# REGIONAL AGRICULTURAL RESEARCH STATION
# PATTAMBI

## History

The Regional Agricultural Research Station, Pattambi, has entered the seventh decade of activities. Operated by the Kerala Agricultural University, the station was established on March 12, 1927, with the name, Paddy Breeding Station, Pattambi. The land was provided by the revenue authorities of Malabar district. This was the fourth Paddy breeding station sanctioned by the Government in persuance of the policy to provide facilities for improvement of 'local paddies' in the chief rice growing areas of the Madras Presidency. The first rice breeding station was opened at Coimbatore in 1915, the second at Aduthurai in 1922, the third at Maruteru in 1925 and the fourth at Pattambi in 1927.

The station was formally declared open by Mr. Viscount Goshen, Governor of Madras Presidency on October 12, 1928.

The name of the station was changed to Agricultural Research Station, Pattambi in 1930 so as to take up investigations on other crops also like cotton, sugarcane, sesame, groundnut and pulses.

With the re-organisation of states in 1956, the station was transferred to the Kerala State. It continued to function as the main institution for rice research in Kerala. In 1962, when the rice research setup of the state was re-organised, this station was raised to the status of a Central Rice Research Station

for the Kerala State with regional stations at Mannuthy, Chalakudy, Vyttila, Kayamkulam, Moncompu and Karamana. The headquarters of the Rice Specialist was shifted from Mannuthy to Pattambi. In the changed setup, six divisions took shape: plant breeding, agronomy, chemistry, entomology, plant pathology and statistics. Besides, a full-fledged seed testing laboratory was established which was later on nominated as the State Seed Testing Laboratory. An Agricultural Meteorological Laboratory was set up in 1948 under the Co-ordinated Crop Weather Scheme.

With the formation of the Kerala Agricultural University, the Rice Research Station, Pattambi, was transferred to the University on February 1, 1972.

With the implementation of National Agricultural Research Project (NARP) in 1981, the station was reorganised as Regional Agricultural Research Station of the Central Zone. The lead function of the station is to conduct research on rice, pulses, horticultural crops and rice-based farming systems. The station also functions as an advanced centre for studies on laterite soil management. Now, the research activities of the following research stations of the NARP Central Region come under the control of the Associate Director of the Regional Agricultural Research Station, Pattambi.

* Agricultural Research Station, Mannuthy
* Agronomic Research Station, Chalakudy
* Banana and Pineapple Research Station, Kannara/Vellanikkara
* Cashew Research Station, Madakathara and Anakayam
* National Agricultural Research Project - Subcentre, Eruthiampathy
* Operational Research Project, Ozhalapathy
* Aromatic and Medicinal Plants Research Station, Odakkali

At present, the following projects financed by the Indian Council of Agricultural Research are also functioning in this institution.

1. All India Co-ordinated Rice Improvement Project
2. All India Co-ordinated Project for the intensification of Research on pulses
3. National Seed Production - Breeder Seed Production unit

## Location, physiography and climate

The research station is situated within a kilometre east of the Pattambi Railway station along the Pattambi - Perintalmanna road.

| | | |
|---|---|---|
| Lattitude | : | 10° North |
| Longitude | : | 76° East |
| Elevation | : | 25 metres MSL |
| Total geographical area | : | 63.64 ha. |
| Double crop wet land | : | 19.88 ha. |
| Single crop wet land | : | 11.17 ha. |
| 'Modan' land | : | 10.85 ha. |
| Garden land | : | 20.32 ha. |
| Total annual rainfall | : | 2645 mm |
| Rainfall during 'virippu' (June-September) | : | 1765 mm |
| Rainfall during 'mundakan' (October-January) | : | 480 mm |
| Rainfall during 'punja' (January-April) | : | 400 mm |
| Average number of rainy days per year | : | 111 |
| Maximum temperature | : | 32.2° C |
| Minimum temperature | : | 22.4° C |

Land and Soil

The station's 63.64 hectares area includes all the main representative types of land of Kerala: 'modan' (fainfed upland), 'palliyal' (single crop wet land) and 'iruppu nilam' (double crop wet land)

The ridges and slopes of low hills form the bulk of the 'modan' paddy area. The soil is gravelly and overlies directly the undecomposed rock below. Due to unevenness water cannot be impounded in the fields to raise swamp rice.

'Palliyals' are high level terraced lands. The plots are generally small and there is a considerable drop in level from field to field. The soil is extremely shallow and porous.

'Irippu nilams' are typical wet lands. The fields are fairly large and even. The soil is deep and moderately fertile.

The soils of the farm are sandy loam derived from low level laterite, with a pH range of 5.2 to 5.8.

The entire area is rainfed being typical of the general conditions prevailing in the state. There are a few wells and tanks spread over the low lying area which help to supplement the rain whenever necessary.

Research activities - an overview:

The research activities of the station are spread over five disciplines: Varietal improvement,

agronomy, soil science, entomology, plant pathology and extension. The highlights of the works and achievements accomplished so far are presented below.

Varietal improvement:

From ptb-1 to ptb-47 this station has proudly presented 47 varieties to the rice front of India. Most of these varieties are popular due to their suitability to the diverse agro climatic conditions and needs of the rice farmers of Kerala.

Improvement of the popular local varieties through selection was the main breeding programme till the sixties. By selection, 36 strains have been released. Of these 'Kattamodan' (ptb 28), 'Karuthamodan' (ptb 29) and 'Chuvannamodan' (ptb 30) were evolved through mass selection and the others through pureline selection. The first strain to be released from this station was ptb 1 (Aryan ) in 1934.

Among the earlier selections many have got international acceptance as donors for various pests and diseases. Ptb 18 and Ptb 21 are resistant to stem borer, gall midge and 'tungro' virus. Ptb 7 is resistant to foot rot and gall midge. Ptb 19 and Ptb 33 have been universally acclaimed as varieties resistant to brown plant hopper. Ptb 12 is tolerant to bacterial leaf blight disease.

Ptb 28, Ptb 29, Ptb 30 and Ptb 42 are suitable for cultivation in the 'mo?an' uplands. They are tolerant to drought. Ptb 15 and Ptb 16 are resistant to low flooding and waterlogging. Ptb 22, Ptb 23 and Ptb 24 are suitable for cultivation in the sandy areas. Ptb 23 is credited with a high protein content of 12.5 per cent.

'Thekkan Cheera' (Ptb 10), an early duration photoinsensitive variety deserves special mention as it has won name and fame even in other rice cultivating countries. It contributed towards the development of most of the short duration high yielding dwarf varieties released in Kerala.

'Chennellu', a mass selected variety, is suitable for cultivation under shade, for example, in coconut gardens.

Varieties having national and international acclaim were introduced and their performance studied in this station. First strain introduced was Adt 3, evolved at Aduthurai. It faired badly at Pattambi. Other important introductions made were: GEB 24, Co 25, IR 8, T(N) 1, Tainan-3, Jaya, IR 20 and Mashuri. Many of these varieties were well accepted by the farmers of Kerala. Varieties like Mashoori, Co 25 and Jaya still continue to be popular in some parts of Kerala. Some of the introduced strains were used in crossing programmes.

An intensive programme was undertaken to develop high yielding strains with wide adaptability to different agroclimatic regions in Kerala by hybridisation and selection using the introduced high yielding dwarf indica types. This resulted in the development of several hybrid derivatives of which the first one 'Annapoorna' (Ptb 35) was released in 1966. It incidentally was the first high yielding, early duration dwarf rice to be released in India. Known popularly as Culture 28, it has played an important role in augmenting rice production in the state.

The other high yielding varieties released in this category are Rohini, Aswathy, Triveni (1971), Jyothy, Bharathy, Sabari(1974), Swarnaprabha(1985), Culture 1727 and Culture BR-51-315-4(1989)

Mutation breeding was also attempted in rice which led to the evolution of 'Rashmi' a mutant from 'Orpandy' by gamma irradiation.

The three recently released varieties, namely, Red Triveni, BR-51-315-4 and Cul 1727 have already won the appreciation of the farmers. Cul 1727 has the rare distinction of being the highest yielder in the International Rice Testing Programme conducted at 43 locations in 18 countries in 1983-84. It has shown resistance to all the three biotypes of Brown Plant Hopper at IRRI.

Salient features of Rice varieties released from R.A.R.S., Pattambi

| Sl. No. | Strain No. | Name of variety | Duration (days) | Parentage | Stature | Special features |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 1. | PTB-1 | Aryan | 145 | Pureline selection from Aryan | Tall | Red Kernelled - suited for first crop |
| 2. | PTB-2 | Ponnaryan | 135 | Pureline selection from Ponnaryan | -do- | -do- -do- |
| 3. | PTB-3 | Eravapandy | 128 | Pureline selection from Eravapandy | -do- | Red Kernelled - season bound II crop variety |
| 4. | PTB-4 | Vellari | 140 | Pureline selection from Vellari | -do- | -do- -do- |
| 5. | PTB-5 | Veluthari kayama | 145 | Pureline selection from Veluthari kayama | -do- | Red Kernelled - suited for first crop & water logged areas |
| 6. | PTB-6 | Athikraya | 145 | Pureline selection from Athikraya | -do- | Red Kernelled - season bound second crop variety |
| 7. | PTB-7 | Parambuvattan | 120 | Pureline selection from Parambuvattan | -do- | Red Kernelled - Awned, black glumed first crop variety tolerant to gall fly and foot rot |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| 8. | PTB-8 | Chuvannari Thavalakkannan | 130 | Pureline selection from Thavalakkannan | Tall | Red Kernelled - first crop variety |
| 9. | PTB-9 | Veluthari Thavalakkannan | 130 | -do- -do- | -do- | White kernelled - first crop variety, tolerant to gall fly and foot rot |
| 10. | PTB-10 | Thekkancheera | 90-100 | Pureline selection from Thekkancheera | -do- | Red kernelled - variety for all seasons. |
| 11. | PTB-11 | Halliga | 145 | Pureline selection from Halliga | -do- | White Kernelled - First crop variety |
| 12. | PTB-12 | Chitteni | 130 | Pureline selection from Chitteni of South Malabar | -do- | Red Kernelled - black glumed, season bound second crop variety |
| 13. | PTB-13 | Kayama | 140 | Pureline selection from Kayana | -do- | Red Kernelled - First crop variety |
| 14. | PTB-14 | Maskathi | 130 | Pureline selection of Maskathi | -do- | White riced - first crop variety |
| 15. | PTB-15 | Kavunginpoothala | 165 | Pureline selection from Kavunginpoothala | -do- | White Kernelled - season bound second crop variety -- suited for "Karinkora" |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| 16 | PTB 16 | Kavungin Poothala (early) | 155 | Pureline selection from Kavungin Poothala | Tall | White kernelled, season bound second crop variety. Suited for "Karinkora" |
| 17 | PTB 17 | Jeddu Halliga | 145 | Pureline selection from Jeddu Halliga | -do- | Red riced, first crop variety |
| 18 | PTB 18 | Erava Pandy | 130 | Pureline selection from Eravapandy | -do- | Red riced, season bound second crop variety |
| 19 | PTB 19 | Athikraya | 145 | Pureline selection from Athikraya | -do- | -do- -do- |
| 20 | PTB 20 | Vadakkan Chitterni | 125 | Pureline selection from Chitteni of North Malabar | -do- | -do- -do- |
| 21 | PTB 21 | Thekkan | 125 | Pureline selection from Thekkan | -do- | -do- -do- |
| 22 | PTB 22 | Velutha Vattan | 120 | Pureline selection from Veluthavattan | -do- | Red riced first crop variety suited to sandy areas |
| 23 | PTB 23 | Cheriya Aryan | 110 | Pureline selection from Cheriya Aryan | -do- | Red kernelled, first crop variety suited to sandy areas |
| 24 | PTB 24 | Chuvanna Vattan | 115 | Pureline selection from Chuvenna Vattan | -do- | -do- -do- |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| 25 | PTB 25 | Thonnuran | 120 | Pureline selection from Thonnuran | Tall | Red kernelled, first crop variety suited to sandy areas |
| 26 | PTB 26 | Chenkayama | 125 | Pureline selection from Chenkayama | -do- | -do- |
| 27 | PTB 27 | Kodiyan | 130 | Pureline selection from Kodiyan | -do- | Red kernelled, season bound second crop variety |
| 28 | PTB 28 | Kattamodan | 120 | Mass selection from Kattamodan | -do- | Red kernelled first crop variety for uplands |
| 29 | PTB 29 | Karuthamodan | 110 | Mass selection from Karuthamodan | -do- | Red kernelled black glumed first crop variety for uplands |
| 30 | PTB 30 | Chuvannamodan | 110 | Mass selection from Chuvannamodan | -do- | Red kernelled first crop variety for uplands |
| 31 | PTB 31 | Elappapoo Champan | 110 | Pureline selection from Elappapoo Champan | -do- | Red kernelled, first crop variety |
| 32 | PTB 32 | Aruvakkari | 125 | Pureline selection from Aruvakkari | -do- | -do- |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| 33 | PTB 33 | Arikkrai | 150 | Pureline selection from Arikrai | Tall | Red kernelled, season bound second crop variety. Internationally recognised as highly resistant to BPH |
| 34 | PTB 34 | Valiya Champan | 110 | Pureline selection from Valiya Champan | -do- | Red kernelled, first crop variety |
| 35 | PTB 35 | Annapurna | 95-100 | Taichung(Native)1x PTB 10 | Semi dwarf | Red kernelled, short duration variety for all seasons |
| 36 | PTB 36 | Rohini | 85-100 | PTB 10 x IR 8 | -do- | White kernelled, short duration variety for first and 3rd crop |
| 37 | PTB 37 | Aswathy | 115-125 | PTB 10 x Dee-Gee-Woo-Gen | -do- | White kernelled medium duration for all seasons |
| 38 | PTB 38 | Triveni | 95-105 | Annapurna x PTB 15 | -do- | White kernelled, short duration variety for all seasons |
| 39 | PTB 39 | Jyothi | 110-125 | PTB 10 x IR 8 | -do- | Red kernelled, short duration variety for all seasons |
| 40 | PTB 40 | Sabari | 130-135 | IR 8/2 x Annapoorna | -do- | Red kernelled, medium duration variety for all seasons |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| 41 | PTB 41 | Bharathy | 120-125 | PTB 10 x IR 8 | Semi Dwarf | Red kernelled, medium duration variety for all seasons |
| 42 | PTB 42 | Suvarna modan | 110-115 | Pureline selection from ARC 11775 | Tall | White kernelled, variety for uplands |
| 43 | PTB 43 | Swarna-prabha | 100-105 | Bhavani x Triveni | Medium Tall | White kernelled, short duration variety for all seasons blast resistant and also suitable for 'modan' |
| 44 | PTB 44 | Resmi | 150-180 | Gamma induced mutant of Oorpandy | Tall | Red kernelled, season bound second crop variety suitable for 'Koottukundakan' |
| 45 | PTB 45 | Red Triveni | 90-105 | Pureline selection from Triveni | Semi dwarf | Red kernelled, short duration variety for all seasons |
| 46 | PTB 46 | Cul 1727 | 120 | Thriveni x IR 2061 | -do- | White kernelled short duration variety adapted to all the three seasons. Resistant to all three biotypes of BPH, GLH, leaf folder and blast |
| 47 | PTB 47 | BR-51-315-4 | 130-140 | IR-20xIR-5 | Semi tall | White riced variety suited to the poonthalpadam areas of Chittoor Taluk |

Besides the 47 released varieties the following 7 promising ~~Pre-rel~~ Pre release cultures from this station are now under adaptive trials and minikit trials

Salient features of promising Pre-release rice cultures evolved at RARS, Pattambi

| Sl.No. | Culture No. | Duration(days) | Percentage | Stature | Special features |
|---|---|---|---|---|---|
| 1. | Cul-871 | 140-160 | CO 25 x Trivenix Vellathil Kolappala | Tall | Red riced-season bound suited for II crop moderate resistance to sheath blight |
| 2. | Cul-8770 | 120-130 | BR 51 x 23332-2 | Semi tall | Red riced-photo insensitive - suited for I & II crop - moderate resistance to blast & sheath blight |
| 3. | Cul 8772 | 120-130 | Jyothi x BR 51 | -do- | -do- |
| 4. | Cul 8754 | 110-115 | IR 36 x Jyothi | Semi dwarf | Red riced suited for all the 3 seasons cul 8754 is tolerant to sheath blight and cul-8756 to blast & sheath blight |
| 5. | Cul 8755 | -do- | IR 36 x Pavizham | -do- | |
| 6. | Cul 8756 | -do- | -do- | -do- | |
| 7. | Cul 8759 | 95-100 | IR 36 x Annapoorna | -do- | A highly promising culture for kole lands due to its short duration - red riced |

Co-ordinated trials

Inorder to test the adpatability of improved strains evolved all over India, All India Co-operative trials were started in 1962-63. Under this programme 57 improved strains were tested. From 1965-66 onwards these trials were re-named as All India Coordinated Rice Improvement Project (AICRIP). By the end of 1989, the station could test the performance of 4652 entries through 119 trials.

Germplasm and varietal museum of rice strains

From the beginning of this station all the available rice varieties were collected and maintained. Till 1971-72 germplasm collection of nearly one thousand varieties were being maintained. These were transferred to the Gene Bank of the International Rice Research Institute, Manila in 1972. From 1973 onwards an assemblage of recently released varieties and promising Pre-release cultures is being maintained. Now, the varietal museum of the station posesses nearly one hundred strains of rice.

Keeping the unique varietal requirements of Kerala in perspective, the rice breeders of the station have now taken the challenge of evolving special varieties in the following lines:

*Special season bound tall varieties for 'mundakan' season.

*Drought tolerant varieties for rainfed uplands

*Varieties for dry sown 'Virippu' crop

*Varieties with broad spectrum of pest and disease tolerance

*High yielding varieties with grains having good cooking and milling qualities

*Better varieties for special systems of cultivation like 'Koottumundakan' and 'Karinkora'

*Varieties with good ratoon yield for areas suffering from water scarcity during 'mundakan'

*High yielding varieties suited for low cost technology

*Varieties with bold grains and red kernel using BR 51 and IR 36 as base varieties

*Reselection in Mashuri for red kernel colour and disease tolerance

*Lodging resistant fertilizer responsive medium tall varieties for uplands

*Improved varieties for ill drained areas of Kerala

Crop management:

A large number of cultural, manurial and herbicidal trials have been conducted in this station from 1927 onwards.

Manurial trials have revealed many important findings which enabled to formulate appropriate manurial schedules for the different agroclimatic regions.

A combination of organic and inorganic manures was found to be superior to either of them alone for swamp rice. There is universal response to nitrogen and it is the nutrient that limits production in the majority of the soils. Response to nitrogen of the tall indica varieties was linear upto 6.7 kg/ha and thereafter the law of diminishing returns set in. In the case of early and medium duration dwarf varieties, there was response upto 94 kg and 122 kg respectively, per hectare.

Split application of nitrogen at the early vegetative and reproductive phases has been found to be better than single application at planting. Application of nitrogen at the reproductive stage is highly helpful to increase spikelet number and ear weight. The best time to top-dress nitrogen is 7 days prior to panicle initiation and not exactly at the panicle initiation stage. Application of nitrogen at panicle initiation and heading stages increases grain yield, protein content and recovery of head rice. Experiments have proved that foliar application of nitrogen in the form of urea can be advantageously adopted in rice manuring. A combination of soil and foliar application is better than soil

or foliar application alone. Placement of nitrogen in the reduced zone of soil has been observed to double the nitrogen use efficiency indicating that the dose of nitrogen can be reduced considerably by placement techniques. Comparison among the nitrogenous fertilizers showed that urea and ammonium sulphate are superior to the others. On equal nitrogen basis, sulphur coated urea, shellac coated urea and isobutytedene diurea are far superior to ordinary urea when applied entirely at planting. Application of granular urea in 3 or 4 splits during appropriate growth stages produces equal or better nitrogen use efficiency compared to the slow release materials.

Investigations on the manuring of upland rice have revealed that application of nitrogen at seedling increases the foraging capacity of roots and enhances drought tolerance.

Recent studies indicate that under transplanted condition during Kharif and Rabi seasons fertilizer requirement for Mashoori variety of rice is 50:25:25kg NPK/ha. During kharif season, application of N in 4 equal splits (25% N as basal, 25% at 20 DAT, 25% at 40 DAT and 25% at 60 DAT was found to be the best) and during rabi season, the optimum time of application for N was 25% as basal, 25% at 20 DAT and 50% at 40 DAT.

Gypsum coated urea (GCU) and neem coated urea (NCU) showed better performance as well as higher (N) recovery than prilled urea and mussooriephos coated urea, irrespective of the rate of application (30, 60 and 90kg N/Ha)

Studies on Volatilisation loss of 'N' from rice soils revealed that nitrogen loss through ammonia volatilization from submerged soils recorded 5.3 percent of applied N during virippu season and 9.5 percent during mundakan season. Upto 75 percent loss occurred during the first 6 days. The relative efficacy of different N carriers in reducing the ammonia volatilization loss has been obtained from this trial. Combined application of urea and muriate of potash was found to reduce volatilisation loss of Ammonia compared to application of urea alone.

Sulphur coated urea is found to be the best form for increasing efficiency of fertilizer nitrogen in transplanted rice.

Response to phosphorus and potash has been found to be erratic and inconsistent. All the 3 forms of phosphorus - water soluble, citric acid soluble and insoluble - are equally good for water logged rice. Finely powdered rock phosphate shows slightly better fertilizing efficiency compared to super phosphate. Split application of potash may be more advantageous under conditions of heavy rains and in sandy soils.

Fractional application of lime at planting, tillering and panicle initiation stages has been observed to be relatively more effective than the present practice of applying lime only as basal dressing. Studies on 'bronzing disease' of rice have shown that the disease can be effectively controlled by top dressing lime at the rate of 1000 kg/ha immediately

after the manifestation of symptoms.

Some of the recent studies conducted on the fertilizer requirement of selected cropping systems showed that in places where green manure - rice - rice cropping system is in practice the virippu and Mundakan rice need be given only 75 percent of the fertilizer dose for each season or 50 percent for virippu and 100 percent of the dose for both the seasons. The Virippu and Mundakan crop received no organic manure except the green manure incorporated before the virippu crop. The fertilizer requirement study of fallow-rice-rice cropping system revealed that application of 50 percent of the fertilizer dose for virippu and 100 percent for the Mundakan crop of 75 percent of the full dose during each season is sufficient instead of giving full dose for both the seasons. The Virippu and Mundakan crop received cattle manure @ 5t/ha in addition to the fertilizers.

A recent study on the use of Azolla as a biofertilizer for rice was undertaken and it revealed the following facts: A course textured soil (with near neutral $p^H$, and reasonable phosphorus availability) coupled with cooler climate are the factors favouring the growth of azolla in the coastal areas of Kerala. Addition of phosphorus was found to favour the growth and quality (in terms of nitrogen content) of Azolla. In places where light intensity and temperature are unfavourable for the growth of Azolla bulk method or random planting of rice adopted by the farmers facilitated the growth of azolla as a concurrent crop with rice. This was found

better than line plantings tried. Water, temperature and light intensity below the canopy was minimum in this method of planting. Azolla inoculation at one week after planting was found better during first crop season. For second crop season, inoculation at three weeks after planting was found to be better, when the temperature and solar radiation were unfavourable for the concurrent crop of azolla. Substitution of cattle manure by azolla at 5t/ha can save 25 percent of fertilizer dose.

Studies on the time of planting of rice revealed that planting the first crop beyond the 15th of July and the second crop beyond the third week of October definitely reduces the yield.

Planting seedlings at a depth of 3 to 4.5 cm has been found to be the best. Shallow planting helps to increase the tillering ability of seedlings.

Trials conducted on methods of planting have shown that dibbling sprouted seeds in puddle is superior to broadcasting in respect of yield and yield components. It has also recorded higher productivity per day compared to transplanting. In areas where there are facilities for water control, this method can be suitably advocated.

The optimum plant density for the medium deviation dwarf indica varieties is 33 hills/$M^2$ (15 x 20 cm) during the cloudy first crop season and 50 hills/$M^2$ (10 x 20cm) in the second crop season. A Plant density of 67 hills/$M^2$ (10 x 15cm) is the best for the early duration rices for all the three seasons.

Chemical control of weeds has been found to be effective and economical in the uplands as well as the wet lands. Propanil, butachlor, nitrofen, benthiocarb, Ronstar and penoxalin are highly effective against a wide spectrum of weeds in the rice fields. Recently pendimethalin (1.0kg ai/ha) along with one handweeding has been found to be a very effective control of grassy weeds in direct sown rice grown under semi dry condition.

Water management trials undertaken in this station for the different seasons indicated that 5 cm irrigation once in 6 days will be adequate for mundakan rice when irrigation water is available and for summer rice 5cm irrigation 2 days after the disappearance of ponded water is sufficient.

Crop protection

Several trials have been conducted to devise effective control measures against some of the major pests and diseases of rice.

Control measures against the major pests of rice, namely, stem borer, gall midge, leaf roller, rice bug and brown plant hopper have been recommended from this station. Various chemicals in different formulations were evaluated for their efficacy in controlling these pests.

The first Indian record of Hydrellia philippina Ferino (whorl maggot) infesting rice seedlings was made from this station. Another pest Haplothrips ganglibauri attacking the emerged panicles was also

recorded at Pattambi for the first time in India. Moreover, most of the Ptb strains belonging to the tall indica group have got resistance to major pests of rice and these are being utilised as donor parents in resistance breeding work all over the country and abroad.

Chemical control measures for subjugating leaf roller epidemics which have assumed serious proportions in the state were suggested from this research station. The effectiveness of carbofuran against brown plant hopper was recognised from various trials conducted here. Trials on seedling root dip in chemical solutions, viz. Dursban, Mipcin and recently chlorphyriphos proved effective measures against rice pests in the early vegetative phase. Joint application of carbofuran and urea proved increased grain yields in rice besides controlling important rice pests. The multiple resistance of 'Rashmi' to leaf roller and gall midge was reported from this station. The resurgence of rice leaf folder on application of carbofuran 3G was also reported based on various trials. The effectiveness of two new chemicals, viz. 'Padan' and 'Trebon' has been reported for the control of stem borer and leaf folder.

In Plant Pathology, studies on major rice diseases like blast, sheath blight, brown spot and bacterial leaf blight were taken up. Rice varieties were screened to assess their reaction to major rice diseases. The efficacy of many new chemicals against blast and sheath blight has been pointed out from here. Economic spray

schedules for the control of major rice diseases have been recommended. The effectiveness of Hinosan and Bavistin against blast, Dilthane Z - 78 & Dithane M-45 against brown spot, Topsin - M 70 WP for blast and sheath blight and validacin against sheath blight reported from this centre have been transferred to the farmers for general adoption through Package of Practices Recommendations. A simple low cost and pollution free method has been devised by the Scientists of this station for the control of the dreaded bacterial leaf blight disease of paddy i.e., spraying fresh cowdung extract at an interval of 10 days. This is the first world record for the biological control of bacterial leaf blight disease. Similarly Rhynchosporium oryzae causing the leaf scald disease of rice was reported for the first time in India from this station.

**Pulses**

Earlier works (1930-'40) at Pattambi on the improvement of horsegram, blackgram and cowpea by pure line selection did not yield the desired results. A scheme for research on pulses was commenced at Sasthamkotta in Kollam district in 1963 with financial assistance of the ICAR. Later on it was shifted to the Rice Research Station, Pattambi, in 1966 in view of better facilities. This scheme was terminated in 1968 and thereafter continued as a state scheme. A new scheme for the intensification of research on pulses as a part of the All India Co-ordinated Pulses

improvement Project was started in November, 1976 with the financial support of the ICAR.

The most significant accomplishment of the research project on pulse crops is the release of an early duration cowpea variety 'Kanakamony' (Ptb 1) in 1977. It is a dual purpose strain (as grain and vegetable) evolved by pure line selection from a popular variety Kunnamkulam local. This, incidentally, is the first variety of cowpea to be released in the state. Following this, a grain type cowpea variety 'Krishnamony' (Ptb-2) with black seed colour was released from this station.

Recently two promising cowpea cultures (Cul.7 and Cul.9) were evolved by crossing 'Krishnamony' with 'Kanakamony' so as to improve the black seed colour of the former parent. These two cultures exhibit ideal characters of a grain type with short duration, synchronised flowering and maturity with the seed colour of Kanakamony and out yielded Krishnamony. These two cultures are expected to be released shortly.

Under the All India Co-ordinated varietal trials on Pulses, the best varieties and cultures nominated by various states and finalised at National Pulses workshop are tested for their yield performance for the region. Some of the varieties which were found promising in the Co-ordinated trials are as follows:

Cowpea:- GC-82-7,V.240, HG-171, C-88

Greengram.- MH-309, PDM-84-143, Pusa-103, Pusa-117, RMG-146

Blackgram:- LBG-17, B-3-8-8, PDU-5, UH-80-9, Phule 11-1

Other Crops

Varietal evaluation trials on soybean revealed the varieties Bragg and Ishi Ishi were suitable for this region.

In the fifties introductory trials with Sea Island Cotton were initiated. An extra long staple cotton 'Andrews' was selected in 1956 from the varietal trials with cultivars of Gossypium barbadense. Studies have also indicated G. hirsutum varieties can be successfully cultivated in the 'modan' uplands as a rainfed crop in the first and second crop seasons. 'Ceiba', a new silk cotton variety introduced to Pattambi in 1951 proved its worth as a homestead crop since it has a dwarf habit facilitating easy harvesting. Studies conducted here have shown that 'Ceiba' can be propagated vegetatively also by grafting on one year old kapok root stocks.

Trials conducted in 1975-76 have indicated that groundnut can be grown as a companion crop with tapioca.

Studies conducted on horticultural crops during 1988-89 revealed that two varieties of watermelon, viz. 'sugar baby' and 'Fuken' are suitable for riverbed cultivation. The mosaic resistant bhindi varieties sel.4 and sel.10 are ideal for riverbed cultivation.

Tapioca varieties, viz. Sreeprakash, Co-2 and H.165 are suitable for rice fallows.

Seed Testing programme

A Seed Testing Laboratory was established at the Central Rice Research Station, Pattmbi as per section 4(2) of the Central Seed Act-54 of 1966. This is a seed testing laboratory notified under seed act, 1969, for Kerala State. Apart from the routine seed testing works, research data on seed storage, seed viability, seed dormancy etc., were generated from this laboratory and transferred to researchers seed multiplication agencies and extension personnel.

Till 1978, this laboratory catered to the needs of the entire Kerala State. With the declaration of the Seed Testing Laboratory, Alapuzha as a State Seed Testing Laboratory, the service area of the laboratory at Pattambi has been confined to the districts of Thrissur, Palakkad, Malappuram, Kozhikode, Cannoor and Wynad. From 1966 to 1990, this laboratory has analysed 30,777 seed samples received from various sources.

Studies done in 1973 on the volume expansion of 18 tall indica rice varieties revealed an average increase of 402.2 per cent in volume expansion on cooking, the highest being recorded by Ptb 29 and the lowest by Ptb 32.

In 1976 a project was undertaken to study the influence of season of harvest on the viability of short and medium duration paddy seeds. The results indicated that seeds of 'Virippu' crop harvested in August-September have comparatively longer storage period than those harvested in 'mundakan' and 'punja' seasons.

In an attempt to select the best container for storing paddy seeds without loss of viability, polythene bag (700 guage) could retain the minimum germination of 80 per cent for a period of 13 months. Polythene lined gunny bag could retain this level of moisture upto 12 months.

The volume weight of important Ptb varieties have been found out by this laboratory. The strains of 'virippu' season had higher volume weight than the 'mundakan' strains.

Dormancy behaviour of 12 important high yielding paddy varieties were studied in 1979. Considerable variation ranging from 8 to 62 days during 'virippu' and 2 to 40 days during 'mundakan' existed for the varieties. Amont the varieties tested Triveni had the lowest (8 days in 'virippu' and 2 days in 'mundakan') and Jagannath the highest (62 days in 'virippu and 40 days in 'mundakan).

The biometric parameters of grains of 35 improved rice varieties released from this station have been studied, in terms of the length, breadth, thickness and thousand grain weight.

Studies conducted in 1984 have revealed that seed treatment with Thiride, Captan and Foltaf are effective seed dressing fungicides.

Recently, the Seed Testing Laboratory, Pattambi has been strengthened by the implementation of the National Seed Production - Breeder Seed Production Unit (NSP-BSP Unit).

Seed Multiplication and distribution

Multiplication of nucleus seeds of rice for the 33 state seed farms of Kerala is an important responsibility of the Regional Agricultural Research Station, Pattambi. Besides nucleus seeds, foundation seeds are also produced for distribution among the cultivators. There has been considerable demand for the seeds produced by this station. Both the state department of Agriculture and the rice farmers of Kerala attach high credibility to the quality seeds distributed from here.

Extension Activities

The station maintains close linkage with the various departments and agencies for the effective transfer of technology generated by the Scientists. The scientists assist the state department of Agriculture in conducting the monthly T & V workshops. These workshops finalise the messages to be communicated to the farmers based on research results, feedback from the farmers and extension personnel.

In the annual regional workshops the research highlights are presented by the Scientists and results of the farm trials and field problems by the departmental officers. Action programme of research and farm trials are decided in this workshop.

The Scientists perform joint field visits with the department personnel as members of diagnostic team. On-farm trials are also conducted with the help of the Department of Agriculture.

Various trainings to the extension officers, farmers and undergraduate students of Agriculture are being imparted from this station.

The Krishi Vigyan Kendra (KVK) located in this station organises short training programmes for farmers, women and youth on Agriculture, Animal Husbandry, Fisheries and Home Science.

In collaboration with the soil conservation department and the state Agriculture department an Operational Research Project is functioning at Ozhalapathy.

Publications

Research articles based on the results emulating from trials conducted in this station are published in the leading journals of the country and abroad. Scientists regularly contribute popular articles to the newspapers. So far, about 250 papers have been published.

Radio talks by the Scientists of the station are also being broadcast over All India Radio, Kozhikode and Thrissur.

## Conclusions and a forward look

For the last six decades the Regional Agricultural Research Station, Pattambi has been an invaluable outdoor laboratory, class room and transfer of technology centre. Research findings mainly on rice have traversed throughout Asia. During the last decade, since the inception of the National Agrl. Res. Project (NARP), station research has diversified, and infrastructural facilities improved. The station will continue to serve the farming society as research and extension outlet in response to changes in the broad geographical area it represents.

Long term research programmes with an interdisciplinary and regional approach, patterned after the NARP concept can dramatically expand the value and application of individual studies done in this station. Close liaison and collaboration with the State Department of Agriculture and other developmental agencies can make the rapid transfer of technology to and from the farming community a reality.

The station, as part of the Kerala Agricultural University, thus is well positioned to meet the challenges of the years ahead.

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Staff position (As on 30-9-90)

| Name of post | No. of post | Discipline | No.of post filled | No.of post vacant |
|---|---|---|---|---|
| A. Teaching Staff | | | | |
| Non Plan | | | | |
| 1. Associate Prof. | 2 | Agronomy | 1 | 1 |
| 2. Assistant Prof. | 2 | Plant Patho. | 1 | 1 |
| 3. Jr. Asst. Prof. | 4 | Agronomy | 1 | 3 |
| NARP Phase-I | | | | |
| 1. Associate Director | 1 | --- | 1 | – |
| 2. Professor | 1 | Soil Science | – | – |
| 3. Assoc. Prof. | 4 | Agronomy | 1 | – |
| | | Agrl. Engg. | – | 1 |
| | | Agrl. Eco. | – | 1 |
| | | Soil Conservation | – | 1 |
| 4. Assistant Prof. | 10 | Agronomy | 1 | – |
| | | Soil Science | on leave | – |
| | | Soil Science | 1 | – |
| | | Economics | – | 1 |
| | | Agrl. Extn. | 1 | – |
| | | Horticulture | 1 | – |
| | | Biochemistry | – | 1 |
| | | Entomology | – | 1 |
| | | Plant Br. | – | 1 |
| | | Agrl. Engg. | – | 1 |
| NARP Phase-I Eruthempathy | | | | |
| 1. Associate Prof. | 1 | Agronomy | 1 | – |
| 2. Assistant Prof. | 1 | Agronomy | – | 1 |
| NARP Phase-II | | | | |
| 1. Assistant Prof. | 3 | Horticulture | 1 | – |
| | | Animal Sci. | 1 | – |
| | | Agrl. Engg. | – | 1 |

| Name of post | No. of post | Discipline | No.of post filled | No.of post vacant |
|---|---|---|---|---|
| AICRIP | | | | |
| 1. Assoc.Prof. | 4 | Plant Patho. | 1 Prof. | - |
| | | Agronomy | 1 | - |
| | | Entomology | 1 | - |
| | | Botany | - | 1 |
| 2. Assistant Prof. | 4 | Agronomy | 1 (JAP) | - |
| | | Plant Patho. | 1 | - |
| | | Botany | 2 (JAP) | - |
| NSP-BSP | | | | |
| 1. Assistant Prof. | 1 | Agronomy | 1 (JAP) | - |
| Pulses | | | | |
| 1. Assoc. Prof. | 2 | Agronomy | 1 | - |
| | | Plant Breeding | - | 1 |

B. NON TEACHING STAFF

| Schemes | Name of post | No.of post | No.of post filled | Vacant |
|---|---|---|---|---|
| Non Plan-A | | | | |
| 1. | Section Officer | 3 | 3 | - |
| 2. | Sr.Gr.Assistant | 6 | 6 | - |
| 3. | Assistant Grade II | 3 | 1 | 2 |
| 4. | Sr. Office Supdt. | 2 | 2 | - |
| 5. | Typist Gr. I | 1 | 1 | - |
| 6. | Lab. Asst.Gr.II(Hr.Gr.) | 2 | - | 2 |
| 7. | Lab, Asst. Gr. II (Hr.Gr.) | 2 | 2 | - |
| 8. | Lab. Asst. Gr. II | 2 | 2 | - |
| 9. | Peon Hr.Gr. | 3 | 3 | - |
| Non Plan - B | | | | |
| 1. | Sr.Farm Supervisor Gr.I | 1 | 1 | - |
| 2. | Farm Supervisor Gr.I | 2 | 1 | 1 |
| 3. | Farm Supervisor Gr.II | 2 | 2 (1(FA) | - |
| 4. | Farm Assistant Sr.Gr. | 3 | 3 | - |
| 5. | Farm Assistant Gr. I | 2 | 2 | - |
| 6. | Technician Gr.I | 2 | 2 | - |
| 7. | Tractor Driver | 1 | - | 1 |

| | | | |
|---|---|---|---|
| **Non Plan-N** | | | |
| 8. Regular Mazdoor | 9 | 9 | - |
| 9. Watchman | 4 | 4 | - |
| 10. Class IV | 6 | 6 | - |
| **NARP Phase-I** | | | |
| 1. Administrative Officer | 1 | 1 | - |
| 2. Typist | 2 | 2 | - |
| 3. Duplicator Operator | 1 | 1 | - |
| 4. Lab. Assistant | 2 | 2 | - |
| 5. Driver HDV | 1 | 1 | - |
| 6. Driver LDV | 1 | 1 | - |
| 7. Tractor Driver | 1 | - | 1 |
| 8. Photographer | 1 | - | 1 |
| **NARP Phase-I Eruthempathy** | | | |
| 1. Farm Assistant | 2 | 1 | 1 |
| 2. Peon | 1 | 1 | - |
| **NARP Phase-II** | | | |
| 1. Assistant Gr. II | 1 | 1 | - |
| 2. Farm Supervisor Gr.I (Vety.) | 1 | 1(FAGr.I) | - |
| 3. Technician | 1 | 1 | - |
| **AICRIP** | | | |
| 1. Farm Assistant (Agri.) Sr.Gr. | 1 | - | - |
| 2. Farm Asst. Gr. I | 4 | 4(1Sr.Gr.) | - |
| 3. Driver Gr.II | 1 | 1 | - |
| 4. Tractor-cum-jeep driver | 1 | - | 1 |
| **ERBMF** | | | |
| 1. Farm Supervisor Gr.II(Vety.) | 1 | 1(FA Gr.II) | - |
| **NSP/BSP** | | | |
| 1. Technician Gr.II | 1 | 1 | - |
| **Pulses** | | | |
| 1. Farm Assistant | 2 | 2 | - |
| 2. Asst. Gr.I | 1 | 1 | - |
| 3. Typist | 1 | 1 | - |
| 4. Lab Asst. Gr.III | 1 | 1 | - |
| 5. Peon Hr.Gr. | 1 | 1 | - |

# INFRASTRUCTURAL FACILITIES AVAILABLE AT REGIONAL AGRICULTURAL RESEARCH STATION, PATTAMBI

## LABORATORIES

1. Soil Science and Agricultural Chemistry
2. Seed Testing
3. Agronomy
4. Plant Pathology
5. Entomology

## Office buildings and other structures

1. Administrative Office
2. NARP Building
3. Botany and Pulses division
4. Seed Stores
5. Farm Office
6. Animal Husbandry building
7. Cattle shed
8. Threshing yard
9. Canteen (To be renewed)
10. Trainees Hostel and Conference Hall (under construction)
11. Guest House (Old - for accommodating 4 persons)

## Residential facilities for staff

| | |
|---|---|
| Class I Officers | 7 quarters |
| Class II Officers | 23 quarters |
| Class III Officers | 25 quarters |
| Class IV Officers | 7 quarters |

## Agricultural Machinery and equipments

| | |
|---|---|
| Tractor - | 2 nos. |
| Tiller - | 2 nos. |
| Power Sprayer - | 2 nos. |
| Diesel pumpsets 5 HP- | 2 nos. |
| Diesel pumpsets 7 HP - | 1 no. |
| Electric Motor & Pumpset - | 6 nos. |
| Sprinkler unit - | 1 no. |
| Borewell and Pumpset system - | 1 no. |
| Generator(diesel)10 KWA - | 1 no. |
| Paddy Thresher - | 1 no. |
| Seed Drier - | 1 no. |
| Seed Winnower - | 1 no. |

Mini workshop equipments available

## Vehicles

| | |
|---|---|
| Ambassador Car - | 1 No. |
| Mahindra Jeep (old) - | 1 No. |

Financial Position as on 30.9.1990

| | Allotment | Expenditure |
|---|---|---|
| 1) KAUF.A. V(b) 5 N.P. (A) | | |
| Salaries | 8,15,000.00 | 4,37,094.00 |
| Travelling Allowance | 9,000.00 | 618.00 |
| Contingencies | 64,000.00 | 26,949.00 |
| Total | 8,88,000.00 | 4,64,661.00 |
| 2) KAUF.A. V(b) 5 N.P.(B) | | |
| Salaries | 7,18,000.00 | 4,59,466.00 |
| Travelling Allowance | 4,000.00 | 823.00 |
| Contingencies | 11,51,000.00 | 7,96,760.15 |
| Total | 18,73,000.00 | 12,57,049.15 |
| 3) KAUF.A. V(b) 5 N.P.(C) | | |
| Salaries | 7,18,000.00 | 4,89,891.00 |
| Travelling Allowance | 12,000.00 | 6,958.00 |
| Contingencies | 2,65,000.00 | 20,276.85 |
| Total | 9,95,000.00 | 5,17,125.85 |
| 4) KAUF.A. V(b)(6) ERBMF | | |
| Salaries | 41,500.00 | 23,313.00 |
| Travelling Allowance | 1,200.00 | 867.10 |
| Contingencies | 1,38,000.00 | 49,104.50 |
| Total | 1,80,700.00 | 73,284.60 |
| 5) KAUF.A. V(b) viii(a) 7 NSP/BSP | | |
| Salaries | 59,000.00 | 26,463.00 |
| Travelling Allowance | 300.00 | - |
| Contingencies | 15,000.00 | 6,812.00 |
| Total | 74,300.00 | 33,275.00 |
| 6) KAUF.A. V(b) viii(a)(8) AICRIP | | |
| Salaries | 2,50,000.00 | 1,93,326.00 |
| Travelling Allowance | 11,200.00 | 3,064.00 |
| Contingencies | 65,000 | 9,747.15 |
| Total | 3,26,200.00 | 2,06,137.15 |
| 7) KAUF.A. VI(viii)(a)(9) Pulses | | |
| Salaries | 1,67,300.00 | 88,731.00 |
| Travelling Allowance | 8,000.00 | 6,028.00 |
| Contingencies | 36,000.00 | 433.00 |
| Total | 2,11,300.00 | 95,191.00 |
| 8) KAUF.A. VI(viii) (a) (10) NARP Phase-II | | (Pattambi alone) |
| Salaries | 4,88,000.00 | 61,948.00 |
| Travelling Allowance | 25,000.00 | 150.00 |
| Contingencies | 1,54,000.00 | 25,363.00 |
| | 6,67,000.00 | 87,461.00 |

ANNEXURE - I

LIST OF ONGOING EXPERIMENTS

A. AGRONOMY

a) 1. Weed control trial for direct sown rice under upland condition.

2. Integrated organic and inorganic nutrient management for wet land rice.

3. Effect of prilled urea, coated urea and modified urea on yield of wet land rice.

4. Maximisation of rice yield under transplanted condition.

5. Rice varieties for late planted situation.

6. Soil fertility management of acid soils for upland rice.

7. Nutrient management of wet land rice in pest and disease endemic areas.

b) 1. Standardising fertilizer schedule for Koottumundakan system of cultivation.

2. Growing leguminous crops as source of green matter for dry sown rice.

3. Studies on the management practices for correcting yield reduction in medium duration rice sown on certain dates during Mundakan season.

4. Management of rice soils having iron toxicity.

5. Management practices to overcome the effect of drought on dry sown rice.

6. Management practices to overcome the effect of drought on Mundakan rice.

7. Varietal combination for first and second crop season for maximum productivity.

8. Hastening decomposition of organic and inorganic manures and crop residues under intensive cropping system during mundakan season.

9. Evaluation of ratooning ability of some rice cultures/varieties.

10. Cultural and manurial practices for ratoon rice crop.

11. Investigation on the interrelation and pattern of occurrence among weather elements (Observational trial)

12. Varietal reaction of rice to soil iron in mundakan season.

13. Influence of nutritional environment on crop response to soil iron.

B. SOIL SCIENCE

1. Permanent Manurial Experiment(Tall Indica)
2. Permanent Manurial Experiment (Dwarf Indica)
3. Lack of response of Phosphorus and Potash in rice

C. CROP IMPROVEMENT

1. Uniform Multiple Resistant Variety Trial
2. Preliminary Variety Trial
3. Uniform Variety Trial
4. International Rice Yield Nursery-E
5. International Rice Yield Nursery-M
6. Multiple Resistance Variety Trial-2
7. Breeding lodging resistant fertilizer responsive medium height rice varieties suited for semi dry virippu season in uplands of Kerala
8. Breeding high yielding rice varieties resistant/tolerant to sheath blight
9. Breeding high yielding rice varieties with pigmentation at some plant parts
10. Evolution of awnless and high yielding type of the rice variety Parambuvattan for virippu cultivation in palliyal lands

11. Breeding high yielding tall photosensitive rice varieties with good straw yield specifically suited for mundakan season of Kerala

12. Improvement of rice varieties BR 51 and IR 36 for consumer acceptibility

13. Reselection in Mashuri for red kernel colour and blast tolerance

14. Evolution of semi tall or dwarf types of important tall indica rice varieties

15. Genetic conservation, maintenance and evaluation of rice germplasm

16. Evolution of a high yielding sesamum variety for the uplands of Kerala by pureline selection in the 'Pattambi Local' variety

17. Genetic improvement of promising indica varieties through ideotype breeding

18. Identification of rice variety suited to the ill drained iron toxic fields of Kerala

19. Breeding for early maturing varieties possessing tolerance to moisture stress

D. PULSES

1. Cowpea Co-ordinated Varietal Trial

2. Urd Co-ordinated Varietal Trial

3. Mung Co-ordinated Varietal Trial

4. Breeding for high yielding short duration cowpea varieties with better grain quality

5. Breeding for high yielding vegetable type cowpea with better cooking quality

6. Maintenance of germplasm of major pulse crops of Kerala

7. Urd Advanced Varietal Trial-1

8. Urd Advanced Varietal Trial-2

9. Mung Advanced Varietal Trial-1

10. Agronomic management of promising genotypes of Redgram(kharif - 1990-91)

11. Agronomic management of promising genotypes of Blackgram(kharif-1990-91)

12. Evaluation of promising genotypes of Mungbean at different levels of agronomic management

13. Evaluation of promising genotypes of chickpea at different levels of agronomic management under rainfed condition(Rabi 1990-91)

14. Evaluation of promising genotypes of urdbean at different levels of agronomic management under rainfed conditions

E. HORTICULTURE

1. Screening bhindi varieties for cultivation in the river banks of Bharathapuzha

2. Evaluation of watermelon varieties for cultivation in riverbeds of Bharathapuzha

3. Study on quality, storage life of fruits and seed viability of cucumber and Ashgourd as influenced by organic and inorganic manures

4. Survey on vegetable based cropping pattern and crop production practices in the riverbeds of Bharathapuzha.

5. Breeding for mosaic resistant cultures of ashgourd suitable for riverbed cultivation

E. CROP PROTECTION

a) Pathology

1. Screening for blast disease resistance

2. Screening for sheath blight disease resistance

3. Effective chemical control of blast disease

4. Evaluation of granular formulations for blast disease control

5. Granular formulations in combination with seed dresser and EC/WP formulations for blast disease control

6. Evaluation of new fungicidal formulations for sheath blight control

7. Disease Management Trial

8. Investigations of glume and grain discolourations

b) Entomology

1. Trial on early stage pest control
2. Economic threshold levels for major pests
3. Light trap data collection
4. Meteorological related data collection of insect pest damage
5. Gallmidge screening
6. Leaf folder screening
7. Rootknot nematode trials.

Compiled & Edited by

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EXTENSION

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