PROGRESS WITH RESEARCH ON TEA IN UVA

L. M. de W. Tillekeratne

Early History (*1931–1955*)

The activities of the Tea Research Institute of Ceylon in the Uva Province were enhanced by the establishment of a station at Passara, situated on Gonakelle Estate in the thirties. The station then consisted of a small estate bungalow and two Nissen huts, which served the purpose of a laboratory and insectory. The staff consisted of the Assistant Entomologist (Mr G. D. Austin) as Officer-in-charge and two laboratory assistants.

Research originally undertaken was mainly entomological because nettle grubs were the cause of much concern to the planting community of Uva, and this group was, therefore, the first problem to be investigated. The results of these investigations were published in *The Tea Quarterly* of 1931 and 1932.

By 1933, activities were extended to cover agricultural problems, when two fertilizer experiments were initiated by Dr T. Eden on Gonakelle Estate. By 1935 the station was equipped with a new laboratory and insectory ; a new bungalow was erected for the Officer-in-charge, and a private bungalow rented for the chief assistant. The entomological research covered by the officers on this station were extended to include the Shot-hole Borer.

Nettle Grubs

Investigations with Nettle Grubs included the bionomics of the species concerned, their parasites and predators, and a search for an effective spray that would be both economical and safe for application on tea. Nine species of Nettle Grubs were recorded, the chief species responsible for most outbreaks was the Fringed Nettle Grub then called *Natada nararia* and now known as *Macroplectra nararia.* The Saddle-backed Nettle Grub, *Thosea cervius* was next in importance. Early control measures adopted were hand-picking of larvae and the collection and destruction of cocoons, when outbreaks were confined to small areas. Conservation of the indigenous parasite, by leaving parasitized Nettle Grubs was introduced as an additional control measure. Collecting podians were trained to leave behind parasitized grubs, which were bright yellow in colour and very conspicuous on tea.

An ecological study of the pest, adopted in the island for the first time, helped in extending our knowledge of the minute parasites known as *Euplectrini.* The early disappearance of Nettle Grubs were also attributed to ' wilt disease '. From this ecological survey, however, it was found that the disappearance was caused mainly by a minute Hymenopterous parasite known as *Euplectrini.* Trials with a spray of semi-purified solution of ' wilt disease ' gave encouraging results, and indicated the possibility of starting an artificial epidemic of 'wilt disease' during the early stages of an outbreak of the Fringed Nettle Grub.

Biological methods of control were extended by an attempt to introduce parasites from abroad. A consignment of a fly parasite was received from America in 1932 and liberated in a field infested with the Saddle-backed Nettle Grub. This experiment was not successful.

On the chemical control side, several insecticides available in the early thirties for the control of caterpillar pests in general were tried, and soap solutions were found to be most effective. The popularity of this method can be appreciated when it was observed that estates at certain times had about three dozen sprayers working on a single occasion. This was perhaps the first time in the history of the Industry that so many spraying machines were utilized for the control of a pest.

Shot-hole Borer

Systematic work on the Shot-hole Borer (*Xyleborous fornicatus*) was undertaken by the Institute in 1935, when Austin and Fonseka* were assigned to study the pest at Passara. Results of their findings and the considerable amount of data collected were analysed by Dr Gadd and published in a series of articles in *The Tea Quarterly.*

Early achievements were the elucidation of the life history of the pest under field conditions, and it was recorded for the first time that attack from Shot-hole Borer was not of economic importance during the first year from pruning.

Attempts were made to introduce biological control measures by the importation of parasites from abroad. In 1938, Austin visited the United Kingdom, to discuss this aspect of the problem with fellow workers in the same field. They were of the opinion that there were possibilities of biological control by importing parasites from abroad. A small consignment of a Hymenopterous parasite was tried in 1935, but the results were disappointing. The war intervened and this aspect of the investigation was dropped.

Chemical control methods by the use of a ' paint ' for application on frames at pruning was tried by Speyer (1914–1919) of the Department of Agriculture. This turned out to be expensive to prepare, and uneconomical to apply. By 1939 the Institute commenced to give this aspect serious consideration. Several new formulations in the market were tested at Passara. Gammexane and DDT were tried, the former proving more effective. Later dieldrin was tried extensively by Austin who found it most satisfactory. Unfortunately its lethal effects on the imported parasite of the Tea Tortrix *Macrocentrus homonae* followed by Tortrix, Twig and Looper Caterpillars are still fresh in our memory.

Other activities

Reference has already been made to the two fertilizer experiments of Dr Eden in 1943. In 1934 assistance was extended to the Plant Physiologist when a survey was made and data collected on die-back in relation to shot-hole borer attack. The same year an experiment was carried out for the Technologist to investigate any possible taint in the manufactured teas by the use of sulphur for the control of *Oidium* leaf disease.

1946 saw the arrival of Blister Blight, when a considerable amount of assistance was rendered to the Plant Pathology Division. Spray operations were supervised and much data collected relating to the incidence of the blight under Uva conditions.

---

*Mr G. D. Austin was seconded from the Department of Agriculture to work for the TRI, and later became the officer-in-charge of the substation. Mr W. T. Fonseka, now Assistant Tea Controller was also closely associated with the activities of the Uva Station.

By 1947 a series of demonstrations for the planters of Uva was almost a feature of the Gonakelle Station. With the return of Assistant Superintendents to normal duties on estates, demonstrations and exhibitions of specimens accompanied by talks, helped to refresh the minds of planters called to active service, while new recruits were introduced to entomological problems and the new technique of vegetative propagation.

In 1955, with the transfer of the entomological staff to other stations and the need for an area for clonal testing, the Gonakelle substation took on a new function.

Recent Past (*1955–1963*)

In 1955 the function of the Gonakelle Substation was entirely changed. The Institute at this time was concentrating on the selection and testing of clonal material under different climatic conditions, and the substation was utilized for the planting of test rows of different clones. A Vegetative Propagation Officer was installed as Officer-in-Charge with trained assistant staff. In 1957 the first planting of clonal test rows was done with sixty seven clones from both TRI and estate selections, followed by a further twenty clones in 1958 and fifteen clones in 1959 on a two acre area. In 1959 a further one acre was planted with three TRI clones at different spacings.

In 1960 it was strongly felt that testing clones in rows was not satisfactory, and that for statistical purposes, replicated blocks were more desirable. From 1961, therefore, all clonal testing was done in replicated blocks, using a coloured clone to demarkate the individual plots. A further treatment of shade *vs* no shade was introduced in 1961. From 1961 to 1964 clonal blocks were planted ; each clone being replicated four times, two replicates with *Gliricidia* shade, and two without shade. In 1961, 30 clones were planted, followed by 16 in 1962, 14 in 1963 and 12 in 1964.

As each clonal area came into plucking, yield records of individual plots were maintained. In addition, experimental work in connection with nursery techniques like use of bags of different size, different shade levels, soils *etc* were conducted on the station.

Present Activities

The volume of advisory correspondence and visits had increased considerably towards the latter part of the fifties, and the research divisions found it difficult to cope with both research and advisory problems. In 1959 the Institute added an Advisory Division to deal with all advisory matters. Until 1963, advisory problems in all the tea growing areas were dealt with directly from St Coombs. It was decided at this time that decentralization of the advisory service with advisory officers stationed in different districts had definite advantages. These officers would be far more familiar with local conditions, and have a more intimate knowledge of each individual estate in the district. In addition district officers would be in a position to bring to the research officers the problems in their respective districts, while at the same time being in a better position to interpret and modify the general recommendations from research findings to suit district conditions. The first step in this decentralization programme was the transfer of an officer to the substation at Gonakelle in the latter part of 1963, as officer-in-charge of the substation and advisory officer for the Uva District. To accommodate this new officer, a house was constructed on the Substation in 1963.

With this decentralization, the extension activities of the Institute in Uva increased rapidly, and following the good results obtained, advisory staff were later stationed in other planting districts as well. The functions of the advisory officer are summarized below.

Advisory Service

All advisory problems connected with pruning, fertilizer application, plucking, shade and the identification of pests and diseases were dealt with at district level. If any difficulties were encountered, expert officers from St Coombs were called in for specialized advice. Facilities for the analysis of soil samples for pH and texture were made available at the station.

Extension Service

To disseminate the vast amount of knowledge and experience on vegetative propagation in the district itself, symposia were held at subdistrict level. A new technique of questioning and answering panels comprising senior planters was introduced, and the results obtained were encouraging. An educational programme to explain the scientific principles behind the different operations in tea cultivation for Assistant Superintendents were organized at subdistrict level in conjunction with the Planters' Association. The attendance at these discussions and the interest shown was most gratifying.

Field Experiments

In addition to extension activities, field experiments in connexion with current problems in conjunction with research staff have been undertaken both at the Uva Station and on estates. These experiments are laid down and supervised by advisory staff, and the results are made use of in giving advice. The district staff co-operate with specialist officers in their experiments in the district, and help them to find suitable estates for field experiments in the district, and carry out experimental operations.

Extension Experiments

In 1965 the Institute decided to launch a programme of extension experiments on selected estates in each district. These experiments were to be supervised by estate staff in co-operation with officers of the Institute. In Uva a number of experiments were started on the problems of shade and fertilizer use on estates covering a cross section of the soil and climatic conditions found in Uva. The response by estates to this scheme was most encouraging.

In 1966 a technology unit was added to the Gonakelle Substation as it was felt that test manufacture of clones and also leaf from experiments was best done under local conditions. A building to house this unit was constructed in 1966 and test manufacture was started the same year.

The Agratenne Substation

The soil and climatic conditions of the Uva Province can be localized, and extreme conditions are encountered. It was felt for a long time by the planting community in Uva that conditions prevailing on the substation at Gonakelle were

more favourable than conditions on most estates in Uva. For this reason, results obtained on this substation may not be universally applicable to other estates in the district. Further, the land area available for experimental work had already been utilized for clonal testing. It was, therefore, decided to find a land area more typical of Uva conditions, and bordering on the less favourable extreme conditions. For this purpose the Planters' Association appointed a committee in 1964 to select a suitable area of land for a new substation. This committee inspected a number of areas and finally decided that a certain section of land situated on Agratenne Division of Ury Group, Passara, was ideally suited for the purpose. The Principals, George Steuart & Co. Ltd. were quite willing to let the Institute have this land and negotiations for the transfer were opened. Meanwhile, rather than delay the progress of the programme, with permission from the management, the Institute has already uprooted twenty acres for replanting and a building programme has been envisaged for 1967. The area to be purchased consists of 120 acres of tea land, and approximately 180 acres of scrub patna land. It is proposed to uproot twenty acres a year of old tea for replanting, and in 1967 to plant five acres of the scrub land with 30 different clones for purposes of multiplication, and also for testing their performance. Our grateful thanks are due to the Manager and Staff of Ury Group for their co-operation in getting this project underway.