Ceylon Coconut Planters' Review, Vol. VI No. 1, December, 1969.

Activities of the Coconut Research Institute

DURING 1968

(*Summary*)

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General

1. Dr. U. B. M. Ekanayake, Crop Protection Officer and Mr. V. Abeywardene, Biometrician attended the Third Session of the F.A.O. Technical Working Party on Coconut Production, Protection and Processing, held in Jogjakarta, Indonesia from 9-19th September, 1968 and presented papers.

2. Dr. D. A. Nethsinghe, Soil Chemist, who was released by the Coconut Research Board to take up an assignment with the International Atomic Energy Agency in Vienna, reported on the progress of work in the Division of Soil Chemistry, whilst on leave in Ceylon during August/September, and also addressed the Low Country Products' Association on the New C.R.I. Fertilizer Recommendations.

3. Mr. M. A. T. de Silva, Senior Technical Assistant, who completed a year's training at the Long Ashton Research Station, Bristol, was given a period of six months' extension by the Coconut Research Board to complete his studies for the M.Sc. Degree.

4. Reports regarding the favourable progress of the Research Assistants in Botany and Agrostology who continued to be away on overseas training have been received during the period under review.

A summary of the activities of the Institute is as follows :—

I. Chemistry Division

1. *Coir Technology.* In continuation of the work commenced earlier, some experiments were conducted on the recovery of coir fibre using the "Dry Decorticator". Unlike the technique of "Drum Processing", in this process only one grade of fibre, viz., 'mattress' is recovered. A further difference is that the husks used are not retted but merely soaked for a few hours prior to milling.

2. *Studies on the Coconut Endosperm.* Chemical studies on the coconut kernel were continued during the year. The early developmental stages of the endosperm were examined for protein and the major mineral elements, to establish the presence of concentration gradients in different regions of the kernel.

3. *Arrack.* Twelve palms were continued to be tapped for toddy during the year. The samples collected were used for laboratory studies on fermentation efficiencies and the preparation and examination of experimental samples of arrack.

4. *Pot Culture Experiment.* The chemical examination of plant samples prepared from the previous pot culture experiments were continued.

The eighth sand pot-culture experiment on 252 seedlings laid down on 20th March 1968 to study the pattern of nutrient distribution in the leaves (by rank) for seven treatments (+ ALL, — ALL, — N, — P, — K, — Ca and — Mg) using the "Leaf-punch" technique was continued during the year.

5. *Germination Experiment.* Studies on the uptake and distribution of macronutrients during the germination, and early growth stages of the coconut that has been in progress for some time, were concluded during the year.

6. *Coconut Varieties.* Samples of copra prepared by the Division of Botany from Coconut cultivars grown in Ceylon were examined and reported on for oil content. This work is being continued.

II. **Botany Division**

1. *Field Experiments.* All the field experiments and observation plots at Bandirippuwa (13), Rathmalagara (5), Walpita (1) and Pothukulama (9), were maintained throughout the year.

2. *Hybridization Work.* Controlled pollination work for the production of Tall x Tall and Tall x Dwarf seed-material was continued at the Isolated Seed Garden and the following six estates:—

Bandirippuwa Estate,	Lunuwila
Ratmalagara Estate,	Madampe
Marandawila Estate,	Bingiriya
Achchithotam Estate,	Mundel
Andigedera Estate,	Weerapokuna
Kiniyama Estate,	Weerapokuna

From the above seven stations 19,208 Tall × Tall, 27,991 Dwarf × Tall and 4,646 Tall × Dwarf seednuts were harvested during the year.

In all 7717 Tall × Tall, 6049 Dwarf × Tall and 125 open pollinated seedlings were issued to the industry by the Division.

Assistance in the form of palm selection, training of pollinators, supervisory checks and supply of pollen was given to 17 private estates to carry out their own controlled pollination work.

3. *Mother Palm Seed Supply.* 1,604,847 mother palm seednuts were supplied to the Planting Division during the year. The Staff of the Botany Division also assisted six estate owners in selecting mother palms for raising their own planting material.

4. *Isolated Seed Garden.* 5,000 Teak seedlings obtained from the Forest Department, were planted in that portion of the isolation barrier which was previously occupied by squatters. The Seed Garden and the barrier were maintained in good order throughout the year.

III. Soil Chemistry Division

A. *Field Experiments*

1. The long term field experiments (twelve) at Bandirippuwa, Ratmalagara, Pothukulama, Bingiriya, Walahapitiya, Mawatte, Naiwala, and Rathgama were continued.

2. The first differential manuring of the 5× 5 × 5 B Zn S Experiment at Rathgama was done in early 1968.

3. The observation trials on "Leaf Scorch" at Kirimetiya, yellowing of leaves at Iranaville, and immature nut fall at Palugaswetiya were continued.

4. In the programme of isotope studies on efficiency of fertilizer utilization by coconut palms two experiemnts were completed in the field.

5. Field Experimental Results of interest are :—

(i) *Placement and Liming Experiment* (*Walahapitiya*). For the first time since the inception of the experiment the response to the higher level of manuring (F_2) was found superior to that of the lower level (F_1).

(ii) *Experiment on Nitrogen Quality* (*Mawatte*): On a lateritic gravel soil the results to date indicate that urea is as efficient a source of nitrogen as ammonium sulphate.

(iii) *Radioactive Isotopes.* Studies showed that the zone of highest density of active roots lies within a distance of a metre from the palm and above a depth of 45 centimetres.

B. Laboratory Investigations

1. *Soil Analysis* : (i) Total carbon, total ammoniacal and nitrate nitrogen were determined on Iranaville soils.

(ii) Total nitrogen, total carbon and available phosphorus (Olsen's) were determined on the samples from the radioisotope experiment.

2. *Leaf Analysis.* The following estimations were done; (i) N.P.K. Ca and Mg on samples from the Response Curve Experiment at Bandirippuwa Estate.

(ii) N.P.K. on samples from the Naiwala Experiment.

(iii) B & Na on samples from the Response Curve Experiment at Bandirippuwa.

3. *Radioisotope experiment.* Radioactive counts on the leaf samples from the two experiments were carried out.

C. Soil Survey

The main project for the year was the survey of the Eastern Province. The Batticaloa, Kalkudah and Kalmunai Sheets were completed and the Tirukkovil Sheet commenced.

At the request of the Crop Protection Officer of the Institute a detailed soil survey of Sirikandura, Kirimetiya, Kahatapitiya and Ginigalmelyana Estates in the Ambalangoda 1" sheet was carried out.

At the request of the Government Agents of Moneragala and Jaffna Districts reconnaissance Surveys were conducted to determine the suitability of lands in the district for the cultivation of coconuts.

Surveys of tea and/or rubber estates in Rakwana, Kegalle, Baddegama and Passara were conducted to advise on the suitability of planting coconuts.

IV. Agrostology Division

1. *Soil Fertility Studies*

Studies on the nutrient status of the Attavillu series of soils in the Puttalam Distrct were commenced this year. Experiments set up with the Kiulkelle component of this series have been completed and the data are been studied.

Experiments set up to determine the optimum requirements of the deficient nutrients of the lateritic gravel at Hanwella were completed during the year. The data are being written up for publication.

2. *Pasture studies*

All pasture-coconut competition studies were managed to schedule. A new experiment to study the effect of management of a pasture of B. brizantha on the yield of coconut was laid down at Ratmalagara Estate.

Evaluation studies of introduced pasture species were commenced during the year. Of the introduced species B.ruzizienzis appears to be promising. This species was studied in detail in a pot experiment. A large number of legumes and grasses were introduced during the year and were planted in small plots for observation.

3. *Pasture Analysis*

All these years, due to lack of facilities for chemical analysis all management studies of pasture and fodder grasses were restricted to the quantitative aspects only. With the setting up of a unit for nitrogen estimation during the year, qualitative studies of pastures and fodder grasses were undertaken.

4. *Subsidiary Food Crops*

Studies on Subsidiary food crops under coconut were continued during the year, with emphasis on ground nuts and sweet potatoes.

5. *Cattle*

Milk production during the year was satisfactory. The entire herd was tested for T.B. and Brucellosis during the year and found to be free from both diseases. 3 Jersey bull calves were bought from the Department of Agriculture to be used as stud bulls. There were 87 births in the herd during the year.

V. Crop Protection Division

A. *Pests*

1. *Coconut Caterpillar Nephantis serinopa Meyr*

The biological control programme was continued. The information available from the inception of the programme is being analysed and methods of interpreting results are being developed.

On the basis of the tentative results obtained, the release of parasites in affected estates have been modified. The parasites were bred in the insectaries in Lunuwila and Mylambavelly and released in affected estates.

Evaluation of parasite liberations were carried out on four estates in the Eastern Province, four estates in the North Western Province and one estate in the Western Province. In estates north of Batticaloa the pest population densities appear to be decreasing. The same pattern is found in the estates in the North Western, and Western Provinces. However, in some estates south of Batticaloa the densities of the host populations seem to be increasing. These patterns of fluctuations of the host population densities will be discussed at length in the Annual Report.

2. *Rhinoceros Beetle, Oryctes rhinoceros L.*

A large number of palms were uprooted during the cyclone of 1967 in the Chilaw and Puttalam districts. These have not been completely removed from the holdings. Consequently, this situation has led to an increase of Rhinoceros Beetle damage.

An ecological survey was begun to determine the population densities of the Rhinoceros beetle and the insect co-inhabitants, parasites and predators of the pest.

Platymerus levicollis, a predator of the Rhinoceros beetle was imported from W. Samoa and is being maintained in the laboratory. It is hoped to release this predator in selected areas in which the Rhinoceros beetle is prevalent.

Metarrhyzium anisopliae, causing a fungal disease was found to occur extensively in certain areas.

3. *Red Weevil Rhyncophorus ferrugineus F.*

An ecological survey of the Red Weevil was begun in the hope of assessing the population densities of its insect co-inhabitants.

Studies on the habits, morphology etc. are being carried out.

4. Other Pests

1. *Nettle Grub Parasa lepida Cram*

Sporadic outbreaks of Nettle Grub occurred in the Chilaw districts. Studies on the parasite-predator complex of the pest were started in collaboration with Mr. M. B. Wickramasinghe, Asst. Lecturer of the Department of Zoology, University of Ceylon, Colombo.

2. *Coconut Scale, Aspidiotus destructor*

The Coconut Scale population appeared to increase in the Chilaw district towards the end of the year.

B. **Diseases**

1. *Leaf Scorch*

Detailed studies on root growth of diseased and healthy palms were begun. With the help of the Soil Survey Unit a detailed soil survey of the Leaf Scorch affected area in the Southern Province is being carried out in order to determine the associations, if any between soil types and the incidence of the disease. Details of this work will be published elsewhere.

VI. Biometry

1. *Statistical Service.* Routine analyses of the experimental data of the Research Divisions of the Institute were carried out.

2. **Biometrical Studies**

(i) *Crop Forecasting.* Studies on the relationship between rainfall and crop variations were commenced during the year. The first study in the series using the crops and rainfall of Bandirippuwa Estate has yielded encouraging results.

(ii) *Calibration Trial.* The recordings of the calibration trial at Ratmalagara estate continued as per schecule.

3. *Agri-Meteorology.* The meteorological stations at Bandirippuwa estate, Ratmalagara estate and the Isolated Seed Garden were maintained satisfactorily.

VII. Advisory Division

1. *Advisory Visits*

(*a*) During the year 7,699 visits have been made by the Field staff to coconut lands for advice and demonstrations on planting, soil conservation, draining, manuring, cultivation, pests and diseases control and for inspections under the Fertilizer Subsidy Scheme.

(*b*) 18,323 holdings in all were visited in connection with general advisory work. 2,282 holdings were visited for advice and demonstrations in connection with pests and diseases.

(*c*) The field staff delivered 158 talks at 175 meetings attended in their ranges. The Divisions participated in three Agricultural exhibitions held in Mapalana, Kurunegala and Horana.

2. **Demonstration Centres**

All routine items of work were carried out at the Demonstration Centres at Pallai, Alampil, Mundel and Mylambavelly.

3. **Citronella Subsidy Scheme**

The main items of work for the year under this Scheme comprised inspection of lands for the payment of cash subsidy and the issue of free fertilizer. Fertilizer was distributed to applicants who had obtained their initial allocations during the planting seasons—October/November, 1960, May/June, 1961, Oct/Nov. 1961, May/June 1963 and Oct/Nov. 1963.

The particulars regarding fertilizer issues during the year were as follows:—

Number of applicants to whom permits were issued	3895
Number of applicants who took delivery of fertilizer	3757

Quantity of fertilizer issued—2335 tons, 3 cwts. 14 lbs.

4. Miscellaneous Work

(1) During the early part of the year, the field staff of the Division, under the guidance of the Biometrician, took part in the sample Survey of the coconut lands in the Chilaw district that were affected by the cyclone of October 1967.

(2) During December 1968, some of the Field officers were engaged in the distribution of seedlings to applicants in the cyclone affected areas of the Chilaw district. Actually, under this scheme 18,183 seedlings were delivered free of transport cost to 151 applicants.

VIII. Planting Division

1. *Seed-Nuts.* The Planting Division maintained 13 nurseries during the year. A total of 2,176,623 seednuts were planted for issue of seedlings in the May/June and October/November seasons. 601,919 seednuts were planted for issue of seedlings in May/June and 1,574,707 seednuts for October/November.

2. *Seedlings.* A total of 1,518,868 seedlings were booked for the two planting seasons as follows :—

	Number
May/June 1968	397,726
October/November 1968	1,121,142
Total ...	1,518,868

In addition to the above, 66,220 balance seedlings from the October/November 1967 season were also issued during the early part of the year.

IX. Publications Unit and Library

1. *Journals.* The following issues of the C.R.I. journals were published during the year :—

(*a*) *Ceylon Coconut Quarterly*

Vol. XVIII, No. 3/4.

Vol. XIX, Nos. 1/2, and 3. No. 4 was sent to the press.

(*b*) *Ceylon Coconut Planters' Review*

Vol. V, Nos. 2 and 3. No. 4 was sent to the press.

(*c*) *Pol Pawath* Vol. IV. No. 2.

2. *Advisory Leaflets.* Wherever necessary, the C.R.I. Leaflets were revised and/or reprinted in order to up-date the information and to maintain the stock position.

3. *Library Bulletin*

Four issues at quarterly intervals of the Library Bulletin, compiled (in mimeo. form) by the Library Assistant, were produced during the year.