

research in progress

Coconut Research Institute

Coconut research in Sri Lanka was institutionalised with the initiation in 1929 of the "Coconut Research Scheme". With the expansion of its activities, its status was raised to that of a "Coconut Research Institute" in 1951. The Coconut Development Act of 1971 created the Coconut Development Authority to co-ordinate the functioning of the four constituent Boards of which the Coconut Research Board is one. The Ministry of Plantation Industry exercises general control over all major plantation crops and their associated Institutions.

Research activities are funded by a Government grant generally administered by the Coconut Development Authority through the Coconut Research Board.

The Board consists of seven members all of whom are nominated by the Minister of Plantation Industry.

The Coconut Research Institute has its head quarters, at Bandirippuwa Estate, Lunuwila and maintains three sub-stations, four commercial estates and fifteen nurseries.

Research activities are currently concentrated upon the agronomic aspects of production and protection of the crop with only limited laboratory scale investigations on the technology and chemistry of coconut products. It is proposed to considerably expand these latter activities in the future. The Institute is also responsible for the provision of quality coconut seedlings to the industry. Assistance is provided to the Coconut Cultivation Board, in fulfilling its responsibility of providing advisory and extension services. Administration, Estate Management and Publication and Publicity Units function as support services.

The activities of the Coconut Research Institute are conducted by eight Divisions or Units, the main areas of responsibility are as indicated below:-

- (1) **Agrostology:- Development of pastures as inter-crop with coconut.**
 - (a) Soil nutrient status—principally by use of "indicator plants"
 - (b) Nitrogen fixation by legumes.
 - (c) Agronomy and arrangement of pastures and fodder grasses
 - (d) Weeds of coconut land
 - (e) The microclimate within the "coconut square."
- (2) **Biometry:- Statistical service and crop statistics**
 - (a) Analysis of experimental data from other Divisions
- (b) Copra conversion studies
- (c) Effects of irrigation and the study of "immature nutfall"
- (d) Bunch-thinning of coconuts.
- (3) **Botany:- Breeding and Genetics—Physiology.**
 - (a) Selection of mother palms and provision of selected seednuts to the nurseries.
 - (b) The evaluation of selections and crosses in field trials.
 - (c) The study of dwarf x tall and other hybrids and the establishment of Hybrid Seed Gardens.
 - (d) Physiological studies of the coconut palm.
 - (e) Preliminary attempts at "tissue culture" of coconut.
- (4) **Chemistry:- Plant tissue analysis. Sap products**
 - (a) Internal and external factors influencing variation of leaf nutrient contents.
 - (b) Nutrient recovery from applied fertilizers
 - (c) Sap yield from tapped inflorescences.
 - (d) Production of sugar, treacle and jaggery from sweet toddy.
 - (e) Regulation of fermentation and utilization of yeast.
 - (f) Products of alcoholic and acetic fermentation.
 - (g) Beverages based on sweet toddy.
- (5) **Crop Protection:- Control of pests, diseases and weeds of coconut**
 - (a) Surveillance and successful biological control of the leaf-miner (*Premecotheca cuningii*).
 - (b) Breeding and release of biological control agents of the coconut leaf scale (*Aspidiotus destructor*) and the leaf-eating caterpillar (*Neophantis serinopa*).
 - (c) Chemical control of the red-weevil (*Rhynchophorus ferrugineus*), black beetle (*Oryctes rhinoceros*) and stem-borer (*Xyleborus similis*).
 - (d) Control of fungal diseases—bud rot (*Phytophthora palmivora*).
 - (e) Biological control of the weed *Eupatorium odoratum* by the agents *Ammalo insulata* and *Apion brunneorignous*.
 - (f) Study of Leaf Scorch Decline.
 - (g) Maintenance of insectaries at Lunuwila, Colombo and Mylambavelly.
- (6) **Intercropping:- Associate crops other than pasture and including livestock.**
 - (a) Trials on economic evaluation of intercropping in the different ecological regions.

- (b) Study of crops of special interest as intercrops—manioc, passion fruit, cocoa, castor, banana, aroid yams etc.
- (c) Breeding and management of dairy animals.
- (7) **Planting:- Maintenance of nurseries.**
 - (a) Provision of quality seedlings to the industry.
- (8) **Soils—Fertilizer practices: Soil Surveys.**
 - (a) Fertilizer trials on major and minor nutrients.
 - (b) Comparison of different forms and types of fertilizer.
- (c) Analysis of leaf and soil samples for inorganic nutrients
- (d) Soil moisture studies.
- (e) Nutrient uptake using isotopic tracers.
- (f) Soil Surveys, production and interpretation of soil maps.

The Toddy Tappers Training Scheme at Bandirippuwa Estate will come within the Administrative Control of the Coconut Research Board. The Staff of the Institute continue to function in Advisory and other assisting roles to several Institutions and organizations.

Tea Research Institute

PRESENT ACTIVITIES OF THE TRI

Instant Tea Project: Research on the production of instant tea was initiated in 1967 and there are, at present, three processes patented by the T.R.I. for instant tea production. In all these processes the starting material may be fermented leaf or black tea, and in one of them the product is soluble in hot water, whilst in the other two the product is soluble in either hot or cold water.

Miscellaneous Research Activities: Root exudates of tea plant were found to contain an organic acid (identified as malic acid) which mobilises phosphate in the soil and makes this nutrient available to the plant. The mechanism of action of this organic acid was elucidated.

Roundup (Glyphosate) was found to provide a means of controlling the growth of obnoxious weeds (including cootch grass) which occur in tea fields.

The sand culture technique for investigation of nutrient uptake by tea plants was perfected. Studies were made of the uptake of nitrogen by the tea plant and mixture of ammonium nitrogen and nitrate nitrogen was found to be more beneficial for growth than either of these two forms of nitrogen applied individually. Conversion of ammonium nitrogen to nitrate nitrogen occurs in the soil through the activity of soil micro-organisms.

Soil rehabilitation was found to increase tea yields, and sugar cane was identified as a suitable and profitable rehabilitation crop.

Dimbula disease of tea was found to be the result of restriction to the flow of nutrients through the tea bush. This restriction occurred in the collar region of the bush, and could be eliminated only by the drastic measure of pruning the bush at soil level.

The effect of plant growth regulators on the development of nursery and field plants was investigated.

A number of new clones, some obtained by selection and others by clonal crossing, were developed and tested. Among these, a few show promise of becoming very useful for future replanting.

The basis was determined for the differing susceptibility of tea clones to infestation by the shot-hole Borer beetle, and the reason found for the rapid proliferation of the beetle at specific times after pruning.

The mechanism was unravelled of the effect of climatic conditions on the development of tea flavour.

The Fluid Bed Dryer was made available commercially, and its fabrication covered by international patents.

Investigation of root enzymes, responsible for the biosynthesis of theanine, is in progress.

Use of antitranspirants in tea, soil-plant water relations and phosphate nutrition in tea is in progress.

Multidisciplinary projects on the following subjects have been initiated:-

- (a) Identification of parameters for the selection of clones.
- (b) Shade trees for tea,
- (c) Soil fertility,
- (d) Pruning,
- (e) Causes for decline of yield,
- (f) Dissemination of information,