



# संवादपत्र NEWSLETTER

गोवा के लिए भा.कृ.अनु.प. का अनुसंधान परिसर  
(भारतीय कृषि अनुसंधान परिषद)

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भारतीय कृषि अनुसंधान परिषद

*Agrisearch with a human touch*

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## From Director's Desk...

The soils of Goa are mostly lateritic (81%), which are rich in ferric aluminum oxides and reddish in color. The soil is rich in minerals and humus, thus conducive to plantation crops. Goa lies in the tropical zone and has warm and humid climate. The soils are mostly sandy loam to silt-loam texture, well drained and highly acidic (5.5 to 6.5 pH). Although soils of Goa are rich in humus and minerals, still it possesses few constraints for crop production. The Institute has carried soil fertility (macro and micro nutrients) mapping of two districts - North Goa and South Goa. The soil fertility analysis has revealed that the soils are acidic in soil reaction and have high in soil organic carbon. With regard to available N, about 81%-90% of the total area was predominantly under low category and only 10%-19% was under medium status. In the case of available P, the status was predominantly under low category (74%-82%) and 18%-26% of the area in medium category. The order of area with respect to soil available K, was as, medium (58%-77%) > high (22%-38%) > low (1%-4%). The soils of both the Districts are sufficient with respect to soil available iron, manganese and copper, however they are deficient in zinc.



A software called "STFR-Goa i.e. soil test based fertilizer recommendation" for Goa has been developed using already existing soil testing with the Institute and Directorate of Agriculture, Govt. of Goa. The similar has been launched on the Institute website (Link - <http://www.icargoa.res.in/soilgoa/index.php>) and it is being updated time to time. The farmers can get village wise soil testing data for two districts of Goa using the software and online fertilizer recommendations for different crops of Goa for selected location.

Sea water intrusion induced coastal soil salinity is one another constraint for rice production in Goa. Such soils are spread over 18000 ha and rice is a prevalent crops over 12000 ha. The rice productivity is often lower under such situation. Under Department of Science, Technology and Environment funded project the Institute has carried out characterization of the coastal saline soils locally called 'Khazan lands'. Soil pH is not a real indicator of salinity in coastal saline soils of Goa. Salinity exists under low pH situations which is rare and one of its kind only. In general, the coastal saline soils are low in soil available N and P and medium to high with respect to soil available K. The soil available micronutrients - Fe, Cu, Zn and Mn status were recorded in sufficiency ranges. Exchangeable Na was the most dominant among all cations. This causes poor physical properties of these soils. Pot and field trials are under process to improve crop productivity under coastal saline soils.

The soil degradation status of Goa shows that 163480 ha representing 44.16% of the total geographical area are affected by various soil degradation problems. The Institute has developed and studied various soil and water conservation measure for crops like cashew, mango and coconut.

The Institute has been playing an important role in understanding and managing one of the most important natural resources i.e. soil through its various research programmes.

(Narendra Pratap Singh)

## RESEARCH HIGHLIGHTS

### KORGUT: a rice landrace from Goa, registered as Unique Germplasm, for tolerance to salinity stress at seedling stage



**Korgut**, a traditional rice landrace from the State of Goa, has been registered as unique germplasm, for tolerance to salinity stress at seedling stage, with the National Bureau of Plant Genetic Resources (NBPGR), New Delhi. Plant Germplasm Registration Committee of Indian Council of Agricultural Research in its 30<sup>th</sup> meeting held on September 4, 2014 has approved 'Korgut' for registration and assigned with registration number

INGR14055. It was collected during *Kharif* 2010 in farmers' field at Chorao Island of North Goa district and being maintained at the institute farm. Phenotyping for salt stress tolerance at seedling stage under hydroponics culture with  $EC = 12 \text{ dSm}^{-1}$ , showed its tolerance (SES score 3) to salinity stress at seedling stage. The tolerance of Korgut was associated with low ratio of  $\text{Na}^+/\text{K}^+$  (0.18) in shoot as compared to susceptible check variety IR-29 (0.68). In addition,



evaluation of Korgut under natural coastal salinity conditions in farmers' field at Chorao Island (North Goa), for past four years confirmed its adaptability to coastal saline soils. Hence, this germplasm can be utilized as genetic stock in breeding program aiming at the development of high yielding salt tolerant rice varieties for coastal saline soils. The above work was carried out in collaboration with Central Rice Research Institute, Cuttack. (Dr. Manohara K.K., Scientist (Plant Breeding))

### A web portal on soil health management –Goa developed

A web portal –**Soil Health Management** - Goa has been developed by the Institute considering the importance of soil fertility, nutrient recommendation and soil health. It is an online web application developed using base data of about 20,000 soil samples. This generates information on village and Taluka wise soil fertility status of all sampled village and talukes of Goa. The information is given on parameters like soil pH, Electrical conductivity, Soil organic carbon, Soil available nitrogen, phosphorus, potassium, zinc, boron, iron, manganese, copper, etc. It gives fertilizer recommendation to annual and perennial crops as well. In case of annual crops, the recommendations given are based on soil fertility status, targeted yield and area, whereas, in case perennial crops the fertilizer recommendation are based on the soil fertility status, type of crop, age of crop and number of plant. The recommendation are given on per tree basis or given number of trees. Furthermore, final recommendations are given on the kinds of fertilizer

North Goa Talukas		
<input type="radio"/> Bardez	<input type="radio"/> Bicholim	<input type="radio"/> Pernem
<input type="radio"/> Ponda	<input type="radio"/> Sattari	<input type="radio"/> Tiswadi

South Goa Talukas		
<input type="radio"/> Canacona	<input type="radio"/> Mormugao	<input type="radio"/> Salcete
<input type="radio"/> Sanguem	<input type="radio"/> Quepem	<input type="radio"/> Darbandora

and fertilizer grades that are available in local market. The combinations of different complex and straight fertilizers are also suggested. The approximate cost for the given combination is additionally suggested to choose as per feasibility of farmer. The possible users

for this application are farmers, students, agricultural officers, zonal agricultural officers of Directorate of Agriculture, researchers, policy makers, etc. Advices on how and when to apply fertilizers are also given.

*(The application has been developed by Dr. G. R. Mahajan (Scientist (Soil Science)), Shri. Vishwajeet Prajapati (Programme Assistant (Computer), KVK), and Shri. Shashi Vishwakarma (Lab technician, KVK).*

### Rearing technique for cashew stems and root borer

Stem and root borers are the most serious pest on cashew. A semi-synthetic diet has been formulated for mass rearing of cashew stem and root borer. It comprises of cashew bark powder, agar-agar, yeast, sucrose, casein, ascorbic acid, cellulose, sorbic acid, methyl paraben, formalin, KOH, vesson's salt mixture and distilled water. The diet ingredients have been auto-claved thoroughly before the preparation of diet. Finally prepared diet was poured in to the conical flash (250 and 50 ml) or small plastic cups. Field collected eggs were kept under controlled conditions for emergence. The egg incubation period was 5 to 7 days. The first instar grubs emerged from the eggs were introduced in to the diet containing flask and plugged with cotton. Peripheral feeding activity of the grubs was observed. The grub and pupal period ranged



between 175 to 203 and 29 to 43 days respectively. *(Dr. R. Maruthdurai, Scientist (Entomology)).*

### Management of cucumber fruit fly *Bactrocera cucurbitae* with roosting crops and food baits



Fruit fly is a major pest on cucumber. Roosting crops are those crops which will attract the fruit flies before their reproduction. The adult melon flies have a special behavior of visiting and hanging around these plants. The main aim of the work is to target the roosting crops with food baits and to save the cucumber from fruit fly infestation and insecticide residues. Roosting crops like Maize, Castor, Sorghum and Co-3 fodder grass were sown in border two weeks before the main crop i.e cucumber (local variety). Food baits containing jaggary + nimbizidine (50 ml) was sprayed weekly on the roosting crops. The percentage infestation and fruit yield was recorded at each harvest. The percentage of fruit fly infestation varied from 18.25 to 26.46 in treatments and 31.30 to 37.81 in control. *(Dr. R. Maruthdurai, Scientist (Entomology)).*

### Application of lime to the soil and its effect on bacterial wilt incidence in brinjal

Four levels of lime (@2, 4, 10, 20 t/ha) was applied to soil and bacterial wilt susceptible brinjal cv. *Agassaim* plants were planted. The plants were inoculated with different levels of *R. solanacearum* inoculum. Results indicated that bacterial wilt incidence reduced in 10 and 20 t/ha lime applied

treatments in all the pathogen inoculum levels. Analysis of soil pH during the experimental time indicated that the soil pH may play a role in the disease incidence and its manipulation would help in managing the bacterial wilt incidence. *(Dr. R. Ramesh, Sr. Scientist (Plant pathology))*

## Unknown or newer sequevars of *R. solanacearum* isolates from India

Bacterial wilt caused by *Ralstonia solanacearum* is one of the important constraints in the cultivation of solanaceous vegetables in India. Sequence analysis of *egl*, *pga* and *hrpB* genes of 95 isolates and genetic diversity of 50 representative isolates was studied. Indian isolates within the Phylotype I did not group according to host or geographical location except clustering of isolates from Andaman Islands. The study revealed the presence of two major population groups within Indian

isolates. Indian phylotype I *R. solanacearum* strains are diverse including the previously described sequevars 14, 17, 44, 47, 48 and unknown/ newer sequevars. The diversity exist among the phylotype I isolates might be due to the continuous evolution process. This is the first documented report on the diversity of phylotype I *R. solanacearum* strains infecting solanaceous vegetables and the existence of unknown/ newer sequevars in India. (Dr. R. Ramesh, Sr. Scientist (Plant pathology)).

## Coconut selection for tender coconut

**Benaulim** is a coconut population native to Benaulim village of South Goa. Benaulim coconut has many special features and is an adapted landrace of Goa. The Institute has identified a single plant selection in Benaulim coconut with excellent tender coconut water traits, and copra. Tender coconuts of the plant of the Benaulim pani were harvested at 6, 7 and 8 months of maturity where the volume of the water was 300, 280 and 250 ml/nut respectively. TSS of the water was 6.86, 6.66 and 7.36 degree brix in 6, 7 and 8 months old nuts. Sodium content was 22 to 23 ppm and potassium content ranged from 1267 to 1366 mg/l. Orgnaoleptic test revealed the taste of the water with very good score. Annual yield of the selected palm ranged from 67-74 nuts/palm. Fruit component analysis of mature nuts revealed that it contains water of 160 ml/nut with 6.53 degree brix. Copra weight and dry weight of the fruits was 266 and 194 g/nut respectively. The nuts had minimal damage due to eriophyiid mite. Open pollinated seedlings of the selected palm were raised in the nursery. Observations were recorded on eight plants whose height and girth were 139 cm and 15 cm



respectively. These seedlings were planted in the main field. Selfing is initiated this year on three bunches of the palm and so far 25 fruits are set. Benaulim pani has good scope for cultivation in Goa for tender coconuts. (Dr. V. Arunachalam, Pr. Scientist (Spices, Plantation and Medicinal and Aromatic Crops)).

## Amaranth selection for root knot nematode tolerance

Nine germplasm accessions of Chinese spinach (*Amaranthus tricolor* L.) and one accession of *Amaranthus cruentus* L. were earlier evaluated for resistance to root knot nematode, *Meloidogyne incognita* (Kofoid and White) on a sick plot infested by nematodes. Significantly highest proportion of parasitism (1.0) was recorded in four accessions. One accession of *Amaranthus cruentus*, IgAtR-49 (IC-0598178) recorded low level of parasitism (0.03) by nematodes. Four accessions with varying level of parasitism were further screened in container trials with un-inoculated sterile soil and compared with soil of known amount of nematode inoculum of Old Goa isolate. The experiment was repeated



using nematodes of isolate of Varanasi. IgAtR-49 had 1.7 galls per plant whereas the number of galls per plant in other accessions varied from 13.7 to 23. Staining the root samples with acid fuchsin showed the presence of fewer nematodes and absence of eggs within the roots of IgAtR-49. Hence, IC-0598178

vegetable amaranth has potential in soils with root knot nematode (*Meloidogyne incognita*) infestation. (Dr. V. Arunachalam and Dr. R. Maruthadurai of ICAR RC Goa in collaboration with Mr. C. Sellaperumal of Indian Institute of Vegetable Research, Varanasi)

## Evaluation of noni germplasm for leaf and fruit production

A total of 131 noni (*Morinda citrifolia*) plants of 20 accessions collected from 16 locations of Goa and Coastal Maharashtra were analyzed for traits such as, number of leaves, number of fruits, leaf yield and the fruit yield produced by the plant per year during initial year of planting. Nagaon population (IC0598515) recorded highest number of leaves (413 leaves/plant/year) and also had highest annual leaf yield (2.8 Kg/plant). MPT 3 population (IC0598516) produced lowest (122) leaves/plant/year) and had lowest leaf yield (1.05 Kg/plant/year). Loutolim population (IC0598229) recorded highest fruit yield of 2.77 Kg/plant/year. The highest number fruits 67/plant/year were observed in Nagaon population (IC0598515), whereas MPT3 population recorded lowest fruit yield (11 fruits or



0.46 Kg/plant/year). (Dr. V. Arunachalam, Pr. Scientist (Spices, Plantation and Medicinal and Aromatic Crops)).

## Conservation of chilli germplasm at NBPGR, New Delhi



A chilli germplasm collected from Gadongri village of Canacona Taluka in South Goa district was regenerated. The accession was conserved as seeds at National Gene Bank at NBPGR New Delhi with national identity number IC 0610165. (Dr. V. Arunachalam, Pr. Scientist (Spices, Plantation and Medicinal and Aromatic Crops)).

## Value addition in Wax jambo and Roseapple

Wax jambo and Roseapple tree are found in Goan homestead farms. Though the trees bear abundantly during summer, most of the fruits are wasted. Hence, a trial was initiated on scope of value addition in wax jambo and rose apple. Jam was prepared from the freshly harvested fruits of rose apple and the residue after juice extraction from wax jambo. Four types were prepared from these fruits and monthly organoleptic tests (sensory evaluation scores 1-9) were conducted. The details of the four different types of jam are Wax jambo (100%), Rose apple (100%), Wax jambo (75%) + Roseapple (25%) and Wax jambo (50%) + Roseapple (50%). From the results, it is evident that, jam prepared out of 100 % wax jambo scored better than the other



types of jams prepared, over the period of six months. Also panelists scored jam prepared from Wax jambo (75%) + Roseapple (25%) for better acceptability. Homescale value addition of these fruits will reduce the wastage and spoilage and also prevent the nutritional drain. (Dr. S. Priya Devi, Sr. Scientist (Fruit Sciences)).

## Demonstration of Gladiolus as commercial cut flower crop under agro climatic conditions of Goa

An attempt was made to demonstrate and popularize gladiolus as cut flower crop under agro climatic conditions of Goa. Demonstration plots were laid out at three different locations in farmers field comprising different gladiolus varieties viz., Summer pearl, Red ginger, Jester yellow, Jester gold, Novalux yellow, Coral Sea, Charms glow, Arka Amar, Aka Gold and Darshan. The salient findings of the field demonstration conducted are briefly described here under. The vegetative, flowering, corm and cormel characters studied showed significant differences among the different cultivars. Arka Amar gave tallest plant (84.84 cm), longest (80.59cm) and broadest (3.70 cm) leaves whereas Darshan and Arka Gold gave shortest (50.23 cm) and narrowest (2.83 cm) leaves respectively. Significantly maximum number of leaves/plant (19.60) was recorded in Arka Amar. Arka Gold took least number of days for emergence of spike (57.61) and was found earliest in heading. Days required for opening of first pair of florets was least (64.43 days) in Arka Gold. Significantly maximum number of spikes (2.57) was recorded in Arka Amar. Longest spike (100.77 cm) was recorded in Darshan whereas Arka Gold produced shortest spike (88.02 cm). Maximum number of florets per spike was found in 'Darshan' (14.29), whereas minimum was observed in Arka Gold (7.73). Stalk length of the flower (3.21cm) and floret length (10.49



cm) was significantly higher in Darshan whereas flower diameter (10.17cm) and weight of individual florets (3.38 g) was found to be significantly maximum in Arka Gold. Arka Amar recorded significantly higher weight of the flower spike (69.51 g). Flower spikes lasted longest in Arka Amar (9.14 days) whereas Arka Gold exhibited minimum lasting (7.00 days). Largest corm diameter was given by Arka Amar (4.37 cm). Heaviest corm were produced by Arka Amar (35.15 g) with maximum number of corms / plant (3.17 g) and cormels / plant (32.4 no's) while Arka Gold exhibited minimum number of cormels (1.03). Cormel weight/plant was significantly higher in Darshan (1.84g). It was demonstrated at the farmer's plot that gladiolus cultivation was as a viable enterprise for farmers which improved the economic condition of farmers. (Dr. Safeena S. A., Scientist (Floriculture)).

## Performance of crossbred buffalo, cow, goat and rabbit breeds under agro-climatic conditions of Goa



Highest daily milk yield of Murrah cross buffalo was recorded as  $9.279 \pm 0.034$  lit with an overall mean value of  $7.369 \pm 0.087$  lit/ head /day. Multiple regression analysis revealed that daily milk yield was reduced by 782 ml and 285 ml per °C rise of air temperature and per % increase of relative humidity. So effect of air temperature was much higher than that of relative humidity. Average daily gain in Sahiwal and Cross bred calves was found to be  $261.13 \pm 34.10$  and  $313.11 \pm 29.80$  g/day respectively with overall mean value of  $287.81 \pm 25.05$  g / day. In goat twelve does delivered

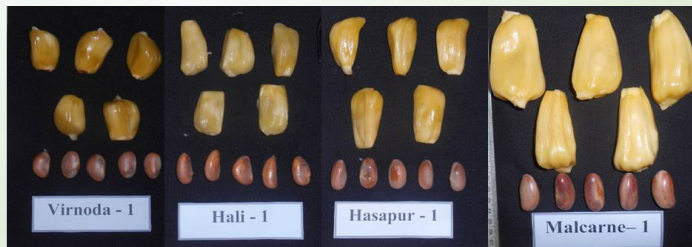
so far, out of which three twin birth (25 %) and nine single births (75%) was recorded. Highest growth was attained in Konkani Kanyal, Osmanabadi and Crossbred (K×O) goat was 162.22, 146.67 and 166.67 g/d, respectively. In rabbit twenty eight does delivered during this period with average litter size at birth  $6.22 \pm 0.19$ . Average litter weight at birth was found to be  $75.60 \pm 0.15$  g. Growth rate of grower rabbit was found to be  $17.82 \pm 0.38$  g/d. Highest litter size at birth and highest growth was observed in New Zealand White breed of rabbit. (Dr. S. K. Das, Pr. Scientist (LPM))

## NEW INITIATIVES

### Genetic Diversity of Jack fruit in Goa

In order to study the variability in jack fruit and bread fruit, a project, “Survey, collection and evaluation of Jack fruit and bread fruit in Western region” was

initiated. As a part of the project field surveys were conducted in Bicholim, Canacona, Pernem and Bardez Talukas for studying jack fruit germplasm.



### Breeding initiatives in papaya

The experiments on breeding of papaya have been initiated at the Institute. A segregating population has been developed from a promising open pollinated papaya plant. Plant height ranges from 70-284 cm, plant girth from 10-30 cm, height at which first fruit is found from 73-200 cm; the petiole colour green and purple. There is segregation into male, female and bisexual sex forms. Promising

plants have been selected based on yield, quality and tolerance to biotic stress. Either selfing or sibmating is being effected depending on the sex of the selected plant. In case of the selected plant being a pistillate, a promising staminate plant is also being selected from the population for pollination, whereas hermaphrodite flowers are bagged as such.

### Artificial Insemination (AI) reaches in field

The technology of Artificial Insemination (AI) in pigs standardised at the institute has started its effective dissemination to the field. Artificial Insemination (AI) technology was demonstrated in five pig farming units (Agasem, Aldona, Sawantawadi, Bhati and Curtorim) and actual breeding of the animals was undertaken. Estrus detection, proper timing of insemination and advantages of AI were explained to farmers. Role of AI for crossbred piglet production was also described. The Institute website also hosts a link <http://www.icargoa.res.in/AIinpigs.html> for information on different facilities and contact details.



### Project on production and formulation of bacterial bio-agents

A new project on “Production and formulation technology refinement of bacterial bio-agents for soil borne plant disease management under coastal ecosystems” was sanctioned

by ICAR-National Bureau of Agriculturally Important Microorganisms (NBAIM) sub scheme AMAAS platform for three years (2014-15 to 2016-17).

## MAJOR EVENTS

### Training programme on ornamental fish farming and aquarium fabrication



A training programme on ornamental fish farming and aquarium fabrication for women and children was organized on 8<sup>th</sup> May, 2014 at village Sangolda, adopted by Krishi Vigyan Kendra, ICAR RC for Goa, Old Goa. There is a huge untapped potential

for ornamental fish farming. The training programme emphasized on breeding and feeding of fishes, aquarium fabrication and its maintenance. As a part of the training programme practical demonstrations on aquarium fabrication, settings etc. were given. Dr. Narendra Pratap Singh, Director ICAR RC for Goa highlighted the development of ornamental fisheries sector and explained that under the National mega seed project many activities like breeding and sales of ornamental fishes, live feed development etc are going on in the Institute. He further explained that ornamental fisheries sector can be managed without any large investment or intensive labour. The training was organized and coordinated by Shri H.R. Prabhudesai, SMS-Agronomy, Ms. Manju Lekshmi, N. Scientist (FRM) and KVK in collaboration with the NGO “Green Growth Institute”.

### Participation in the Goa Mango Festival 2014

The Institute participated actively in the Goa Mango Festival-2014 organised by the Directorate of Agriculture was inaugurated on 13<sup>th</sup> May, 2014. The programme experienced the presence of Honourable Governor of Goa, Shri. Bharat Vir Wanchoo, Mathew Samuel, Secretary of Agriculture, Govt. of Goa, Dr. Narendra Pratap Singh, Director, ICAR Research Complex for Goa and Shri. P. Tufani, Director, Directorate of Agriculture, Govt. of Goa. The festival has been organized with an objective to verify the different varieties of mangoes in Goa. During the festival around sixty varieties of mangoes were displayed. The KVK, ICAR RC for Goa exhibited 35 local and introduced mango varieties. Samples of important pest and diseases and value added products of mango are also displayed. Practical demonstrations



on mango grafting were given to interested farmers during the festival.

### Training and demonstration programme on bypass fat

A training and demonstration programme for dairy farmers of Goa was held at ICAR Research Complex for Goa, Old Goa on 23<sup>rd</sup> May, 2014 under the Rashtriya Krishi Vikas Yojana (RKVY) funded project ‘Production and supplementation of bypass fat to dairy animals for enhancement of milk production and

livelihood security of dairy farmers of Goa’. About 50 delegates including dairy farmers from different Talukas, officials from Directorate of Agriculture, Directorate of Animal Husbandry and Veterinary Services and Goa State Co-operative Milk Producers’ Union Limited (Goa Dairy) of the state participated in



the above training and demonstration programme. Shri P. Tufani, Director of Agriculture and Nodal Officer, RKVY, Govt. of Goa was the chief guest; while Shri Vithoba D. Dessai, Chairman, Goa Dairy and Dr. S. K. Singh, Director, NBSS & LUP, Nagpur were the Guests of Honour. The delegates were trained for 'production and supplementation of bypass fat to dairy animals for enhancement of milk production and livelihood security of dairy farmers of Goa' through technical presentations and practical demonstrations. Indigenously produced bypass fat at the Institute was provided to the dairy farmers at a fixed rate for feeding their dairy animals and were requested to give their feedback. The programme was organized by Dr. P.K. Naik, Sr. Scientist (Animal Nutrition), ICAR RC for Goa, Old Goa.



## Technology demonstration on mussel culture



ICAR Research Complex for Goa initiated demonstration on mussel (green mussel, *Perna viridis*) culture on about 500 sq. m. semi enclosed water body of Mr. Antonio Bosco Menezes, an entrepreneur in Goavelha on 29<sup>th</sup> November 2013. The rack culture method was followed by constructing a structure with dimension 5×5 m made of bamboo poles. The demonstration conducted was a part of the Institute project on "Development of Coastal mariculture in brackish water areas of Goa". Regular monitoring and advisories through scientific

biweekly sampling procedure was followed. The physico-chemical and biological parameters of water and sediment were monitored regularly. Moreover, growth, length-weight progression and meat quality of mussels were monitored. The mussels reached an average weight of 32.5g in 6 months of culture. After culture period, mussels were harvested on 28/05/2014. The farmer has got reasonably high production of about 186 kg from 60 kg mussel seed. The mussels were sold at a price of Rs. 5/each. The total production cost for the culture operation of a single rack was Rs. 12,000. The total returns and net profit from the operation were Rs. 28,510 and Rs.16, 510, respectively. The culture operation has revealed enterprising results for the coastal mariculture in Goa. This method is found to be eco-friendly as there is no involvement of additional nutrient inputs to the culture system. The mussels will thrive on the plankton which enters through the tidal forcing by filter feeding. The demonstration was organized and coordinated by Manju Lekshmi. N., Scientist (FRM) and Sreekanth G.B., Scientist (FRM).

## Training programme on "Improved methods for nursery production and cultivation of horticultural crops"

A training program on "Improved Methods for nursery production and cultivation of vegetable, flower and fruit crops cultivation" under Tribal Sub plan funded project on "Naturally ventilated greenhouse for seedling production and crop cultivation for providing livelihood opportunities for Tribal of Goa" was conducted on 18<sup>th</sup> June, 2014 at temple hall of

Malcoponwado, Malkarne, Quepem Taluka Goa. A total of 29 farmers of various Self Help Groups (SHGs) of Macopon and Malkarne attended the same. There were deliberations on different themes like improved methods of vegetable cultivation, protected cultivation, improved methods for fruit tree propagation and nursery production, flower

nursery management and floriculture and structures for protected cultivation of horticultural crops by scientists from the institute. Hybrid seeds and inputs were distributed to the members of the SHGs. The training was organized and coordinated by the Dr. Mathala Juliet Gupta, Scientist (AS&EM), and Dr. M. Thangam, Sr. Scientist (Vegetable Sciences).



## Interface meeting with Developmental Departments



The interface meeting between ICAR and Directorate of Agriculture, Directorate of AH and VS and Directorate of Fishery, Govt. of Goa was held on 20<sup>th</sup> June, 2014 at ICAR Research Complex for Goa, Old Goa. The meeting had presence of Dr. Narendra Pratap Singh, Director, ICAR Research Complex for Goa, Chairman, Shri P Tufani, Director, Directorate of Agriculture, Govt of Goa, Chief Guest, Dr U. V. Pednekar, Asst. Director, Directorate of AH and VS, Govt. of Goa and Mr. Hrishikesh

Pawar, Superintendent, Directorate of Fisheries, Govt. of Goa were the guest of honour. Around 30 officials from Directorate of Agriculture, Directorate of Animal Husbandry and Veterinary Service, Directorate of Fisheries, Govt. of Goa, Goa Dairy, Curti, Ponda and TERI, Bambolim and 25 officials from ICAR Research Complex for Goa attended the meeting. The chairman of the meeting mentioned about developing Goa as an educational hub including starting an agriculture college or university in the state of Goa. Shri. P. Tufani, Director, Directorate of Agriculture, Govt. of Goa elaborated the problem faced in the important crops and areas of agriculture in Goa viz., Mango, Kokum, Spices, Nutmeg, protected cultivation and requested the scientists of ICAR RC for scientific solutions and to develop suitable technology. The salient achievements of last one year were then presented by Section In-Charges, ICAR – RC for Goa. Dr. S. K. Das, Pr. Scientist (LPM), ICAR RC for Goa, co-ordinated the Interface meeting.

## Training Program on “Power Tiller Operation and Maintenance”

A training program on “Power tiller operation and maintenance” under Tribal Sub plan funded project on “Agricultural Mechanization Program for Small and Marginal Tribal Farmers of Goa” was conducted on 21<sup>st</sup> June , 2014 at research farm of ICAR Research Complex for Goa, Ela, Old Goa by Dr. Mathala Juliet Gupta, Principal Investigator of the project. A total of 42 farmers (29 men and 13 women) who were from 18 Farmers /Self Help Groups from 18 wado belonging to Cotigaon, Gaodongrim, Karvem and Barddem of Canacona taluka and Morpirla, Dabem, and Karvem of Quepem Taluka participated in the same. On the occasion, Mr. Talbert Frank of Ms. Goa Tractors Tillers Agencies gave a lecture on Power tiller and its various attachments, applications, servicing, common mistakes made by farmers during use and its servicing. The farmers were then individually taught to use the power tiller and mini rotary tillers in the wetlands at



the research farm of the ICAR Research Complex for Goa. The training was organized and coordinated by the Dr. Mathala Juliet Gupta, Scientist (AS&EM).

## Training on Jack fruit: Value Addition as an enterprise for farm women

ICAR Research Complex for Goa organised a training - “Training on Jack fruit: Value Addition as an enterprise for farm women”, during 25<sup>th</sup> to 27<sup>th</sup> June, 2014, under the Project, “Empowering Tribes of Goa with post harvest machinery for processing and value addition in minor fruits”. The training programme was funded by Tribal Sub-Plan, Ministry of Tribal Welfare, Govt. of India. The Institute has trained and ensured capacity building to tribal self help groups by providing processing machinery to the groups. During the training, demonstration on preparing different products (twelve) of Jack fruit was given. They were also given hands on training for operation of the processing machinery, bulk production, packaging and labelling. Besides, Mrs. Iva Fernandes, resource person from Department of Food and Drugs, Panjim has given a lecture on “Significance, modalities and advantages of FSSAI license for value added products”. During the valedictory session, chief guest Dr. Narendra Pratap Singh, Director, ICAR RC for Goa, encouraged all participants to come forward and make good use of



the facilities rendered by government. He also stressed the importance of financial self dependence for women that will facilitate to lead a stress free life. The training programme was organised by Dr. S. Priya Devi, Sr. Scientist (Horticulture), ICAR RC, along with Dr. Mathala Juliet Gupta, Scientist (AS&EM), ICAR RC and Mrs. Sunetra Talailikar, SMS (Home Science), KVK, North Goa.

## Distribution of machinery to beneficiaries under Tribal Sub Plan, Govt. of India

A program was arranged on 5<sup>th</sup> July, 2014 for distribution of farm machinery viz. 12 Power tillers (13 Hp), 6 Power tillers (9 Hp) with all accessories including Mould board plough, cage wheels, rotavator, cultivator etc. and 6 mini rotary tillers to 225 farmers of 18 wards belonging to Gaodongrim, Morpirla, Cotigaon and Cola under Agricultural Mechanization Programme for Small and Marginal Farmers of Goa under Project leadership of Dr. Mathala Juliet Gupta, Scientist (AS&EM). Similarly, five sets of processing equipment viz., Jackfruit cutting machine, jackfruit Chips cutter, kokum cutting Machine, Electric Cabinet dryer, Mini mill, sealing machine, wet-grinder and utensils and cutlery worth were distributed to about 100 farmers of Gaodongrim, Poinguinim, Morpirla, Mardol, Priol and Karmali under the project “Empowering Tribes of Goa with Post-Harvest Machinery for Processing and Value Addition in Minor Fruits” headed by project leader, Dr. S. Priya Devi, Sr. Scientist (Horticulture). Dr. Narendra Pratap Singh, Director, ICAR RC for Goa and Shri. Narendra Sawaikar, Hon’ble MP, South Goa appreciated the efforts of scientists and enthusiasm of the farmers and



urged them to focus on the strategic development of agriculture in the state through mechanisation. The programme was organized and coordinated by the Dr. Mathala Juliet Gupta, Scientist (AS&EM) and Dr. S. Priya Devi, Senior Scientist (Fruit Sciences).

## Foundation Day Celebration



ICAR Research Complex for Goa, Old Goa, celebrated the ICAR Foundation Day on 16<sup>th</sup> July, 2014 at KVK Old Goa. On this occasion “Small and Marginal Farmers Meet on Integrated Farming System” was organized. The event was attended by 110 farmers from different adopted villages of KVK – North Goa. The event was chaired by Shri Deepak Dhavalikar, Hon. Minister for Cooperation, Govt. of Goa. He appreciated the role

of Scientists and KVK officials in developing new agricultural technologies and transferring them to the farmers over last few decades. Further, he urged the farmers to take up agriculture as an enterprise for the development of the state. Shri Pandurang Madkaikar, Hon. MLA, Kumbharjua, requested the farmers/youth to take up agriculture in the state which has the highest subsidy component in comparison with the national status. Dr. Narendra Pratap Singh, Director, ICAR Research Complex for Goa presented the highlights of ICAR system in India and the role played by the organization in securing food security. He advised the farmers to take up the advantage of the ICAR Institute and KVK to enhance the growth of agriculture in Goa. Shri Prakash Amonkar, Sarpanch, Old Goa and Smt Sandra Fernandes, Director, Green Growth Institute, Sangolda, also addressed the gathering. At the outset Shri Vishram Gaonkar, Programme Coordinator In-charge, KVK welcomed the dignitaries and the farmers from different adopted villages. Farm machinery and implements were distributed during the occasion to the tribal farmers of Veling village.

## The First meeting of VII Research Advisory Committee (RAC)

The first meeting of the VII RAC was held during 18<sup>th</sup> to 19<sup>th</sup> July, 2014 at ICAR Research Complex for Goa, Old Goa. The meeting was chaired by Dr. R. B. Deshmukh, Chairman, RAC and accompanied by the members; Dr. N. Sarangi, Dr. D. P. Waskar, Dr. P. Indira Devi, and Dr. I. D. Tyagi, Dr. Narendra Pratap Singh and Dr. M. Thangam, Sr. Scientist and Member-Secretary. At the outset Dr. Narendra Pratap Singh, Director of the Institute offered welcome address and highlighted the research carried out at this Institute. Then Chairman of RAC, Dr. R. B. Deshmukh addressed the gathering. A presentation of action taken report on



recommendations of last RAC meeting was made by Dr. M. Thangam, Member-Secretary. Deliberations were made by all the scientists and Programme Coordinator, KVK on research and extension activities carried out during the last year.

## Visit of Union Minister of Agriculture to the Institute

Honourable Shri. Radha Mohan Singh, Union Minister of Agriculture, Govt. of India visited ICAR Research Complex for Goa on 3<sup>rd</sup> August 2014. During the visit, he was appraised about the Institutional activities through exhibition of various technologies developed at the Institute. He visited the laboratories of the Institute and was explained about the ongoing research work. On the occasion, Dr. Narendra Pratap Singh, Director, ICAR Research

Complex for Goa welcomed the Hon. Minister which was followed by a brief presentation about the history, research and extension activities of the Institute. The Union Minister launched ‘Soil Health Management - Goa’ website on this occasion. He stressed upon dissemination of technologies as ‘Lab to Land’ for improving livelihood of the farmers. The programme was also attended by Shri. Narendra Sawaikar, MP, South Goa, Scientists, Technical and Administrative



Staff of the Institute and KVK staff of North & South Goa, State Government Officials, representatives of press and media, etc. The Hon. Minister released two publications – 1. Annual Report of ICAR RC for Goa – 2013-14 and 2. Handbook on Freshwater Aquaculture during the programme. The Hon. Minister visited experimental farms, units and demonstration plots of the Institute and Krishi Vigyan Kendra. The Union Minister appreciated the research work and extension activities being carried out by the Institute. Further the minister suggested that personal involvement in the day-to-day research is very crucial for the success of various programmes.

## Training programme on mariculture technologies

A training programme on mariculture technologies was conducted by the fisheries section of ICAR Research Complex for Goa under the National Fisheries Development Board funded project on August 6, 2014. Around 15 participants from Madkai and Canacona areas attended the training programme. The programme highlighted the importance of mariculture in Goa with particular reference to mussel and oyster culture. Dr. Narendra Pratap Singh, Director, ICAR Research Complex for Goa welcomed the participants and sensitized them about the importance of mariculture in Goa. Ms. Manju Lekshmi N., Scientist (FRM) and Mr. Sreekanth G. B., Scientist (FRM) co-ordinated the training programme.



## Twenty fifth Institute Research Council (IRC) meeting



The twenty fifth Institute Research Council (IRC) meeting of ICAR Research Complex for Goa was held during 12<sup>th</sup> to 13<sup>th</sup> August, 2014.

The meeting was chaired by Dr. Narendra Pratap Singh, Director of the institute. He welcomed all the scientists and highlighted the suggestions from DG, DDG and Secretary, ICAR during the Director's conference for research and extension activities in the institute. The scientists from different sections made their deliberations on the actions taken on recommendations of last IRC meeting and research activities carried out during the last one year. Scientists also presented their new research project proposals. The chairman appreciated the scientists on research work progress during the last year. The programme was co-ordinated by Dr. S. K. Das, Pr. Scientist and Member Secretary of Institute Research Council.

## IPR CELL ACTIVITIES

### I. Germplasm Registration:

1. Nineteen *Ralstonia solanacearum* cultures were deposited with microbial culture collection of National Bureau of Agriculturally important microorganisms (NBAIM) on 2<sup>nd</sup> July, 2014, and assigned the Accession Numbers from: NAIMCC-B-01613 to NAIMCC-B-01631. Scientist Associated: Dr. R. Ramesh, Sr. Scientist (Plant Pathology)
2. Application to obtain IC numbers for nine Amaranth and two Chilly accessions has been sent on 11<sup>th</sup> June, 2014 to NBPGR, New Delhi for consideration. Scientist Associated: Dr. V. Arunachalam, Pr. Scientist, (Spices, Plantation and Medicinal & Aromatic Crops).

### II. Commercialization of Technologies

IPR Cell facilitated the commercialization of the following technologies

1. Process for Commercialization of the technology entitled “Production of bypass fat indigenously” with second client *viz.* Milk Producers Co-operative Society, Koppal, Koppal District, Karnataka is initiated.
2. Commercialisation of technology entitled “Computer programme for DNA marker discovery” is initiated through India Innovation Growth Programme (IIGP) - 2014, a consortium, comprising of FICCI-DST, Lockheed Martin Corporation and others is initiated.

### Progressive farmers meet on Protection of Plant Varieties and Farmers right act

So as to create awareness among the farming community of Goa regarding protection of plant varieties and farmers right act 2001, one meeting with progressive farmers of Goa and scientists of ICAR Research Complex for Goa, Ela, Old Goa and staff of Krishi Vigyan Kendra was held on August 16, 2014 at Exhibition hall of ICAR Research Complex for Goa. Dr. R. R. Hanchinal, Chairman, PPV FRA, New Delhi gave the detailed presentation on how to protect farmers varieties by doing registration of their varieties and explained in detail about the “Farmer Right Act 2001”. He requested the scientists of ICAR Research Complex for Goa and Krishi Vigyan Kendra to help the farmers in registration of their varieties. Dr. Narendra Pratap Singh, Director, ICAR Research Complex for Goa, Ela, Old Goa in his introductory remarks assured full support to farmers in getting their varieties registered. Dr. Priya Devi, Sr. Scientist (Fruit



Science) presented the work done in collection and evaluation of kokum, flowers and vegetables varieties from Goa. Forty Progressive farmers from Pillar, Veling, Neura, Aldona and other parts of Goa have participated in the programme.

## Workshop/Seminar/Symposia/Training attended

Date	Name of Scientist	Programme	Venue
15 <sup>th</sup> to 16 <sup>th</sup> May, 2014	Dr. S. Priya Devi	International Symposium on Jack fruit and Bread fruit of the Tropics: Genetic diversity, Management, Value Addition and Marketing Strategies	UAS, Bangalore, Karnataka
16 <sup>th</sup> to 18 <sup>th</sup> May, 2014	Dr. S. A. Safeena	Training cum workshop on Essential oils, Perfumery and Aromatherapy	Pritam Hotels Pvt. Limited, Mumbai, Maharashtra
19 <sup>th</sup> May, 2014	Dr. N. P. Singh	Brainstorming session on substitution on NPK requirement using organic sources Directorate of Cashew Research, Puttur- Chief Guest	Directorate of Cashew Research, Puttur, Karnataka
20 <sup>th</sup> to 23 <sup>rd</sup> May, 2014	Dr. K. K. Manohara	Annual Workshop of Bill & Melinda Gates funded project ‘Stress Tolerant Rice for Poor Farmers of Africa and South Asia (STRASA)’	NASC Complex , New Delhi
21 <sup>st</sup> to 22 <sup>nd</sup> May, 2014	Ms. Manju Lekshmi N., Mr. Sreekanth G. B.	National Workshop on “ Marine Biodiversity and Climate Change”	Karwar Research Centre of CMFRI, Karwar, Karnataka
27 <sup>th</sup> May, 2014	Dr. P. K. Naik	Workshop on “Priority setting, monitoring and evaluation in national agricultural research system: Status, Experiences and Way forward”	NASC Complex, ICAR, PUSA, New Delhi
26 <sup>th</sup> to 28 <sup>th</sup> May, 2014	Dr. R. Ramesh	National Symposium on “Plant Pathology in Genomic Era”	IGKV, Raipur, Chhattisgarh
22 <sup>nd</sup> to 31 <sup>st</sup> May, 2014	Dr. M. J. Gupta	Training course on “Participatory Research for Mainstreaming Gender Concerns in Agriculture”	D R W A , Bhubaneswar, Odisha
5 <sup>th</sup> to 6 <sup>th</sup> June, 2014	Dr. N. P. Singh	Directors Conference	NASC Complex, New Delhi
7 <sup>th</sup> to 8 <sup>th</sup> June, 2014	Dr. N. P. Singh Dr. K. K. Manohara	30 <sup>th</sup> Annual workshop of AICRP on Arid Legumes	Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior , Madhya Pradesh
18 <sup>th</sup> June, 2014	Dr. S. A. Safeena	Training programme on “Improved Methods for nursery production and cultivation of vegetable, flower and fruit crops cultivation” for Small and Marginal Tribal Farmers of Goa	Malkarne Village, Quepem, Goa
24 <sup>th</sup> to 27 <sup>th</sup> June, 2014	Dr. M. Thangam	32 <sup>nd</sup> workshop on “AICRP-Vegetables”	IGKV, Raipur, Chhattisgarh

1 <sup>st</sup> to 3 <sup>rd</sup> July, 2014	Dr. V. Arunachalam	XXIII Group meeting of AICRP (Palms)	DOR, Hyderabad, Andhra Pradesh
5 <sup>th</sup> July, 2014	Dr. P. K. Naik	Workshop on “Hydroponics fodder production in India”	NAAS Secretariat, DPS Marg, New Delhi
7 <sup>th</sup> July, 2014	Dr. N. P. Singh	Meeting for exploring the possibility of spreading out the Insurance coverage to horticulture crops held at Delhi, Ministry of Agriculture, Govt. Of India	Delhi
22 <sup>nd</sup> to 26 <sup>th</sup> July, 2014	Ms. Manju Lekshmi N.	Training programme on “Isolation, Identification and Culture of Microalgae and Live Feeds for Aquaculture”	CMFRI, Kochi, Kerala
25 <sup>th</sup> to 28 <sup>th</sup> July, 2014	Dr. N. P. Singh	Annual Group meeting of All India Coordinated Project on Palms	DOR Hyderabad, Andhra Pradesh
28 <sup>th</sup> July, 2014	Dr. M. J. Gupta	National Seminar on “Agricultural Engineering Research and Development in the changing environment of the nation’s new dimension	CIAE, Bhopal, Madhya Pradesh
6 <sup>th</sup> August, 2014	Dr. K. K. Manohara	Half yearly review meeting of the foreign aided projects under division of Natural Resource Management.	Krishi Anusandhan Bhavan, New Delhi
28 <sup>th</sup> to 29 <sup>th</sup> A u g u s t 2014	Dr. N. P. Singh Dr. G. R. Mahajan	Strengthening partnerships and refined methodology for on-station experiments of AICRP on IFS	Sardar Krushinagar Dantiwada Agricultural University, Sardarkrushinagar (Gujarat)

## PERSONALIA

### Awards and Recognition

#### Dr. V. Arunachalam

Recognized as Faculty member to guide interns under the National Network for mathematical and computational biology (Science and Engineering Research Board, Government of India) 2014-15.

#### Dr. G. R. Mahajan

ICAR Jawaharlal Nehru Award for P.G. Outstanding Doctoral Thesis Research in Agricultural and Allied Sciences 2013 by Indian Council of Agricultural Research, New Delhi

BC Fertilis Nutrient Deficiency Photo contest 2014 – Fifth award in the Photo contest symptoms of nutrient deficiencies and excess in agricultural crops 2014

### Superannuation:

Shri. Ankush Kambli, Sr. Technical Assisamt superannuated w.e.f. 31-05-2014.

### Transfers:-

Dr. B. L. Manjunath, Principal Scientist (Agronomy) transferred to IIHR, Bangalore w.e.f. 31-05-2014.