Onattukara Regional Agricultural Research Station, Kayamkulam

Onattukara Regional Agricultural Research Station , Kayamkulam P.O., Alappuzha
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Station Head		Dr.T.N.Vilasini	
Longitude		76^0 20' E	
Lattitude		90 30' N	
Nearest City/ Town	Kayamkulam	**Distance from Nearest City/ Town (km)**	1.6
Nearest Railway Station	Kayamkulam	**Distance from Nearest Railway Station (km)**	1
Nearest Airport	Trivandrum	**Distance from Nearest Airport (km)**	110

About Station

Onattukara is surrounded by Thottapally spillway in the north, Neendakara in the south, Arabian sea in the west and Edanadu in the east. Onattukara comprises of 42 panchayaths and three municipalities with 71059 ha of land, of which 65757 ha. is suitable for cultivation. Uplands (46800 ha.) are ideal for growing crops like coconut, banana, tuber cops, pulses and vegetables. The low land (18957 ha.) is suitable for growing rice, sesamum, pulses and vegetables. On an average the region receives an annual rainfall of 2600 mm spread over a period from April to November. The average maximum and minimum temperature in the area is 32^oC and 25^oC respectively and a relative humidity of 92.5 per cent. The soil type is loamy sand with 83-89 per cent sand, 5 per cent silt and 5.8 percent clay with a field capacity of 16.05. The soil contain 0.145 per cent N, 0.121 percent P_2O_5, 0.0185 per cent K_2O, 0.098 per cent calcium and 0.035 per cent magnesium. The soil is porous with low organic matter and nutrients. Flooding is a problem during rainy season and the crops experience drought during summer season.

The Onattukara Regional Agricultural Research Station, Kayamkulam the then Coconut and paddy experiment station was established in 1937 under the erstwhile Travancore University for the improvement of rice and coconut in Onattukara region. On 28^{th} May 1958, it was transferred to the State Department of Agriculture. With the formation of the Kerala Agricultural University on 1^{st} February 1972, this institution was transferred to Kerala Agricultural University as its constituent unit known as Rice Research Station. In 1981, the station has been declared as a sub centre for conducting research on root (wilt) disease of coconut. On 12^{th} April 2000, the status of the station was raised to Onattukara Regional Agricultural Research Station with the idea of implementation of comprehensive coconut care project in Onattukara region. The station is located 1.6 km east of Kayamkulam town, 3.05 m above MSL. The station has a

total area of 11.65 ha. comprising of 9.45 ha. of wet land and 2.2 ha. of garden land. Rice based (Rice-Rice- Sesame/ pulses/ vegetables) and coconut based (sesame, pulses, vegetables, banana, tuber crops and fodder crops along with coconut) cropping systems are followed in this station.

Objectives

- To develop improved varieties of paddy, sesame, pulses, catering to the needs of farming community of Onattukara.
- Conduct of frontline demonstrations and onfarm trials for technology dissemination

Vision

- To institute better agriculture research and outreach programmes so as to improve the livelihoods and welfare of farmers, consumers and state holders through growth and sustainability inclusive of social development.
- To ensure food, employment and income security for all through technological innovations and sustainable Agriculture

Mission

- Protecting crops from pests and diseases
- Improving the quality and safety of agricultural products
- Sustaining soil and other natural resources
- Ensuing profitability for farmers and processors
- Keeping costs down for consumers.

Achievements

1. Crop improvement

(i). Rice

- **UR-19** was evolved by pure line selection from **Chempavu** for *mundakan* season.
- **UR-110** was released for Orumundakan areas.
- **Kottarakara-1** was evolved through pure line section from **Cheradi** for the lateritic regions.
- **Lekshmi** was released for the *mundakan* season involving a cross between **Kottarakkara-1** and **Poduvi**
- **Onam** was released for *virippu* season involving a cross between **Kochuvithu** x [**TN (1)** x **Triveni**]
- **Bhagya,** a high yielding variety was released through a cross between **Thadukkan** and **Jaya** for the *virippu* season.
- **Dhanya** was released for the *mundakan* season.

- **Sagara**, a saline and flood tolerant variety was released through pure line selection from local *Orumundakan* types suited for the *Orumundakan* areas.
- **Makaram** and **Kumbham** were released for the eastern lateritic region through mass selection.
- **Chingam** and **Dhanu** were released for the *virippu* and *mundakan* seasons of Onattukara.
- **Thulam** was released for cherady tracts during 2010
- A total no. of 32 accessions of rice were maintained in the germ plasm
- The medium duration rice varieties viz; Triguna, Kanchana, MO-16, Jyothy, Athira, MO4 and Aiswarya were found to be suited for cultivation in Onattukara
- Medicinal rice variety "Njavara" is found to be promising for the first and second crop season of Onattukara
- Short duration rice variety "Bhagya" is found to be suitable for upland cultivation in Onattukara
- Quality seed production of rice was carried out at Chirayilkulam Padasekharam in Nooranad with Bhagya and Uma varieties and a total quantity of 5960 kg. bhagya and 827 kg uma seeds were produced during Mundakan 2009-10.

(ii) Sesamum

- **Kayamkulam-1** with an oil percentage of 50.5 was evolved by pure line selection.
- **Kayamkulam-2** (**Thilothama)** was released by a cross between **Pt 58-35** x **Kayamkulam-1**
- **Thilak** which has an yield potential of 648 kg/ha was released by the pure line selection.
- **Thilathara** was evolved by combination breeding with parents **B-9** x **CST-785**
- **Thilarani was** released for the summer rice fallows of Onattukara region.
- Identified three wild sesame species viz. *S. malabaricum, S. mulayanum* and *S. radiatum.* Transferred the drought tolerant trait from wild to the cultivated sesame. Several promising BC6 lines are being maintained at the station

(iii) Ground nut

- **Cul 608** and **Cul 612** were evolved by hybridisation programme.

(iv) Pulses

- **Pournami,** a grain type cowpea was released for summer rice fallows.
- ***V-118*** *and* ***Co-3*** *varieties were recommended for partially shaded coconut gardens.*
- **Syama** a high yielding black gram variety was released for summer rice fallows.

- **Co-4**, a black gram variety was recommended for rice follows. **KM-2** and **TMV-1** were recommended for partially shaded coconut gardens.
- **Pusa-8973**, a high yielding green gram variety was recommended for summer rice fallows.

  Two grain cowpea varieties **Hridya** and **Sreya** were released during 2010

(v) Coconut

- Standardized ELISA test for the identification of root(wilt) disease
- Surveyed and identified 573 number of elite palms from farmers field, from which 50,000 elite seed nut were procured
- Based on ELISA 219 palms among 573 were identified disease free and produced 4420 (TXT) hybrid seed nuts
- Produced & distributed 26264 elite seedlings and 1856 (TXT) hybrid seedlings

(vi) Cassava

- **Nidhi**, a short duration variety was released for Thara lands through clonal selection.

2. Crop management

(i) Rice

- Sowing seeds behind country plough followed by planking is the best method for Onattukara.
- Hoeing on 15th and 25th day after dibbling can control the weeds during *virippu* season. Maximum yield can be obtained by split application of nitrogen i.e. 1/4 basal and 3/4 top dressing in two or three splits.
- Application of potash @ 67.5 kg K_2O/ha along with 5 t/ha. of FYM is effective for reducing iron toxicity.
- Application of cattle manure to supply 25 percent of the total recommended dose of N along with balance N and recommended dose of P&K as inorganic fertilizers gave optimum rice yield.
- First fortnight of August is the best time for planting to get high yield in ***mundakan*** season.
- Cowpea is the best legume for dual culture followed by sunhemp and
- incorporation on the 30thday brings the best result.
- Application of $ZnSO_4$ @ 30 kg/ha with recommended dose of NPK is found to be better for getting maximum yield.
- Application of Butachlor @ 1 kg ai/ha on the first or second day after sowing is the most economic practice in controlling weeds during *Virippu* season .
- Vermicompost /coirpith compost @2.5 t ha^{-1} can be substituted for 5 t ha^{-1} of FYM for rice in Onattukara region.
- 75% of full dose of fertilizer (40:20:20 kg NPK/ha) along with organic matter 5 ton/ha is found to be the optimum for the rice variety Njavara

(ii). Sesamum

- A seed rate of 5 kg/ha is recommended for maintaining optimum population.
- A fertilizer dose of 30:15:30 kg NPK has been recommended as the optimum fertilizer schedule.
- Urea 3 percent solution @ 15 kg N/ha, 20 DAS will increase the yield.
- Two irrigation at 3 cm depth during vegetative phase and reproductive phase will increase the yield.
- Hoeing on 15^{th} and 25^{th} day is the suitable time for healthy growth of the plants.

(iii). Pulses

- Application of NPK @ 20:30:10 kg/ha is found suitable for maximum yield.

(iv). Cucumber

- A spacing of 2 x 2 m with 70:25:25 kg NPK/ha is suitable for maximum yield.
- Triadimefon at 20 ppm as seed treatment will reduce the irrigation requirement to $1/4^{th}$ and induce drought tolerance.

(v). Banana

Application of N, $P_2 O_5$ and $K_2 O$ @ 200:200:400 g/plant per year in two equal split doses: the first, two months after planting and the second, four months after planting. is recommended for banana cv. Njalipoovan

3. Crop protection

(i) Rice

- By adopting IPM, the pests and disease incidence was very low, the population of associated natural enemies was high compared to that of Non IPM plots. The average grain and straw yield of 5.1 and 5.7 t ha^{-1} was obtained from IPM plots compared to 4.1 and 4.9 t ha^{-1} respectively in non IPM plots.
- Standardised corcyra egg production for carrying out the production of trichocards of *Trichogramma japonicum* and *T.chilonis*.
- A native strain of *Beauveria bassiana* was isolated from rice leaf roller which has already been reported from the college of Agriculture, Vellayani as culture ITC 6063.
- Collected and identified a predominant egg parasitoid of rice stem borer in the paddy fieds of Onattukara, *Tetrastichus* sp.
- Application of *Pseudomonas fluorescence* as 2% spray at active tillering stage and panicle initiation stage can minimize the earhead blackening disease complex.
- Adoption of IPM practices with rice variety onam followed by Bhagya can maximize the grain and straw yield in Onattukara for virippu season

(ii) Sesamum

- A spray fluid of 0.05 percent Phosphamidon at seedling stage is recommended to control stem fly.

(iii) Groundnut

- Hexaconazole 0.1% followed by bittertanol 0.1% effectively controlled the late leaf spot disease of groundnut and recorded maximum pod yield .

(iv) Pulses

- Tobacco decoction spray at 3-4 leaf stage will control the stem fly attack.
- Neem kernel suspension (0.1 percent) at trailing to flowering can control aphids and pod borers.
- To control *Bruchus,* quinalphos (0.03 percent) at 60 DAS is effective and a need based spray at the same concentration and treatment using *Achorus calamus* @ 1 kg/100 kg seed at storage is also effective.
- An IPM package against major pests of cowpea was developed (1) Burning of trash before sowing, (2) Selecting healthy seeds, (3) Clean cultivation, (4) Soil drenching with Bordeaux mixture 1% wherever fungal disease prevalent, (5) Treating the seeds with rhizobium culture @ 250 to 375 gm/ha before sowing, (6) Monitoring the field for incidence of pests and population of natural enemies especially at flowering stage (for *Aphis craccivora ,* epilachna beetles and pod borers) and at pod formation stage for pod bugs; (7) Adoption of mechanical methods of pest control such as application of dry leaf ash at 10 DAS, keeping yellow sticky trap/yellow pan tray, collection and destruction of infested leaves, flower buds and pods and sweeping and destruction of the pests; (8) Collection and release of potential natural enemies viz., grubs and adults of *Coccinella transversalis, Menochilus sexmaculatus, Harmonia octomaculata* and maggots of *Ischiodon scutellare;* (9) Need based application of *Fusarium pallidoroseum* @ $7x10^6$/ml specifically for the management of *A. craccivora*; (10) Need based application of neem kernel suspension (NKS) 5% or Chlorpyriphos 0.05% during 45 DAS in the case of moderate incidence of *A. craccivora*, pod borers and a second spray using NKS 5% at 60 DAS if needed against pod borers and pod bugs.
- The Project Co-ordination Group of pulses and oil seeds is being co-ordinated by this Centre.

(v)Coconut

- Due to the implementation of Comrehensive coconut care programme at Vallikunnam the yield of coconut was increased to the tune of 80.77 percent with substantial decrease in the incidence of pest and disease.

- Econeem 3 ml/litre is sufficient in controlling coconut perianth mite as compared to the present recommendation of 4 ml/l when applied in combination with the wetting agent APSA 80 @ 0.033%. Application of Hexaconazole @ 1.5 ml/300 ml water alone is sufficient for the management of leaf rot disease in coconut.
- By adopting Comprehensive coconut package and mite management measures at Thazhappu ward of Kuthiathode Panchayath , general health of the palms was improved and production increased to the tune of 70 percent.
- Reduction in the incidence of pests and diseases, improvement in health of the palms were observed and recorded 77 and 76 percent yield increase respectively at Thazhakkara and Kandalloor due to the implementation of comprehensive coconut care programme

(vi)Mango

- Ocimum baiting technique is found to be effective for controlling fruit flies in mango.

4. Biotechnology

1. Orchids

- Standardized protocols for the clonal propagation of seven Dendrobium varieties viz., Kasim white, Uniwy, Madame pompador, Betty Ho, Amoemum, Soniya and a hybrid through embryo culture.
- Standardized protocols for the clonal propagation in Dendrobium varieties viz., Kasim white, Betty Ho, Amoemum, and a hybrid through meristem culture.
- Standardised protocols for the clonal multiplication of Dendrobium Uniwy through direct and indirect organogenesis.

Garcinia

- For Tissue culture, 132 collections were made from different geographical conditions.
- Protein profiling of different ecotypes were analysed.
- Standardised the protocol for direct organogenesis using meristem, embryo and endosperm
- Standardised the indirect organogenesis via protoplast, leaf and endosperm culture

a).	Details of flagship projects	:	Nil
b).	Technologies commericialized	:	Nil
c).	Technologies for commercialization	:	Nil
d).	New varieties released (last 5 years)	:	Rice - Thulam Pulses – Sreya& Hridya

e). Awards and patents if any etc. :

- Dr. Sverup John, Associate Professor (Pl. Breeding) has been awarded the Krishi Vigyan Award for 1998-99 instituted by the Government of Kerala for the best Agricultural Scientist of the State.

- Dr. S. Bhavani Devi, Professor (Pl. Path.) (Retd.) is nominated as Advisory Committee Member of National Level Committee on Mushrooms (National Research Centre for Mushrooms, Solan, H.

f). Research news and events (recent) concerned with the station

The following research programs are being implemented at this station.

Rice and rice based cropping system

- Testing the adaptability and stability of high yielding varieties of rice in Onattukara (RIC/02-01-01-2007/KYM (9) /KAU)
- Breeding tall high yielding rice varieties resistant/tolerant to salinity and flood for Oorumundakan tract
- Breeding of short duration rice varieties for virippu season and photosensitive, semitall high yielding varieties for mundakan season in Onattukara (RIC/01-04-05-2000/KYM(9)KAU/Plan)
- Genetic conservation, molecular characterization and restoration of abiotic resistant genes of indigenous rice varieties for the changed agro climatic situations of Onattukara
- Genetic improvement of the popular variety "Cheradi" for mundakan season of lateritic areas (concluded)
- Ecological restoration of low land rice soils of Onattukara
- Standardization of agrotechniques for the new varieties and pre release cultures for Onattukara and cherady tracts

A. Coconut and other palms

- Enhancement of production & productivity in coconut for food security in the root(wilt) affected area in Onattukara through comprehensive coconut care programme
- CDB – Performance evaluation of elite seedlings in farmer's fields of Alappuzha and Kollam districts
- Large scale procurement of seed nuts from superior dwarf by screening and identification in Southern zone of Kerala
- RKVY – coconut mission – Development of production units for hybrid coconut seedlings and other planting materials in three southern districts of Kerala
- Studies on seedlings of selected elite palms of root(wilt) hot spot area

B. Pulses and Oilseeds

- AICRP initial varietal trial (POS/02/00-01/87/KYM(9)ICAR- Co-ord)
- AICRP Advanced varietal trial(POS/02-00-01/87/KLM(9)ICAR-Co-ord)

- AICRP – Evaluation of new varieties to identify superior checks for replacement of old checks (POS/02/00-01/87/KYM(9)ICAR-Co-ord)
- Development of hybrids(POS/02-00-01/87/KYM(9)ICAR)
- Generation and testing of breeding material for drought resistance (01/87/KYM(9) ICAR – Co-ord.)
- Development of promising lines by Hybridization (POS/02-00-01/87/KYM(9)ICAR)
- Genetic resource management – maintenance and evaluation (POS/02-00-01/87/KYM (9) ICAR – Co-ord)
- Genetic improvement of "Ayali" suited to the drought conditions of Onattukara (POS/07-00-01-2003/KYM(9) KAU)
- Evolution cowpea varieties with synchronized maturity suited to summer rice fallows of Onattukara (POS/01-00-12-KYM(9) 91/KAU/NP)
- Optimization of sesame production under resource constraints
- Crop weed competition in sesame
- Weed management study in sesame
- Integration of organic sources to fertilizer for higher sesame yield
- Effect of foliar spray on seed yield and economics of sesame
- Frontline demonstrations in sesame
- Management of storage pests in groundnut under stored conditions

C. Soils and Agronomy

1. Permanent manurial trial (BR/01-00-05-64/KYM(3)KAU
2. Soil based plant nutrient management plan for agro ecosystems of Kerala (Soil science component
3. Soil based plant nutrient management plan for agro ecosystems of Kerala (Agronomy component)
4. Network project on characterization and management of soil fertility with respect to secondary and micronutrients for agro ecosystems of Kerala

D. Organic Farming

1. Establishment of centre for organic farming in Onattukara (OF-04-00-03-2010/KYM(3)RKVY)
2. Green technology for rice based cropping system in Onattukara(OF-03-01-02-2008 KYM (3)KAU)

E. Plant protection

1. Eco friendly management of major pests and diseases of vegetables in Onattukara with special emphasis on bio control agents
2. Development of technologies including alternatives for banned pesticides for the management of pests and diseases of major crops in Kerala

   Rice

   i. Evaluation of insecticides against stemborer, gall midge and leaf folder –
      1. Insecticides with label claim

ii. Evaluation of insecticides against stem borer, gall midge and leaf folder -
    1. Insecticide for label expansion
iii. Evaluation of insecticides against brown plant hopper and rice bug
iv. Evaluation of ecofriendly products for rice pests
v. Evaluation of new fungicides against blast of rice
vi. Evaluation of new fungicides against sheath blight of rice
vii. Evaluation of new fungicides against brown spot/sheath rot/glume
    1. discolouration of rice
viii. Evaluation of Botanical and biocontrol agents against major diseases of
    1. rice

Coconut

i. Mangement of red palm weevil
ii. Management of coreid bug
iii. Management of mealy bugs and mite
iv. Management of root(wilt) disease

Vegetables

i. Management of downy mildew of snakegourd
ii. Management of leaf blight of amaranthus
iii. Management of major pests of cucurbits – snakegourd- leaf feeders
iv. Management of major pests of cucurbits – snakegourd – sucking pests
v. Management of major pests of cowpea – Pod borers
vi. Management of major pests of cowpea - sucking pests (Aphids, pod bugs)
vii. Management of major pests of Amaranthus

3. Natural Resource Management

- Strengthening of Onattukara Regional Agricultural Research Station, Kayamkulam for the development of Onattukara region – Kuttanad package
- Screening medium duration varieties suitable for Onattukara
- Screening and identification of superior dwarf mother coconut palms of Onattukara for the large scale production of quality seedlings
- Organic nutrition of medicinal rice Njavara in Onattukara

4. Biotechnology

1. Exploiting somaclonal variation for saline tolerant rice plants
    - A leaflet on Samagra Keraraksha package in Malayalam was published by Dr.G.Suja, Dr.M.Indira and Dr.T.N.Vilasini
    - Published an article “Elite coconut seedling for root(wilt) affected coconut gardens “ - Naleekera journal July 2013 by Dr.M.R.Bindu, Dr.T.N.Vilasini and Seeja.S.

The world environment day June 5th 2013 was celebrated at Onattukara Regional Agricultural Research Station, Kayamkulam in a befitting m