ACTIVITIES OF THE COCONUT RESEARCH INSTITUTE DURING (1969)

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GENERAL

1. Dr. M. A. P. Manthriratne was appointed Head of the Division of Botany and Planting Breeding with effect from 22nd October on his return from U.K., after successfully completing his Ph.D., degree course in genetics at the Welsh Plant Breeding Station, Aberystwyth, Wales.

2. Mr. M. A. T. de Silva, Senior Technical Assistant, Soil Chemistry Division successfully completed his course of training at the Long Ashton Research Station, Bristol and resumed duties on 23rd June. He was awarded the M.Sc. degree of the University of London, and was promoted Research Assistant with effect from 1st January, 1970.

3. At the Request of the University authorities in Reading Mrs. N. Rajaratnam, Research Assistant on overseas training was granted an extension of study leave by the Coconut Research Board from September 1969 to January 1970 to complete her programme of studies.

4. 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, continued to be away throughout the year.

5. Dr. W. R. N. Nathanael, Director, attended the Inaugural Session of the Asian Coconut Community held in Colombo from 2nd to 8th September.

6. A Field Day (organised in collaboration with the Ceylon Milk Board), on the management and production of pasture under Coconut was held at Bandirippuwa Estate on 4th June, 1969.

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

I. SOIL CHEMISTRY DIVISION

A. FIELD EXPERIMENTS

1. The twelve long term field experiments at Bandirippuwa, Ratmalagara, Pothukulama, Bingiriya, Walahapitiya, Mawatte, Veyangoda, and Dodanduwa were maintained.

2. The observation trials on 'Leaf Scorch' at Elpitiya, nutrient deficiency in marine sands at Iranaville, and immature nutfall at Palugaswetiya were maintained.

3. Two field experiments were conducted in the programme of isotope studies on the efficiency of fertilizer utilization by coconut palms.

4. Field experimental results of interest are:—

(i) Highly significant responses were obtained for potasium in the Response Curve Experiments on Adult Palms at Bandirippuwa Estate.

(ii) Highly significant response to phosphorus was maintained in the (Manurial × Cultivation) Experiment, Ratmalagara Estate.

(iii) In the Observation Trial at Iranaville Estate—on quarterly application of fertilizer, the yield of nuts has increased between 241% to 500% of the pre-treatment yields.

(iv) Response to liming was just significant and significant (placement × fertilizer) interaction was obtained in the Placement and Liming Experiment at Walahapitiya.

(v) *Experiment on Nitrogen Quality* (*Mawatte*).

Urea was an efficient a source of nitrogen as ammonium sulphate on the lateritic gravel soil.

(vi) *Pothukukalama Experiment*

In manuring young palms, potassium and phosphorus have shown responses.

B. LABORATORY INVESTIGATIONS

Soil Analysis—Available phosphorus (Olsen's) was estimated on samples from the P32 experiments at Marandawila and Mawatte Estates. Total Exchangeable Bases, Exchangeable Ca, Mg and K were also estimated.

Leaf Analysis—Estimation of N, P, K, Ca & Mg in leaf samples from the field experiments at Marandawila (NPK, Mg) and Monrovia (NPK, Mg and B, Zn, S) estates.

P 32 *Experiment*—Determination of radioactivity, total phosphorus and potassium in leaf samples.

C. SOIL SURVEY

The regional soil survey of the coconut growing areas in the Eastern Province was continued.

Detailed soil survey of a selected area affected by the "Leaf Scorch" disease was commenced and is being continued.

At the request of Government, soil surveys, to determine suitability of land for the cultivation of coconut, in Moneragala, Jaffna and Puttalam districts were conducted.

Soil Surveys were also done at the request of superintendents or owners of tea and/or rubber estates.

II. DIVISION OF BOTANY AND PLANT BREEDING

1. Controlled Pollination Work

The production of high-yielding (Tall × Tall) and (Tall × Dwarf) seed material was continued at Bandirippuwa, Ratmalagara, Isolated Seed Garden, Marandawila, Achchitotam, Andigedera and Kiniyama Estates.

A total of 171,254 female flowers were pollinated consisting of 112,729 (Tall × Tall) crosses where the male parent is a 'prepotent' and 58,525 (Tall × Dwarf) crosses. Besides the above, systematic emasculation of selected palms within a 5 acre dwarf plantation at the Seed Garden, Ambakelle, produces (Dwarf × Tall) seednuts resulting from natural cross-pollination with the tall variety. 23,608 (Tall × Tall), 14,518 (Tall × Dwarf) and 10,152 (Dwarf × Tall) seednuts were harvested during the year. 60,000 seednuts have been laid in the Bandirippuwa Estate research nurseries.

Fifteen private estates have been assisted to carry out their own programmes of controlled pollination work.

The demand for hand pollinated seedlings continues to be heavy and this year 21,400 were issued. This consists of 9,931 (Tall × Tall), 1,905 (Tall × Dwarf) and 9,565 (Dwarf × Tall) Seedlings.

2. Mother palm seed supply

The Planting Division nurseries were supplied with 2,092,753 selected seednuts. Palm selection programmes were curtailed due to the effect of drought in most areas. Nevertheless, 1,900 additional mother palms were selected from Letchemy and Walahapitiya Estates. Nattandiya (Chilaw District).

3. Field Experiments

The field experiments and observation trials at Bandirippuwa (13), Ratmalagara (5), Walpita (1) and Pothukulama (9) were maintained throughout the year.

A new observation trial (6 acres) was planted at Bandirippuwa to compare the performance of (Tall × Dwarf) and (Dwarf × Tall) crosses of mixed parentage.

4. Coconut Seed Garden, Ambakelle

20,000 teak seedlings were planted in the Western isolation barrier recently freed of squatters. 50-75 acres remain for re-afforestation in 1970. Effects of drought have been particularly severe in Field No. 1.

III. CHEMISTRY DIVISION

1. Pot Culture Experiment

(i) The chemical examination of plant samples prepared from previous pot culture experiments was continued.

(ii) The first pot culture experiment (in a series to follow) involving 288 seedlings was laid down on 23rd October 1969, to study the pattern of *micro-nutrient* distribution in the various components of the seedling for eight treatments (+ALL, —ALL, —N, —P, —K, —Ca, —Mg and —TE).

(iii) Preliminary experiments were carried out to observe the germination rate and subsequent growth performance of a random selection of seednuts (from the estate heap) sand cultured in Mitscherlich vessels.

2. Germination Experiment

(i) The eighth and final stage of the germination experiment that has been in progress for some years was completed during the year.

(ii) A nursery experiment was laid down to study the relative germination rates and subsequent growth performances of seedlings raised from different size categories of seednuts of the *typica* variety.

3. Correlation Studies on Drupe Components of the Coconut

Studies were initiated during the year to determine possible correlation factors between the weight and other physical characteristics of the pericarp components of the drupe and its endosperm elements.

4. 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.

5. Coconut Varieties

Samples of copra prepared by the Division of Botany and Plant Breeding from varieties and forms of coconut grown in Ceylon were examined and reported on for oil content. This work is being continued.

IV. AGROSTOLOGY DIVISION

1. Soil Fertility Studies

During the year studies on the nutrient status of Attavillu soils were completed. All three soils types studies revealed acute deficiencies of N and K. While P was deficient only in the Kiulkelle and the Kallady components, it appeared to depress yields in the sandy soils from Madurankuliya. None of the minor nutrients tested was found to be deficient. The data are being studied in detail.

A soil type from the Kurunegala district at Mawathagama was sampled during the latter part of the year. Preliminary data indicate that the soil is deficient in N, P and K.

2. Pasture Studies

All long term experiments studying pasture—coconut competition and management studies of *B.miliiformis* under coconut were maintained during the year. In addition to these, the following experiments were commenced:—

(*a*) Response of Pangola grass to added levels of urea at different frequencies of cutting.

(*b*) Comparison of 13 pasture grasses for efficiency of Nitrogen recovery and persistence.

(*c*) Response of Pangola grass to different intensities of light and levels of added nitrogen.

(*d*) Response of *Setaria speculata* (variety Nandi) to different levels of applied nitrogen and heights of cutting.

(*e*) Methods of establishing a legume in an existing pasture of *B.miliiformis*.

(*f*) Effect of levels of nitrogen and frequencies of cutting on *B.miliiformis*.

In all the above experiments a quantitative study of the pasture harvested was made.

3. Cattle

The entire herd of cattle was immunised against Haemorrhagic Septicaemia during the year, after an outbreak of the disease resulting in the death of one bull calf. Milk production during the year was satisfactory.

V. CROP PROTECTION DIVISION

1. Breeding and release of parasites of the Coconut Caterpillar, *Nephantis serinopa* Meyr, were continued. Census data on the fluctuations of the population densities of the pest and parasites were recorded in four estates each, in the Eastern and North Western Provinces and in one estate in the Western Province.
2. Population studies on the Coconut Scale, *Aspidiotus destructor* Sign., and the Black (Rhinoceros) Beetle, *Oryctes rhinoceros* L. were in progress.
3. *Platymeris levicollis* a predator of the Black Beetle was reared in the laboratory.
4. A field experiment was initiated to test the effects of defoliation by pests on yields of coconut.
5. Field experiments were laid out to assess the efficiency of a trap designed to collect the Red Weevil, *Rhyncophorus ferrugineus* F.
6. Irradiation experiments on the Red Weevil were initiated.
7. A field trial was laid out to determine the effect of placing fungicides bags on palms as a prophylactic measure in the control of Bud Rot.
8. Investigations on the relationships between palms affected by Leaf Scorch and soil physical factors have given promising results. Significant relationships were obtained between Leaf Scorch decline and the depth at which the hard pan occurs in lateritic soils and the depth of the water table in "deniya soils". A field trial is being laid out to confirm these findings.

The information available suggests that Leaf Scorch may be a complex disorder of coconut caused by a veriety of factors.

VI. BIOMETRY

1. Statistical Work

(*a*) The statistical work for the Research Divisions were attended to.

(*b*) A good portion of the working time of the division during the year was spent on collecting statistics of fertilizer usage and making summary tabulations. The assignments that came in a series prevented any research work being done.

(*c*) Three village surveys, wherein the Advisory Division collected information on coconut cultivation were analysed and reports were prepared for circulation.

2. Research

(*a*) *Crop Forecasting Project*

Work on this project continued and attempts were made to generalise the approach to crop forecasting using rainfall data. But this work was drastically curtailed as the collection of fertilizer statistics and the analysis of surveys took up all the time available after attending to the essential routine duties of the division.

(*b*) *Calibration Trial*

The recordings of the calibration trial at Ratmalagara Estate were maintained as per schedule.

(*c*) *Agri-Meteorology*

The Meteorological stations at Bandirippuwa Estate, Ratmalagara Estate and Isolated Seed Garden were maintained satisfactorily.

3. General

(*a*) The Biometrician acted as Consultant Biometrician of the Rubber Research Institute of Ceylon from July 1969.

(*b*) The Biometrician organized a training class in coconut cultivation for the Investigators in the All Island Coconut Survey now being conducted by the Department of Census and Statistics.

VII. ADVISORY DIVISION

1. Advisory visits

(*a*) During the year 1,420 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 Fertilizer Subsidy Inspections.

(*b*) 15,286 holdings in all were visited in connection with general advisory work. 2,019 holdings were visited for advice and demonstrations in connection with pests and diseases.

(*c*) The field staff delivered 120 talks at 134 meetings attended in their ranges.

The Division participated in 2 National District Exhibitions held in Galle and Kegalle and 3 Agricultural Exhibitions held in Kandy, Matara and Marawila.

2. Demonstration Centres

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

3. Citronella Subsidy Scheme

The inspection of lands for the payment of cash subsidy and the issue of free fertilizer comprised the main items of work for the year under this Scheme. Fertilizer was distributed to applicants who had obtained their initial allocations of seedlings during the May/June and October/November 1962 planting seasons. The particulars regarding fertilizer issues during the year were as follows:—

Number of applicants to whom permits were issued	2,060
Number of applicants who took delivery of fertilizer	1,876

Amount of fertilizer distributed—514 tons, 6 cwt. 42 lbs.

4. Miscellaneous Work

(i) *Cyclone Relief*

Work in connection with the Cyclone Relief Scheme, which commenced in December 1968, was continued during 1969 with intermittent breaks. The Advisory Field Staff was deployed for the inspections and the issues of free seedlings and fertilizer under this Scheme. After the inspection, of 1,265 holdings, 78,072 seedlings and 270 tons 8 cwt. 04 lbs. of free fertilizer were issued. Whilst the cash subsidy of Re. 1/50 was paid only in respect of 15,835 seedlings, 60,570 seedlings issued under the scheme qualified for free fertilizer.

(ii) *Village Surveys*

The Field Staff of the Division was engaged in a detailed holding to holding survey of three villages (viz., Wennappuwa, Thoduwawa and Panirendawa) in the Chilaw District, that were affected by the Cyclone of 1967. These surveys were spread out over the period 17th April until 24th October 1969.

VIII. PLANTING DIVISION

1. Seed nuts

The Planting Division maintained 14 nurseries during the year. A total of 2,496,439 seednuts were planted for issue of seedlings in the May/June and October/November seasons. 550,775 seednuts were planted for issue of seedlings in May/June and 1,945,664 seed-nuts for October/November.

2. Seedlings

A total of 1,453,608 seedlings were booked for the two planting seasons as follows:—

	Number
May/June 1969	343,081
October/November 1969	1,110,527
	1,453,608

In addition to the above, 18,551 balance seedlings from the October/November 1968 season were also issued during the early part of the year.