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KERALA AGRICULTURAL UNIVERSITY
RESEARCH HIGHLIGHTS

1985-'87



Directorate of Research
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Trichur, Kerala

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RESEARCH HIGHLIGHTS 1985-'87

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RESEARCH ACCOMPLISHMENTS & HIGHLIGHTS 1985-'87

▮ BIO-CONTROL OF AFRICAN 'PAYAL' SALVINIA MOLESTA

One of the most outstanding achievements of the University has been the remarkable control of the troublesome aquatic fern-weed Salvinia molesta in the Kuttanad area of the Alleppey District using the Australian strain of the weevil Cyrtobagous salviniae Calder and Saund. The impact of the releases made from 1983 became perceptible in 1986 by which time, the weed mass in an area of about 1000 sq.km in the Kuttanad area could be cleared of this noxious weed.

Specific recommendations on the use of the weevils for bio-control of Salvinia have been formulated and transferred to the farmers. Initially 50-70 weevils are required for release in a particular site. Alternatively, about 1 kg of badly infected Salvinia mass can be used for such releases. Redistribution of infected weed mass in fresh areas is needed in stagnant water pockets. The impact of the weevils will be felt in a period of 12-18 months.

▮ HYBRID LAYER CHICK DEVELOPED

The hybrid layer chick IWN x IWP has been developed in the AICRP on Poultry Centre in the University.

This strain with a hen-housed production of 266.7 eggs/year excelled others consistently in tests conducted at Anand and also in the 17th RST for egg production conducted at the Hessarghata Centre. The new hybrid exhibited excellent layer house livability (98.1%) and best feed conversion efficiency, the feed intake being only 1.73kg for the production of 1 dozen of eggs.

NEW RD-VACCINE RELEASED

During the course of investigation on the role of free flying birds in the epizootiology of Ranikhet disease, a mesogenic strain (RDV-M) of the virus was isolated from a mynah. The physico-chemical and biological characteristics of this strain were comparable with those of the mesogenic vaccine strain-K which is being used for vaccine preparation in Kerala. The new strain RDV-M is less pathogenic and more immunogenic than the strain-K. The transmissibility of RDV-M to contact birds was negligible when compared to strain-K.

Furthermore, this strain has no adverse effect on egg production in layers and weight gain in chicks. The duration of immunity lasts for over 18 months.

CROPSRICE

VARIETAL IMPROVEMENT

During the period, five improved varieties were released for general cultivation.

RESHMI (PTB-44)

This is a tall, season bound saline-tolerant red riced variety suited for cultivation in the 'Mundakan' season. Duration 150-180 days. Grain yield 2-3 t/ha.

SWARNAPRABHA (PTB-43)

This medium tall white kernelled variety is suited for uplands ('Modan') and also for all the three cropping seasons in wet lands. It possesses moderate resistance to Blast and Stem Borer and tolerance to drought. The duration of this variety is 100-105, the productivity being over 3.5 t/ha.

KARTHIKA (MO-7)

This dwarf photo insensitive variety is suitable for growing in all the three seasons in the State and is particularly suitable for the punja crop season of the Kuttanad area. Tolerance to BPH, Sheath blight and

sheath rot and BLB is a distinct advantage of this variety. Grain yield is about 4.5 t/ha, the duration being 105-115 days.

ONAM (KAYAMKULAM-2)

Onam is an extra-short duration variety (95 days) which is specially suited for dry sowing in the first crop season in the Onattukara region. Drought tolerance in the early growth phase is an added advantage to tide over the moisture stress due to delayed south-west monsoon. Grain yield 3 t/ha.

BHAGYA (KAYAMKULAM-3)

This red kernelled short duration variety (100 days) is also bred for dry sowing situation in the Onattukara tract during the first crop season. Grain yield 3 t/ha. This is moderately resistant to Blight, Sheath blight, Stem borer and leaf folder.

Advanced cultures identified for release

Culture No.	Parentage	Suitability and traits
93 (Moncompu)	Jaya x PTB 33	Dwarf-photoinsensitive - short duration (100-110 days) - Grain medium bold, red kernelled - Production potential over 5 t/ha Resistant to BPH Moderately resistant to stem borer, Leaf folder and sheath rot

170 (Moncompu)	ARC-6650 x Jaya	Dwarf - Duration 100-110 days yield potential 5-6 t/ha - Red Kernelled - Grain medium bold - Resistant to BPH.
153-1 (Moncompu)	IR-1561 x PTB-33	Medium duration (110 days) - Production potential 5 t/ha - Possesses good deal of re- sistance to BPH - Kernel colour red
871 (Pattambi)	CO.25 x Triveni x 'Vellathil Kolappala'	Tall - Photosensitive - suited for growing in the Mundakan season in the Palghat as a replacement of PTB-4 and Co-25
841 (Pattambi)	" "	" "
745 (Pattambi)	IR8 x CH- 1039	Cold tolerant - Suitable for growing in the high ranges of Idukki & Wynad districts during Mundakan season - Season bound - Duration 145 days.
796 (Pattambi)	Jaya x CH- 1039	" "

TECHNOLOGIES APPROVED FOR TRANSFER

1. Conjunctive application of carbofuran and urea

Whenever carbofuran application is needed at 20 DAP, addition of 10 kg N/ha in the form of urea is found to be useful to obtain increased rice yields and better pest control due to enhanced efficiency of the insecticide.

2. Economic dose of quinalphos for paddy pest control

It is found that 750ml of 25% EC formulation of Quinalphos is adequate to control the major pests of the rice crop.

3. Control of weeds in the 'Kole' lands

Benthicarb at 1 kg ai/ha at 6 DAS followed by hand weeding on 30 DAS is very effective for the control of the weeds occurring in the 'Kole' lands. A thin film of water is to remain in the field after fungicidal application.

4. Storage of rice seeds

In polybags (700 gauge), Jaya seeds retain their viability for upto 13 months. Triveni can be kept in this manner for 6 months without losing viability.

5. Control of sheath blight with Benomyl

Benomyl at 500 g/ha is found to be effective against the SB disease.

6. Control of sheath blight and sheath rot

In endemic areas where rice root nematodes occur above threshold levels of 200/lkg soil, application of 1kg ai/ha of carbofuran and 50% extra of recommended dose of K_2O are recommended.

7. Seedling root dip for control of GM

Dipping the roots of seedlings in a 0.02% suspension of chlorpyrifos for 12 hours is recommended to control the gall midge.

8. Soaking paddy seed in copper and zinc sulphate

Presoaking of seeds in a solution containing zinc sulphate 1% and copper sulphate 0.25% for 12 hours gave substantial profit margin.

9. Fertiliser recommendation for Mashoori

For Mashoori, the currently recommended dose of 70-45-45 kg/ha is reduced to 50-25-25 kg/ha. Apply 50% N as basal, 25% at active tillering at 40 DAP and 25% at 60 DAP.

10. Water management practice for rice

Irrigation at 5 cm of water once in 6 days is recommended particularly during the 'mundakan' season when water shortage is experienced. The existing recommendation is to allow 5 cm of water from rooting up to 13 days before harvest.

11. Control of false smut

Spray 0.3% any of the Dithio carbamate fungicides before heading to control false smut disease.

12. Reshmi resistant to leaf folder and Gall midge

The variety Reshmi is found to be resistant to leaf folder and the Gall midge.

13. Spray cowdung extract for BLB control

Spraying an extract of fresh cowdung using conventional equipment controls BLB infection (Xanthomonas campestris var oryzae), perhaps due to bacteriophage activity.

14. Spray Topsin M-70 WP (Thiophanate) at 1g/L for control of Sheath blight and also for neck and Leaf blast

Topsin is recommended for control of sheath blight and also for neck and leaf blast diseases.

15. Fertilizer recommendation for rice-rice (Medium duration) - Fallow cropping system

In this cropping sequence, the Mundakan crop needs only 75% of the recommended N-P-K doses.

16. Waiting periods of insecticides recommended for rice

Waiting periods for quinalphos fenthion and mercaptothion have been specified.

17. Fertilizer recommendations for short & medium duration varieties grown in the 'kole' lands of Trichur district

As against the existing recommendation of 70-35-35 kg W,P,K/ha for the popular Annapoorna variety, the dose of 90-35-45kg NPK/ha is recommended in view of the responsiveness of the variety. For medium duration varieties the dose of 110-45-45 kg/ha of N-P-K is recommended.

Technologies generated

Control of wild rice

The wild rice Oryza sativa var. fatua is a serious problems in certain pockets of Kuttanad. Hand weeding is impossible in the pre-flowering stage due to their close resemblance to the rice plants. Coating unsprouted seeds with calcium peroxide at 20% W/W using PVA as the sticker and sowing the treated seeds is found to be very effective in selectively eliminating wild rice. The fields are to kept flooded for upto 10 DAS. This will destroy wild rice seeds while the calcium peroxide coated seeds remain viable due to continuous availability of oxygen from the peroxide. Extensive multilocational testing is now complete and the technology is ready for transfer.

COCONUT

VARIETAL IMPROVEMENT

Varieties released

LO x GB (Kerasree) (Laccadive Ordinary x Gangabondam)

This hybrid variety consistently outyielded all other hybrids under evaluation for a long period of over 20 years, even under rainfed gardens. The average nut production per palm per year for 23 years is 121, as compared to only 59 in the WCT.

Varieties identified for Release

The two hybrids AO x GB (Andaman Ordinary x Gangabondam) and WCT x GB (West Coast Tall x Ganga Bondam) consistently showed excellent performance as compared to all hybrids involving 'GB' other than LO x GB. These two hybrids gave a copra yield of more than 20 kg/palm/year, with the annual production of 95.2 and 100.2 respectively over a period of 23 years.

TECHNOLOGIES APPROVED FOR TRANSFER

1. Fertilizer recommendation for red loam soils of Southern Kerala

Based on data generated in the long term fertilizer experiments conducted at the Balaramapuram Centre from

1964, the NPK dose of 680-225-900 g/palm/year has been recommended for WCT palms grown in the red soils of Trivandrum district.

2. Control of black headed caterpillars

Dichlorvos 0.02% is recommended instead of BHC 0.2%.

3. Control of coreid bug

Application of carbaryl 0.1% ^{or} Endosulfan 0.1% on newly opened inflorescence after receptive phase of the female flowers is recommended for control of coreid bug. The entire crown excluding leaves and older bunches are to be sprayed.

4. NPK recommendation for palms giving more than 100 nuts/year

For palms yielding more than 100 nuts/tree/year additional dose of 10-5-15 g of NPK/palm/year is recommended for every nut exceeding 100.

5. New method for controlling the rhinoceros beetles

Spreading a layer of insecticide - treated soil (15cm) on the floor of manure pits, before storing manure is recommended for control of Oryctes grubs.

For treating the soil, HCH or Aldrin at 0.1 kg ai/m³ is recommended. The grubs invariably burrow the floor of the pit to pupate deeper and while moving downward they are killed due to the toxic stimulus of the insecticide.

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6. Sodium chloride nutrition in coconut palm

Replacement of potassium to the extent of 50% or even 75% by sodium chloride is recommended in laterite soil. This brings about considerable savings in the cost of fertilization.

CASHEW

TECHNOLOGIES APPROVED FOR TRANSFER

1. Fertilizer recommendation revised

The existing fertilizer recommendation of applying NPK at 250-125-125 g/tree/year has been revised to 500-125-125 g/tree/year.

2. Method of fertilizer application for cashew

Specific recommendations on the application of fertilizers for cashew have been formulated and approved for general adoption. The revised recommendation consist of applying the fertilizers by broadcasting in the tree basins and incorporating the same to a depth of 1.5 cm within the radial distance of 2-3m within the drip line leaving half a meter from the trunk. Alternatively, it is recommended that the

fertilizers may be applied in circular trenches 25 cm wide and 15 cm deep, at a radial distance of 1.5-3.0 m from the trunk.

3. Spacing for cashew

A new recommendation of planting cashew at a closer spacing of 4 x 4 m is recommended. It is further recommended that the extra plants available in the plantation may be thinned out after 6 years leaving the remaining trees at a spacing of 8 x 8 m. The advantage of this system of planting is that it would generate fuel^{wood} from the extra plants which are removed at a later stage.

SPICES

PEPPER

TECHNOLOGIES APPROVED FOR TRANSFER

1. Raising of rooted cuttings

The middle 1/3 portion of the runner shoots is recommended for vegetative propagation.

2. Use of Seradix B₂ for root induction

Seradix B₂ is recommended for treating pepper cuttings for induction of early rooting. Since Seradix B₂ is available as a dust formulation,

treatment of the cuttings can be easily done by simple dipping of cut ends.

3. Under planting in pepper

A new recommendation for underplanting in pepper on the basis of the long term performance of the different varieties has been accepted. Replanting is recommended after 18 years for Karimunda and Kottanadan varieties, 25 years for the variety Kuthiravally, 22 years for Narayakodi and after 15 years for the variety Balankotta.

4. Revised fertilizer recommendation for pepper

The fertilizer recommendation for pepper has been revised as 50-50-200 g/NPK/ha. The dose of P is to be reduced to 25 g or increased up to 100 g/plant/year based on the P status of the soil.

5. Mulching for pepper vines

Mulching the basins of the pepper vines during summer months after abatement of the North-east monsoon is found to be advantageous for increasing productivity. Therefore, mulching with saw dust/arecanut husk/dry leaves is recommended in pepper gardens for the conservation of soil moisture and also for increasing the productivity of vines.

6. Advanced cultures identified for release

The two advanced cultures 239 and 331 of pepper developed at the Panniyur centre excelled the check varieties consistently over a fairly long period of time. The culture 239 is an open pollinated material from the cultivar 'Perumkodi' while the culture 331 is a hybrid derivative from 'Uthirankotta' x 'Cheriyakaniyakadan'. The mean green berry yield per vine per year in culture 239 is 3.576 kg and that from the Culture 331 is 4.231 kg.

CARDAMOM

TECHNOLOGIES APPROVED FOR TRANSFER

7. New recommendations on processing capsules

Revised recommendations on the methods of processing cardamom capsules have been formulated.

8. New recommendations on poly-bag nursery

The details of the preparation of nursery seedlings of cardamom following the poly-bag method have been formulated.

9. Control of 'Azhukal' disease

Based on multi-locational trials conducted in several locations in the Idukki district, specific recommendations on the fungicidal control of the 'Azhukal' disease caused by Phytophthora meadi have been formulated and recommended.

Advanced cultures identified for release

The PV-1 (Pampadumpara-Valayar culture) developed at the Pampadumpara centre has been found to exceed the check varieties consistently. The high yielding culture with elongate capsules each containing 21-24 seeds has already become popular in the Idukki district.

VEGETABLES

VARIETAL IMPROVEMENT

Varieties released

ACV-C-1 (Jwala Mukhi)

This is a hybrid derivative possessing tolerance to the bacterial wilt is developed from 'Vellanotchi' x 'Pusa Jwala'. This variety gives an yield of 22.5 t/ha which is about 30% higher than the potential of the check variety 'Vellanotchi'. The fruits are less pungent and

fleshy and can be consumed as cooked tomato.

/ACV-C-2 (Jwala Sakhi)/

This is a sister selection from 'Vellanotchi' x Pusa Jwala, yielding about 21% higher than the standard variety Vellanotchi. Its plant type is very unique, with attractive wrinkle-free fruit which occur in clusters of 8-12. The yield potential of this variety is 19.6 t/ha.

Cultures identified for release

/PUMPKIN - CM-14/

This is a promising selection from the Trichur local pumpkin variety which has been approved for National release in the 9th workshop of the AICVIP held at Faizabad. In multilocational trials, this line excelled others at Solan (50.2 t/ha), Bhubaneswar (38.35 t/ha); Bangalore (38.69 t/ha), Coimbatore (34.16 t/ha) and Faizabad (39.10 t/ha). This is a high yielding line with a mean productivity of above 15 kg of fruit/plant. The fruits are flat round with shallow furrows.

TECHNOLOGIES APPROVED FOR TRANSFER

1. Waiting periods for insecticides

The waiting periods to be followed in the application of insecticides such as Carbaryl, Fenitrothion,

Quinalphos, Malathion, Fenthion, Monocrotophos, Dimethoate have been formulated on the basis of residue assay studies.

2. The tomato culture LE 79 found to possess resistance to the bacterial wilt

The tomato culture LE-79 is found to possess broad spectrum resistance to all the known races of the bacterium causing the wilt disease of the crop.

This culture has therefore been recommended for hot spot areas where the wilt disease is very severe.

3. Control of the pests of vegetables

Carbofuran applied at the rate of 0.5 kg ai/ha or phorate at 1 kg ai/ha at seeding followed by need based application of foliar insecticides is found to be effective in the control of different species of pests occurring in the cowpea crop.

PULSES AND OIL SEEDS

VARIETAL IMPROVEMENT

Varieties released

SESAMUM - ACV-1 (SOMA)

This is a pure line selection from a Punjab type, having a duration of 83 days. It is found to be quite suitable

for cultivation in the summer rice fallows. The variety is erect in growth habit, possessing white kernel having an oil content of 51.1%. The yield potential of this variety in the rice fallows is 712 kg/ha. When cultivated during the **kharif** season in uplands, the yield is lesser, being only 347 kg/ha.

SESAMUM - ACV-2 (SURYA)

This is a pure line selection from a West Bengal type which is suitable for growing in the early 'rabi' season in the uplands of Trivandrum district. The duration of this variety possessing grey kernel is about 85 days. The yield potential of Surya is 508 kg/ha when grown in the summer rice fallows. During the 'rabi' season this variety gives a yield of 356 kg/ha when grown in the uplands.

GROUNDNUT - TG-3

This a bunch type of groundnut developed from the stock made available by the BARC. This is suitable for growing in the kharif season in uplands and also for growing in the rice fallows during the summer season. The productivity of this variety is over 2.7 t/ha when grown in the summer season, the production during the 'kharif' season in uplands being over 2.8 t/ha.

GROUNDNUT - TG-14

This is another bunch variety selected from the original stock made available by the Biology division of the BARC. The variety is suited for growing in the uplands during the 'kharif' season and also in the summer rice fallows. The average productivity of this variety in the kharif season is over 3.13 t/ha, the productivity from the summer rice fallows being about 2.47 t/ha.

GROUNDNUT - SPANISH IMPROVED

This is another bunch variety which is suitable for growing in the uplands during the kharif season and also for growing in the rice fallows during summer season. The production potential of this variety during the kharif season is over 2.8 t/ha, while the productivity during the summer season from rice fallows is well above 2.3 t/ha. The duration of this variety is 100-110 days.

TECHNOLOGIES APPROVED FOR TRANSFER

1. The cowpea variety V-26 is found to be quite suitable for growing along with cassava, as a companion crop during the 'kharif' season. This non-trailing variety which is an induced mutant from Pusa Phalguni is erect in growth habit with a duration

of 66 days. The potential yield of the variety when grown as a companion crop is well above 300 kg/ha.

2. The promising rhizobium cultures KAU-BG-2 and BG-12 of blackgram have been developed by the University.
3. Sesamum seeds stored in poly bags, tin bins or wooden receptacles can be kept for a period of one year without losing its viability. It is to be ensured that physical admixture with household ash is avoided, since this would cause fast deterioration in the viability of seeds.

CASSAVA

TECHNOLOGIES APPROVED FOR TRANSFER

1. Preservation of tubers in soil column

In order to preserve small quantities freshly harvested tubers, a method of keeping the tubers along with the whole stem in a column of sand or soil is recommended.

2. Optimum plant population for cassava grown as inter-crop in coconut gardens

The optimum plant population of cassava for growing as an intercrop in coconut gardens has been standardised and recommended.

3. Srivisakhom variety recommended for intercropping in coconut garden

Among the varieties evaluated for their performance in coconut gardens, Srivisakhom excelled others and therefore this variety has been recommended for growing in coconut gardens.

4. Fertilizer requirement of Srivisakhom variety

For the variety Srivisakhom grown as an intercrop in coconut gardens, the fertilizer requirement has been determined as 50-50-100 kg/ha as against the current recommendation of 100-100-100 kg/ha for open conditions.

BANANA

TECHNOLOGIES APPROVED FOR TRANSFER

1. Application of phorate granules for the control of banana aphids in the red banana crop

The red banana variety which is very popular all over the Trivandrum district, is highly susceptible to the bunchy top disease. Application of phorate 10% G at 25 g/plant, first on 20 days after planting, followed by two applications at 95 and 165 DAP has been found to be very effective in the control of the aphid vectors of the disease. This recommendation has been

approved for general adoption.

2. Integrated control of pests and diseases

In banana, particularly the nendran variety, nematodes rhizome weevil, bunchy top and the Sigatoka disease are often very serious and these often occur concurrently. Application of carbofuran 3% G at 20 g/plant around rhizomes at planting, followed by leaf axil filling of carbofuran 3 G at 20 g/plant twice on 75 and 165 DAP is recommended in situations where concurrent infestation of the pests occurs.

As an alternative, phorate 10% G applied at 20 g/plant around rhizomes at the time of planting, followed by leaf axil filling of the same granule at 10 g/plant on 75 and 165 DAP is recommended to control the pest problems simultaneously. For the control of Sigatoka disease, application of Bordeaux Mixture 1% or Captofol 0.3% is recommended soon after the appearance of the disease symptoms.

3. Split application of fertilizers for the nendran

Six split applications of fertilizers have been recommended for the Nendran variety of banana, to be given at planting and one month after planting, followed by four applications given on 2,4,5 months after planting and just after complete emergence of hands.

4. Cucumber as an intercrop for banana

Results of three years of intercropping trials in the 'Nendran' plantations have clearly indicated that cucumber can be cultivated profitably along with the main crop, during the period September-October without affecting the bunch weight of banana.

SUGARCANE

TECHNOLOGIES APPROVED FOR TRANSFER

Consequent on the severe outbreak of the red rot disease in parts of the Alleppey, Quilon and Pathanamthitta districts of the State, screening for identification of promising varieties possessing moderate level of resistance to the disease was carried out. Among the several varieties tested, CO-7704 has been identified to be a very promising substitute for the highly red rot prone short duration variety CO-997 which is currently popular in these regions. The variety 7405 has also been recommended for general cultivation, in these two districts, in view of its resistance to the red rot disease.

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FORAGE CROPS

VARIETAL IMPROVEMENT

Varieties released

/GUINEA GRASS - HARITHA (ACV-F-1)/

This is a mutant clone developed from FR-600 which is suitable for growing in the sandy-loam soils of the coastal tract of Kerala. This variety is suitable for growing in the shaded situations of coconut plantations. Leaves of this variety are glabrous and much relished by cattle. Mean yield of forage per cutting is 1.78t/ha.

MUSHROOMS

TECHNOLOGIES APPROVED FOR TRANSFER

Methods for the cultivation of the edible mushrooms, namely, Volvariella volvacea, Pleurotus sajor caju and Termitomyces spp. have been standardised using various substrates and specific recommendations on these have been passed on for general adoption.

