THE INDIAN CENTRAL COCONUT COMMITTEE

SIXTEENTH ANNUAL REPORT

(1st April, 1960 to 31st March, 1961)

1962

PRINTED AT THE I.S. PRESS, ERNAKULAM.
A view of the 28th Meeting of the Indian Central Coconut Committee held at Rajaji Hall, Madras on the 21st January, 1961.

Seated sixth from the left is Shri. V. Shankar, I. C. S., President of the Committee. To his right is Dr. P. J. Gregory, M. A., Ph. D., F. L. S., Secretary of the Committee and to the right of the Secretary is Shri. K. P. Madhavan Nair, B. A., B. L., Vice-President of the Committee.
CONTENTS

PART I
Introduction, Committee's Constitution and Sub-Committees .......................... 1

PART II
CHAPTER I
RESEARCH
Central Coconut Research Station, Kasaragod ........................................... 2
Regional Coconut Research Stations ......................................................... 5
Central Coconut Research Station, Kayangulam ......................................... 6

CHAPTER II
DEVELOPMENT WORK
Supply of quality seedlings ................................................................. 8
Collection and supply of seednuts ........................................................ 9
Biological control of Nephantis serinopa ..................................................... 9
Extension work ......................................................................................... 9

CHAPTER III
STATE-WISE PROGRESS OF WORK
Kerala ........................................................................................................ 10
Mysore ..................................................................................................... 11
Madras ..................................................................................................... 11
Andhra Pradesh ...................................................................................... 11
Maharashtra ............................................................................................ 12
Gujarat ..................................................................................................... 12
Orissa ....................................................................................................... 12
West Bengal ............................................................................................ 12
Assam ....................................................................................................... 13
Andaman and Nicobar Islands ................................................................. 13
The Laccadives ......................................................................................... 13
Pondicherry ............................................................................................. 13

CHAPTER IV
Schemes under the II plan ......................................................................... 13
PART III
CHAPTER I
ECONOMIC AND MARKETING ACTIVITIES

Area and production statistics ... ... ... 17
Prices ... ... ... ... 18

CHAPTER II
BUDGET AND FINANCE

Part I Budget ... ... ... ... 23
Part II Budget ... ... ... ... ... 24

CHAPTER III
Results of practical utility that had emerged out of the schemes financed by the Committee ... ... ... 26

APPENDICES

Appendix I Revised statement of copra crushed, oil extracted and cake produced during the year 1959-60 ... 1
Appendix II Receipts and payments Account of the Indian Central Coconut Committee for the year ended 31st March, 1961 (Part I) ... iv
Do (Part II) ... xii
Appendix III Receipts and payments Account of the Indian Central Coconut Committee Provident Fund for the year ended 31st March, 1961 ... xvi
The Indian Central Coconut Committee was constituted in February, 1945 as a Statutory Body under the Indian Coconut Committee Act, 1944, for the development of the cultivation, marketing and utilisation of coconut in India. It derives its revenue from a cess levied on copra (indigenous or imported) crushed in power-operated mills. The Vice-President of the Indian Council of Agricultural Research is the President of this Committee.

Dr. M. S. Randhawa continued to be the President of the Committee till November 16, 1960. He was succeeded as President by Shri V. Shankar on 17th November, 1960.

Shri K. P. Madhavan Nair held the office of Vice-President during the year.

Dr. P. J. Gregory continued as Secretary of the Committee during the year. Dr. K. P. V. Menon was Director of the Central Coconut Research Station, Kayangulam. Dr. K. M. Pandalai, continued to be the Joint Director of the Central Coconut Research Station, Kasaragod.

The annual session of the Committee was held in Madras from the 17th to 21st January, 1961. Shri V. Shankar presided over a joint plenary session of both the Indian Central Coconut and the Areca nut Committees on January 21, 1961. Shri M. Bhaktavatsalam, Minister for Agriculture and Home, Government of Madras inaugurated the joint session.

Shri V. Shankar drew attention to the many common characteristics and problems of the two commodities and expressed the view that in the larger interests of the country there should not be any haste on the part of the State governments in imposing area ceilings of coconut and arecanut crops; and that, even though it might not be possible to exempt these
plantations fully, serious consideration should be given to concede a measure of freedom and liberty to the cultivators of these crops.

Shri M. Bhatavatsalam referred to the many activities in the State of Madras in the field of coconut and arecanut research and development, drawing special attention to the reclamation of the large areas of waste lands in Ramanathapuram and South Arcot Districts for planting coconuts.

PART II
CHAPTER 1
RESEARCH
CENTRAL COCONUT RESEARCH STATION, KASARAGOD

Botanical Aspects

The germination performance and seedling characters of seven exotic varieties, the vegetative and yield characters of adult palms of 21 exotic varieties and the growth characters of open pollinated progenies of a dozen exotic varieties introduced in 1955 were studied. Four (4) indigenous types and 219 seedlings of 15 world varieties, 10 varietal hybrids, 2 interspecific hybrids of Cocos nucifera x Cocos auriculata and 71 progenies of eight high yielders of the Station were planted for study of performance. The cytological study of seven Cocos species other than Cocos nucifera was in progress.

Thirteen thousand four hundred and seventy-six (13,476) female flowers from 543 inflorescences were pollinated for hybridisation work. Studies on yield characters of T x D hybrids and natural cross dwarfs were continued. Five inflorescences in a single tree were pollinated with pollen from seven different male parents for study of xenia and metaxenia.

A field trial to study the effect of pollen of 12 male parents of the West Coast Tall variety was laid out. From an intensive survey of the coconut tracts of Tiruchirapalli, North and South Arcot and Chingleput Districts of Madras State and Pondicherry, two local types known as "Surya Kanthi" and "Navus carumbar" were located. To induce haploidy in coconuts, irradiated pollen was used for pollination work and the nuts thus obtained were scored for planting. The development of the nut from the button to the mature stage and also developments leading to the abscission response revealed the presence of lignin.

An analytical relationship between maximum daily and minimum temperature and the yield of pollen was confirmed last year and spraying with horseradish per bunch in cold and sprayed but unopened conditions revealed the effect of temperature on the occurrence of pollen. Trials to induce rooting in suckers were made and studies between tree characters and their relatives showed that trees from 30 known lines existed among seedling girths at the age of 5 years.

Physiological and biochemical characteristics of the acids and allied substances involved in the metabolism of coconut oil were evaluated. The radioactive column chromatography of coconut oil was studied.

The recorded coconut palms and their progenies were haphazardly numbered and harvested where planted in the...
to concede a

t in the State of
development,
ares of waste
eating coconuts.

An analysis of the data over the past five years revealed a significant relationship between monthly coconut pollen catches and relative mean maximum daily temperature, difference between mean maximum and minimum temperature, humidity, mean total sunshine and rainfall. A study of pollen germination and longevity of pollen under different storage conditions in nine different nutrient media was initiated. Germination of pollen was highest in the ‘Tall’ and least in the ‘Dwarf’. Field trials have confirmed last year’s finding that trees which are manured while being sprayed with hormones showed an increase in yield of about two nuts per bunch in comparison with trees that were manured but not sprayed, and sprayed but not manured. The necessity of manuring trees in the event of their receiving hormone spraying was thus established once again. In a study of the effects of applying growth regulating substances for controlling the occurrence of barren nuts naphthalene acetic acid was found better than the other hormones tried. The effect of the application of common salt to the palms in reducing the incidence of barren nuts was also under study. Trials to induce meristematic activity in coconut stems leading to rooting and suckering through application of growth regulating substances alone and in combination with purines were continued. Correlation studies between annual yield of female parent, seednut, seedling and adult tree characters undertaken from data available on 212 seedlings obtained from 30 known female parent trees revealed that highly significant relationship existed between the average number of leaves per seedling and seedling girth at collar.

Physiological investigations were taken up to throw light on the bio-chemical constituents (which include proteins, nucleic acid, amino acids and allied nitrogenous compounds, sugars, organic acids and tannins) involved in the physiological processes of the coconut palm. The identification and evaluation was done using paper chromatographic techniques, column chromatography and agar and paper electrophoresis.

The recording of basic data on flowering and fruiting of about 6,000 coconut palms in the Station was continued. During 1960, 2,89,489 ripe nuts were harvested which marked an increase of 5.7 per cent, over the number harvested the previous year. Out of the 17,558 seed coconuts planted in the 1960 nursery, 90.2 per cent germinated. It was found that
three porous earthen pots filled with water and placed round a seedling on the surface sustained it during the summer period.

Observations in the N. P. K. fertiliser experiment were continued. There was early response by the trees to nitrogen and delayed response to potash application. The results have also revealed that phosphoric acid gives increased yields. The average increase in yield for nitrogen was 15.5 per cent, phosphoric acid 10.1 per cent, and potash 10.6 per cent.

In a comparative study of Chilean nitrate, ammonium sulphate and other nitrogen fertilisers, Chilean nitrate on the average appeared to be better than ammonium sulphate. This study has been discontinued. Ammonium sulphate nitrate and ammonium sulphate recorded 37.1 and 30.9 per cent increased yield over control. Green manuring had a favourable effect on all growth characteristics of seedlings raised in sandy soil. Among the nutrients, N & K showed some beneficial effect and phosphoric acid none. No adverse effect on yields due to the use of sea water was perceived. Observations were continued on Calopogonium mucunoides, Indigofera hirsuta, Gliricidia maculata and Aeschynomena americana. The pattern of growth exhibited was the same as in previous years. As with Gliricidia it was found that 35.8 per cent of the seedlings and 12.2 per cent of the rooted cuttings that were planted alone survived. There was no evidence of any beneficial effect of lime applied singly or in combination with manure on yield. Application of lime increased the pH particularly in the first foot layer. It also appeared to increase the calcium and available P, O, and K, O contents of the soil when compared to unlimed plots. Regular cultivation and manuring gave the highest yield of 58.3 nuts per tree in 1959 as against 38.9 nuts obtained under regular cultivation alone and 17.1 nuts under no cultivation and no manuring. A survey of 36 villages of Kasaragod Taluk had been completed at the beginning of the year covering an area of 2,620 acres. During the year 11 villages of Kasaragod Taluk and four of Hosdurg Taluk were surveyed covering an area of 7,560 acres. The coastal sandy soil was found to have the lowest nitrogen and organic matter status while the laterites and soils with finer texture contained the highest. The deep red sandy loam type of soil was intermediate.

It was observed that about 1 kg. of sulphur was required to treat 3,000 nuts to get satisfactory drying and preservation. The nuts thus treated produced good copra free from fungus even when the drying was completed over 10 days in occasional sunshine. Sulphured copra had lighter colour than the normal, did not contain any of the toxic constituents of the product. Good quality copra was available at a temperature of 60°C. and, however, by employing sulphur dioxide for eight hours and heating to 68°C., it was possible to reduce the total defects to less than 1%.

Storing for about six months did not affect its shelf life. The best quality was about 15 per cent of total production.

Coating with acid layers of thickness did not affect the quality of the product.

Scheme for promotion of coconut: Poona.

Regional Coconuts:

At Kunjikunnu, Kasaragod, 40,000 healthy and disease-free young trees were planted in 1951-52 and 1952-53. An effect was observed in 12 acres of Kasaragod Taluk.

Regional Coconuts:

Observation:

1959 adopting a scheme for promotion of healthy and disease-free young trees.

Regional Coconuts:

The layman in the experiment in...
lighter colour than the sun-dried copra and the oil pressed out of it did not contain any SO₂.

Good white copra was obtained by drying nuts at an air temperature of 60°C, above which the copra showed a tendency to char. However, by employing an initial higher temperature of 70°C, for the first eight hours and then completing the drying at 60°C, it was possible to reduce the total drying time considerably without affecting the quality of the product.

Storing in a dry godown retained the oil-cake undeteriorated for about six months. Storing the cake in alkathene lined bags improved its shelf life. The critical moisture percentage for prevention of mould was about 15 per cent.

Coating husked nuts with paraffin prevented rapid driage. Shell thickness did not influence driage to any appreciable extent, but the thickness of the paraffin coating appeared to prolong the period of safe storage.

Scheme for the investigation of 'Band' disease of coconut palm in Maharashtra; Poona. Chemical and microbiological analysis of soils from the healthy and diseased palms as well as chemical analysis of the leaves of the healthy and 'Band' effected palms were carried out.

Regional Coconut Research Stations at Kumarakom and Neyyattinkara (Keralo)

At Kumarakom, the residual effect of the various manurai treatments was watched. One hundred and fourteen seedlings of exotic varieties were planted for observation.

At Neyyattinkara, the manurai and cultural experiments started in 1951-52 and 1952-53 were discontinued during the year and their residual effect was under study. Proposals for conducting an inter-cropping experiment in 12 acres were formalated.

Regional Coconut Research Station, Ambajipetta (Andhra Pradesh)

Observations in a comprehensive manurai trial laid out in October 1959 adopting a factorial design were continued.

Regional Coconut Research Station, Veppankulam (Madras)

The layout of the Station was completed. The spacing-cum-manurai experiment initiated during 1959-60 was finalised.
Regional Coconut Research Station, Arskere (Mysore)

Trials were undertaken regarding (1) manuring seedlings in a second nursery (2) spacing and manuring of seedlings in the permanent plantation and (3) age of seedlings cum depth of planting.

Regional Coconut Research Station, Ratnagiri (Maharashtra)

Cultural trials consisting of eight different treatments were continued. In a 16-acre plot, seedling manuring trials were initiated.

Regional Coconut Research Station, Kahikuchi (Assam)

The manurial and cultural experiments to find out the manurial and cultural practices most suited to Assam conditions were continued.

Central Coconut Research Station, Kayangulam

Studies on the root exudation of healthy and diseased palms and the condition of palms fed with root sap collected from healthy and diseased palms, investigations on the physiology of the nutrition of the coconut palm comprising studies on nutrient exhaust, deficiency symptoms, absorption, accumulation and translocation of food and the effect of feeding nutrients, curatives, hormones etc. were carried out.

A detailed soil survey was conducted in four villages of Mavelikkara and Karunagappally Taluks of Travancore-Cochin area covering a total area of 17,500 acres. Thirty-four soil samples and 15 leaf samples were collected during the survey. Studies on the titanium content of soils and leaf samples in relation to disease indicated higher titanium content in healthy than in the diseased.

It was confirmed that H. halodes, Gloeosporium and Gliocladium roseum were associated with leaf rot disease, the most virulent being H. halodes. Infection trials showed that the intensity of infection was related to atmospheric humidity. Infection trials with H. halodes showed that none among the varieties Cochin China, F. M. S. Big, Andaman Ordinary, Laccadive Dwarf, Laccadive Micro, Kappadam and Philippines appeared to be resistant to fungal infection. Experiments to study the residual effect of fungicides on H. halodes were started.

The viability of pollen grains from healthy and palms affected by root (wilt) disease was studied. Examination of the roots of a set of 12 healthy and 12 diseased palms was continued to study the frequency of occurrence of R. Solani and R. t and subjected to virus factors on fungal of roots from hea and 90 root samp and actinomyces samples collected base of healthy p element of tend (wilt) disease we

The rhino its infestation., Insecticidal tre Prophylactic leaf efficacy of differ dators were con grubs were in pr

Observati pillar showed th by Chalcids and the year were Br parasitise the pu

Field con cone E. 2/20. S of mites and t identificatio an

Only int coneophora) cou to controlled cc

Life histo etc. were mad recorded. Suc common visitor ment started fo the control of t
occurrence of *Rizoctonia solani*. Infection trials were conducted with *R. Solani* and *R. bataticola* on healthy roots of a few palms previously subjected to virus transmission for a study of the effect of pre-disposing factors on fungal infection. Determination of the carbohydrate contents of roots from healthy and diseased palms was in progress. Ninety soil and 90 root samples were studied for the population of fungi, bacteria and actinomycetes. The micro-biological activity was lesser in soil samples collected from the base of diseased palms than from those at the base of healthy palms. Histopathogenic studies relating to the conducting element of tender leaves of healthy palms and palms affected by root (wilt) disease were completed.

The rhinoceros beetle pest was seen to occur throughout the year, its infestation, however, being greater during the monsoon periods. Insecticidal treatments continued to be effective in controlling the pest. Prophylactic leaf axil filling experiments were laid out to compare the efficacy of different insecticides. Studies on exotic parasites and predators were continued. Studies on a micro-organism causing disease in grubs were in progress.

Observations recorded on field parasitisation of leaf-eating caterpillar showed that 11.1 to 43.0 per cent. of the pupae were parasitised by Chalcids and Eulophids. Larval parasites of the pest recorded during the year were Braconids and Elasmids. *Approstocetus israeli* continued to parasitise the pupae of the pest effectively.

Field control of the red palm weevil pest was effected with Pyrocone E. 2/20. Search for parasites and predators showed the association of mites and thrips with the weevil and pupae respectively. Their identification and economic importance were under study.

Only interrupted studies on the root-eating grub (*Leucopholi coneophora*) could be carried out owing to the susceptibility of the larvae to controlled conditions.

Life history studies of *Parasa lepida*, *Gangara thyrsis*, *Susstus gremius* etc. were made. Observations on the populations of *S. Typicus* were recorded. Studies on the flight range of honey bee, *Apis indica*, the most common visitor of the coconut inflorescence was made. The field experiment started for the control of coccids was concluded. Experiments for the control of termites was in progress.
CHAPTER II
DEVELOPMENT WORK

Supply of quality seedlings

Twenty-eight coconut nurseries functioned in the various States with grant-in-aid from the Committee and with a total annual production target of 4,42,000 seedlings. The distribution of the nurseries among the various coconut-growing States, their annual production targets and the numbers of seedlings actually distributed are given below:

<table>
<thead>
<tr>
<th>Name of State</th>
<th>No. of Nurseries</th>
<th>Annual production target</th>
<th>No. of seedlings supplied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kerala</td>
<td>20 (including 11 nurseries in N. E. S. Blocks)</td>
<td>2,42,000</td>
<td>2,26,742</td>
</tr>
<tr>
<td>Andhra Pradesh</td>
<td>3</td>
<td>1,05,000</td>
<td>80,663</td>
</tr>
<tr>
<td>Orissa</td>
<td>3</td>
<td>67,000</td>
<td>12,957</td>
</tr>
<tr>
<td>West Bengal</td>
<td>3</td>
<td>28,000</td>
<td>25,844</td>
</tr>
</tbody>
</table>

In addition to the nurseries mentioned above, 65 nurseries receiving financial aid from the Central Government were functioning in the various States and centrally administered areas. The State-wise distribution of the nurseries, their production targets and the number of seedlings supplied from them are given below:

<table>
<thead>
<tr>
<th>State</th>
<th>No. of nurseries</th>
<th>Target for 1959</th>
<th>Target for 1960</th>
<th>No. of seedlings distributed in 1960-61 from 1959 nursery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kerala</td>
<td>4</td>
<td>56,000</td>
<td>72,000</td>
<td>50,833</td>
</tr>
<tr>
<td>Mysore</td>
<td>7</td>
<td>90,000</td>
<td>90,000</td>
<td>81,793</td>
</tr>
<tr>
<td>Madras</td>
<td>10</td>
<td>1,26,000</td>
<td>2,47,500</td>
<td>1,60,120</td>
</tr>
<tr>
<td>Andhara Pradesh</td>
<td>5</td>
<td>1,50,000</td>
<td>1,50,000</td>
<td>1,18,590</td>
</tr>
<tr>
<td>Orissa</td>
<td>2</td>
<td>8,000</td>
<td>31,000</td>
<td>8,112</td>
</tr>
<tr>
<td>West Bengal</td>
<td>1</td>
<td>15,000</td>
<td>18,000</td>
<td>18,037</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>2</td>
<td>15,000</td>
<td>15,000</td>
<td>11,122</td>
</tr>
<tr>
<td>Gujarat</td>
<td>3</td>
<td>10,000</td>
<td>10,000</td>
<td>11,122</td>
</tr>
<tr>
<td>Pondicherry</td>
<td>2</td>
<td>9,000</td>
<td>9,000</td>
<td>4,536</td>
</tr>
<tr>
<td>Assam</td>
<td>13</td>
<td>65,000</td>
<td>65,000</td>
<td>60,493</td>
</tr>
<tr>
<td>Laccadives</td>
<td>9</td>
<td>14,250</td>
<td>14,250</td>
<td>(Information not available)</td>
</tr>
<tr>
<td>Andamans</td>
<td>7</td>
<td>26,400</td>
<td>26,400</td>
<td>13,557</td>
</tr>
</tbody>
</table>

- Collection and Biological control

- The scheme of the State 1,64,288 seednuts

- Extension work.

- The collection and Biological control of the State.

- The scheme of the State 1,64,288 seednuts

- The Committee for Kottayam, Quilor, Mangalore in Mysore, Colombo, Udaipur and Ratnagiri.

- Nine postcards.

- Main diseases and their control.

- The monograph in English was also published.

- The Colonial Bulletin in English was continued to be published.

- The quarterly bulletin in English was also published.

- Fairs and Exhibitions.

- The Comiitee during the year.

- The Central Khadi and
Collection and supply of seednuts

The scheme to procure and supply seed coconuts to the Governments of the States of Assam, West Bengal and Tripura was continued and 1,64,288 seednuts were supplied.

Biological control of N. sericea

The Committee continued to give grant-in-aid to the Kerala Government for running 5 parasite breeding stations at Kasaragod, Vytilla, Kottayam, Quilon and Trivandrum. One Station at Kozhikode, one at Mangalore in Mysore and 5 in Madras located in Nagercoil, Gudiyattam, Coimbatore, Udangudi and Paatuakkottai, two in Maharashtra at Alibag and Ratnagiri and two in Andhra Pradesh at Razole and Ambajipetta were also functioning.

Extension work

Publications

The monthlies, "Coconut Bulletin" in English, the "Nalikera Bulletin" in Malayalam and the "Thengina Bulletin" in Kannada continued to be issued. The August issues were brought out as attractive Independence Day Numbers with additional pages.

The quarterly scientific publication "The Indian Coconut Journal" in English was also continued to be published.

Nine posters in colours, four on the major pests and five on the main diseases were brought out in the regional languages. Seven pamphlets in English and six in Malayalam were also published.

The printing of a cheaper edition of "The Coconut Palm — A Monograph" was completed. A third revised Malayalam edition of the popular handbook on "Coconut Cultivation" was brought out.

Fairs and Exhibitions

The Committee participated in the following fairs and exhibitions during the year under report:-

Sree Chithira Agricultural and Industrial Exhibition at Haripad.
Khadi and Village Industries Exhibition at Trichur.
Khadi and Village Industries Exhibition at Nanthiyattukunnam, North Parur.

The First National Agricultural Fair held at Calcutta.

The Akhil Karnatak Exhibition held at Karkal, (South Kanara).

The Committee and National Extension Service.

Intensive coconut cultivation was undertaken in a few extension blocks in Kerala, Mysore, Madras, Andhra Pradesh, Orissa, Gujarat, West Bengal and Maharashatra States.

The Committee's note on "Coconut cultivation" was translated into the Bengali and Marathi languages by the Governments concerned and distributed among their coconut growers.

Eight thousand and thirty-two (8,032) seed coconuts were procured and supplied to the Block Development Officer, Ambalapuzha. Gramsevaks, students from Agricultural Institutions and N. E. S. personnel visited the Committee's Research Stations. Training in the different aspects of coconut cultivation and pests and disease control was given to coconut growers. Two batches of Gramsevaks, one from the Kolipuram N. E. S. Block and the other from the Extension Training Centre, Kottarakara, batches of students from the agricultural institutions at East Kallada, Ollukkara and Nagpur and Agricultural Officers from the States of Maharashtra and Andhra Pradesh were trained in the different aspects of coconut cultivation, manuring and control of pests and diseases.

CHAPTER III
State-wise progress of work
Kerala

At the Regional Coconut Research Stations at Kumarakom and Neyyattinkara, cultural and manurial trials were in progress. The number of seedlings distributed was 2,77,575. A total of 65,43,224 parasites to control Nephantis serinopa were liberated. Two hundred and thirty-four (234) demonstration plots, distributed over 39 taluks in the nine districts of Kerala State were in operation. The first round of the statistical survey for correct estimation of coconut area and yield was completed. The enquiry into the cost of cultivation of coconuts in Kerala was in progress.