



RESEARCH ACCOMPLISHMENTS AND RECOMMENDATIONS

2015



GJG 6



GJP 1



GJTL 5



GJTB 4



GJBH 4



GJSG 2



GJTB 4



GJRO 11



JUNAGADH AGRICULTURAL UNIVERSITY
JUNAGADH-362 001(Gujarat)



DIRECTORATE OF RESEARCH
JUNAGADH AGRICULTURAL UNIVERSITY
JUNAGADH-362 001(Gujarat)

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**MESSAGE**

Research is important mandate of the University. The fruitful research results and findings emerged out after year long efforts of scientists working in the different streams of Agriculture such as Agriculture, Horticulture, Agricultural Engineering, Fisheries, Veterinary Science & Animal Husbandry and Agri-Business Management. These results discussed at zonal level, University level and finally at state level for finalizing the recommendations for farmers. I am happy to inform that the publication entitled "**Research Accomplishment and Recommendations-2015**" contains several recommendations and technologies for farmers, scientific community and entrepreneurs emerged from different scientific groups of Junagadh Agricultural University in the year 2015. I believe that the information provided will be very much useful to the scientists, extension officers, farmers, entrepreneurs and students in their future work.

I congratulate and appreciate the scientists/ teachers for their distinguish contribution to come out with recommendations through experimentation. I also praise the entire team of Directorate of Research for nicely compiling and publishing this booklet.

Junagadh
November 20, 2015

(A. R. PĀTHAK)
VICE-CHANCELLOR



Junagadh Agricultural University
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PREFACE

It is a matter of great pleasure for me to highlight the research work carried out in during 2014-15 in the University. The contents of recommendations and new technical programmes were critically discussed and approved in respective 11th AGRESCO meeting of various sub-committees of Junagadh Agricultural University. These were presented in 11th Combined Joint AGRESCO meeting held at Anand Agricultural University, Anand during April 07-09, 2015.

The Junagadh Agricultural University represents ten districts and about 32.74 per cent area of the state. There are six colleges, five polytechnic colleges and 31 research stations, which include multidisciplinary main research stations, sub research stations for various crops as well as testing centers in the University. The eight different sub-committees have been constituted and conveners were nominated to plan and monitor the research work. All the sub-committees have successfully completed their job. The University has also arranged 12th Research Council meeting on October 13, 2014 and 3rd circulation Research Council meeting on March 04, 2015 for approval of new research projects and research activities during this year.

Total 30 new projects worth of Rs. 408.86 lakh were sanctioned from ICAR, Govt. of India, Govt. of Gujarat and Private sectors in the University. The main sanctioned projects are:

1. Crop improvement in papaya at Junagadh.
2. Integrated Pest Management in Seed Spices at Junagadh.
3. Evaluation of pharmacological activity of indigenous medicinal plants of Saurashtra Region at Junagadh.
4. Identification and documentation of marine fish biodiversity using mitochondrial DNA barcoding at Fisheries College, Veraval.
5. Production of groundnut breeder seed at farmer's field.
6. Biochemical and molecular characterization of *Bacillus* spp. isolated

from rhizosphere of plants and their biocontrol potentials against *Fusarium oxysporum* f. sp. *cumini*.

7. Enzymatic pre-treatment in the processing of pigeon pea.
8. Utilization of chickpea genome sequence for crop improvement.
9. Consortia Research Platform (CRP) on Bio-fortification.
10. Estimation of coconut yield and production in the State of Gujarat.

The breeder seeds of different crops to fulfill the demand of private and public sectors as per the national and state indents were successfully produced. The required nucleus seeds of different crops were also produced for the breeder seed production in the ensuing seasons.

Under the HRD component of the University, 117 scientist/teachers were deputed to attend winter/summer school training, 258 attended different seminar/symposium/conference at state and national level, 133 attended the workshops and group meet of their respective projects and 109 scientist/teachers were deputed to attend monitoring, academic work, visit etc. The University has also organized two national level programmes like scientists' meets and workshops as well as three state level seminars/training/workshops.

In the 11th Combined Joint AGRESCO Meeting, eight varieties viz., Gram: Gujarat Junagadh Gram 6 (GJG 6), Pigeonpea: Gujarat Junagadh Pigeonpea 1 (GJP 1), Sesame: Gujarat Junagadh Til 5 (GJ Til 5), Brinjal: Gujarat Junagadh Long Brinjal 4 (GJLB 4) & Gujarat Junagadh Brinjal Hybrid 4 (GJBH 4), Sponge gourd: Gujarat Junagadh Sponge Gourd 2 (GJSG 2), Okra: Gujarat Junagadh Okra Hybrid 4 (GJOH 4) and Onion: Gujarat Junagadh Red Onion 11 (GJRO 11) were recommended for release in the state. Besides, 45 technologies/recommendations were made for farmers and 32 recommendations were made for Scientific Community. In addition, as many as 66 new technical programmes were formulated to initiate the new research programmes for the solutions of the applied and basic problems of agriculture and allied fields. The new varieties were also released in 46th meeting of State seed Sub-Committee held on November 18, 2015 at Gandhinagar.

(A. Y. Desai)

Junagadh
November, 2015

DIRECTOR OF RESEARCH & DEAN
FACULTY OF P.G. STUDIES

Summary of new released varieties and developed agro technologies during the 2014-15

Sub-Committee	No. of Recommendations finalized for		Approved New Technical Programmes
	Farmers	Scientific Community	
Crop Improvement	08*	-	-
Crop Production	13	03	08
Plant Protection	16	09	19
Horticulture & Agro Forestry	04	-	03
Agricultural Engineering	05	02	07
Basic Science	04	05	09
Social Science	-	-	07
Animal Science	-	08	06
Fisheries Science	03	05	07
Total:	8*+45	32	66

* Varieties released

Recommendations for Farmers

I. CROP IMPROVEMENT

Eight varieties viz., Gram: (GJG-6), Pigeonpea: (GJP-1), Sesame: (GJ Til 5), Brinjal: (GJLB 4) & (GJBH 4), Sponge gourd: (GJSG 2), Okra: (GJOH 4) and Onion: (GJRO 11) were recommended for farmers of the state during 2014-15.

Chickpea: Gujarat Junagadh Gram 6 (GJG 6)

This variety has produced (1867 kg/ha) 13.6, 21.9 and 5.2 per cent higher seed yield over check varieties Gujarat Gram 1 (1643 kg/ha), Gujarat Gram 2 (1531 kg/ha) and Gujarat Junagadh Gram 3 (1775 kg/ha), respectively. Seeds of this variety are of medium size and dark brown in colour with 19.9 per cent protein. This variety is resistant to wilt (8.7 % in wilt sick plot) and stunt (5.0 %) diseases. It is recommended for release in Gujarat under rainfed condition.



(Pulses Research Station, JAU, Junagadh)

Pigeonpea: Gujarat Junagadh Pigeonpea 1 (GJP 1)

This variety has produced (2115, 2045 & 1987 kg/ha) 38.78, 10.06 and 27.62 per cent higher seed yield over check varieties, BDN 2 (1524 kg/ha), ICPL 87119 (1858 kg/ha) and Vaishali (1557 kg/ha), respectively. This variety is medium late (176 days) in maturity. Gujarat Junagadh Pigeonpea 1 (GJP 1) is also found moderately resistant to wilt (13.89 %) and SMD (13.89 %) disease. The seeds of this variety are bold in size with white colour. This variety is recommended for Gujarat state.



(Pulses Research Station, JAU, Junagadh)

Sesame: Gujarat Junagadh Til 5 (GJ Til 5)

This variety recorded the seed yield of 1241 kg/ha which was 22.39 per cent higher than the check variety Gujarat Til 3 (1014 kg/ha). Oil yield of proposed variety was 22.22 per cent higher than Gujarat Til 3. Proposed variety matured in 91 days and contains 46.98 per cent oil in its seeds, which are white in colour and bolder in size. This variety was approved by the house for cultivation in summer season.



(Agricultural Research Station, JAU, Amreli)

Brinjal: Gujarat Junagadh Long Brinjal 4 (GJLB 4)

This variety had recorded a mean fruit yield of 396.03 q/ha which was 30.81 and 25.83 per cent higher over check varieties GOB 1

(302.75 q/ha) and GBL 1 (314.73q/ha), respectively. The little leaf disease (5.08 %) was less as compared to check variety GOB 1 (6.15%). Jassid (3.04/leaf), whitefly (4.70/leaf) and fruit borer (11.05 %) were less as compared to check variety GOB 1. The protein (1.51 %) and total soluble sugar (3.36 %) were also more than check varieties. The fruits of GJB 4 are medium in size with long shape and light purple colour with good shining. It is recommended for release in Gujarat state.



(Vegetable Research Station, JAU, Junagadh)

Brinjal: Gujarat Junagadh Brinjal Hybrid 4 (GJBH 4)

This hybrid gave a mean fruit yield of 428.01 q/ha which was 14.11 and 25.68 per cent higher over hybrid checks GBH 2 (375.08 q/ha) and ABH 1 (340.57 q/ha), respectively. It has recorded 6.63 and 7.66 per cent higher fruit yield than the private hybrids Navina (VNR Seeds) and ARBH 201 (Ankur Seeds), respectively. The little leaf disease (4.42%) was less as compared to check variety GBH 2 (4.98%). The damage due to jassid (2.84/leaf), white fly (3.93/leaf) and fruit borer (4.93 %) were less as compared to hybrid checks. The protein (1.48 %) and total soluble sugar (3.33 %) were more as compared to hybrid checks. The fruits of this hybrid are medium in size with oblong shape and pink purple colour with good shine. It is recommended for release in Saurashtra and Middle Gujarat.

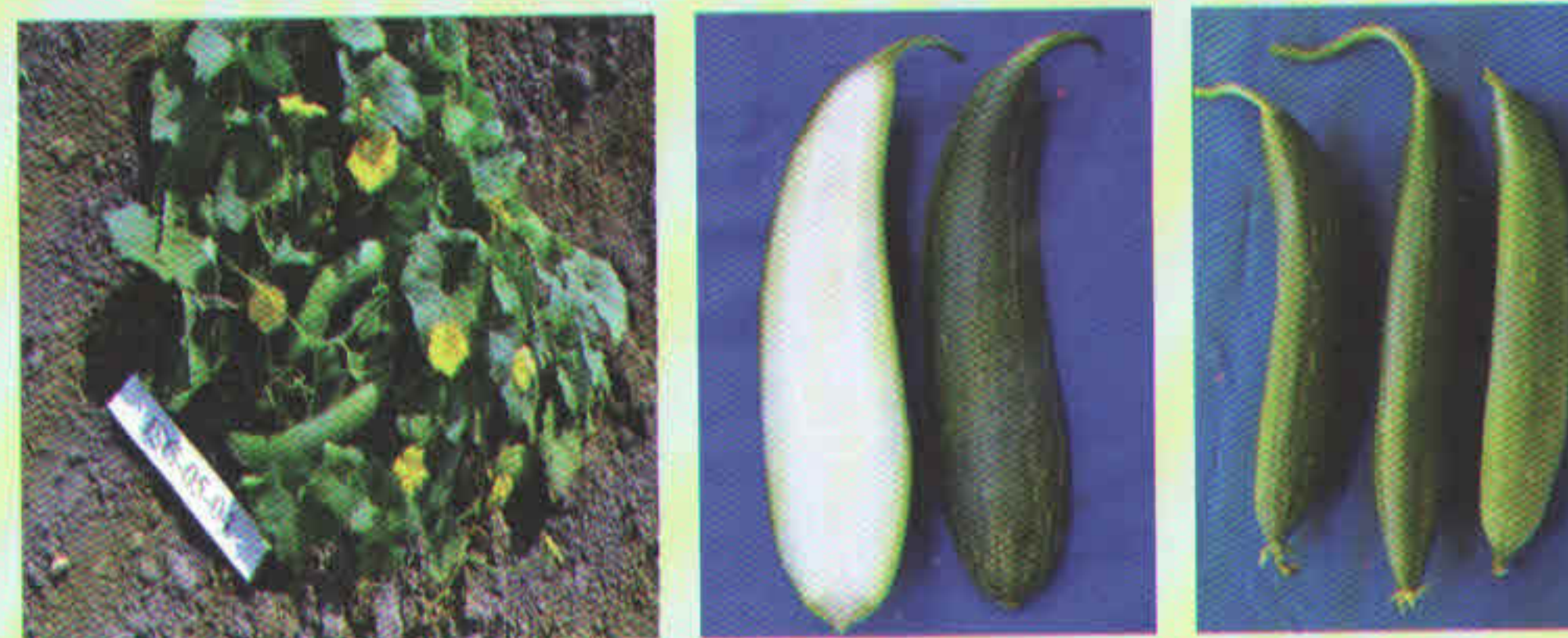


(Vegetable Research Station, JAU, Junagadh)

Sponge gourd: Gujarat Junagadh Sponge Gourd 2 (GJSG 2)

This variety had recorded a mean fruit yield of 114.04 q/ha, which was 18.05 and 19.18 per cent higher than state check variety

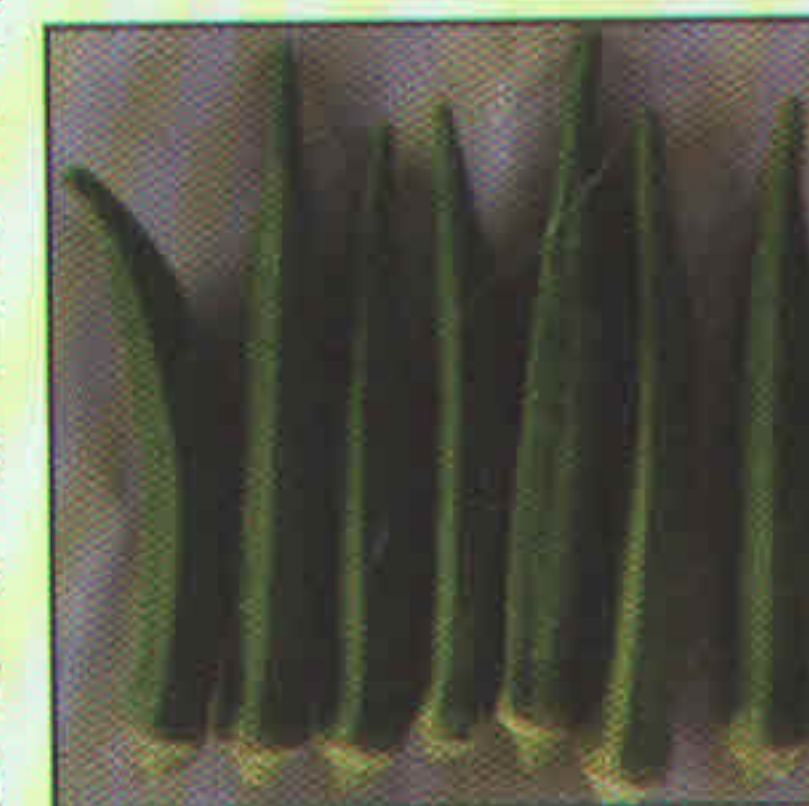
GSG 1 (96.60 q/ha) and National check variety Pusa Chikni (95.69 q/ha). Further, mosaic (18.25 %), downy mildew score (2.35), fruit fly damage (12.86 %) and leaf miner larvae (5.61/leaf) were less as compared to check varieties. The pulp/skin ratio (12.393), total soluble solids (6.25 %), total soluble sugar (1.67 %), protein (0.218 %) and chlorophyll total (1.53 mg/g) were more as compared to check varieties. The fruits of GJSG 2 are long in size, green colour with good shine. It is recommended for release in Gujarat.



(Vegetable Research Station, JAU, Junagadh)

Okra: Gujarat Junagadh Okra Hybrid 4 (GJOH 4)

This hybrid recorded a mean fruit yield of 135.94 q/ha, which was 46.91 per cent higher over check variety Pusa Sawani (92.50 q/ha) while with hybrid check the GJOH 4 recorded 145.74 q/ha fruit yield which was 23.86 per cent higher than GJOH 3 (117.67q/ha). It also yielded 17.11, 28.04 and 30.69 per cent higher yield over one private check HOK 152 and two public sector checks Arka Anamika and Pusa Sawani, respectively. The yellow vein mosaic (36.71%) was found less as compared to check variety Gujarat Okra Hybrid 2 (46.15 %). The jassid (5.26), thrips (4.79), white fly (4.76) and fruit borer (4.66 %) damage were less than check varieties. The pods of this hybrid are medium dark green, tender, long and attractive. It is recommended for release in Gujarat.



(Vegetable Research Station, JAU, Junagadh)

Onion: Gujarat Junagadh Red Onion 11 (GJRO 11)

This variety had recorded a mean bulb yield of 323.55 q/ha which was 21.57, 18.71 and 15.41 per cent higher over check varieties

AGFL-Red (266.15 q/ha), Pilli Patti (272.55 q/ha) and Talaja-Red (280.34 q/ha), respectively. The purple blotch (12.67 %) was less as compared to check varieties AGFL-Red (20.30 %), Pilli Patti (23.56 %) and Talaja-Red (24.28 %). Population of thrips (5.7/leaf) was found less as compared to check varieties. It was found less pungent (Pyruvic acid: 1.22 %) as compared to check varieties AGFL-Red and Talaja-Red. In this variety, 12.94 per cent total soluble solids were recorded. The bulbs of GJRO 11 are medium in size with flat globe shape and red in colour. It is recommended for release in Gujarat (except South Gujarat).



(Vegetable Research Station, JAU, Junagadh)

II. CROP PRODUCTION

Nutrient Management

Studies on the effect of water soluble foliar grade fertilizers on the growth and yield of summer groundnut

The farmers of South Saurashtra Agro-climatic Zone growing summer groundnut are recommended to fertilize the crop with FYM 7.5 t/ha + 60 % RDF (i.e. 15-30 kg N-P₂O₅/ha) for obtaining higher yield and net realization.



(Main Oilseeds Research Station, JAU, Junagadh)

Effect of bio-phos on the performance of castor

The farmers of South Saurashtra Agro-climatic Zone growing irrigated castor are recommended to apply 40 kg P₂O₅/ha and treat the seeds with phosphate solubilizing microorganism (*Chaetomium globosum*) @ 30 g/50 g seed along with recommended dose of

nitrogen (120 kg/ha) for obtaining higher seed yield and net return.



(Main Oilseeds Research Station, JAU, Junagadh)

Nutrient management in groundnut-Bt. cotton intercropping system

The farmers of South Saurashtra Agro-climatic Zone adopting groundnut-Bt. cotton inter-cropping system (in 3:1 ratio) are recommended to apply 50 per cent RDF (i.e. 6.25-12.5-0 kg N-P₂O₅-K₂O/ha) to the groundnut crop and 100 per cent recommended dose of fertilizer (i.e. 160 kg N/ha) to the cotton crop for obtaining higher yield and net realization.



(Main Oilseeds Research Station, JAU, Junagadh)

Effect of integrated nutrient management on yield, quality and nutrient uptake by garlic under salt affected soil

The farmers of South Saurashtra Agro-climatic Zone growing garlic in salt affected soil are recommended to apply 50 % RDF (i.e. 25-25-25 kg N-P₂O₅-K₂O/ha) along with FYM @ 10 t/ha for obtaining higher bulb yield and net return.

(Dept. of Agril. Chem. & Soil Sci., CoA, JAU, Junagadh)

Package of Practices

Evaluation of preparatory and secondary tillage practices in rainfed groundnut

The farmers of South Saurashtra Agro-climatic Zone growing rainfed groundnut are recommended to adopt in-row subsoiling (20 cm depth) before sowing, interculturing at 15, 30, 45 and 60 days after sowing (DAS) and apply pendimethalin @ 900 g/ha (30 EC 60 ml/10 lit) as pre-emergence with hand weeding at 30 and 45 DAS for achieving higher yield and net realization as well



as effective moisture conservation and weed management.

(Department of Agronomy, JAU, Junagadh)

Studies of possibilities of organic farming in pearl millet-gram crop sequence

The farmers of North Saurashtra Agro-climatic Zone adopting pearl millet-gram crop sequence and interested in organic farming are recommended to apply FYM 7.5 t/ha every year to pearl millet only for securing higher net realization and to maintain soil fertility.

(Main Pearl millet Research Station, JAU, Jamnagar)

Optimization of nutrients for pearl millet production in kharif season

The farmers of North Saurashtra Agro-climatic Zone growing hybrid pearl millet during kharif season are recommended to apply 100 kg N and 30 kg P₂O₅/ha for obtaining higher yield and net return.

(Main Pearl millet Research Station, JAU, Jamnagar)

Nutrient management through organic and inorganic sources for major and trace elements in rainfed pearl millet

The farmers of North Saurashtra Agro-climatic Zone growing hybrid pearl millet during kharif season are recommended to apply ZnSO₄ and FeSO₄ @ 20 kg/ha each, along with recommended dose of fertilizers (80-40-0 kg N-P₂O₅-K₂O/ha) and FYM 5 t/ha for obtaining higher yield and net return as well as for improving grain quality.

(Main Pearl millet Research Station, JAU, Jamnagar)

Weed management

Weed management in cumin

The farmers of South Saurashtra Agro-climatic Zone growing cumin are recommended to apply oxadiargyl 75 g/ha (6 EC 25 ml/10 lit) as early post-emergence application at 7 DAS followed by hand weeding at 45 DAS for achieving higher yield and net realization as well as effective weed management.

(Department of Agronomy, JAU, Junagadh)

Evaluation of pre and post emergence herbicides for irrigated Bt. cotton

The farmers of South Saurashtra Agro-climatic Zone growing Bt. cotton are recommended to apply pendimethalin 900 g/ha (30 EC 60



ml/10 lit) as pre-emergence followed by hand weeding and interculturing at 30 and 60 days after sowing (DAS) or pendimethalin 900 g/ha (30 EC 60 ml/10 lit) as pre-emergence followed by quizalofop 40 g/ha (5 EC 16 ml/10 lit) at 45 DAS for achieving higher yield and net realization as well as effective weed management.

(Department of Agronomy, JAU, Junagadh)

Weed management in kharif urdbean

The farmers of South Saurashtra Agro-climatic Zone growing kharif urdbean are recommended to apply quizalofop-ethyl 40 g/ha (5 EC 16 ml/10 lit water) at 20 days after sowing (DAS) and hand weeding at 40 DAS for obtaining higher yield and net realization as well as effective weed management.

(Pulses Research Station, JAU, Junagadh)

Water management

Effect of crop geometry and irrigation levels on sugarcane

The farmers of South Saurashtra Agro-climatic Zone growing sugarcane are recommended to adopt drip method of irrigation and plant the crop in paired rows (60-90-60 cm) and irrigate the crop at 0.9 PEF with laying laterals in each paired rows for securing higher cane yield and net return. Nitrogen and potassium should be applied at 80 per cent of recommended dose (i.e. 200-100 N-K₂O kg/ha) under drip irrigation in 10 equal splits starting from 45 DAP at an interval of 20 days.

Drip system details:

Details	Operating time-Alternate days	
	Month	Minutes
Dripper spacing: 60 cm	March-May	2 Hrs. 20 min
Dripper discharge: 4lph	June	2 Hrs. 10 min
Operating pressure: 1.2 kg/cm ²	July-September	1 Hr. 30 min
Operating frequency: Alternate days	October-November	1 Hr. 40 min
	December-January	1 Hr. 25 min



(Main Sugarcane Research Station, JAU, Kodinar)



Soil management

Effect of soil amendments on different genotypes of castor under salt affected soil

The farmers of South Saurashtra Agro-climatic Zone growing castor with saline irrigation water are recommended to select variety GC 3 and apply FYM @ 10 t/ha and gypsum 50% GR (3 t/ha) along with recommended dose of fertilizers.

(Dept. of Agril. Chem. & Soil Sci., CoA, JAU, Junagadh)

III. PLANT PROTECTION

Agricultural Entomology

Management of sucking pests through insecticides in brinjal

For effective and economical control of brinjal whitefly, three sprays of chlorantraniliprole 18.5 SC, 0.002 %, 1.08 ml/10 litre water at 15 days interval starting from the pest infestation are recommended under South Saurashtra Agro-climatic Zone. The PHI for chlorantraniliprole 18.5 SC, 0.002 % is one day.



(Dept. of Entomology, CoA, JAU, Junagadh)

Storage potential of bio-agent under refrigerator conditions

Farmers are advised to store the field collected ladybird beetles (*Coccinella septempunctata* (L.)) in jar containing folded papers under domestic refrigerator conditions (6.0 to 7.5 °C) up to 120 days with the survival rate of 84 per cent without hampering their longevity and fecundity. These stored predatory beetles can be released in field crops for biological control of insect pests.

(Dept. of Entomology, CoA, JAU, Junagadh)

Storability of HaNPV and SNPV under refrigerator condition

Farmers are advised for biological control of *Helicoverpa armigera* and *Spodoptera litura* through Nuclear Polyhedrosis Virus (NPV) to store the field collected NPV infected larvae under domestic refrigerator conditions (6.0 to 7.5 °C). These NPV infected larvae can be stored up to 8 months of storage period with 100 per cent virulence,

which can be utilized for the biological management of respective pest.

(Dept. of Entomology, CoA, JAU, Junagadh)

Studies on effect of drip v/s flood irrigation on the incidence of important mango pests

Mango growers of South Saurashtra Agro-climatic Zone are informed that the lower incidence of gall midge, hopper and thrips is found in drip irrigated orchard as compared to flood irrigated orchard.



(Dept. of Entomology, CoA, JAU, Junagadh)

Testing of efficacy of different newer insecticides against shoot fly and stem borer in pearl millet

Farmers of North Saurashtra Agro-climatic Zone growing kharif pearl millet are advised to treat the seeds with imidacloprid 600 FS, 8.75 ml/kg seeds, 4.20 g a.i./kg seeds at the time of sowing followed by spray with imidacloprid 17.8 SL, 0.009 % (5.0 ml/10 liter water, 45.39 g a.i./ha) at 35 days after germination of the crop for effective management of shoot fly and stem borer. The PHI for these insecticides is 42 days.

(Pearl Millet Research Station, JAU, Jamnagar)

Storage study of wheat harvested by combine harvester

The farmers storing wheat are advised that wheat harvested by combine harvester (up to 6 % mechanically damaged grain) to be stored with the treatment of castor oil (15 ml/1.0 kg grain) and can be kept in GI bin container to keep safe against lesser grain borer up to eight months of storage as it reduces pest population, grain damage, weight loss as compared to untreated wheat kept in jute bags.

(Dept. of Processing & Food Engg., CAET, JAU, Junagadh)

Testing bio-efficacy of certain insecticides against pod borer complex on urdbean

Farmers of South Saurashtra Agro-climatic zone are advised to apply two sprays of chlorantraniliprole 18.5 SC, 0.006 % (3 ml/ 10 litre water) or flubendiamide 48 SC, 0.0096 % (2 ml/ 10 litre water), first spray at 50 per cent flowering and second at 15 days interval for the control of pod borer complex in urdbean.

The PHI for chlorantraniliprole 18.5 SC is 20 days, whereas 11 days for flubendiamide 48 SC.

(Pulses Research Station, JAU, Junagadh)

PLANT PATHOLOGY

Assessment of *Trichoderma* population in the field under groundnut cultivation

Farmers of North and South Saurashtra Agro-climatic Zone are advised to apply *Trichoderma* every year for the management of stem/pod rot disease in groundnut.

(Dept. of Plant Pathology, CoA, JAU, Junagadh)

Standardization of method and time of application of bio-control agents for management of stem and pod rot of groundnut caused by *Sclerotium rolfsii*

Farmers of South Saurashtra Agro-climatic Zone are advised furrow application of *Trichoderma harzianum* 2×10^6 cfug⁻¹ @ 1.25 kg in 125 kg of castor cake/ha at the time of sowing as well as its broadcasting at plant base with same dose at one month after sowing for effective and economic control of stem and pod rot (*Sclerotium rolfsii*) of groundnut.

(Dept. of Plant Pathology, CoA, JAU, Junagadh)

Compatibility of *Trichoderma* with different seed dressing agrochemicals used for the management of diseases and pest in groundnut

Farmers of South Saurashtra Agro-climatic Zone are advised that the agrochemicals used for seed treatment in groundnut viz., carbendazim 12 % + mancozeb 63 % - 75 WP @ 3.0 g/kg seed or mancozeb 75 WP @ 4.0 g/kg seed or carboxin 37.5 % + thirum 37.5 % - 75 WP @ 3.0 g/kg seed or tebuconazole 2 DS @ 2.0 g/kg seed or imidacloprid 600 FS @ 3.0 ml/kg seed against seed and soil borne diseases/sucking pests do not reduce the soil population of *Trichoderma*, hence they are compatible with *Trichoderma harzianum*.

(Dept. of Plant Pathology, CoA, JAU, Junagadh)

Effect of spawn rates on sporophore production of Oyster mushroom (*Pleurotus sajor-caju*)

Mushroom growers are advised to use 3.0 per cent spawn rate in polyethylene bags (18×24 inch) of oyster mushroom (*Pleurotus sajor-caju*) to get the optimum sporophore production with higher biological efficiency.

(Dept. of Plant Pathology, CoA, JAU, Junagadh)

Effect of substrate rates on sporophore production of Oyster mushroom (*Pleurotus sajor-caju*)

Mushroom growers are advised to use 3 kg wheat straw substrate with 3 per cent spawn rate in polyethylene bags (18×24 inch) for the optimum sporophore production with higher biological efficiency of oyster mushroom (*Pleurotus sajor-caju*).

(Dept. of Plant Pathology, CoA, JAU, Junagadh)

Management of cumin wilt (*Fusarium oxysporum* f. sp. *cumini*)

Farmers of South Saurashtra Agro-climatic Zone are advised to broadcast *Trichoderma harzianum* 2×10^6 cfug⁻¹ @ 5.0 kg mixed in 1000 kg of FYM/ha at the time of sowing for effective and economical control of cumin wilt.



(Dept. of Plant Pathology, CoA, JAU, Junagadh)

Efficacy of different bio-control agents against cumin wilt caused by *Fusarium oxysporum* f. sp. *cumini*

Farmers of South Saurashtra Agro-climatic Zone are advised to broadcast mixture of *Trichoderma viride* @ 1.70 kg + *T. harzianum* @ 1.70 kg + *Pseudomonas fluorescens* @ 1.70 kg (2×10^7 cfug⁻¹) or *T. viride* @ 2.50 kg + *P. fluorescens* @ 2.50 kg (2×10^7 cfug⁻¹) mixed in 500 kg of castor cake/ha at the time of sowing for effective and economical control of cumin wilt.

(Dept. of Plant Pathology, CoA, JAU, Junagadh)

Effect of foliar application of insecticides in cumin on *Trichoderma* applied in soil

Farmers of South Saurashtra Agro-climatic Zone are advised to apply *Trichoderma harzianum* (2×10^7 cfug⁻¹) @ 5 kg in 500 kg of castor cake/ha at the time of sowing as well as its broad-casting @ 5 kg/ha *Trichoderma* in 100 kg sand at one month after germination of crop for effective and economical control of cumin wilt.

(Dept. of Plant Pathology, CoA, JAU, Junagadh)

Effect of foliar application of herbicides in cumin on *Trichoderma* applied in soil

Farmers of South Saurashtra Agro-climatic Zone are advised that the application of herbicides oxadiargyl 6 EC, 0.075 kg a.i./ha, 25

ml/10 litre at 7 days after sowing in cumin do not reduce the soil population of *Trichoderma harzianum*.

(Dept. of Plant Pathology, CoA, JAU, Junagadh)

IV. HORTICULTURE & AGRO-FORESTRY

Effect of different sources of nitrogen with graded levels of inorganic fertilizer on papaya cv. Madhubindu

Farmers of South Saurashtra Agro-climatic Zone growing papaya (Madhubindu) crop are advised to apply 25 per cent N from FYM (6 kg FYM), and remaining 75 per cent N (150 g), 200g P and 250g K per plant from chemical fertilizers during 2nd, 3rd and 4th month after transplanting in equal splits for getting higher yield and net return.



(Dept. of Horticulture, CoA, JAU, Junagadh)

Effect of micro nutrients on growth, yield and quality of papaya cv. Madhubindu

Farmers of South Saurashtra Agro-climatic Zone are advised to spray micronutrients viz., zinc sulfate 24.0 g (Zn 0.5 %) and Borax 10.0 g (B 0.1 %) per liter of water during 2nd and 4th month after transplanting for getting higher yield and net return in papaya cv. Madhubindu.



(Dept. of Horticulture, CoA, JAU, Junagadh)

Dehydration of sapota slices

Fruit processors are advised to dry the sapota slices of 0.5 cm thickness in solar dryer up to 33 per cent recovery to maintain quality in storage up to six months at room temperature.



(Dept. of Horticulture, CoA, JAU, Junagadh)

Effect of soil amendment with organic materials on yield and quality of tomato (cv. Junagadh Tomato-3) under sodic soil & brackish water condition

The farmers of South Saurashtra Agro-climatic Zone growing Rabi Tomato (JT-3) under sodic soil (EC 1.48 dS/m, pH 7.81, ESP 21.84 %) and brackish water (EC 4.34 to 4.88 dS/m) condition are advised to apply FYM 5 t/ha + 50 per cent R.D.F. (37.5+18.75+ 31.25 NPK kg/ha) + poultry manure (3700 kg/ha) for securing higher yield and net return.



(Agriculture Research Station (Fruit Crop), JAU, Mahuva)

V. AGRICULTURAL ENGINEERING

Impact of irrigation regimes and mulching on the economic productivity of drip irrigated cotton

Farmers of South Saurashtra Agro-climatic Zone growing Bt. Cotton are advised to adopt drip irrigation (with 1.2m lateral spacing, 40 cm dripper spacing and emitter discharge of 2 lph) in raised bed covered with silver black plastic mulch of 20 micron and irrigate every alternate day at 0.8 ETc level (or to operate system for 2 to 3.5 hrs, 2.25 to 3.25 hrs and 1.25 to 3 hrs during September-October, November-December and January, respectively) for acquiring higher yield (33%) and water use efficiency (79%), higher water productivity (91%) and higher net return over no mulch.



(Research Testing & Training Center, JAU, Junagadh)

Extraction of pectin from kesar mango peel by resins

Mango processors are recommended to adopt a process technology developed by Junagadh Agricultural University for the production/extraction of pectin from mango peel using cation exchange resin as an extracting medium with peel to extracting medium ratio of 1:4, extraction pH of 2.56, extraction temperature of 80 °C, extraction time of 60 min and two extractions. This method can give better yield and quality of pectin with benefit cost ratio (BCR) of 1.17.

(Dept. of Processing and Food Engg., CAET, JAU, Junagadh)

Development and performance evaluation of low cost greenhouse fertigation irrigation system

The greenhouse / net house growers are advised to use low cost greenhouse fertigation system developed by Junagadh Agricultural University to apply fertilizer through drip irrigation as well as interested manufacturers are recommended for manufacturing this system.



(Dept. of Renewable Energy & Rural Engg., CAET, JAU, Junagadh)

Studies on microclimate and plant growth of capsicum under different type of shade net

The farmers of South Saurashtra Agro-climatic Zone are recommended to adopt white coloured 50 per cent shade net house for cultivation of capsicum. This type of net house results in early production approximately 10-12 days,



protection from insects/pests, diseases and higher yield of capsicum as compared to use of green, black and blue coloured shade net house.

(Dept. of Renewable Energy & Rural Engg., CAET, JAU, Junagadh)

Effect of mulch and irrigation level by drip on water use efficiency and yield of water melon

The farmers of South Saurashtra Agro-climatic Zone are advised to use silver black plastic mulch (20 µm) with drip irrigation at 0.6 ETC level to achieve higher crop production of water melon in summer season.



Details of mulching technology :		Details of irrigation system :	
1	Mulch film: 20 µm silver black plastic	1	Lateral spacing : 180 cm
2	Bed size: (a) Top width : 40 cm (b) Bottom width : 70 cm (c) Height : 30 cm	2	Dripper spacing : 40 cm
3	No. of row per bed : 2	3	Dripper discharge : 2 lph
4	Spacing : (a) Bed spacing : 180 cm (b) Row spacing : 20 cm (c) Plant spacing : 40 cm	4	Irrigation scheduling : a. Feb. : 20 to 45 min/day b. March: 30 to 95 min/day c. April : 70 to 105 min/day d. May : 70 to 90 min/day

(Dept. of Renewable Energy & Rural Engg., CAET, JAU, Junagadh)

VI. BASIC SCIENCE

Effect of brassinolide foliar spray on yield and yield attributing characters of wheat

The farmers of South Saurashtra Agro-climatic Zone growing wheat under irrigated condition are recommended to spray growth promoter Brassinolide (BS) @ 0.01mgL⁻¹ (12.5 ml Brassinolide dissolved in 5 litres water, from which 150 ml is taken and diluted to 15 litres solution) at milk dough stage to obtain higher grain yield and net return.



(Dept. of Genetics and Plant Br., CoA, JAU, Junagadh)

Response of sesame (*Sesamum indicum* L.) to growth regulators

The farmers of North Saurashtra Agro-climatic Zone growing sesame in *kharif* season are recommended for foliar spray of Indole Acetic Acid (IAA) 100 ppm (1 gram/10 liter water) at flowering stage for obtaining higher yield and net return.

(Dry Farming Res. Station, JAU, Targhadia)

Effects of foliar application of organic and inorganic substances on the yield of chick pea (GJG-3) under limited water supply

The farmers of North Saurashtra Agro-climatic Zone (AES-VI) growing chickpea (Var. GJG-3) in *rabi* season are recommended to apply two irrigation (one at flowering and second at pod development stage) along with recommended dose of fertilizer (20:40 NP kg/ha) and foliar application of KNO_3 @ 2 per cent twice at flowering and pod development stages for obtaining higher yield and maximum net return.

(Dry Farming Res. Station, JAU, Targhadia)

Effect of foliar spray of plant growth retardants on growth and yield parameters of *kharif* groundnut

The farmers of South Saurashtra Agro-climatic Zone growing *kharif* groundnut are recommended for foliar spray of cycocel (50 % SL) @ 1000 ppm (2.0 ml/lit) at 30 days after sowing (DAS) or foliar application of paclobutrazol (23 % w/w SC) @ 500 ppm (2.5 ml/lit) at 60 DAS to suppress the excess vegetative growth and to get higher pod yield and net return.

(Main Oilseed Research Station, JAU, Junagadh)

VI. FISHERIES SCIENCE

Growth, mortality and stock assessment of Soldier cat fish *Osteogeneiosus militaris* of Veraval coast

The present level of fishing of the Soldier cat fish confirmed that the stock is over exploited in Veraval. Hence, it is recommended to fishermen of Veraval not to increase the fishing efforts.



(FRM Dept., College of Fisheries, JAU, Veraval)

Study the effect of some natural cryoprotectants on quality of Japanese threadfin breams (*Nemipterus japonicus*) surimi during frozen storage

Surimi processors and exporters are recommended to use 1% shrimp chitosan as natural cryoprotectant in Japanese threadfin bream surimi to get better gel strength and good water holding capacity instead of commercially used cryoprotectants (sugar, sorbitol, polyphosphate) up to 240 days under frozen storage at $-18^{\circ}C$.

(Dept. of Harvest and Post-harvest Tech., College of Fisheries, J.A.U., Veraval)

Effect of salinity on survival rate of *Penaeus monodon* larvae

It is recommended to hatchery entrepreneurs to use 15 ppt salinity water for larval (zoea and mysis) rearing and 20 ppt salinity water for post-larval (PL1 to PL20) rearing of *Penaeus monodon* for higher survival.

(Research Officer, Fisheries Research Station, JAU, Okha)

Recommendations for Scientific Community

I. CROP PRODUCTION

Study of uptake pattern of phosphorus in different varieties of castor

In castor crop, phosphorus uptake was 47.6, 33.1 and 19.3 per cent by leaf, stalk and root at branching stage, while at flowering stage 23.8, 13.3, 5.3 and 57.6 per cent and at capsule formation stage 13.7, 16.9, 3.4 and 66.0 per cent by leaf, stalk, root and spike, respectively. Among the different stages of plant growth, the maximum phosphorus uptake was obtained at capsule formation stage (370 mg/plant) followed by flowering stage (118 mg/plant) and branching stage (29 mg/plant). Among the different varieties, maximum phosphorus uptake by crop was observed with GCH-7 at all the growth stages.

(Dept. of Agril. Chem. & Soil Sci., CoA, JAU, Junagadh)

Weed management in garlic

The scientific community is informed that application of oxyfluorfen 240 g/ha as pre-emergence followed by hand weeding at 40 days after sowing (DAS) or application of oxadiargyl 90 g/ha as pre-emergence followed by hand weeding at 40 DAS



gave higher yield and net realization as well as effective weed management.

(Department of Agronomy, CoA, JAU, Junagadh)

Weed management in cumin

The scientific community is informed that application of pendimethalin 900 g/ha as pre-emergence followed by hand weeding at 45 days after sowing (DAS) gave higher yield and net realization as well as effective weed management.

(Department of Agronomy, CoA, JAU, Junagadh)

II. PLANT PROTECTION

AGRICULTURAL ENTOMOLOGY

Management of sucking pests through insecticides in brinjal

Three sprays of bifenthrin 10 EC, 0.02 %, 20 ml /10 litre water or buprofezin 25 SC, 0.06 %, 24 ml/10 litre of water at 15 days interval starting from the pest infestation found effective for the control of brinjal whitefly.

The PHI for bifenthrin 10 EC, 0.02 % and buprofezin 25 SC, 0.06 % is 1 and 7 days, respectively.

(Dept. of Entomology, CoA, JAU, Junagadh)

Population dynamics of important pests of mango

The incidence of mango hopper, thrips and flower bug was found high during December to February while, leaf gall midge and shoot borer were found active during September to October.

(Dept. of Entomology, CoA, JAU, Junagadh)

Population dynamics of important pests of pomegranate

Anar butterfly was found high during November to May while, thrips was found active during August to November in pomegranate.

(Dept. of Entomology, CoA, JAU, Junagadh)

Testing of efficacy of different newer insecticides against shoot fly and stem borer in pearl millet

Seed treatment with imidacloprid 600 FS @ 8.75 ml/kg, 4.20 g a.i./kg at the time of sowing followed by spray with spinosad 45 SC, 0.009 % @ 2.0 ml/10 litre at 35 days after germination of the crop found effective for the management of shoot fly and stem borer. The PHI for these insecticides is 42 days.

(Pearl millet Research Station, JAU, Jamnagar)

Incidence of insect pests of chickpea through the cropping period and monitoring of pod borer moths using pheromone traps

Normal and late sowing of chickpea varieties showed sustainable population of *Helicoverpa armigera* at 60 days after sowing.

(Pulses Research Station, JAU, Junagadh)

PLANT PATHOLOGY

Effect of fungicides application in cumin on *Trichoderma* applied in soil

Soil drenching of carbendazim 50 WP @ 2 kg in 2000 litre water/ha or foliar spray of mancozeb 75 WP @ 30 g/10 litre or hexaconazole 5 EC @ 10 ml/ 10 litre against soil borne diseases do not reduce the population of *Trichoderma harzianum* applied in soil.

(Dept. of Plant Pathology, CoA, JAU, Junagadh)

Effect of foliar application of insecticides in cumin on *Trichoderma* applied in soil

Foliar spray of imidacloprid 17.8 SL @ 3 ml/10 litre or dimethoate 30 EC @ 10 ml/10 litre in cumin against sucking pests do not reduces the population of *Trichoderma harzianum* applied in soil.

(Dept. of Plant Pathology, CoA, JAU, Junagadh)

Effect of foliar application of herbicides in cumin on *Trichoderma* applied in soil

Herbicides used as pre-emergence or early post emergence in cumin viz., pendimethalin 30 EC, 0.9 kg a.i./ha, 60 ml/10 litre at 2 DAS or glyphosate 41 SL, 0.75 kg a.i./ha, 37 ml/10 litre at 2 DAS reduces the soil population of *Trichoderma* up to one month after sowing but *Trichoderma* population was increased at later stage. While application of oxyfluorfen 23.5 EC, 0.240 kg a.i./ha, 20 ml/10 litre at 2 DAS do not reduce the population of *Trichoderma harzianum* applied in soil.

(Dept. of Plant Pathology, JAU, Junagadh)

Disease management through organic practices for organic groundnut cultivation

Blanket furrow application of FYM @ 7.5 tonne/ha followed by *Trichoderma viride* as seed treatment @ 10 g/kg seed, and *T. viride* @ 4.0 kg enriched in 250 kg FYM and as spray @ 2.5 kg/ha (5 g/litre of water) at 30 and 45 DAS found effective for the management of diseases of groundnut.

(Main Oilseed Research Station, JAU, Junagadh)

III. AGRICULTURAL ENGINEERING

The Impact of seawater intrusion on the qualitative parameter of ground water

The following scientific information as models developed for rainfall and groundwater EC are released for the scientific communities/Line Departments of State/Central Governments/NGOs working in the coastal belts of the Saurashtra region.

SN	Costal belt region	Best fit model	R ²
1	0-5 km	$EC_{PM} = 0.6364(EC_{bm}) - 0.00166(RF) + 2.9495$	0.83
2	5-10km	$EC_{PM} = 0.6965(EC_{bm}) - 0.000359(RF) + 1.2837$	0.64
3	10-15km	$EC_{PM} = 0.4171(EC_{bm}) - 0.000267(RF) + 1.5592$	0.64
4	15-20km	$EC_{PM} = -0.3577(EC_{bm}) - 0.0000683(RF) + 1.8636$	0.82

(Dept. of Soil & Water Engg., CAET, JAU, Junagadh)

An assessment of suitability of groundwater for drip irrigation in Saurashtra region

The following scientific information is released for the scientific community. The pH of the groundwater was observed higher (more than 7) in all districts of the Saurashtra region. The maximum ground water samples (99.14 %) were found in category scale forming but non corrosive class.

- Based on the EC, SAR and RSC of the groundwater, 56.24, 18.4, 6.64 and 18.68 per cent samples were found under categories of good water, saline water, high SAR saline water and alkali water class, respectively.
- The hardness of the groundwater in Jamnagar, Rajkot, Surendranagar, Junagadh and Porbandar districts were varying from 9 to 177, 12 to 206, 12 to 292, 10 to 221 and 12-176, respectively.

(Dept. of Soil & Water Engg., CAET, JAU, Junagadh)

IV. BASIC SCIENCE

Biochemical characterization of *Trichoderma* spp. for inhibition of *Macrophomina phaseolina* causing root rot in castor

It is recommended to the scientific community that among seven *Trichoderma* spp., *T. koningi* MTCC 796 was found the best antagonist to inhibit the growth of pathogen *Macrophomina phaseolina* followed by *T. harzianum* NABII Th 1 on PDA media. Cell wall degrading enzymes-chitinase and β -1, 3 glucanase are

positively correlated to inhibit *in vitro* growth of fungal pathogen *M. phaseolina*. Two species specific SCAR primers, JAU-KON856-4 (F: 5' A C C T T T C T G T C A C T G C C C T G 3'; R: 5' A G G A G A A A G G A G T G G T C G G T 3') for *T. koningi* MTCC 796 and JAU-HAR395-3 (F: 5' C T T T T G G T T T G A C A C G G T T C T 3'; R: 5' A A G C T T T G A A G T T G C G A G G A 3') for *T. harzianum* NABII Th 1, were developed from sequenced, species specific, RAPD bands of OPA16. These two SCAR markers identified best antagonists inhibiting test pathogen *M. phaseolina*.

(Dept. of Biochemistry & Biotech., CoA, JAU, Junagadh)

QTL mapping and development of SCAR marker for Fusarium wilt (*Fusarium oxysporum* f. sp. *ricini*) in castor

JAUC1 to JAUC5 series of primers can be used in castor breeding programme to identify Fusarium wilt resistant genotypes in Marker Assisted Selection (MAS) or Marker Assisted Backcrossing (MAB).

(Dept. of Biochemistry & Biotech., CoA, JAU, Junagadh)

Sex Determination of papaya (*Carica papaya*) through molecular markers

The scientific community involved in papaya improvement are recommended to use JAUP1 to JAUP4 series of primers for sex determination at pre-flowering stage in 'Madhubindu' variety of papaya.

(Dept. of Biochemistry & Biotech., CoA, JAU, Junagadh)

QTL mapping and development of SCAR marker for *Macrophomina* root rot in castor

JAUC6 to JAUC10 series of primers can be used in castor breeding programme to identify root rot resistant genotypes in Marker Assisted Selection (MAS) or Marker Assisted Backcrossing (MAB).

(Dept. of Biochemistry & Biotech., CoA, JAU, Junagadh)

Yield assessment of some drought tolerant groundnut genotypes

It is recommended to the scientific community that the genotypes DRT-2004-7 and J-53 possessed drought tolerance under unirrigated condition. Both genotypes recorded higher pod, haulm and biological yield. Harvest index and partitioning to pod were also highest along with high LAI and number of nodules at 70 DAS, thereby having better assimilation of photosynthates towards sink under rainfed condition. These genotypes may be used as parents in breeding

programme for development of drought tolerant varieties.



(Main Oilseeds Research Station, JAU, Junagadh)

IV. ANIMAL HEALTH & ANIMAL PRODUCTION

Survey on ethno-veterinary practices and preliminary evaluation of antibacterial activity of commonly used plants for animal health in Junagadh district

Methanol extract of *Prosopis juliflora* (Gando Baval) leaves at the concentration of 200 mg/ml has good *in vitro* antibacterial activity against bacterial isolates from animals, viz., *Escherichia coli*, *Streptococcus agalactiae* and *Staphylococcus aureus*.

(Department of Veterinary Pharmacology & Toxicology, College of Veterinary Science & A. H., JAU, Junagadh)

Radio-anatomy of heart size in mongrel dogs using vertebral heart score system

The normal VHS for mongrel dogs is 8.0 to 11.1 V. The deviation from this range may indicate cardiac abnormalities.

(Dept. of Vet. Surgery & Radiology, College of Vet. Sci. & A. H., JAU, Junagadh)

Histomorphometry & Histochemical observations on the ovaries of Jaffrabadi buffaloes in different season of year

In Jaffrabadi buffaloes, based on biometrical and micrometrical observations, higher functional activities of ovaries are observed in winter season.

(Dept. of Veterinary Anatomy, College of Vet. Sci. & A. H., JAU, Junagadh)

Molecular characterization of Interleukin-8 (IL-8) gene in Jaffrabadi Buffalo (*Bubalus bubalis*)

It is recommended to use following primers for the study of IL-8 gene involved in mastitis resistance.

List of Primers

Sr. No.	Primer Sequence 5'-3'	Primer length (bp)
Primer 1	Forward 5'-GGGCGGAGGTTGCGTATT-3'	18
	Reverse 5'-TAAGAGGGATCCCAGTAAGGTTT-3'	23
Primer 2	Forward 5'-GACGAGCTTCAGGCAACTATCA-3'	22
	Reverse 5'-ATATTAAATGCCATGGAGACAAA-3'	23
Primer 3	Forward 5'-TGGAAGAATCCAGCAAAGTTC-3'	21
	Reverse 5'-TGACAGAAGGCACAGGCATA-3'	20
Primer 4	Forward 5'-CCAATCGATCTGGAAATCCT-3'	20
	Reverse 5'-TGACTAAGAGGTCTTTCTGTTTGTG-3'	25
Primer 5	Forward 5'-ACAAACAGAAAGACCTCTTAGTCA-3'	25
	Reverse 5'-CAAACCTCTGATGACTCTGACA-3'	22

(Dept. of Animal Genetics & Breeding, College of Vet. Sci. & A.H., JAU, Junagadh)

Molecular characterization of Toll Like Receptor 4 (TLR-4) gene in Jaffrabadi Buffalo (*Bubalus bubalis*)

Allele B is more frequent than allele A for *TLR-4/ALU I* gene and use of following primers is recommended in Jaffrabadi buffaloes.

Exon(s)	Sr. No.	Primer Sequence 5'-3'	Amplicon Size (bp)
Exon 1	Primer-1	Forward 5'-CACAGAGCCACTTCTGGTCA-3'	180
		Reverse 5'-TTTTCAGAAGCAAGGCCAAG-3'	
Exon 2	Primer-2	Forward 5'-ACCTGAGCTTTAACTACCT-3'	280
		Reverse 5'-AATATTTCTGCTGAATAGGA-3'	
Exon 3	Primer-3	Forward 5'-CTGGGCTCTCAAGTTTACGG-3'	410
		Reverse 5'-AACCAGCCGTTGATTTTTA-3'	
	Primer-4	Forward 5'-GGCTGGTTTTGGGAGAATTT-3'	420
		Reverse 5'-TGTGAGAACAGCAACCCTTG-3'	
	Primer-5	Forward 5'-CAAGGGTTGCTGTTCTCACA-3'	478
		Reverse 5'-GAGCGAGTGGAGTGGTTCAT-3'	
	Primer-6	Forward 5'-TGCTCCCTGACATCTTCACA-3'	440
		Reverse 5'-TCTGACAAGTGGCATTCTG-3'	
	Primer-7	Forward 5'-TCAGGAATGCCACTTGTCAG-3'	406
Reverse 5'-CAGGTCTGGGCAATCTCATA-3'			
Primer-8	Forward 5'-CCAGAGCCGATGGTGTATCT-3'	410	
	Reverse 5'-CACTGAATCACCGGGCTTT-3'		
Primer-9	Forward 5'-GGTAAACCCACGAGTCCAGA-3'	286	
	Reverse 5'-CCCCCGGGAAGTTCTATATT-3'		

(Dept. of Animal Genetics & Breeding, College of Vet. Sci. & A.H., JAU, Junagadh)

To study the retrieval rate and grading of oocytes from ovary of culled Jaffrabadi buffaloes

Higher recovery rate and good quality oocytes can be obtained from ovaries without CL (Corpus Luteum) in Jaffrabadi buffalo using slicing method.

(Dept. of Vet. Gyn. & Obstetrics, College of Vet. Sci. & A. H., JAU, Junagadh)

Comparative study on efficacy of different medicaments for induction of estrus in true anestrus Jaffrabadi heifers (*Bubalus bubalis*)

The true anoestrus Jaffrabadi buffalo heifers of 3 to 3.5 body condition score responded well to CIDR or ovsynch-protocol in terms of estrus induction and conception rate.

(Dept. of Vet. Gyn. & Obstetrics, College of Vet. Sci. & A. H., JAU, Junagadh)

Association of milk components with intra-mammary infection in Jaffrabadi Buffaloes

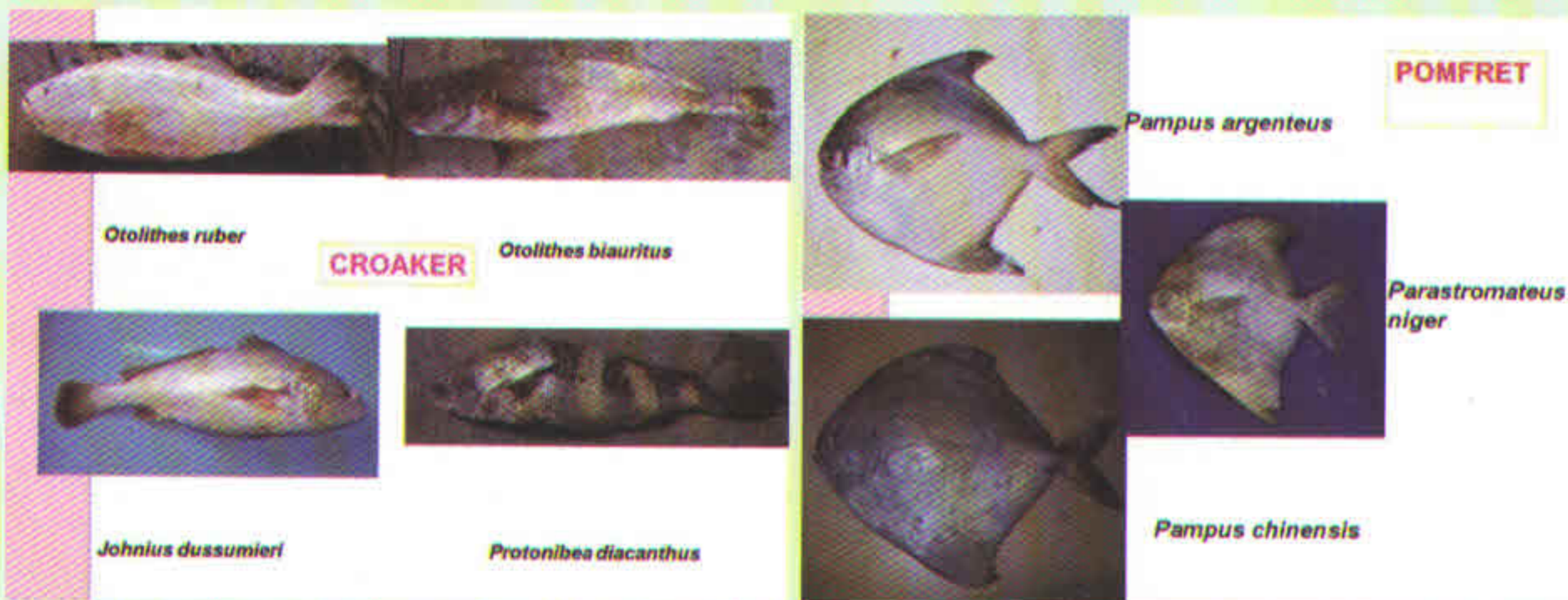
The milk lactose and milk urea nitrogen are found to be decreased in Jaffrabadi buffaloes with mastitis.

(Dept. of Livestock Production mgmt., College of Vet. Sci. & A. H., JAU, Junagadh)

V. FISHERIES SCIENCE

Record of marine finfishes commonly landed at Veraval fishing harbor

Seventy finfish species of different genera were recorded during the period of October 2010 to May 2014 at Veraval fish landing centre. The major groups of finfish available are sharks and rays, pomfrets, croakers, groupers, threadfins, ribbonfish, clupeids, lizard fish, sea catfishes, leather jackets, bull's eye. Fishes like *Rachycentron canadum*, *Mene maculate*, *Pomadasys maculates*, *Lethrinus ramark*,



Upeneus sp., *Cypselury obligolepis*, *Remora remora*, *Therapon jarbua*, *Therapon theraps*, *Harpodon nehereus*, *Plotosus conius*, *Coryphaena hippurus* are available in very less proportion at Veraval fish landing center.

(Dept. of Fisheries Resource Management, College of Fisheries Sci., JAU, Veraval)

Antibacterial activity of some available seaweeds from Veraval coast

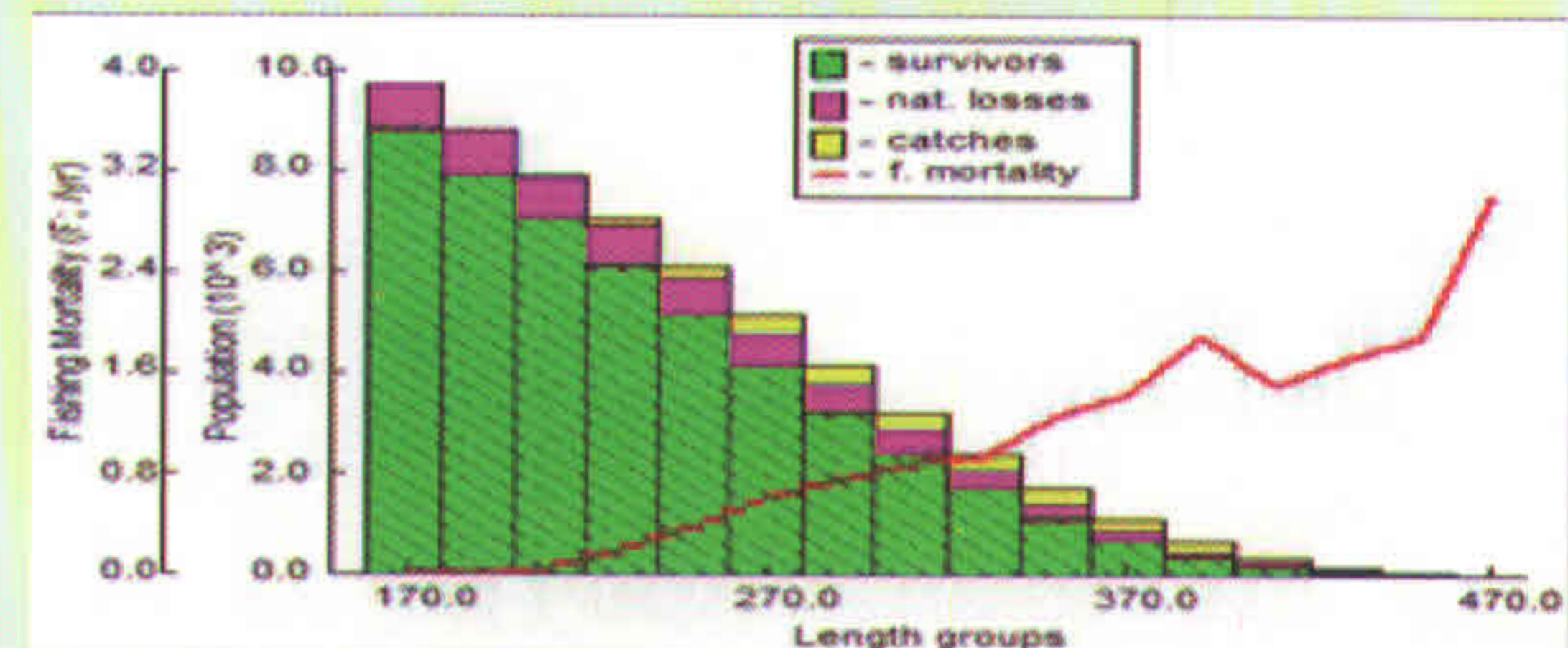
Seaweeds extract of *Gracilaria edulis*, *Sargassum weightii* and *Hypniamus ciformis* collected from Veraval coast contains antibacterial activity against *Aeromonas hydrophila*, *Pseudomonas aeruginosa* and *Vibrio alginolyticus*, respectively.



(Dept. of Aquaculture, College of Fisheries Science, JAU, Veraval)

Growth, mortality and stock assessment of Soldier catfish *Osteogeneiosus militaris* (Linnaeus, 1758) off Veraval coast

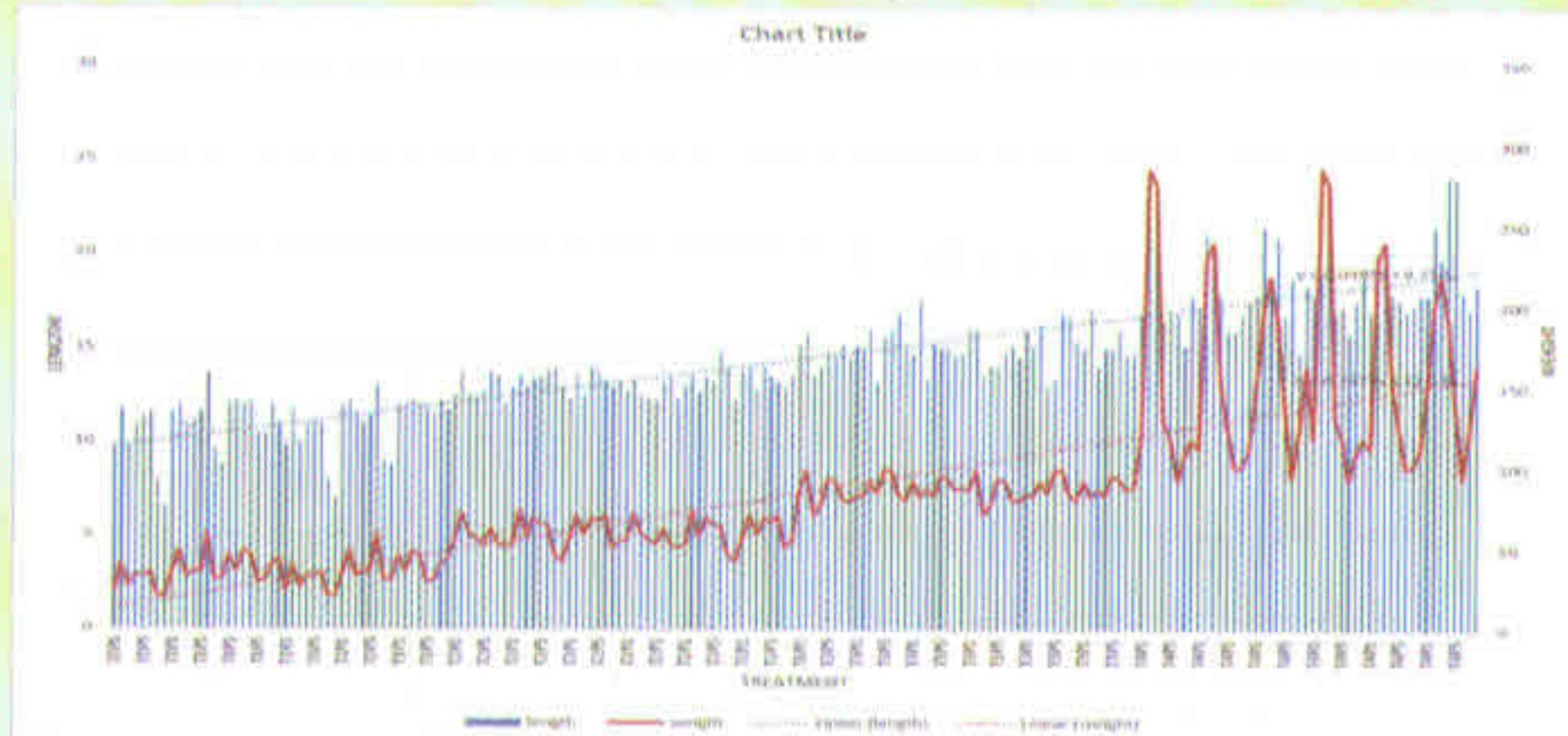
The present level of fishing on the Soldier catfish, *Osteogeneiosus militaris*, confirmed that the stock is being overexploited. Estimated growth parameters for *O. militaris* were 523 mm and 0.62 for L_{∞} & K respectively. Estimated mortality parameters for *O. militaris* were 1.09, 3.67 and 2.58 for natural mortality, total mortality and fishing mortality respectively.



(Dept. of Fisheries Resource Management, College of Fisheries Sci., JAU, Veraval)

Length-weight relationship and stomach content analysis of Japanese threadfin bream (Pink Perch), *Nemipterus japonicus*

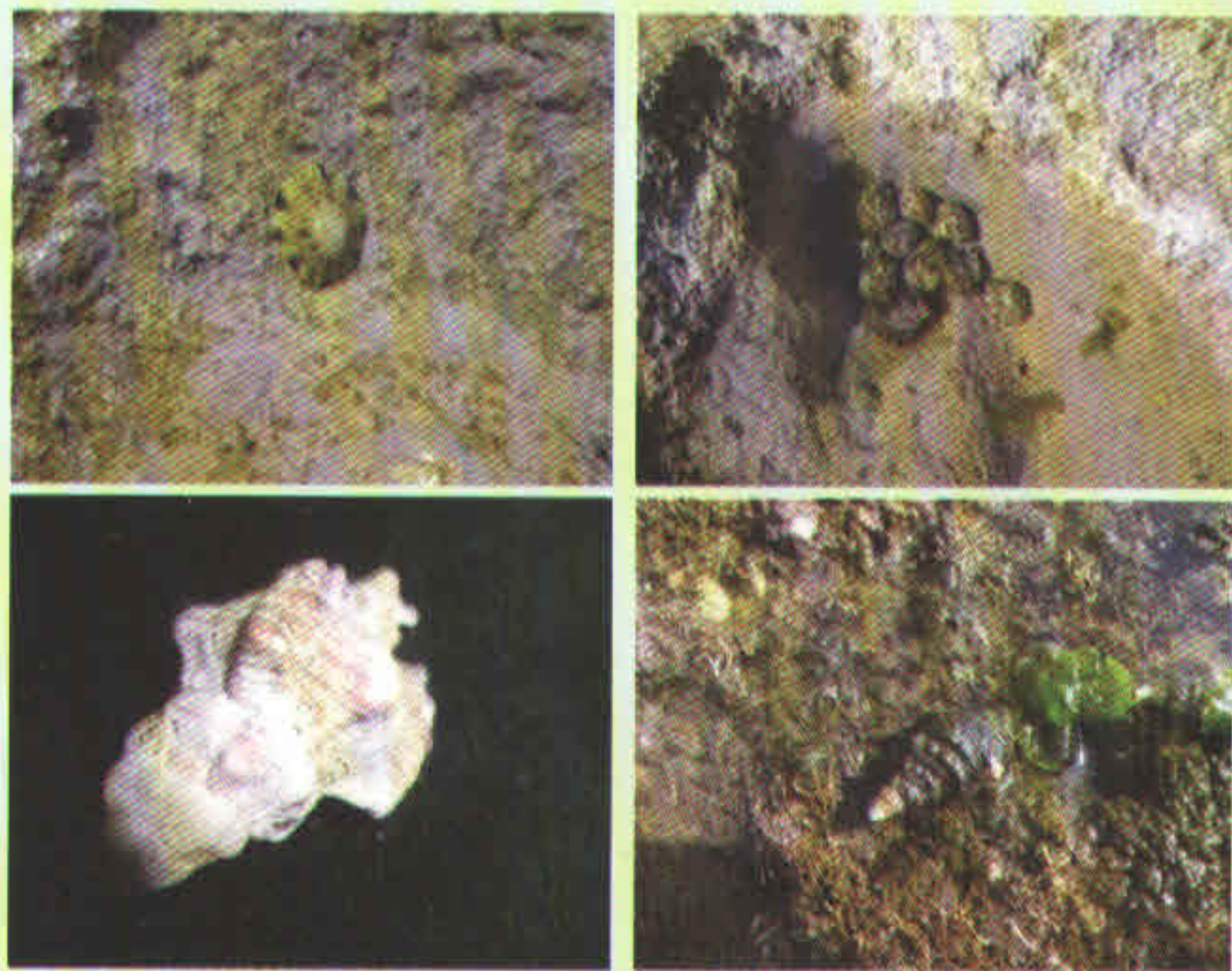
The size and weight of Threadfin bream, *Nemipterus japonicus* available at Gujarat coast ranged from 6.5-24.1 cm and 20.5-277 g respectively with the length-weight relationship equation $\text{Log } W = -2.2520 + 2.4669 \text{ Log } L$. The major food composition of *N. japonicus* constituted of crustaceans (54.35%), finfishes (30.24%), molluscs (7.80%), and unidentified and semi-digested materials (5.80%).



(Dept. of Fisheries Resource Management, College of Fisheries Sci., JAU, Veraval)

Study on biodiversity of shellfishes in rocky intertidal zone of Veraval coast

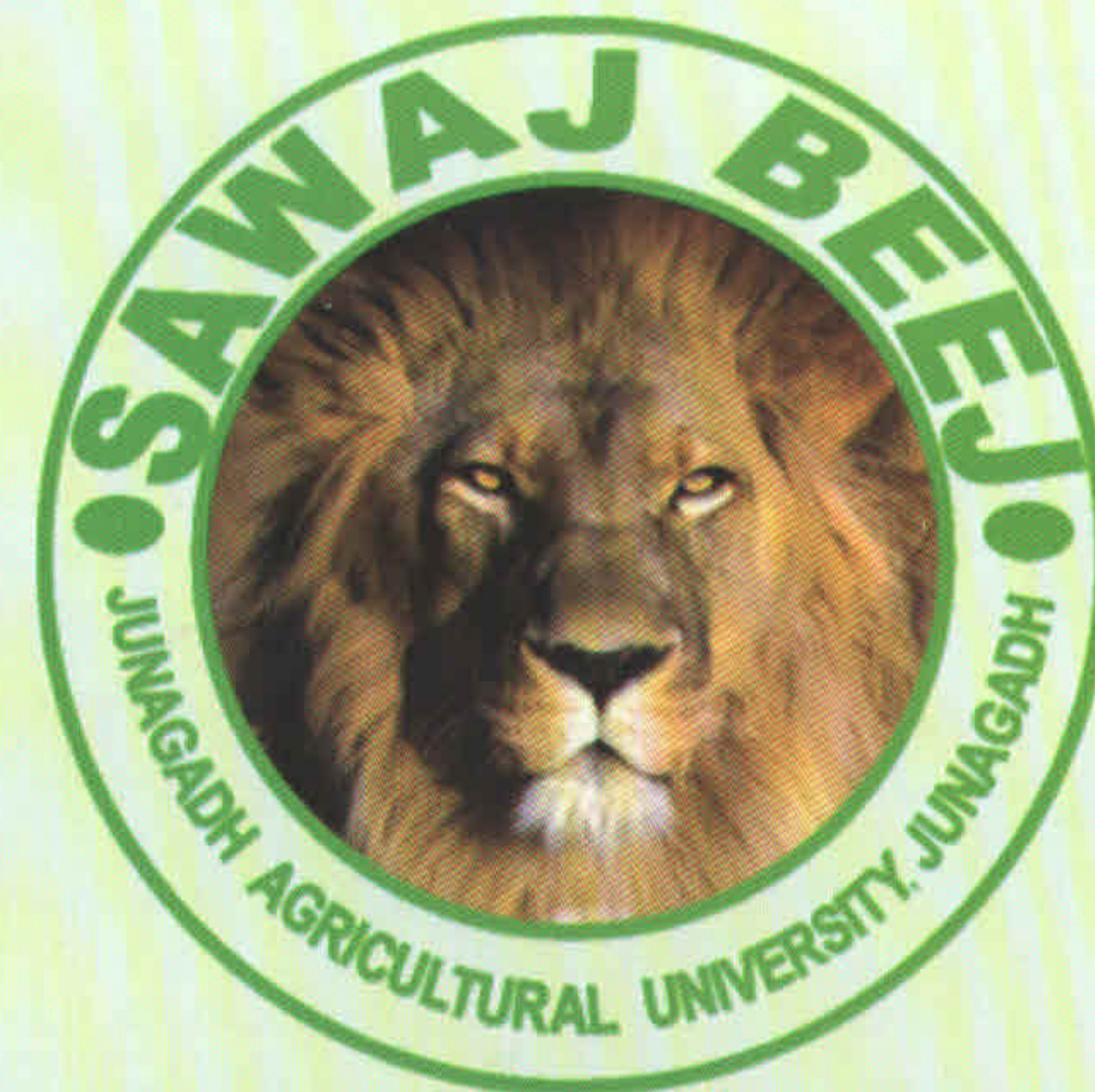
The most abundant and year round species found at Veraval are *Patella radiate* followed by *Turbo intercostalis*, *Chiton granoradiatus*, *Rinoclavis sinensis* and *Cerithium* spp. of molluscs and *Balanus amphitrite* among the crustaceans.



(Dept. of Fisheries Resource Management, College of Fisheries Sci., JAU, Veraval)

Production and distribution of breeder/truthful seeds, planting materials and bio-agent and bio-fertilizer (SAWAJ BRAND)

SN	Name of Product	2014-15
1	Nucleus/Breeder Seed (q)	2822
2	Truthful Seeds (q)	6284
3	Fruit crop grafts (Nos.)	16959
4	Fruit crop sapling (Nos.)	83412
5	<i>Tricoderma</i> (kg)	37216
6	<i>Rhizobium</i> (Bottle-500 ml)	11698
7	<i>Azotobacter</i> (Bottle-500 ml)	1981
8	PSB (Bottle-500 ml)	1987
9	<i>Beaveria</i> (kg)	5857
10	HNPV(Bottle-250 ml)	163
11	SNPV(Bottle-250 ml)	143
12	Tricocard (Nos.)	800
14	Fruit fly traps (Nos.)	297
15	Fruit fly lure (Nos.)	350



Production of Nucleus / Breeder seeds during year 2014-15

Sr. No.	Crop	Variety	Nucleus Seed	Breeder Seed (q)		Total (q)
				National	State	
1	Groundnut	GG-2	1.20	3.00	88.76	92.96
		GG-5	1.80	-	58.50	60.30
		GG-7	0.30	-	32.10	32.40
		GG-8	2.50	17.65	-	20.15
		GJG-9	6.50	14.00	26.45	46.95
		GAUG-10	-	-	36.40	36.40
		GG-11	0.90	-	70.00	70.90
		GG-16	0.80	18.45	-	19.25
		GJG-17	1.30	-	32.08	33.38
		GG-20	2.50	50.00	1569.77	1622.27
		GG-21	-	12.30	-	12.30
		GJG-22	0.40	-	101.84	102.24
		GJG-31	-	18.20	10.90	29.10
		GJGHPS-1	1.40	-	53.10	54.50
		Sub Total		19.60	133.60	2079.90
2	Pearl millet	Hybrid seed	-	-	2.82	2.82
		Parent seed	-	-	3.59	3.59
		Sub Total			6.41	6.41
3	Sesame	G.Til-2	-	1.75	10.84	12.59
		G.Til-3	-	0.40	1.57	1.97
		G.Til-4	-	-	0.60	0.60
		G.Til-10	-	1.25	0.75	2.00
		Sub Total			3.40	13.76
4	Chickpea	GG-1	1.75	-	29.00	30.75
		GG-2	6.00	27.25	44.00	77.25
		GG-3	7.25	47.00	34.25	88.50
		GG-4	1.80	6.50	-	8.30
		Sub Total		16.80	80.75	107.25
5	Wheat	GW-366	6.70	144.40	64.00	215.10
		GW-496	-	-	77.60	77.60
		Lok-1	-	-	68.00	68.00
		Sub Total		6.70	144.40	209.60
		Grand Total	43.10	362.15	2416.92	2822.17



Shri Babubhai Bokhiria, Minister of Agriculture and Chairman, Shri Jasabhai Barad, Minister of Agriculture (State) and Dr. A. R. Pathak, Hon'ble Vice Chancellor were present in Krushi Parisanvad organized under Krushi Vikas Varsh - 2014 -15 at JAU, Junagadh on January 22, 2015



Dr. A. R. Pathak, Hon'ble Vice Chancellor and Chairman of the 9th DUS Review Meeting of Protection of Plant Varieties and Farmers' Rights, Govt. of India, New Delhi was held at JAU, Junagadh during March 9-10, 2015



Shri Babubhai Bokhiria, Minister of Agriculture and Chairman of Brainstorming Session organized by College of Veterinary Science & A. H., JAU, Junagadh on "Establishment of cow sanctuary in Gujarat" held at Gandhinagar on February 28, 2015



Shri Babubhai Bokhiria, Minister of Agriculture visit to Agri. Exhibition of JAU during 11th Combined Joint AGRESKO Meeting of SAUs held on April 07-09, 2015 organized by AAU, Anand