Special Zone of Problem Areas

XXX WORKSHOP

OF

ZONAL RESEARCH & EXTENSION ADVISORY COUNCIL

2nd May 2009

Kerala Agricultural University
REGIONAL AGRICULTURAL RESEARCH STATION
KUMARAKOM

CONTENTS

SPECIAL ZONE OF PROBLEM AREAS

XXX Zonal Research & Extension Advisory Council

REGIONAL AGRICULTURAL RESEARCH STATION, KUMARAKOM

I. RICE AND RICE BASED CROPPING SYSTEM

1.1 Crop Improvement

A. RICE RESEARCH STATION, MONCOMPU

1. Breeding short duration high yielding varieties of rice suited to Kuttanad (RIC-02-01-21-93/MON (9)KAU)

- Quality analysis of the promising cultures was conducted. One culture SD 36 (KAU M 108- 262-1) was submitted for KAU Variety Evaluation Committee for evaluation and recommendation.

2. Breeding high yielding varieties of rice with resistance to important rice diseases of Kuttanad (RIC/03-02-08-93/MON(9)KAU)

- Quality analysis of the promising cultures is in progress. From the screening trials BLB resistant varieties were collected and used in the breeding programme. Following fresh crossings were made toevolve varieties with BLB resistance. (1) Uma / DV 85, (2) Jyothy/BJ1,(3) Remya /BJ 1, (4) Krishnanjana / DV 85

3. Collection, maintenance and evaluation of rice (RIC/01-00-02-82/MON ((9)KAU)

- During the period, 452 accessions of rice were raised in the field and seed materials collected. 30 more cultures selected from National Screening Nursery of AICRIP having Bacterial Blight (score 0-3) were added to the germplasm.

4. Genetic analysis of gall midge resistance in rice and evolving resistant varieties for gall midge biotype 5 (RIC/03-01-11-99/MON(9)ICAR)

- Selections were made from the following 3 crosses.
  (1) KAU M 59-29-2-1-2 (GM 1)/ NHTA 8, (2) KAU M 61-6-1-1-2 (GM 8)/ Phalguna and KAU M 59-29-2-1-2 (GM 1)/Triguna. Seeds were

multiplied from the cultures which attained uniformity and IET was conducted with 12 cultures from 4 crosses. The highest yielding entries were M 109-1-2-3 (6250 kg/ha. Kakathiya / MO 6), M 112-10-6-3 (6796 kg/ha. KAU M 59-29-2-1-2 / Triguna) and M 112-10-6-5 (6240 kg/ha.) respectively where as the check variety Jyothy gave a yield of 4150 kg.

5. Breeding for high yielding rice varieties with resistance to major pests of Kuttanad (RIC/01-03-06-2003 /MON (9) / KAU)

- From the screening trials cultures/ varieties with resistance to major pests like stem borer and leaf folder were selected and used in the breeding program.

6. Breeding for high yielding rice varieties with resistance tolerance to adverse soil conditions (RIC/01-03-06-2003/MON(9)/KAU)

- Around sixty rice varieties were tested in different locations of Kari lands. Results of the trial revealed that Uma, IR 47551 and IR 50138 can be recommended for cultivation at Karumady, Uma, Vytilla 2 and Krishnanjana in Purakkad Kari and Vytilla 6, IR 47544 and Uma in Vaikom Kari.
- A parallel programme for developing new varieties incorporating high yield and resistance to adverse soil conditions was also taken up from 2004-05 onwards. Cross combinations involving the varieties adapted to the region were made and single plant selections were made from the segregating generations. The stabilized cultures are in Initial Evaluation stage now, which are to be field tested in the kari lands.

7. Breeding for high yielding rice varieties with submergence tolerance (RIC-02-01-10-90 / MON (9) ICAR)

- Single plant selections are continued from the segregating populations involving flood resistant parents and high yielding varieties.

8. Characterization and Evaluation of medicinal rice (*Oryza sativa.* L) *var* Njavara

- Single plant selections were continued from the heterogenous mixture of Njavara and high yielding types with short duration were selected

AICRIP TRIALS

Eight AICRIP trials as detailed below were laid out in the field during Kharif 2008.

9. Advanced Variety Trial - VE (RIC-02-01-10-90/MON (9) ICAR)

• Among the twenty one entries received from DRR including 18 inbred entries, IET 20309 recorded the maximum yield of 5300 kg/ha followed by IET 20308 with 5200 kg/ha and IET 20310 with 4800 kg/ha.

10. Advanced Variety Trial - 2- E (RIC 02-01-10-90 / MON (9) ICAR)

• Twelve entries including 8 inbreds and 4 checks were tested during Kharif 2008 for yield and reaction to biotic stresses. Among the entries, IET 20132 recorded the maximum yield of 5000 kg/ha followed by IET 20134 with 4900 kg/ha. The national check Annada recorded 3800 kg/ha. Remanika, the local check recorded 3500 kg/ha.

11. Advanced Variety Trial - 1- E (RIC- 02-01-10-90/MON (9) ICAR)

• Seven entries received from DRR including 3 inbreds were tested along with 4 checks. Among the entries, IET 20413 recorded the maximum yield of 5280 kg/ha followed by IET 20405 with 5060 kg/ha and IET 20405 with 4840 kg/ha.

12. Advanced Variety Trial - 2-IME(RIC-02-01-10-90/ MON (9) ICAR)

• Seven entries with 3 inbreds and 4 checks were evaluated during Kharif 2008. The local check Uma recorded the maximum yield of 4110 kg/ha followed by the hybrid check PA 6201 with 3920 kg/ha

13. Advanced Variety Trial - 1-IME (RIC-02-01-10-90/MON (9) ICAR)

• Twenty five entries including 17 inbreds, 4 hybrids and 4 checks were tested during Kharif 2008 for yield and reaction to biotic stresses . Among the entries, IET 19985 recorded the maximum yield of 5870 kg/ha followed by IET 20553 with 5350 kg/ha and IET 20524 with 4620 kg/ha. Uma, the local check gave 4400 kg/ha .

14. Initial Variety Trial - VE (RIC-02-01-09-90/MON (9) ICAR)

• Among the thirty entries laid out, IET 20854 recorded the maximum yield of 4500 kg/ha followed by IET 20859 and IET 20855 with 4400 kg/ha each and IET 20853 with 4300 kg/ha.

15. Initial Variety Trial - E (RIC-02- 01-09-90/MON (9) ICAR)

• Trials were conducted with forty eight entries received from

DRR, Hyderabad along with check variety Remanika. IET 21076 recorded the maximum yield of 5700 kg/ha followed by IET 21075 with 5600 kg/ha and IET 21106 with 5400 kg/ha.

16. Initial Variety Trial - IME (RIC-02-01-09-90/MON (9) ICAR)

- Eighty entries received from DRR, Hyderabad along with check variety Uma were laid out in an RBD with two replications. IET 21006 recorded the maximum yield with 5900 kg/ha followed by IET 20970 with 5800 kg/ha and IET 20964 with 5700 kg/ha.

17. Seed production programme

- A total of 2057.5 Kg. of Breeder seeds, 1112 Kg.of Foundation seeds and 4346.5 kg. of Truthfully labeled seeds were produced during 2008.

B. RICE RESEARCH STATION, VYTTILA

1.Hybridization programme -Improvement of pokkali rice. *(RIC-03-03-04-VTL - 9 / 82 – KAU)*

- The project is targeted to evolve high yielding varieties suited to pokkali tracts and other similar situations, after incorporating the high yielding traits of dwarf *indica* races into the pokkali varieties through hybridization.
- Based on its superior performance in CYT, MLT and Farm trials, cul.1009 was recommended for release in the XXVIII ZREAC held at RARS Kumarakom.
- During Kharif 2008 the seed production in large plot of 50 cents was carried out and could produce 4.70 tons / ha. The quality parameters were studied and found to be within the acceptable limits.

2. Breeding high yielding varieties suitable for pokkali area by hybridization between pokkali varieties and other high yielding varieties. *(RIC-03-0303/ 80VTL (9) K.A.U.*

- The objective of this project is to combine superior characters like high yield, salinity tolerance, acid tolerance, dormancy and duration from various sources by a pyramiding approach through multiple crosses and to evolve promising varieties suited to pokkali and other coastal saline ecosystem.
- During Kharif 2008, the CYT of superior cultures were conducted with superior 8 cultures in the farmers field and participatory varietal screening was conducted as part of KAU – IRRI collaborative project and selected Cul. 1009, CIRJ-3 and CIRJ -2 as the superior

cultures for advancing to Baby trials during Kharif 2009.

3. Breeding for earliness in the Pokkali varieties by induced mutation. ***(RIC - 03 - 03 - 12/ 78 VTL (9) KAU)***

- The project aims at evolving promising mutant varieties suited to pokkali ecosystem by modifying the pokkali land races through induced mutation.
- Cul. 2006 was released as VTL 7 in the 23rd State Seed Committee held at the Central Soil Testing Laboratory, Parottukonam on 30th October 2006. The project was concluded and final report will be sent.

4.Collection, maintenance and utilization of saline resistant varieties. ***(RIC - 01 - 00 - 03 - VTL (9) 77 - KAU)***

- The project aims at building up and maintaining a large germplasm of saline tolerant/resistant varieties. Sixty six saline tolerant accessions were maintained in the germplasm as breeding stock.
- During Kharif 2007, seven more saline tolerant accessions were collected from Kaipad region and adaptive trial was conducted. Only one type viz. Kuthiru flowered at Vyttila. During kharif 2008 six accessions did not germinate and hence has to be collected again.

5.National Saline Alkaline Screening Nursery (NSASN), Saline Alkaline Tolerant Variety Trial (SATVT) and International Saline Alkaline Tolerance Observational Nursery (IRSATON). ***(RIC - 03 - 03 - 20 - VTL (9) 94 – KAU)***

- This experiment was initiated to identify genetic resources with high yield and tolerance to salinity from the materials provided under IRRI – ICAR collaborative scheme as well as from the national level promising materials sent under AICRIP through DRR, Hyderabad.
- It also aims to test the suitability of the selected entries under pokkali ecosystem and utilize the selected promising lines either for direct use or for future breeding programme.
- The experiment also envisages to provide a convenient platform for exchanging genetic material and information among those engaged in breeding for salinity tolerance and to enrich the germplasm bank with promising saline tolerant entries / lines.

IRSSTN– Kharif 2006 & 2007

- During Kharif 2006, two sets of entries were received for screening and evaluated under pokkali situation. Seven outperforming entries from the first group and eleven superior entries from the second group were selected for detailed evaluation.
- The selected cultures were evaluated in CYT during kharif 2007 and the entry 31.01 yielded 4.6 t/ha and the entry 9.12 yielded 4.9 t/ha. However, the repeatability of performance has to be tested further.

ii)CSTVT–

- During kharif 2008, 26 test entries were screened and could select four promising entries for detailed evaluation.

iii.NSASN

- During kharif 2008, twenty seven test entries were evaluated and could select three promising entries for detailed evaluation.

iv. CYT of promising selections from CSTVT and NSASN

- Two cultures viz.cul.2625(7.25 t/ha) and cul.2628 (7.0 t/ha out yielded all the other cultures including check variety VTL.6 followed by cul.1701 (6.1 t/ha). However, the repeatability has to be tested further in one more season.
- The CYT using superior cultures was repeated during kharif 2008 also.The cul.2625 out yielded all the cultures followed by cul.1701. These two cultures can be recommended for MLT during kharif 2009.

6.Induced mutagenesis in pokkali rice genotypes *(RIC-01-03-08-2004-VTL (9)KAU)*

- The objective of this project is to induce semi tall non-lodging high yielding varieties of pokkali and cheruvirippu.
- The seeds of VTL 1 and VTL 2 were subjected to gamma irradiation (10KR, 15 KR, 20 KR, 25KR and 30KR) and chemical mutagen treatment with EMS (0.5%, 1.0%, 1.5% and 2.0%) with an exposure time of o.5h, 1.0h, 1.5h and 2.0h. Significant reduction in plant height was not observed in the M2 generation of the above treatments. Hence the seeds were irradiated with higher

dozes of 40 KR and 50KR and EMS treatment with higher exposure time (4h, 8h, 12h & 16h).

- About 28 M2 plants with reduced height could be selected from the M2 generation. The stability in the reduced plant height has to be tested in the advanced mutant generations.
- During kharif 2008 also the semi dwarf mutants segregated for plant height in the M3 generation and hence has to be advanced further and selection has to be effected further.

Externally Aided Projects

7. KSCSTE project : Rice varietal improvement under abiotic stress*(RIC – 01 – 03-10-2004 / VTL (9) / KSCSTE)*

- The objective of the project is to develop an extra short duration high yielding rice variety tolerant to acidity, salinity and flooding through screening from the hundreds of breeding lines available in the centre and to standardize the anther culture technique in rice.
- Seven early duration saline tolerant accessions were selected out of the 200 breeding lines available in the station. The duration varies from 95 days to 110 days. All the selected entries are semi tall and non – lodging. From the comparative yield trial it was proved that three entries viz. CIRJ – 6, CIRJ – 2 and CIRJ – 3 could yield about 4 tons per ha. An on farm demonstration of rice-fish-prawn farming was done in the farmers field and could prove that the system is not only eco friendly but also profitable. The system could yield a profit of about Rs. 75,000/- per acre.
- An easy and economical method of *in vitro* screening system for tolerance to salinity, acidity and submergence were standardized.
- Anther culture technique in pokkali rice genotypes could be standardized under the scheme.
- The project was concluded by 31-10-2006

8. BRNS project : *In vitro* and *In vivo* mutagenesis in rice and screening for tolerance to abiotic stresses *(RIC/01-03-08-2004/VTL(9)KAU)*

• The objectives of the project were to induce semi tall stature through in vitro and in vivo mutagenesis to pokkali rice genotypes having tolerance to multiple abiotic stresses like salinity, acidity and submergence prevalent in the coastal saline agro ecosystem of Kerala and identify a reliable and dependable molecular marker for salinity tolerance so as to hasten and improve the efficiency of breeding programme.

• A tissue culture laboratory was set up for *in vitro* screening and *in vitro* mutagenesis and procured the different instruments approved under the project.The seeds of rice varieties VTL-3 and VTL-4 were subjected to gamma irradiation at the gamma garden of BARC. The M1 generation was raised and collected the M1 seeds. A high percentage of seed sterility was observed in M1 generation, which indicates a positive response of mutagenesis. The M2 generation was raised in the field during kharif, 2006 and fifty eight semi dwarf high yielding mutants (115-120cm) could be selected from the M2 generation of the 40 KR irradiated treatment of VTL-3. The M3 generation advancement was done in the uplands and the M4 generation was raised in the field. More than 75 % plants showed stability in the plant height.

• The seeds of rice varieties VTL -3 and VTL – 4 were subjected to EMS treatment at three different dozes (0.5%, 1.0%, and 2.0%) and five different treatment times (4h, 8h, 12h, 16h and 24h). The M1 generation was raised in uplands and pots and collected the M1 seeds. No seeds germinated in 16h and 24h treatments for the 1% and 2.0% dozes. The methodology for estimation of markers such as proline (Bates, 1973) and peroxidases (Putter, 1974) and superoxide dismutase were standardized.

• The level of proline accumulation was higher in tolerant varieties than moderately tolerant and sensitive varieties. There was a significant stimulation of L-proline accumulation under NaCl stress ($8dSm^{-1}$) in all the varieties which maintains an osmotic balance to alleviate the salt stress, but the level was higher in tolerant varieties followed by moderately tolerant and susceptible varieties. Hence the level of proline accumulation under salt stress (>3.5µmoles/g tissue) can be used as a biological marker for screening the sensitive and tolerant breeding

lines of rice during early germination period.

• Peroxidase activity in the salt tolerant cultivars increased to levels significantly above their respective controls under a saline stress of $8dSm^{-1}$. Tolerant (VTL-1 and VTL-6) and moderately tolerant (Jaya) cultivars were characterized by higher values of peroxidase under salt treatment ($8dSm^{-1}$) compared to susceptible variety MI-48. A decrease in peroxidase activity was noted in susceptible cultivar MI-48 under a salt stress $8dSm^{-1}$. The enhanced peroxidase activity in tolerant/moderately tolerant rice cultivars under saline stress is an enzymatic mechanism to alleviate the salinity stress. Thus, the peroxidase activity of germinating rice seeds under saline stress can be used as a molecular marker for screening the tolerant lines of rice.

• During kharif 2008, the semi dwarf mutants were evaluated in CYT and could select few promising mutants . These mutants can be tested in MLT during kharif 2009. Further the enzyme superoxide dismutase was found to be useful as a marker for salinity screening.

1.2 Crop management:

A. RICE RESEARCH STATION, MONCOMPU

1.Rice productivity in relation to internal supply capacity of nutrients (RIC/02-02-18- -2004/MON (3)/AICRIP)

• The objective of this trial is to evaluate the field variability in soil supply capacity of nutrients and its relationship to rice productivity at current fertilizer management levels.

• N omission plots have statistically significant grain and straw yield reduction during all seasons of study.

• Continuous P omission has resulted in visual P deficiency symptoms only during the eighth season and consequent significant grain and straw yield reduction.

• K omission plots are still giving grain and straw yields on par with POP applied plots even during the eighth season. The quantity of straw added during each Puncha season is 5515 kg ha^{-1} and during the Additional Crop season is 7525 kg ha^{-1} . Thereby the quantity of K added to the soil during the Puncha season is 83 kg K ha^{-1} and the Additional Crop season is 150 kg K ha^{-1} .

• Farmers' fertilizer practice (110:45:65 kg NPK ha^{-1}) of higher N and K application resulted only in grain and straw yield on par with POP (90:45:45 kg NPK ha^{-1}) indicating that there is no need for the higher dose of fertilizers which will only result in economic loss to the farmer.

2. Screening of rice germplasm for Fe and Zn contents(RIC/ 08-00-01-2004/MON (3) / AICRIP)

• The objective of this study is to identify promising donors accumulating more Fe and Zn especially in seed that can be used in bio-fortification programmes. In the screening trial 30 entries were included and were replicated thrice in $2m^2$ plots. The grain samples are being analysed at DRR for Fe and Zn content. The Fe status of the experimental site is 488ppm and Zn status is 0.9ppm.

3. Field Evaluation of Rice Herbicide PIH 2023

• The test herbicide PIH 2023 10% SC was evaluated for its effectiveness in direct seeded rice during the Puncha 2007-08 and the additional crop season 2008 in comparison with hand weeding twice, Clincher and Almix. The herbicide was found to be effective for controlling echinocloa, sedges and broad leaved weeds in a single application. The grain yield and weed dry weight recorded for the herbicide at 25, 30 and 60 gm ai/ha were statistically on par with hand weeding twice and significantly superior to Clincher and Almix.

4. Weed management trial for transplanted rice

• A new herbicide molecule Penoxsulam 24 SC was evaluated for weed control efficiency at 0.0225 and 0.0250 kg ai/ha both as pre emergence and early post emergence. The herbicide was found to be effective against grasses, sedges and broad leaved weeds. The grain yield recorded for the different doses at different times of application were statistically on par with weed free check, hand weeding twice and Butachlor.

5.Effect of tillage and nutrient management on performance of direct seeded rice under Rice-Rice-Water Fallow cropping system

• The treatments included four tillage methods viz. Conventional tillage, Zero tillage, Minimum tillage before Puncha and Minimum tillage before Additional crop along with two sources of P fertilizer

with and without additional Sulphur.

• During Rabi '07-08 and Kharif '08, the highest yield was obtained for conventional tillage and significantly superior to Zero tillage . Minimum Tillage before the additional crop or before Puncha also recorded grain yield statistically on par with conventional tillage but there is an yield reduction to the tune of 20 per cent. The yield reduction was about 50 per cent in the case of zero tillage.

B.RICE RESEARCH STATION, VYTTILA

1. Permanent manurial trial of rice in acid saline soils under flooded condition (Pokkali Tract) (BR- 01 – 00- 19/77 VTL (3)-KAU)

• In order to study the long term effect of application of inorganic fertilizers on the productivity of pokkali soil and to assess its impact on rice production a permanent manurial experiment was laid out at Rice Research Station, Vyttila, since 1972.

• The treatments comprised of combination of major nutrients either alone or in combinations with and without lime in a test variety of VTL- 4. The experiment was started during 1979.

• The results obtained so far indicated that the application of inorganic fertilizers with or without lime do not have any positive influence on grain yield of pokkali varieties. The low fertilizer responsiveness of the pokkali varieties and the high fertility status of the soil can be attributed to this results.

• The yield data during the period under report are also in conformity with the results obtained for the previous years, indicating that the pokkali soil are ideal for the production of the organic rice without the addition of any chemical fertilizers. The lime had also little effect on the targeted grain production.

2. Impact of tidal current on the sustainability of pokkali cultivation (RIC /07-00-01-2004 VTL (3) KAU)

• To investigate the influence of tidal currents on the soil productivity and sustainable rice yield in pokkali fields a field experiment has been laid out at the Rice Research Station, Vyttila under controlled water conditions by arresting the tidal current and by daily inflow and flushing in

plots with and without fertilizer treatments.

• The daily inflow and flushing the pokkali field with tidal currents had significant positive influence on grain yield and tiller production over arresting the same. This can be attributed to the reduction in the concentration of toxic elements, adding the fertility ingredients to the soil and oxygenating the flood water by way of daily flushing and washing by tidal currents twice in a day.

• The current season results clearly indicated that for a sustainable rice production in the pokkali tract, there should not be any hindrance for the natural tidal inflow of water. The experiment is to be continued to arrive at conclusive results.

3. Studies on the organic carbon flux and developing organic farming techniques for sustained rice production(RIC / 02-03-07-2004 VTL (i) KAU)

• In order to develop an organic farming technology to sustain organic rice production, another field experiment was laid out at the station by using various types of biofertilisers available in the market for both tall (VTL 4) and dwarf (VTL 6) varieties.

• The growth and yield data showed that the main treatment effects of variety was only significant. However the yield of both varieties was on par with each other. In the current season also the biofertilisers either to supplement N or P or combined had no significant effect in grain yield in pokkali owing to high fertility status of the soil, which has a capacity to produce 10 t/ha without the addition of any nutrients both in the form of biological and chemical.

• The level of organic carbon content of the soil after harvest clearly substantiates the above statement.

4. Evaluation of fertilizer response and production potential of promising saline tolerant cultures of rice. (RIC- 08- 00-05/81 VTL (i) KAU)

• In order to study the response to fertilizers on the yield and yield attributes of pokkali rice, six newly evolved saline tolerant pre-release cultures along with two check varieties were evaluated against different levels of fertilizers.

• The statistical analysis of the data on the grain yield indicated that the treatment effects due to variety alone had a significant influence on the yield of grain of rice, whereas

various levels of fertilizers or its interaction effect failed to exert any positive effect.

• It is inferred that the pokkali varieties available right now have the potential of producing a grain yield up to 4 t/ha utilizing the native fertility of the pokkali soil.

5. Nutrient management of semi tall rice for pokkali region(RIC/02-03-06-2004 VTL (1) KAU).

• The experiment aims at studying the influence of semi tall varieties to graded doses of fertilizers for rescheduling of its application under pokkali conditions.

• The statistical analysis of the data on the yield and biometric characters of the experiment did not reveal significant positive influence to the application of various fertilizer treatments. An yield up to 4-5 tons per hectare could be obtained even without the addition of fertilizers under pokkali growing conditions due to the inherent high fertile nature of pokkali soils.

6. Standardization of direct seeding practices for pokkali rice (RIC/02-03-08-2004-VTL (1) KAU).

• The experiment involves two types (tall and semi tall) of varieties against four methods of sowing to find out an appropriate and alternative sowing methodology under pokkali conditions.

• The statistical analysis of the data on grain yield revealed that neither the main plot treatments effect of different varieties nor the sub-plot treatments effect of various sowing methods found to be significant. The same trend of results was also found in the case of number of productive tillers. With respect to the height of plants at harvest, the main plot effect of varieties alone was found to be statistically significant being tall and semi tall combinations in the experiment.

• Preliminary results of the experiment showed only little response to an alternative sowing method irrespective of the stature of varieties tried under the coastal saline agro ecosystem conditions of pokkali. However, it is too early to arrive at any conclusions as the experiment is to be repeated to get confirmatory results.

1. 3 Crop Protection

A. RICE RESEARCH STATION, MONCOMPU

1.Evaluation of new fungicide formulations for sheath blight control (RIC-12-02-06-89/MON (5) ICAR)

Rabi 2007-08: The systemic fungicides Spencer 24 SC @ 0.75 ml/lit and Nativo 75 WG @0.4 g/lit were effective in controlling the sheath blight disease and increasing the yield.

2. Evaluation of new fungicides against blast (RIC/03-02-06-2004/MON (5) /AICRIP)

- **Rabi 2007-08:** The newer fungicides namely Fuji-one 40 EC @ 1.5 ml/lit, Baan 75 WP @ 0.6 g/lit and RIL 013/F1 35 SC @ 2 ml/lit were performed very well in restricting neck blast incidence and spread over control. There was significant difference in grain yield data.

- **Kharif 2008:** Five new molecules with different concentrations were tested against neck blast disease during this season. The newer chemicals like Metominostrobin 20 SC (0.5,1.0 ml and 2.0 ml), RIL 013/F1 35 SC (2.0 ml/lit), Baan 75 WP (0.6 g/lit) and Fuji-One 40 EC (1.5 ml/lit) were found effective against neck blast incidence and severity over control. The grain yield data showed that Baan 75 WP @ 0.6 g/lit produced higher yield and others were on par with Baan 75 WP.

3. Evaluation of biopesticides against location specific diseases (RIC/13-00-19-99/MON (5) ICAR)

Rabi 2007-08: Two botanical fungicides viz., Defender @ 2.5 ml/lit and Biofer @ 1.5 ml/lit were found effective against sheath blight and brown leaf spot disease incidence and on par with the standard check fungicide Bavistin 50 WP @ 1.0 g/lit.

4. Evaluation of fungicides againstlocation specific diseases (RIC/03-02-07-2004/MON(5) AICRIP)

- Three newer fungicides with two standard check fungicides were tested against location specific diseases (Sheath blight) during Kharif 2008. The results showed that the newer formulations namely Metominostrobin 20 SC(0.5ml, 1.0 ml and 2.0 ml/lit) and Taqat 75 WP (1.5 g/lit) were found most effective in restricting

sheath blight disease incidence and severity during Kharif 2008. The grain yield data was not significant.

5.National Screening Nursery (NSN) (RIC/03-02-03-84/MON (5) ICAR)

- 894 AICRIP cultures (168 NSN-I, 557 NSN-2, 56 NHSN and 65 DSN cultures) were screened against blast, sheath blight, brown spot, sheath rot and bacterial leaf blight diseases during Rabi 2007-08. 20 cultures showed their Multiple Resistant nature for all major diseases.

- During Kharif 2008, 934 cultures (193 NSN-I, 622 NSN-II, 76 NHSN and 43 DSN cultures) were screened against blast, sheath blight, brown spot, sheath rot and bacterial leaf blight diseases. 175 cultures showed Multiple Resistance for all above major diseases. Out of 175 entries, 54 NSN-I, 93 NSN-II, 22 NHSN and 6 DSN cultures expressed their Multiple Resistant nature during this season.

6. Screening rice varieties against important diseases

(RIC/03-02-04 84/MON(5)/KAU)

- 16 Moncompu varieties and 5 cultures were screened MO 17 and Culture SD36 showed multiple resistance towards sheath blight, sheath rot and blast. MO 5 showed multiple resistance towards sheath blight, sheath rot, blast and brown leaf spot.

7. Control of False smut of rice

- **Kharif 2008 :** Contact and systemic fungicides of different concentrations along with biocontrol agent *Pseudomonas fluorescens* were tested against false smut disease during flowering stage. Though all the new fungicides were found significantly effective over the untreated plots, Result 25 EC(1.0 ml/lit), Kocide 2000 54 DF (2.5 g/lit), Kocide 101 77 WP (2.0 g/lit) and *Pseudomonas fluorescens* (10 g/lit) were found superior over the standard check fungicides in checking the false smut incidence during this season. However, the data on the grain yield were not significant.

8. Pesticide Compatibility Trial Rabi 2007-08:

- The fungicide insecticide combination spray of Sivic 75 WP @ 0.6 g + Caldan 50 SP @ 1.6 g, Kitazin 48 EC @ 2 ml + Caldan 50 SP @ 1.6 g/lit and Kitazin 48 EC @ 2 ml + Indoxacarb @ 0.4 ml were found most effective in

reducing the neck blast incidence, stem borer and leaf folder pests of rice during this season.

9. Production Oriented Survey (RIC/05-00-06-2004/MON (6) ICAR)

- Production oriented survey was conducted in Alleppey, Pathanamthitta and Kottayam districts during the month of February and March 2008. 80-100 kg/acre of lime was applied for acidity problem at the time of land preparation/gap filling.
- The farmers applied over dose of insecticides/ fungicide due to high labour cost for plant protection operations. So the farmers have sprayed minimum of 4-5 application of insecticide /fungicide in every season. The farmers used biocontrol agent *Pseudomonas fluorescens* supplied by Department of Agriculture for major diseases. The farmer's interest was combined application of insecticide and fungicides to reduce the spraying cost. The average yield of Kharif crop was 5 to 6 ton/ha.

- Farmers applied Cartap (5 kg/acre), Azataf (250 g/acre), Monocrotophos (250 ml/acre) for stem borer and leaf folder, Tatamida (50 ml/acre), Carbaryl (250 g/acre) for bph and thrips, Bavistin (200 g/acre), Contaf (250 ml/acre) and Tilt (100 ml/acre) for sheath blight, blast disease control.

10.Etiology and management of virus and bacterial diseases of rice in Kuttanad(RIC/12-04-01/91/ MON (5) KAU)

- 60 varieties out of 193 of NSN1, 194 out of 622 of NSN2, 21 out of 76 of NSHN and 12 out of 43 of DSN showed resistance to bacterial leaf blight in screening nurseries during Rabi 08.

Farm Trials taken up

- Evaluation of new fungicides for sheath blight and blast

- Control of false smut disease in rice. Farm trials with Kocide 10% WP, & Result 25 EC

Farm trial proposed

Evaluation of newer fungicide & insecticide combination for blast disease and stem borer control in Rice

II. COCONUT & COCONUT BASED FARMING SYSTEM, VEGETABLES, TUBERCROPS & OTHER S

COCONUT & COCONUT BASED FARMING SYSTEM

A. RARS, KUMARAKOM

1. Multi-location trial of coconut hybrids(COC-02-00-07-PIL19/88-KAU-NARP)

a. Performance of Coconut Hybrids planted in 1988 :

- WCT X COD recorded the highest nut yield / palm/year and the highest setting percentage in WCT x MYD.
- Root (wilt) disease incidence was comparatively low in WCT X CGD hybrids
- Ongoing experiment conducted as part of the trial taken up at RARS Pilicode.

b. Performance of Coconut Hybrids planted in 2007 :

- Performance of the coconut hybrids viz. Ananthaganga, Keraganga and Lakshaganga arecompared with West Coast Tall in this tract.
- Performance of Ananthaganga was satisfactory with respect to biometric characters

2. Collection, maintenance and evaluation of the germplasm of *Garcinia gummi-gutta* L.(SPC-11-00-04-KUM-9-90-NARP)

a. Performance of clones from 1987 series of survey:

- Data on dry rind yield showed that GC 45/9014.48kg/tree),GC 2/90 (14.28kg/tree) and GC33/90 (13.67kg/tree) are the top yielders

b. Performance of clones from 1996 series of survey:

- Out of the total 214 clones planted during 1996, 138 clones flowered during the last season.
- Clones, GC 3/116(15.18kg/tree), GC 3/91 (9.95kg/tree) and GC 4/156 (9.28kg/tree) were the top yielders for dry rind yield

3. Breeding for mosaic resistance in vegetable cowpea (*Vigna unguiculata var. sesquipedalis* (PLAN Project)

- Observations on green pod yield, pod length, number, seeds / pod and reaction to CABMV were recorded from 16 selected lines and two parental lines (KMV-1 and CO-6)
- Mean pod length ranged from 39.1cm to 13.2cm

• Green pod yield and number of seeds /pod were maximum in 7/9-10-1. (1.26kg/plant). Though almost all entries were fairly tolerant to CABMV , Phyllody was observed in few lines.

• This is the first trial for observing yield performance

4. Nutrient Management of garcinia grafts in the reclaimed alluvial soils of Kuttanad

• Experiment was laid out in September 2000 with the objective of evolving a nutrient recommendation for garcinia grafts for the Kuttanad tract. Four fertilzer doses viz. T_1 – 15:10:25, T_2 – 25:20:50, T_3 – 35:30:75g NPK/plant, T_4 – No fertilizers (Control) for the first year constituted the treatments. Fertilizer dose will be gradually increased to a dose of T_1 – 150:55:20, T_2 – 250-110-500, T_3 – 350-210-700g NPK/plant during the 10th year. F.Y.M. @ 10kg/plant up to 3 years and 25kg/plant after 3 years will be applied in all the treatments.

• A nutrient dose of 120 : 45:200 g NPK per tree for the first treatment,200:90:400 g NPK per tree for the second and 280:170:575 g NPK per tree for the third treatment were applied during the eighth year of experimentation in addition to the FYM 25 kg/plant which is mandatory for all treatments including the control.Biometric observations are recorded.During the year under report the trees were subjected to pruning and trees did not bear.Yield could not be recorded.

VEGETABLES

SUGARCANE RESEARCH STATION, THIRUVALLA

1.Standardization of population density and nutrients in snake gourd variety Kaumudi (Veg./ 06-02-01-2000/ TLA(14/2 KAU)

• The trial consisted of the fourth season and the data revealed that in snake gourd variety Kaumudi a spacing of 2 x 2 m and a fertilizer dose of 150 % of the recommended dose of NPK is optimum and economic.

Farm Trial proposed

1.Standardisation of nutrients in snake gourd variety Kaumudi in the riverine alluvium of South Kerala

TUBER CROPS & OTHERS

A. RARS, KUMARAKOM

1. Influence of fluorescent pseudomonads and AMF on the growth and yield of coleus (*Solenostemon rotundifolius* (Poir) Morton) (TUB/05-00-03-2003 (ACV(1) /KAU)

• The results of the experiment during first year revealed that there is significant variation among the treatments for the yield and yield attributes of coleus. In the case of number and weight of marketable tubers plant $^{-1}$, F2 (75% rec. dose of NPK) and F1(100 % rec. dose of NPK) were on par and significantly superior to F3 (50 % rec. dose of NPK) . Total number of tubers plant^{-1}, total tuber weight plant^{-1} and tuber yield ha^{-1} also followed a similar trend.

• As far as biofertilizer treatments are concerned, with respect to tuber yield ha^{-1} , B3 (combined application of pseudomonas and AMF) was found to be on par with B2 (AMF) and B1 (Pseudomonas) and all the biofertilizer treatments were significantly superior to control (no biofertilizer). A similar trend was noticed for number of tubers plant^{-1} and weight of tubers plant^{-1}.

• Interaction effect of fertilizer levels X biofertilizers showed that 75% rec. dose of NPK + AMF (F2B2), 75% rec. dose of NPK+ pseudomonas (F2B1) and 75% rec. dose of NPK+ both AMF and pseudomonas(F2B3) were on par with 100% rec. dose of NPK alone(F1B4) indicating that a net saving of 25% fertilizer dose is possible by the addition of biofertilizers(AMF and pseudomonas) either alone or in combination. The experiment is being repeated for confirmatory results.

2. Integrated nutrient management (INM) for the short duration Cassava variety "Vellayani Hraswa" in the reclaimed alluvial soils of Kuttanad (STC-03-00-2008/KUM(i)/ KAU)

• Ongoing experiment

3. RKVY Project Centre for bio waste and bio energy recycling in Kuttanad

• This RKVY project implemented at RARS, Kumarakom envisages demonstration of a waste free, energy conscious integrated farming system approach with

emphasis on waste recycling to meet the crop nutrient requirement and non conventional energy tools for the supplementary energy needs.

- The mode of recycling attempted includes, utilization of agro- wastes, house hold wastes, and aquatic weeds for compost production and, slurry and channel silt recycling for fish and crop production.

- Composting units suitable for different farm sizes viz. **Terracota vermi unit, Sylpaulin vermi beds and vermi compost tanks** were installed.

- Biogas plants of varying capacities for demonstration and research purpose were installed and methane production from different sources established.

- The South American aquatic weed *Cabomba caroliniana* has been identified as an invasive weed of recent introduction with huge bio mass production potential in Kuttanad.

- Apart from cow dung, Eichornia, banana corm, glyricedia leaves, kitchen wastes and vegetable wastes were revealed to be potential sources of bio gas for house hold uses.

4. Hariyali project : Resource Integration for sustainable Water shed development of Madappally and Veliyanad block panchayaths on water shed basis

- Resource mapping, land use mapping and problem – cause anlysis of eight grama panchayaths of Veliyanad and Madappally block panchayaths on a water shed basis were under taken by a team of scientists of the problem region.

- Based on the Community mobilization work, Participatory Rural Appraisal excercise and socio economic analysis of the area, micro water shed work plan incorporating soil, water and bio-diversity conservation and, development projects and training progrmmes in the agricultural and allied fields were chalked out and implemented in these grama panchayaths

B. RRS, VYTTILA

1.Research on vegetatively propagated cut flowers (plan scheme)

- About thirty five orchid varieties (dendrobium) and twenty anthurium varieties were collected, tested their adaptability and standardized their micro propagation technique. Among the orchid varieties, sonia, sakura pink ,kasim white, Caesar red, Emma white, Emma white mutations etc were found highly adapted to saline environment.
- Among the twenty five anthurium varieties collected and screened, Agnihotri, Liver red, Tropical red, lima white etc. were found highly adapted to saline environment.

2. Micro propagation of banana, orchids and anthurium (plan scheme)

- The micro propagation technique of banana for large scale propagation of banana, has been standardized and large scale production has initiated. The protocol for propagation of true to type progenies of orchids has been standardized and of anthurium is being standardized.

III.COMMERCIALCROPS, AQUACULTURE & SOCIAL SCIENCES

COMMERCIAL CROPS

SUGARCANE:

A. SUGARCANE RESEARCH STATION, THIRUVALLA

3.1 Crop Improvement

1. Zonal varietal trial for identifying mid late varieties- 2004-2005 series(CC-06-00-24-TLA-9/11-ICAR)

Advanced Varietal Trial (Second Plant Crop)

- CCS t/ha: - Co 2001-08 recorded highest CCS of 13.84 t/ha followed by Co 2001-10 (13.72 t/ha) and found to be significantly superior to Co 7219 and inferior to Co 86032.
- Yield t/ha:- Co 2001-08 recorded highest cane yield of 124.69 t/ha followed by CoVSi 9337 (115.45 t/ha) and found to be significantly superior to Co 7219 and on par with Co 86032.
- CCS %:- Co 2001-09 recorded highest CCS of 13.21 % followed by Co 2001-10 (12.88%) and found to be on par with standards.

• Sucrose %:- Co 2001-09 recorded highest sucrose of 18.78 % followed by Co 2001-10 (18.26%) and found to be on par with standards.

• Brix %:- Co 2001-09 recorded highest brix of 20.50 % and found to be significantly superior to Co 7219 and on par with Co 86032.

• Single cane weight:- Co 2001-10 recorded highest single cane weight of 1.22 kg followed by Co 2001-08 (1.21 kg) and found to be significantly superior to Co 7219 and on par with Co 86032.

• Cane length:- Co 2001-08 recorded highest cane length of 276.22 cm followed by Co 2001-15 (251.67 cm) and found to be significantly superior to Co 7219 and on par with Co 86032.

• NMC: - CoVSi 9337 recorded highest NMC of 121.38 thousands per hectare and found to be significantly superior to the standards.

Advanced Varietal Trial (Ratoon Crop)

• CCS t/ha:- Co 2001-13 recorded highest CCS of 14.76 t/ha followed by Co 2001 09 (14.73 t/ha) and found to be on par with Co 86032 and significantly superior to Co 7219.

• Yield t/ha: - Co 2001-13 recorded highest cane yield of 123.58 t/ha followed by Co 2001- 09 (107.40 t/ha) and found to be significantly superior to the standards.

• CCS %:- Co 2001-10 recorded highest CCS of 14.56 % followed by Co 2001-08 (14.13%) and found to be on par with Co 86032 and significantly superior to Co 7219.

• Sucrose %:- Co 2001-10 recorded highest sucrose of 20.63 % followed by Co 2001-09 (19.51 %) and found to be on par with Co 86032 and significantly superior to Co 7219.

• Brix %:- Co 2001-10 recorded highest brix of 22.33 % followed by Co 2001-08 (21.83%) and found to be on par with Co 86032 and significantly superior to Co 7219.

• Single cane weight: - Co 2001-15 recorded highest single cane weight of 1.04 kg followed by Co 2001-13 and found to be significantly superior to Co 7219 and on par with Co 86032.

• Cane length: - Co 2001-15 recorded highest cane length of 259.11cm followed by Co

2001-13 (231.55 cm) and found to be significantly superior to standards.

• NMC:- Co 2001-09 recorded highest NMC of 136.09 thousands per ha followed by Co2001-13 (121.50) and found to be significantly superior to the standards

2. Zonal varietal trial for identifying early maturing varieties- 2005-2006 series(CC-06-00-25-TLA-9/11-ICAR)

• CCS t/ha :- CoVc 9982 recorded highest CCS of 18.95 t/ha and found to be significantly superior to both the standards.

• Yield t/ha :- CoVc 9982 recorded highest yield of 136.85 t/ha and found to be on par with Co 94008 and significantly superior to Co 85004 and CoC 671.

• CCS % :- CoVc 9982 recorded highest CCS of 13.83 % followed by Co 0310 (13.61%) and found to be on par with CoC 671 and significantly superior to Co 85004 and Co 94008.

• Sucrose %:- CoVc 9982 recorded highest sucrose % of 19.63 % followed by Co 0310 (19.37) and found to be on par with CoC 671 and significantly superior to Co 85004 and Co 94008.

• Brix %:- Co 0205 and CoVc 9982 recorded highest brix of 21.33 % and found to be on par with CoC 671 and significantly superior to co 85004 and Co 94008.

• Single cane weight:- Co 0209 recorded highest single cane weight of 1.50 kg followed by CoM 9902 (1.44 kg) and found to be significantly superior to Co 94008 and CoC 671 and on par with Co 85004.

• Cane length:- CoVc 9982 recorded highest cane length of 256.11 cm followed by Co 0302 (255.11 cm) and found to be on par with Co 94008 and CoC 671.

• NMC :- Co 0312 recorded highest NMC of 134.71 thousand numbers followed by CoVc 9982 (132.28 thousands) and found to be significantly superior to standards.

3. Zonal varietal trial for identifying midlate maturing varieties- 2005-2006 series (CC-06-00-26-TLA-9/11- ICAR)

• CCS t/ha:- CoM 0265 recorded highest CCS of 16.06 % followed by Co 0211 (16.01%) and found to be on par with Co 86032 and

significantly superior to Co 7219.

• Yield t/ha:- Co 0218 recorded highest yield of 134.01 t/ha and found to be significantly superior to the standards.

• Brix:- Co 0320 recorded highest brix % of 19.67% followed by Co 0219 (19.50%) and found to be on par with standards.

• Single cane weight:- Co 0214 recorded highest single cane weight of 1.49 kg followed by Co 0213 (1.44 kg) and found to be on par with Co 86032 and significantly superior to Co 7219.

• Cane length:- Co 0218 recorded highest cane length of 267.55 cm followed by Co 0213 (265.56 cm) and found to be on par with Co 86032 and significantly superior to Co 7219.

• NMC:- Co 0211 recorded highest NMC of 130.46 thousands per ha followed by Co 0320 (123.49 thousands /ha) and found to be on par with Co 7219 and significantly superior to Co 86032.

4. Zonal varietal trial for identifying early maturing varieties- 2007-2008 series (CC-06-00-29-TLA-9/11-ICAR)

• CCS t/ha:- Co 0402 recorded highest CCS of 14.20 t/ha and found to be on par with CoC 671 and significantly superior to Co 85004 and Co 94008.

• Yield t/ha: - CoM 0326 recorded highest cane yield of 127.56 t/ha followed by CoSnk

• 03632 (118.06 t/ha) and found to be significantly superior to both the standards.

• Sucrose %:- All test entries were found to be non significant in terms of Sucrose %, however Co 0403 recorded highest sucrose of 20.26 %

• Brix %:- All test entries were found to be non significant for Brix %, however Co0403 recorded highest value of 22 %.

• Single cane weight: - Co Snk 03632 recorded highest single cane weight of 1.80 kg and found to be on par with CoC 671 and significantly superior to Co 85004 and Co 94008.

• Cane length: - Co Snk 03632 recorded highest cane length of 262.17 cm followed by Co 0403 (260.50 cm) and found to be significantly superior to all the standards.

• NMC: - Co 0402 recorded highest NMC of 114.68 thousands per ha followed by CoN

• 03132 (105.95) and found to be on par with Co 94008 and

KERALA AGRICULTURAL UNIVERSITY
Regional Agricultural Research Station, Kumarakom
30th ZREAC
PROGRAMME

10.00 AM Silent prayer
10.05 AM Welcome address
Dr.K.G.Padmakumar,Associate Director, RARS, Kumarakom
10.10 AM Presidential address
Dr. D. Alexander, Director of Research, KAU
10.15 am Keynote address
Director of Agriculture
10.20 AM Action taken on the decisions of 29th FRC- Dr. K.G.Padmakumar, ADR
10.30 AM **Session I – Rice & Rice based cropping system**
Chairman - Dr. D. Alexander, Director of Research, KAU
Co-Chairman – Dr. P.V Balachandran, ADR, Paddy Mission
Dr. Pathummal Beevi,ADR,RARS, Pattambi
Rapporteurs - Dr. Shajan V, Assoc. Professor
Dr. Nimmy Jose, Asst. Professor
Presentation on the state of art 'Rice'& Review of research projects in Rice:
Dr. S. Leenakumari, Project Co- ordinator (Rice)
Farm Trial – Results & new proposals
Current issues & field problems in rice:
Sri. Jose Joseph, PAO, Pathanamthitta
Current issues & field problems in Pokkali rice:
Sri. K.S Sasidharan, PAO, Ernakulam
12.00 Noon **Session II – Coconut and coconut based farming system,**
Vegetables, Aquaculture and Social Sciences
Chairman – Dr. D. Alexander, Director of Research, KAU
Co-Chairman – Dr. L . Rajamony, Associate Director
Dr. Mothilal Nehru, Associate Director (Ext.)
Dr. C. Mohana Kumaran Nair, Dean, COF, Panangad
Rapporteurs – Dr. Reena Mathew, Associate Professor
Dr. Dhanya M.K. Assistant Professor
Presentation on the state of art 'Coconut' –
Sri. Thomas Mathew, Director, Coconut Development Board
Review of research projects in coconut:
Dr. P.C. Balakrishnan, Associate Director
Status paper on vegetable cultivation
Dr T.R Gopalakrishnan, Professor& Special Officer (Seeds)
Review of Research Projects in Vegetables:
Dr. Abdul Vahab, Project Co-ordinator (Vegetables)
Farm Trial – Results and New Proposals
Current issues and field problems in Coconut & Vegetables
Sri. A.C. Philip, PAO, Alappuzha
Current issues and field problems in Kottayam District:
Sri. Ramesh Das, PAO, Kottayam
12.30 PM **Session III – Commercial Crops**
Chairman – Dr. D. Alexander, Director of Research, KAU
Co-Chairman – Dr. P. Sivaprasad, ADR, NARP (SR),Vellayani
Rapporteurs – Sri. Surendran, Assistant Professor
Dr. Reeni Mary Zachariah, Assistant Professor
Review of Research Projects in Sugarcane:
Dr. Sajan Kurien, Associate Director (Planning)
Farm Trial – Results and New proposals
1.15 PM Vote of thanks – Dr. Joseph Philip, Professor (Hort.)

CoC 671 and significantly superior to Co 85004.

5. Zonal varietal trial for identifying midlate maturing varieties- 2007-2008 series (CC-06-00-30-TLA-9/11-IACR)

- CCS t.ha :- Co 0409 recorded highest CCS of 11.76 t/ha followed by CoM 0316 (11.66 t/ha) and found to be on par with Co 86032 and significantly superior to Co 219.

- Yield t/ha :- CoM 0316 recorded highest cane yield of 101.40 t/ha and found to be on par with Co 86032 and significantly superior to Co 7219.

- CCS %:- VSI 9805 recorded highest CCS of 13.97% followed by Co 0409 (12.56%) and found to be on par with Co 86032 and significantly superior to Co 7219.

- Sucrose %:- VSI 9805 recorded highest sucrose of 19.88% followed by Co 0409

- (17.79%) and found to be on par with Co 86032 and significantly superior to Co 7219.

- Brix %:- VSi 9805 recorded highest brix of 21.75% and found to be significantly superior to the standards.

- Single cane weight:- CoN 03133 recorded highest single cane weight of 1.58 kg and found to be significantly superior to Co 86032 and on par with Co 7219.

- Cane length: - None of the test entries has shown statistical significance with respect to cane length.

- NMC:- Co SnK 03822 recorded highest NMC of 90.17 thousands /ha followed by MS 0301 (89.46 thousands) and found to be on par with both the standards.

6. Evolution of sugarcane varieties for the different agro climatic tracts of Kerala and fluff exchange programme – 1997 series (CC-06-00-07/TLA 9-97-KAU)

- Seven cultures of 1997 series along with 3 check varieties were evaluated in CYT (1st, 2 nd plant crop and 1st ratoon).

- ANOVA showed significant difference for the characters cane length, cane yield, M.C.C., H.R. Brix and S.M.T Brix.

- Culture no. 12/97 showed highest cane yield followed by Culture no. 44/97 and marginally resistant to red rot. For red reaction, six cultures

were marginally resistant and one was marginally susceptible.

7. Evolution of sugarcane varieties for the different agro climatic traits of Kerala and fluff exchange programme – 1998 series (CC-06-00-07/TLA 9-98-KAU)

- Nine cultures of 1997 series along with 3 check varieties were evaluated in CYT (1st, 2 nd plant crop and 1st ratoon).
- ANOVA showed significant difference for the characters, cane length, cane girth, single cane weight, cane yield, M.C.C. H.R. Brix and S.M.T Brix.
- Culture no. 119/98 showed highest cane yield and marginally resistant to red rot. For red reaction, six cultures were marginally resistant and three were marginally susceptible.

8. Evolution of sugarcane varieties for the different agro climatic tracts of Kerala and fluff exchange programme – 1999 series (CC-06-00-07/TLA 9-99-KAU)

- Ten cultures of 1997 series viz., culture no. 2/99, culture no. 11/99, culture no. 12/99, culture no. 18/99, culture no. 37/99, culture no. 40/99, culture no. 45/99, culture no. 52/99, culture no. 58/99 and culture no. 70/99 were evaluated along with 3 check varieties were evaluated in CYT (1st, 2 nd plant crop and 1st ratoon).
- ANOVA showed significant difference for most of the characters. Culture no. 58/99 showed highest cane yield and marginally resistant to red rot. For red reaction, seven cultures were marginally resistant and three were marginally susceptible.

9. Evolution of sugarcane varieties for the different agro climatic tracts of Kerala and fluff exchange programme-2000 series (CC-06-00-07/TLA 9-2000 KAU)

- Fourteen cultures viz., culture no. 6/00, culture no. 15/00, culture no. 18/00, culture no. 21/00, culture no. 35/00, culture no. 43/00, culture no. 48/00, culture no. 49/00, culture no. 60/00, culture no. 70/00, culture no. 71/00, culture no. 81/00, culture no. 83/00 and culture no. 106/00 were advanced to Comparative Yield Trial (IInd plant crop). Trial is continuing.

10. Evaluation of sugarcane varieties for the different agro climatic tracts of

Kerala and fluff exchange programme – 2001 series (CC-06-00-07/TLA 9-2001 – KAU)

- Twelve cultures were advanced to Comparative Yield Trial (I[st] plant crop). Trial is continuing.

11. Evaluation of sugarcane varieties for the different agro climatic tracts of Kerala and fluff exchange programme – 2002 series (CC-06-00-07/TLA 9-2002 – KAU)

- Thirteen cultures were advanced to to Comparative Yield Trial (I[st] plant crop). Trial is continuing.

12. Evaluation of sugarcane varieties for the different agro climatic tracts of Kerala and fluff exchange programme – 2003 series (CC-06-00-07/TLA 9-2003 – KAU)

- Twenty cultures were advanced to Initial Evaluation Trial. Trial is continuing.

13. Evaluation of sugarcane varieties for the different agro climatic tracts of Kerala and fluff exchange programme – 2004 series (CC-06-00-07/TLA 9-2004 – KAU)

- One hundred and four cultures were advanced to Initial Evaluation Trial. Trial is continuing.

14. Evaluation of sugarcane varieties for the different agro climatic tracts of Kerala and fluff exchange programme – 2005 series (CC-06-00-07/TLA 9-2005 – KAU)

- Seedlings from 17 zonal crosses and 32 general collections are in main field. Trial is continuing.

15. Evaluation of sugarcane varieties for the different agro climatic tracts of Kerala and fluff exchange programme – 2006 series (CC-06-00-07/TLA 9-2006 – KAU)

- Seedlings from 25 zonal crosses, 15 station crosses and 15 general collections are in main field. Trial is continuing.

16. Evaluation of sugarcane varieties for the different agro climatic tracts of Kerala and fluff exchange

programme – 2007 series (CC-06-00-07/TLA 9-2007 – KAU)

- Seedlings from 15 zonal crosses, 16 station crosses and 45 general collections are in main field. Trial is continuing.

3.2. Crop management

SUGARCANE RESEARCH STATION, THIRUVALLA

1. Agronomic evaluation of promising genotypes.(CC/06-00-19/94(i) ICAR)

- Among the genotypes studied, the genotype V_1 (Co 2000-10) recorded highest cane yield (78.2 t/h) followed by CoTl 1153 (V_3) with an yield of 77.1 t/h and were on par and significantly superior to V_2 (Co Tl 1358) . Sugar yield was highest in V_3 (CoTl 1153) followed by V_1 (Co 2000-10) which were on par and significantly superior to V_2 (CoTl 1358).

- The treatment variation due to fertilizer levels were significant for yield parameters, sugar yield and juice quality. Cane yield and sugar yield of the genotypes at 100 % of the recommended dose of nutrient supply was on par with that at 125 % of the recommended dose of nutrient supply and they were significantly superior to 75 % of the recommended dose of nutrient supply.

2..Screening of herbicides for effective weed control in sugarcane ratoon crop (SSA/10-00-01/TLA (i) ICAR)

- Pre emergence application of the weedicide Metribuzine 1 kgai/ha along with hoeing 45 days after ratoon initiation is found to be effective in controlling weeds in sugarcane ratoon crop. The yield of the crop was also superior compared to the other weedicides tried.

3. Studies on the control of flowering in commercial cultivation of sugarcane (SSA/ 10-00-03-2000/ TLA (i) ICAR (b)

- Spraying of ethrel at 500 ppm four months after planting was found to be effective for controlling flowering in sugarcane for improving the quality of the product and staggered harvesting in madhuri variety.

4. Developing organic farming module for sugarcane crop (AICRP on Sugarcane)

- Application of 75 % of the recommended dose of NPK as

inorganic and 25 % as organic(FYM) in plant and ratoon crop of sugarcane is found to be superior in cane yield and sugar yield compared to the other combinations of organics and inorganics.

5. Evaluation of varieties/ promising cultures for multiple ratooning and jaggery production (CC-06-00-16/95-TLA-3 KAU)

- Varieties did not differ significantly with respect to growth and yield of sugarcane. However, there is significant difference between varieties in sugar yield. Madhuri, Madhurima, Madhumati and Thirumadhuram were on par in sugar yield. Madhuri variety gave the highest cane yield among the different varieties tried.

6. Evaluation of varieties/ promising cultures for multiple rationing and jaggerry production (CC-06-00-16/95-TLA-3 KAU0

- Varieties did not differ significantly with respect to growth and yield of sugarcane.Madhuri, adhurima, Madhumati and Thirumadhuram were on par in sugar yield. Madhuri variety gave the highest cane yield among the different varieties tried.

7. Effect of planting geometry and nitrogen levels on the yield and quality of plant and ratoon crop of sugarcane (CC-06-00-15-95/TVLA- 3 KAU)

- Among the various spacing trials higher cane yield was recorded in treatment M_2 when setts were planted in double row spacing (30:60cm). With respect to nitrogenous fertilizer application, treatments did not vary significantly in cane yield. There was no increase in yield on application of nutrients over and above the recommended dose of fertilizers in any of the spacing trials. Interaction effect of varieties and spacing were found to be not significant.

8. Evaluation of sugarcane varieties and their agrotechniques for maximizing the jaggery yield and quality. (PH T-03-00-14-2004/TLA(17)KAU)

- Three varieties with maximum jaggery yield and one with high jaggery recovery percentage were selected and the experiment on standardization of agrotechniques with the above objectives are ongoing.

9. Product diversification and value added products in sugarcane-Production and preservation of different form of jaggery.

- The technology standardized for the preparation of four forms of jaggery with improved quality viz., liquid, semisolid, solid (in the form of balls) and powder.

3.3Plant Protection

1. Evaluation of pre-zonal/IET/zonal varieties/ genotypes for resistance to red rot. (CC-06-00-22-97 / TLA (S) – ICAR.

Initial Varietal Trial(Early)

- Out of the 22 entries tested in the IVT (Early), 14 varieties viz., Co 0301,Co 0302,Co 0303,Co 0308, Co 0309,Co 0310,Co 0312,Co 0313, Co 0314, MS 0202, CoM 0250,Co 0254, Co 0259 and PI 96-0843 showed moderately resistant reaction; seven varieties viz., Co 0305,Co 0315,Co 0211,Co 0306,Co 0219, Co 0251 and Co 0261 showed moderately susceptible reaction; and Co 0114 showed susceptible reaction to plug method of inoculation. By nodal method, all the 22 entries namely showed resistant reaction .

Initial Varietal Trial (Midlate)

- Out of the 17 entries tested in the IVT (Midlate), only one variety - Co 0322 showed resistant reaction; Eleven varieties viz., Co 0320,Co 0112,Co 0308, Co 0325,Co 0209, Co 0217,Co 0221,Co 0265 ,Co 0272, Co Vc 030301 and Co 0311 showed moderately resistant reaction and one variety – Co 0323 showed highly susceptible.By nodal method, all the 17 entries showed resistant reaction.

Advance Varietal Trial (Early) II Plant

- Out of the four entries tested in the AVT (Early) II Plant, one variety Co 2000-01 showed moderately susceptible; Co 2000-03 and Co M 9516 showed susceptible reaction and Co 2000-02 showed highly susceptible reaction to plug method of inoculation. All the varieties showed resistant reaction to the nodal method of inoculation.

Advance Varietal Trial (Midlate) I Plant

- Out of the nine entries tested in the AVT (Midlate) I plant , three varieties viz., Co VSI 9337, Co 2001-09 and Co 2001-10 showed moderately

resistant reaction; three varieties viz., Co 2001-13,Co M 7602 and Co 2001-15 showed moderately susceptible reaction; three varieties viz., Co 2001-08, Co 7219 and Co 86032 to plug method of inoculation. All the varieties showed resistant reaction to the nodal method of inoculation.

Advance Varietal Trial (Midlate) II Plant

- Out of the twelve entries tested in the AVT (Midlate)II Plant, five varieties viz., Co TL 1358, Co 2000-06, Co 2000-12, Co 2000-11 and Co 86032 showed moderately resistant reaction; five varieties viz., Co 85004, Co M 9516, Co 2000-01, Co 2000-10 and Co TL 1153 showed susceptible reaction; two varieties viz., Co 2000-03 and Co 2000-02 showed highly susceptible to plug method of inoculation.

- All the varieties showed resistant reaction to the nodal method of inoculation.

2. Identification of pathotypes /races in red rot pathogen (CC-06-00-20 -97 / TLA (S) – ICAR

- Out of the fifteen entries tested in the three varieties viz., Co 7717 , Co 62399 and SES 594 showed resistant reaction: seven varieties viz., Co 1148, Co 88017, Thirumadhuram, Baragua (*S. officinarum*), Khakai (*sinense*), Bo 91 and CoJ 64 showed moderately resistant reaction; two varieties viz., Co 419 and Co 975 showed moderately susceptible reaction; three varieties viz., Co 671, CoS 767 and Co 997 showed highly susceptible to plug method of inculation.

- All the varieties showed resistant reaction to the nodal method of inoculation.

3. Survey of sugarcane diseases naturally occurring in the area on important sugarcane varieties. (CC-06-00-21 -97 / TLA (S) – ICAR

- Survey was conducted in two districts of South Kerala viz., Pathanamthitta and Alappuzha District.

- There was low incidence of pest and disease incidence and the yield level will be moderate only. The survey was conducted at maturity stage Madhuri was the variety cultivated in all areas.

- Marketing and labour shortage are the major problem in sugarcane cultivated area of Pathanamthitta and Alappuzha District

• The cultivable area was very much reduced due to non availability of co-operative sugar factory in this area.

• There was low incidence of red rot, leaf spot and rust diseases; low to moderate incidence of woolly aphid and shoot borer. Farmers could not follow chemical control measures.

FARM TRIALS

1.Evaluation of sugarcane genotype

2. Screening of new herbicides for effective weed control in Sugarcane ratoon crop

AQUACULTURE

A. RARS, KUMARAKOM

1. Fish culture in Cage Enclosures in Tidal wetlands–Development of a Participatory Farming Model

• With growing demand for food fish and scarcity of land for land based aquaculture , aquaculture intensification calls for exploration of new systems of farming. Multiple uses of water systems and culture of commercially ortant fishes in enclosures open water bodies is an ac ed strategy. The present stu y evaluates the production per ormance of the pearlspot, *Etroplus suratensis*, in cage enclosures in Vembenad estua ine system.

• Pearlspots exh ited biomass accrual of 0.84 o 1.07 g/day, with highest harvestable biomass per ca e (35 kg/m^3) with maximum rvival(86.95 %). The grow performance of endemic f sh, pearlspots, *Etroplus surate sis*, under the intensive cage system was notably impres ve. The cage-reared fishes a ained a higher biomass inc ement with reference to le gth indicating the superior me quality. |

• Net cages stocked with pearlspots wer almost devoid of algal gro th and mesh clogging. The lgal browsing behavior of p rlspots render this species ver ile species for cage culture. I is observation indicates that P rlspots can be employed also a 'scraping' species in all cage culture systems.

• The food conversion efficiency ac ved in the present study higher than most of the r ported studies reported earli r in India (Dehadri, 1975 Sukumaran *et al.*, 1986; Kur araiah *et al.*, 1986; Parames w aran, 1993).

• In the context that pearlspot is a high valued species, fetching almost six times market value as compared to carps, the study points to immense possibilities of cage farming of this species.

• There is a dire need to evolve appropriate species specific and complete feeds using locally available ingredients and crop residues so that the feed cost can be reduced.

• Kerala is the wettest state in India with over 20 % of the geographical area is covered by open waters .The technology on cage fish farming developedby the KAU for the first time in India, now being extended through State Fisheries Department is going to transform Kerala as a pioneer state in open water fish culture

2. ICAR Mega seed project - Fisheries

• RARS, Kumarakom in the past few years has standardized techniques for breeding of several endemic fish species. The present project involves mass production of seeds of such species for distribution among farmers. The project is funded by the ICAR.

• In the context of the heavy demand for local fish species such as pearlspot (*Etroplus suratensis*)and Golden catfish(*H. brachysoma*) as compared to carps, seed production of these species were intensified.

• Captive breeding of *H.brachysoma* and *E suratensis* was undertaken as per techniques standardized and published for the first time by the RARS, Kumarakom The produced seeds were distributed to the farmers for farming or to the State Department of Fisheries has for open water ranching.

• *H brachysoma*, an endemic species in rivers of Kerala, considered a critically endangered species till a few years back is on a massive come back with these efforts

• It is hearty to note that golden catfish is now no more an endangered or rare species in Kerala but a commefcial species s sold in the market places.The massive come back of this speciesto commercial fisheries is exclusively the greatest contribution of this project undertaken by RARS, Kumarakom.

• Seeds of different varieties such as carps, pearlspots, catfishes and ornamental fishes worth over Rs 1.20 lakhs were produced and distributed to farmers during the year.

• In order to display all such the endemic fish species of Vembenad, a public aquarium for endemic food and ornamental fishes is also being built under this project.

B. RICE RESEARCH STATION, VYTTILA

1.Intensive culture of fish in brackish water ponds(F. VYT. AQUA / 13 / 92)

• The objective of this project is to evolve a technology for maximising production of fish in brackish water ponds during low saline phase by adopting mono and poly culture of brackish water fishes and mixed culture of fresh water carps along with brackish water fishes during fresh water phase in ponds.

Monoculture of *Etroplus suratensis (Pearl spot)*

• Monoculture of *Chanos chanos* (Milk fish)

• Mixed culture of brackish and fresh water fishes

SOCIAL SCIENCES

KRISHI VIGYAN KENDRA – KOTTAYAM

• Conducted 3 On Farm Trials in rice, ginger and bush jasmine

• Conducted 4 FLDs in chilli, fish farming and cassava

• Conducted 40 trainings to farmers, 3 trainings to rural youth and 15 trainings to extension functionaries

• Two vocational trainings were conducted on nursery management and fresh water prawn production

• Total number of extension activities conducted was 381

• Planting materials of fruit crops, vegetables, spices and ornamental crops for Rs 13148 was sold out

• Bio fungicide lab of KVK sold out Trichoderma 776 Kg and Psuedomonas 4439.5 Kg

• One book, seven research papers, five popular articles were published by KVK scientists.

• One OFT on Ameliorative management techniques for acute soil acidity in direct sown rice crop of Kuttanad ecosystem was conducted with the financial assistance of Planning Board

• Conducted two FFSs in rice and vegetables

• Conducted 3 On the Job trainings to Vocational Higher Secondary students

• Conducted training on farming of the giant freshwater

prawn with the financial assistance of NFDB

- Conducted RAWE programme to final year students of B.Sc (Ag) and B.F.Sc

- KVK is acting as supporting agency for Central Government Integrated Water shed development programme Hariyali in 12 microsheds in 6 Gramma panchayaths of Lalam block.

ACTION TAKEN ON THE MINUTES OF THE XXIX ZREAC OF THE SPECIAL ZONE OF PROBLEM AREAS HELD ON 11th FEBRUARY 2008 AT RARS KUMARAKOM

I. RICE AND RICE BASED CROPPING SYSTEM:

RRS, MONCOMPU

1. Seed Production Programme

Decision :

• The house recommended to increase the procurement price of paddy to Rs. 13/kg. The seed production programme for Kuttanadu may be finalized in consultation with PAO, Alapuzha

Action Taken:

• A proposal was placed in the Special meeting of Kerala State Seed Development Authority held on11.6.2008 to increase the procurement price of paddy to Rs. 13/- per kg and was approved.

• A State Seed plan for production and distribution of quality seed material in rice for the entire state has been prepared by the Kerala State Seed Development Authority with technical guidance from Dr. Leena Kumary. S and Dr. P. V. Balachandran, Kerala Agricultural University and was released during the Paddyfest 2009 held on 11th and 12th February 2009 at Trivandrum.

2. Rice productivity in relation to internal supply capacity of nutrients

Decision :

• The quantity of straw added and K addition should be worked out

Action Taken:

• The quantity of straw added and K addition has been worked out and will be presented.

3. Yield maximization in rice in the acid sulphate soils of Kuttanad through "systematic approach" in fertilizer use.

Decision:

• Decided to constitute a committee(Associate Director, RARS, Kumarkom, Chairman, & Dr. Abraham Varghese & Dr. N.K. Sasidharan as members) to review result and recommended for mini package work shop.

Action Taken:

• The committee with Associate Director, RARS, Kumarkom as Chairman. Dr. Abraham

Varghese and Dr. N.K. Sasidharan as members was held on 18/9/2008 and reviewed the results of farm trials conducted in the Kari, Karappadam and Kayal areas at 6 locations each. The result was recommended for the Mini POP workshop. The Result was presented in the Mini POP

4. Farm trials

Decision :

- The following new farm trials were proposed and approved
- Evaluation of new fungicides for sheath blight and blast
- Control of false smut disease in rice. Two separate farm trials are to be taken up with 1. Kocide 10% WP, & Result 25 EC

Action Taken

- **(1)** Farm trials for testing effectiveness of newer systemic fungicide Filia 52.5 SC against sheath blight and blast diseases were laid out at 10 locations of Kuttanad and Ambalapuzha Taluk during Kharif 2008. Filia 52.5 SE @ 2.0 ml/lit was found effective against these two diseases in six locations compared to Standard check Contaf 5 EC(2.0 ml/lit) and Kitazin 48 EC(1.0 ml/lit) for sheath blight and blast respectively.

- **(2)** The farm trials for false smut disease control was laid out in ten locations of Kuttanad and Ambalapuzha Taluk during Rabi 2008-09. Two separate trials for Result 25 EC and Kocide 2000 54 DF were laid out in each location. The treatments were applied and observations to be recorded in the first week of April 2009. The results will be presented in the next ZREAC workshop.

Field problems

1.Compatibility of insecti - cides and fungicides

Decision :

- Compatibility trials of important plant protection chemicals to be taken up. A committee of Dr. Abraham Varghese (Chairman), Dr. Ambikadevi, Sri. M. surendran and Dr. Thomas Geoorge, college of Agriculture, Vellayani.

Action : Taken

- A new trial with three insecticide and three fungicide combinations were tried during Kharif 2008 against major pest and diseases like leaf folder, stem borer, sheath blight and sheath rot etc. The pest and disease pressure was very low and there was no significant difference among the treatments. . We need application of individual chemical treatment without combinations should be added in the next year programme for effective

analysis. This trial will be continued in the next season with modifications.

2. Ear cutting caterpillar in rice

Decision:

- Dr Ambika devi for action

Action Taken:

- Necessary recommendat- ions were given for the management of the pest.

3. False smut control

Decision:

- A new trial with pseudomonas is to be taken up – (Action Sri. M.Surendran)

Action Taken :

- The foliar spray of *Pseudomonas fluorescens* was included in the existing false smut disease control trial. All the chemical and biocontrol treatments were effective during Kharif 2008. The Rabi season experiment is under progress. The observations will be recorded in the first week of April 2009.

RICE RESEARCH STATION, VYTTILA

KSCSTE project : Rice varietal improvement under abiotic stress (RIC – 01 – 03-10-2004 / VTL (9) / KSCSTE)

Decision

- Include Uma & 7 lines of Kaipad varieties from Panniyur in Multilocational trial.

Action Taken:

- Uma & 7 lines of Kaipad varieties from Panniyur will be included for the multilocational in the ensuing crop season of 2009

COCONUT AND COCONUT BASED CROPPING SYSTEM:

RARS, KUMARAKOM

1. Multi-location trial of coconut hybrids

Performance of Coconut Hybrids planted in 1988 :

Decision :

- : After consultation with Project Coordinator, it has to be decided whether to continue the project or not.

Action Taken:

- The project will be continued till 2012.

2. Collection, maintenance and evaluation of the germplasm of *Garcinia gummi-gutta* L.
(SPC-11-00-04-KUM-9-90-NARP)

i. Performance of clones from 1987 series of survey:
ii Performance of clones from 1996 series of survey:

Decision

- Recommendation of the best clones may be given

Action Taken:

- As per technical programme evaluation of 1987 series of clones will be completed by 2010 and that of 1996 series by 2017.

3. Breeding for mosaic resistance in vegetable cowpea (*Vigna unguiculata var. sesquipedalis*)(PLAN Project)

Decision

- Crossing with more varieties and comparative yield analysis needed.

Action Taken

- The present trial will continue as per technical programme. Comparative yield analysis with more parental lines will be taken up as a fresh breeding programme.

COMMERCIAL CROPS

SRS, THIRUVALLA

1. Sustaining sugar -cane production and soil health through integration of nutrient sources in sugarcane.

Decision:

- Proposal recommended for mini POP workshop

Action taken:

- As per the recommendation of the workshop, result of sustaining sugarcane production and soil health through integration of nutrient sources in sugarcane was presented in mini POP workshop