
- Dr. S. K. Maheswari, attended Management development programme on PME for Agricultural Research Projects during 04-08th August, 2014 at NAARM, Hyderabad.
- Dr. S. K. Maheswari, attended a training on nursery management in citrus from 07 to 09th October, 2014 at National Research Centre for Citrus, Nagpur
- Dr. S. K. Sharma, Director of the Institute attended the NAAS Silver Jubilee Symposium on Strategic Approaches for Horticulture Research, Education and Development - Way Forward during 26-27th December, 2014 at New Delhi.

PERSONALIA

Awards/Prizes/ Recognitions

- Dr. B. R. Chaudhary, Sr. Scientist (Vegetable Science) received second prize in Hindi Bhasha Ghyan competition during Hindi Awareness Week organized by ICAR-CIAH, Bikaner from 8-15 Sept., 2014.
 - Dr. P.N. Sivalingam, Scientist (Biotechnology) was awarded with best oral for the presentation of a research paper “Differential expression of transcripts during low moisture stress in *Ziziphus nummularia*” in International Conference on Second International Conference on Bio-resource and stress management at Hyderabad during 07-10 January 2015.
- Dr. S. R. Meena, Sr. Scientist (Agricultural Extension) was awarded with Third best oral presentation of a research paper entitled “Eco-friendly pesticides traditionally used to protect the horticultural crops from the attack of insect-pests in hot arid regions of western Rajasthan” in International conference: Changing scenario of pest problems in Agri-horti-ecosystem and their management held at Department of Entomology, MPUAT, RCA, Udaipur during 27-29 November, 2014.

STEPS IN POPULARIZATION AND COMMERCIALIZATION OF TECHNOLOGIES: SUCCESS AND FEEDBACK.

Development of a unique orchard of arid fruit crops by a farmer in desert area of western Rajasthan : A success story:

Sh. Narendra Kiradu belongs to 22 KYD, Tehsil- Khajuwala, District- Bikaner, and Rajasthan. He is a progressive farmer. Academically, he is technical person. He is diploma holder in electrical engineering. Being an engineer, he was very interested in horticultural crop production. He did not bother about Government or private job in the field of engineering and decided to establish orchard of horticultural crops like kinnow, *aonla*, *jamun*, *bael* and other trees on his field situated in Thar desert of western Rajasthan.



Fig. The progressive farmer Sh. Narendra Kumar Kiradu explaining success story of his orchard development to Dr. S. K. Sharma, Director and scientists of the Institute (ICAR- CIAH, Bikaner)

After a long planning and discussion with experts, he started plantation of kinnow with 1.5 ha on his field (situated at 22 KYD, Tehsil- Khajuwala, District- Bikaner, Rajasthan) in 1996. After that he planted NA-7 improved variety of *aonla* with 0.5 ha on his field. He further expanded the plantation of *Kinnow*, *aonla*, lime, *jamun*, *bael*, etc. He adopted the square system of plantation of above crops using drip irrigation system in his entire orchard. Presently, he has 1472 healthy plants of *Kinnow*, 104 plants of *aonla*, 22 plants of *jamun*, 08 plants lime, 05 plants of *bael* and some other plants in his wonderful orchard. He also has a well developed nursery of arid fruit crops. He said "presently, I am earning gross income of rupees 10-12 lakhs per year from my orchard". He uses the Indira Gandhi canal water as source of irrigation for survival of his orchard. He mentioned that under the technical guidance of research Institutions like ICAR- Central Institute for Arid Horticulture, Bikaner, Rajasthan and Rajasthan state Government," I have developed my above orchard. However, presently, he is feeling shortage of irrigation water and electricity to maintain his orchard and facing some problems in selling produces of his orchard in local market to get remunerative price of his produces. He showed us the needs of training and knowledge on value addition and post harvest management of his crops grown in the orchard.

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