THE
RUBBER RESEARCH INSTITUTE OF SRI LANKA

ANNUAL REVIEW FOR 1974

CONTENTS

THE RUBBER RESEARCH INSTITUTE OF SRI LANKA

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(As at 31st December, 1974)

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Mr. M. W. Thompson
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Mr. Salie M. Dias
Mr. S. de S. Daluwatte (up to June, 1974)

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Dr. O. S. Peries
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Secretary to the Board

Mr. M. N. J. Jayaratne, B. A. Hons. (Cey.), A.M.B.I.M. (Lond.)

Lawyers

F. J. & G. de Saram, Proctors
P. O. Box 212, Colombo.

Auditors

Wickremasinghe & Co.
Chartered Accountants,
Mackinon Building,
York Street, Colombo 1.

Bankers

Bank of Ceylon
York Street, Colombo 1.

People's Bank, Matugama

Registered Office and Laboratories

Dartonfield, Agalawatta.

Colombo Office

Consisting of the:

Advisory Services Department & Economic Research Unit, Rubber Chemistry Department, Specifications Laboratory and Board Office

74, Telawala Road,
Ratmalana,
Mt. Lavinia.

THE RUBBER RESEARCH INSTITUTE OF SRI LÁNKA

STAFF

(As at 31st December, 1974)

Director ... O. S. Perics, B.Ag.Sci. (Melb.) Ph.D. (Bristol), M.I.Biol.

RESEARCH DEPARTMENTS

Botany

Head of Department ... L. B. Chandrasekera, B.Sc. (Cey.), Dip.Ag.Sci. (Cantab.)

Botanists ... R. Satchuthananthavale, B.Sc. (Madras), M. A. (Madras), Ph.D.(Sheffield)

Mrs. A. C. I. Samaranayake, B.Sc. (Cey.), Ph.D. (Lond.)

Assistant Botanist ... U. P. de S. Waidyanatha, B.Sc. (Cey.), M.Sc. (Cey.), Ph.D. (Lond.), D.I.C.

Senior Technical Assistant ... W. G. V. Fernando

Technical Assistants ... I. Amarasinghe
J. G. de Mel
L. S. S. Pathiratne, L. I. Biol.
M. A. Tilakasiri

Field Assistants ... D. A. Brahamana
D. R. Colonne
R. B. Gunaratne
S. Kodikara
W. A. T. Silva
U. K. D. Lewis
S. Wilbert

Genetics and Plant Breeding

Head of Department ... D. M. Fernando B.Sc. (Cey.), M.Sc. (McGill)

Assistant Geneticists ... N. E. M. Jayasekera, B.Sc.Ag.(Cey.), M.Sc. (Birm.), Ph.D. (Birm.)

*◊C. M. B. Ratnayake, B.Sc. (Cey.)

Technical Assistants ... K. B. A. Karunasekera
K. W. Rupatunga
P. Samaranayake

Senior Field Assistant	...	H. B. H. de Silva
Field Assistants	...	D. S. Gamage B. M. S. G. Peiris A. K. M. S. Senaratne W. A. C. Wijesinghe

Plant Pathology

Head of Department	...	O. S. Peries, B.Ag.Sci. (Melb.), Ph.D. (Bristol) M.I. Biol.
Plant Pathologist	...	Mrs. V. Satchuthananthavale, B.A. (Madras), M.Sc, (Madras), Ph.D. (Sheffield)
Assistant Plant Pathologists	...	A. de S. Liyanage, B.Sc.Ag. (Cey.), Ph.D. (Lond.) * G. W. Liyanage, B.Sc.Ag. (Cey.)
Senior Technical Assistant	...	Z. E. Irugalbandara
Technical Assistants	...	L. W. Amaratunga D. M. Danthanarayana A. Dharmaratne L. Halangoda S. S. Jayasuriya W. A. D. D. S. Wetthasinghe

Soils Chemistry

Head of Department	...	O. S. Peries, B.Ag.Sci. (Melb.), Ph.D. (Bristol), M.I. Biol.
Soils Chemist	...	C. G. Silva, B.Sc. (Cey.), M.S. (Hawaii)
Assistant Soils Chemists	...	M. K. S. A. Samaraweera, B.Sc. (Cey.) * N. Yogaratnam, B.Sc.Ag. (Alhabad)
Experimental Officer	...	M. H. Sulaiman, B.Sc. (Cey.)
Senior Technical Assistants	...	T. Kanthasamy F. P. W. Silva
Technical Assistants	...	B. P. M. Arsecularatne B. G. K. Jayawardena A. M. A. Perera H. A. Seemon L. J. Wickramasinghe
Field Assistants	...	W. M. Abeysinghe A. D. M. Karunaratne M. A. Mendis K. S. A. C. Peries K. A. J. Wijenayake

Rubber Chemistry

Head of Department	...	M. Nadarajah, B.Sc. (Cey.), M.Sc. (Birm.), A.I.R.I., F.I. Chem. (Cey.)
Consultant in Polymer Science & Technology	...	Prof. Gerald Scott, M.Sc. (University of Aston in Birmingham, U.K.)
Rubber Chemist/Chief Specifications Officer	...	S. W. Karunaratne, B.Sc. (Cey.), M.Sc. (Aston), A.R.I.C., A.N.C.R.T., A.I.R.I.
Assistant Rubber Chemists	...	* A. M. A. Amarapathy, B.Sc. (Cey.), M.Sc. (Aston) A. Coomarasamy, B.Sc. (Cey.), Ph.D. (Aston) M. R. N. Fernando, M.Sc. (Moscow), M.Sc. (Aston) * W. S. E. Fernando, B.Sc. (Cey.), M.Sc. (Aston) R. Tharmalingam, B.Sc. (Cey.), Dip.Chem.Eng. (UC Lond.), M.Phil (Aston) G. Varathungarajan, B.Sc. (Cey.), M.Sc. (Aston) Ph.D. (Aston) P. A. J. Yapa, B.Sc. (Vidyodaya, Cey.), Ph.D. (Lond.)
Assistant Development Officer	...	D. S. Muthukuda
Assistant Specifications Officer	...	* L. M. K. Tillekeratne, B.Sc. (Cey.), M.Sc. (Aston)
Senior Technical Assistants	...	W. C. Dayaratne E. G. Mendis
Technical Assistants	...	A. S. Dekumpitiya W. D. Dharmasena P. P. Jayasinghe, L.I.R.I. S. Kasinathan, L.I. Biol. R. M. Kularatne D. D. Medagama H. Narangoda, L.I.R.I. K. A. Piyadasa, L.I.R.I. P. V. A. G. Perera K. P. N. de Silva M. S. C. de Silva, L.I.R.I. C. T. Weerasuriya
Specification Assistants	...	T. M. Ahamadeen W. C. P. R. Abraham D. R. Peiris A. G. R. S. Perera S. M. C. D. Sebastian T. A. S. Siriwardena W. A. S. Wijesekera Miss S. Wickramanayake
Clerk/Typist	...	G. P. A. I. G. Pathirana

Junior Clerk/Typist	...	Mrs. I. Swaris

Statistical Section

Assistant Statistician	...	G. A. J. P. R. Gunasekera, B.Sc.(Cey.),Dip.Stat. (Vidyodaya, Cey.)
Technical Assistants	...	L. T. Peiris L. S. Weerasinghe

Advisory Services Department & Economic Research Unit

Head of Department	...	A. B. Dissanayake, B.Sc. Ag. (Cey.), B.A. (Cey.), M.Sc. (Cey.)
Chief Advisory Officer	...	R. P. M. de Zoysa, B.Sc. (Cey.), M.Sc. (Oregon)
Assistant Advisory Officers	...	A. Dahanayake, B.Sc.Ag. (Cey.) R. A. Wijewansa, B.Sc.Ag. (Cey.)
Assistant Agricultural Economist	...	G. R. Chandrasiri, B.Sc. (Cey.), M.Sc. (Lond.)
Divisional Advisory Officers	...	K. I. Ariyaratne (Actg. D.A.O.S.) W. S. Dasanayake D. R. Ranwala K. P. Siriwardena A. J. L. de Silva A. Sooriyarachchi D. E. Weligodapola J. D. S. Wickramaratne D. R. Wijesuriya A. Wijesinghe
Chief Clerk	...	C. Jayasinghe
Clerk-Translator	...	I. L. Sirisena
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Clerks	...	R. E. Perera A. Wijesinghe
Junior Clerk/Typists	...	Mrs. L. J. C. Perera Miss Asuntha Senaviratne H. B. de Silva
Rubber Instructors	...	K. A. S. Abeygunawardena D. L. Abeysinghe U. S. B. Alagoda M. D. Albert M. A. D. Ariyaratne M. Athauda S. D. Athukorala D. D. Dasanayake P. W. David

K. D. Dharmasena
H. R. Dias
K. Ekanayake
E. A. G. S. Fernando
S. S. K. Fernando
R. Gunadasa
W. W. Gunasekera
A. S. A. Gunasekera
U. D. V. Gunasinghe
R. K. Gunatillake
G. Gunawardena
B. de A. Gurusinghe
R. B. Heendeniya
T. B. Herath
D. Hettiarachchi
S. D. Hidellarachchi
D. P. P. Jayakody
T. W. Jayalath
A. K. Jayatissa
W. D. Jayawardena
L. S. Kasthuriratne
N. C. Katukurunda
I. Kiridena
K. S. Kodikara
D. D. Kothalawela
E. N. Liyanage
W. E. W. de Mel
P. R. Nonis
D. Palihakkara
P. P. S. Perera
U. L. C. Perera
M. P. V. P. S. Perera
D. Podimahaththaya
S. C. Rajasinghe
R. W. U. Rajapaksa
R. M. B. Ranasinghe
D. J. Ratnayake
G. S. Ratnayake
W. D. D. Rupasinghe
J. Sumanasekera
M. C. Samarasekera
G. Senarath
S. Senawickrama
R. G. Siripala
M. Sirisena
U. S. Somapala
J. H. Swaris
S. H. B. L. de Silva
O. M. W. Tillakaratne
S. S. Waidyakularatne
S. Weerakoon
K. W. N. B. Weragama
C. Wickramatillake
W. A. S. Wijesekera
D. U. Wijesinghe

	V. Wijesinghe
	W. M. D. Wijesundara
	R. P. D. Wijewardena
	U. S. Wijeyapala

Administration and Accounts Section

Chief Administrative Officer and Secretary to the Board ...	M. N. J. Jayaratne, B.A. Hons. (Cey.), A.M.B.-I.M. (Lond.)
Accountant ...	M. E. A. Peiris, Dip.Acc. (Cey.), A.C.M.A. (Lond.)
Assistant Administrative Officer	S. M. J. Neangoda, B.A.Econ. (Cey.)
Office Assistant ...	J. A. Attygalle
Accounting Assistant ...	E. P. D. Roberts, F.C.B.I. (Lond.)
Personal Assistant to the Director	P. Samarasinghe
Internal Audit Clerk ...	B. H. Withanachchi
Chief Clerk ...	W. D. Jayawansa
Establishment Clerk ...	D. G. Udawatte
Book Keeper ...	A. K. D. Amaradasa
Translator cum Typist ...	J. A. A. R. I. St. R. Perera
Foreign Order Clerk ...	K. G. A. K. Dharmawardena
Clerk/Typists ...	J. D. Gunaratne T. H. Wijesena
Junior Clerk/Typists ...	Miss G. R. M. de Alwis Miss M. M. J. R. Cooray R. G. D. Sakaraja Miss W. Sellamuttu Miss R. S. Senaviratne L. Andrew Silva Mrs. D. F. Thambawita
Accounts Clerks	R. L. Fernando A. L. Gunawardena K. D. D. Navaratne J. H. C. S. Perera A. L. Ratnayake N. C. de Silva
Store Keeper	D. P. W. Goonasekera
Stores Assistant	M. H. C. Ariyaratne

Cashier	D. C. A. D. B. de Silva
Clerk cum Typist (Board Office)	P. H. Senaviratne

Library

Librarian & Publications Officer	J. A. Amaraweera, B.Sc. (Vidyodaya, Cey.)
Library Clerk	D. C. Thambawita
Junior Clerk/Typist	Mrs. D. T. Danthanarayana

Works Section

Works Engineer	P. C. J. F. Keerthisinghe
Mechnical Foreman	M. M. Anderson
Building Foreman	W. S. J. Benjamin
Transport Assistant	B. D. Ponnamperuma
Clerk/Typist	D. D. D. Adikaram
Junior Clerk/Typist	N. Jayasekera
Workshop Charge-hand	W. D. Dharmawardena
Mechanic	K. A. Siripala

Dartonfield Group

Assistant Estate Superintendent	S. G. Fernando
Office Assistant	A. C. Swaris
Chief Clerk	B. H. Rodrigo
Accounts Clerk	D. A. Rajapaksa
Junior Assistant Clerks	A. A. Ariyaratne G. S. Doolwela G. A. Kannangara
Senior Field Assistant	L. P. de Mel
Factory Assistant	O. de Alwis
Estate Medical Assistants	M. C. Peiris G. J. A. Silva
Field Assistant	H. A. Haramanis
Field Officer	A. Jayasena

Assistant Rubber Maker	S. Hettiarachchi
School Teachers	Mrs. K. P. Gunawardena D. L. W. Lionel S. Nadarajah
Assistant Nursery Manager	L. H. Samaranayake

Kuruwita Sub Station

Visiting Superintendent	S. M. Dias
Senior Field Assistant	M. C. Perera

Vested Estates

Vested Estate Superintendent	L. R. Cooray

Graduates under the Graduate Trainees Scheme absorbed into the Institute Service :

Miss D. Alvitigala, B.A. (Cey.)
Miss A. M. L. Angammana, B.A. (Vidyodaya, Cey.)
Mrs. N. A. Baduge, B.A. (Cey.)
B. A. D. S. Balachandra, B.A. (Cey.)
Miss G. Caroline, B.A. (Cey.)
K. D. Chandradasa, B.A. (Cey.)
B. D. Cyril, B.A. (Cey.)
W. D. Gunadasa, B.A. (Vidyodaya, Cey.)
U. J. Hirimuthugoda, B.A. (Cey.)
A. Kalubowilage, B.A. (Vidyalankara, Cey.)
P. W. Karunaratne, B.A. (Cey.)
Miss J. N. Kumarasena, B.A. (Cey.)
T. P. Liyanage, B.A. (Vidyalankara, Cey.)
K. S. Peiris, B.A. (Cey.)
Mrs. G. N. P. Perera, B.A. (Cey.)
K. G. D. Piyasena, B.A. (Cey.)
S. D. Ranasinghe, B.A. (Cey.)
Miss C. W. Ranasinghe, B.A. (Cey.)
S. K. Silva, B.A. (Cey.)
Mrs. K. K. Jagoda, B.A. (Cey.)
T. C. Weerasinghe, B.A. (Vidyalankara, Cey.)
L. Wickrama, B.A. (Cey.)
Miss W. Yasawathie, B.A. (Vidyodaya, Cey.)

* On Study leave Overseas

THE RUBBER RESEARCH INSTITUTE OF SRI LANKA

DIRECTOR'S REVIEW FOR 1974

BY

O. S. PERIES

General

The price of rubber is causing concern to the industry once again; this is a perennial problem in the rubber industry and it has been well said that: "He who predicts rubber prices today, will tomorrow learn humility." In spite of this maxim, in my review for 1973 I have stated that natural rubber (NR) prices will reach peak levels in 1978—80, and now, a year later, I confirm this view. There are many reasons for the present low prices for all grades of rubber, the main causes being the economic recessions in the Western World, in Japan and in Australia, and the energy crisis. These factors have caused a marked decrease in the sales of new cars and, as 65% of all rubber goes into tyres of some sort, sales of all rubber have been adversely affected. However, when economic conditions settle down, there is every reason to believe that NR will receive its fair share of the total rubber market, at a fair price. It is important to note that a fair price for primary commodities is much more important to the developing nations than economic aid in any form.

The Institute held a well attended Seminar on Crepe rubbers on 9—10 August 1974, in view of the necessity to step up the production of pale crepe and sole crepe. The Rubber Controller announced the Government's subsidy scheme for factory development at this seminar. The Institute has taken steps to implement this scheme and is actively engaged in it.

The Advisory Services Department organised four Smallholders' Conferences during the year. The Minister of Plantation Industries attended every one of these Conferences and participated fully in them, showing his personal interest in the welfare of rubber smallholders in this country. All these conferences were well attended by smallholders and there were lively discussions on important subjects between the smallholders and research scientists. This is a very worthwhile activity of the Institute and it is encouraging to note the keen interest taken by the Ministry of Plantation Industries and the Rubber Research Board in this regard.

All Departments have made steady progress in their studies during the year. The Rubber Chemistry Department was shifted to Colombo and joined the Advisory Services Department and the Specifications Laboratory, as the Colombo Branch of the Institute. The Smallholdings Department, the Estates Advisory Department and the Economic Research Unit were amalgamated during the year and they now function as the Advisory Services Department and Economic Research Unit.

Research

The work of the Research and Extension Departments is summarised below:

Botany : All long term Ethrel stimulation experiments which have been in progress for four years and where stimulation has been carried out at two months intervals with tapping in the S/2, d/2, 100% system, have shown a progressive decline in yield response with time. The yields at the end of the fourth year however

remains above the unstimulated controls. It is of interest to note that where two applications of 10% Ethrel are made per year and tapped at 100% intensity, the plots where Ethrel was applied above the tapping cut have not shown a downward trend in yields in the third year as compared with below cut applications. Tapping at 150% intensity has continued to give higher yields in the third year as compared with Ethrel stimulation at 100% intensity.

Clone RRIC 36 has continued to remain the best yielding clone in the dry districts. Clone RRIM 600 has yielded well in all trials tapped so far in Sri Lanka. The other selections with good performance in large scale trials and which may be considered for moderate scale commercial planting are clones RRIC 13, 48, 89, RRIM 600, AVROS 1734, PR 252, PB 28/59, RRIC 7 and 9.

The use of rainguards in the wet districts has continued to give enhanced yields by increasing the number of annual tapping days. No deleterious effects have been observed so far, as a consequence of the increase in number of tapping days.

Genetics & Plant Breeding : In the event of South American Leaf Blight (SALB) entry, rubber cultivation would move more into the dry zone and RRIC 103 showed suitability in growth and yields for these areas in trials sited at Moneragala and Bibile. RRIC 102 showed suitability for areas above 1000 feet. A new clone 4011 of RRIC 52 selfed parentage also showed suitability for upland areas. Progress was made in seed germination methods and in increasing the effectiveness of controlled pollinations.

Plant Pathology : Observations made during the year showed that the incidence of leaf diseases of *Hevea* had been mild.

Laboratory and field experiments carried out in the control of different root diseases have given promising results and these methods are being further investigated. Detailed investigations on Black Root disease of rubber caused by *Xylaria* spp., to determine the symptomatology, nature of spread of the fungus and its control, have been undertaken on several outside estates.

Screening of clones to test for resistance against *Oidium* spp., *Gloeosporium* spp., and *Phytophthora* spp. and also to determine the basis of inheritance of disease resistance characters are being carried out.

Soils Chemistry : Discriminatory fertilizer recommendations based on soil and leaf analysis, were made for 2000 acres of *mature* PB 86 in the Kalutara District in 1974. About 11,000 acres of *mature* rubber were also surveyed and fertilizer recommendation will be made to these areas in 1975. A shortage of phosphatic fertilizer and a price increase of all fertilizers was experienced. However, the discriminatory approach to fertilizer recommendation helped to reduce the harmful effects of the above two factors and the fertilizer consumption of the estate sector has not been adversely affected. Leaf nutrient studies have indicated that the present methods of fertilization do not ensure the maximum utilization of fertilizer. The importance of a legume cover during the non-productive phase has been demonstrated. Urea appears to be as good as sulphate of ammonia as a source of nitrogen. The importance of nitrogen and potassium in the nutrition of *Hevea* has been shown. However, there are some rubber growing areas in Sri Lanka, *e.g.* the Kelani Valley, where phosphorus too is required.

Rubber Chemistry : The Rubber Chemistry Department with the exception of the Biochemistry Section, shifted from Agalawatta to its new laboratories at

Telawala Road, Ratmalana, Mt. Lavinia on the 1st of November, 1974. The Department continued to give advice to large and medium sized estates on problems connected with the manufacture of raw rubber. Personnel from the Department also played an active role in assisting the State Rubber Manufacturing Corporation with its programmes of raw rubber manufacture. The Department also increased its role as a technical advisory service unit to the rubber based industries. It is envisaged that this service will be expanded within the Department.

Development work has shown that SCR 5L can be made into honey coloured sole crepe which fetches a much higher price than SCR 5L. Sole crepe producers could use idle time in their factory during the rainy season or by working an extra shift to produce sole crepe from SCR 5L and earn more foreign exchange for Sri Lanka. The major use of latex crepe in consuming countries appears to be to convert it to sole crepe. A correct strategy for Sri Lanka crepe is to exploit this use and become the World's largest producer of sole crepe.

In order to step up the production of sole crepe and pale crepe in Sri Lanka, a factory development subsidy scheme was announced by the Rubber Controller during the year. To implement this scheme a Research Officer of the Department was appointed as the Technical Liaison Officer by the Rubber Controller. The importance of the crepe rubber industry to the national economy and the need to improve the competitive position of Sri Lanka's crepe rubber in the world markets has been a topic of discussion for some time and a seminar on this was held during the year. A Crepe Rubber Development Unit was formed to improve the competitive position of crepe rubbers. In addition to the normal advisory services extended to the raw rubber producers and pure research, this unit is also involved in the overall marketing aspects as well.

In view of the energy crisis and the high price of petrochemicals, the search for import substitutes was actively pursued. This has resulted in the work involved in the preparation of formaldehyde stabilized latex and investigation of it uses as an adhesive for plywood, as a general purpose adhesive, as a binder for pigments in emulsion paints, and in textile printing and in Portland cement mixes for repair work, and for factory floors. Development work on cyclised rubber manufacture has now made it possible for it to be used: a) as a reinforcing filler in the rubber industry and b) as a resin for the paint and printing ink industries. Cyclised rubber has great promise to be exported as a non traditional export and to earn more foreign exchange than if exported as a raw rubber.

A new Specifications Laboratory to deal mainly with testing and issuing certificates for block rubber exported from Sri Lanka was set up.

Advisory Services : Four smallholders rubber conferences were held during the year. The Department participated in four exhibitions. The organisation of Group Processing Centres (GPC) was carried out by the field staff for the improvement of the quality of rubber manufactured by smallholders. There are now 30 Group Processing Centres in operation while 14 are ready to begin operations. Another 45 GPCs are under construction bringing the total to 89. Further, surveys have been completed for another 20 GPCs. Collecting centres for the supply of latex for crepe manufacture at a number of Company estates were organised for the benefit of smallholders. The Department also assisted, through the GPCs, the collection of rubber seeds by the State Rubber Manufacturing Corporation.

76 Fertilizer demonstration plots started in 1972 were maintained during the year. 24 Tapper training classes were organised and of these in 19 classes, trainees

have been tested orally. A total of 338 trainees are entitled to receive certificates. A total of 3419 demonstrations were held by the field staff in subjects which need a certain amount of skill.

A number of economic research studies have been carried out on cost of production, the economics of production of Group processing Centres, marketing of smallholder's rubber, and other subjects of importance.

Library : It is a pleasure to record the fact that the Library received textbooks and periodicals worth £ 2,000/- from the British Government, under the Book Presentation Scheme sponsored by the Overseas Development Authority. We have already received 380 textbooks and periodicals and the balance order will be received early in 1975. The kind assistance given us by Mr. Anthony Vaughan, Librarian, and Mr. W. B. McAlpine, Representative, British Council, Sri Lanka, and Officers of the British High Commission, in this connexion is gratefully acknowledged.

Arrangements have been made to open up a Branch Library at Telawala Road, Ratmalana, where our Colombo Branch is located. The Branch Library will cater to the needs of the Rubber Chemistry & Technology Department, the Advisory Services & Economic Research Unit and the Specifications Laboratory. A Library Assistant & Assistant Publications Officer has been appointed and will take up duties in early 1975.

Staff

The Director, the Heads of Departments and all the Senior and Intermediate Staff Officers of the Institute were on duty throughout the year.

Mr. M. Nadarajah, Head of Rubber Chemistry Department, who was in Malaysia on a FAO Fellowship to work for four months at the Rubber Research Institute of Malaysia, returned to the Island in early February.

The following officers who were sent abroad earlier under Colombo Plan Scholarships, continued their post graduate studies:

Mr. N. Yogaratnam, Assistant Soils Chemist, at the East Malling Research Station, Kent.
Mr. L. M. K. Tillakeratne, Assistant Specifications Officer, at the University of Aston in Birmingham.
Mr. A. M. A. Amarapathy, Assistant Rubber Chemist, at the University of Aston in Birmingham.
Mr. W. S. E. Fernando, Assistant Rubber Chemist, at the University of Aston in Birmingham.
Mr. C. M. B. Ratnayake, Assistant Geneticist, at East Malling Research Station, Kent.
Mr. G. W. Liyanage, Assistant Plant Pathologist, at Wye College, Kent.

The following officers who were sent abroad earlier on Colombo Plan scholarships returned to the Island on completion of their post graduate studies, at the end of the year:

Mr. M. R. N. Fernando, Assistant Rubber Chemist,
Dr. N. E. M. Jayasekera, Assistant Geneticist,
Mr. G. R. Chandrasiri, Assistant Agricultural Economist.

Mr. S. W. Karunaratne, Rubber Chemist & Chief Specifications Officer, proceeded to the U.S.A. to follow a six months course in Rubber Technology at the University of Akron.

Mr. K. M. U. Jayanetty, Chief Administrative Officer, retired from the services of the Institute at the end of April.

Mr. H. H. Peries, Chief Advisory Officer, Smallholdings Department, retired from the services of the Institute on 6th June.

Mr. S. de S. Daluwatta, Estate Superintendent, his services were terminated with effect from 11th June.

Mr. S. D. Wimalaratne, post-graduate scholar, completed his studies at the Institute at the beginning of January.

Mr. M. N. J. Jayaratne was appointed Chief Administrative Officer with effect from 13th May.

Mr. L. R. Cooray was appointed Superintendent, Vested Estates with effect from 1st August.

Mr. M. K. S. A. Samaraweera was appointed Assistant Soils Chemist on 21.06.74 and Mr. S. G. Fernando was appointed Assistant Estate Superintendent on 01.03.74.

Assistant and Minor Staff changes in the various Departments have been reported in the respective Departmental reports.

The salaried staff of the Institute at the end of the year was as follows :

Officers in Grades I & II	..	13
Officers in Grade III	..	24
Officers in Grades IV to IX	..	230
Officers in Grades X to XIII	..	134
		401
Visiting Superintendent, Kuruwita Substation	..	1
Superintendent of Vested Estates	..	1
Total		403

Visitors

Visitors to the Institute from overseas included:—

Mr. Abdullah Kadir, RISDA, Kuala Lumpur, Malaysia
Mr. J. D. Barratt, Plant Protection Ltd., I.C.I.
Mr. Reginald Gonzaliz, Monesey
Dr. Kingston, Jamaica
Mr. J. M. O'Shea, Du Pont (Far East) Inc.
Dr. Moeljono Partosoedarso, Secretary General, ANRPC, Kuala Lumpur
Mr. P. S. Harishara Ayar, UNDP
Mr. J. K. Morlu, Monrovia, Liberia, West Africa

Dr. D. A. Nethsinghe, Joint FAO/IAEA, Vienna, Austria.
Mr. R. Jesinger, Rohm & Hass Co., Singapore
Mr. P. B. Suchaic, Indofil Chemicals Ltd., Bombay
Mr. J. E. Stuckey, University of Aston in Birmingham, U.K.
Dr. H. Walter, West Germany
Dr. S. C. Jha & Mr. B. Hatapermadi, Asian Development Bank
His Excellency, Mr. U. Smedley, British High Commissioner for Sri Lanka
Mr. D. W. Partridge, British High Commission
Mr. V. Korsun, UNESCO, Paris
Mr. L. Ter-Davtian, UNDP/UNESCO, Paris

Visits

The Director attended two meetings convened by UNIDO to discuss the problems of pollution connected with the rubber industry, both natural and synthetic. Both meetings were held in Vienna, Austria.

Mr. A. B. Dissanayake and Dr. R. Satchuthananthavale attended the International Rubber Research & Development Board (IRRDB) Symposium on the Biology of Rubber, held in Cochin, India.

The Director and Research Officers of the Institute attended the following conferences and seminars:

Annual Sessions of the Ceylon Association for the Advancement of Science (CAAS)
Planters' Association
Low Country Products Association
District Planters' Associations
I.R.I. Committee Meetings
Seminars organised by the Chemical Society of Ceylon
Meeting of the Rubber Replanting Advisory Board
Meetings of the panels convened by the Industrial Development Board
Standing Committee meetings on agro-chemicals and fertilizers
Ad hoc meetings of the Ministry of Trade & Commerce
Seminars organised by the Social Science Society
Meetings of the Soil Conservation Society
Meetings of various panels appointed by the Bureau of Ceylon Standards
Meetings of the Working Group on Fertilizers.

The Director served on the following Boards and Committees:

Rubber Research Board (RRB)
Administrative Committee of the RRB
Estate & Experimental Committee of the RRB
Scientific Committee of the RRB
National Science Council (NSC)
Agricultural Sub-Committee of the NSC
Sri Lanka Tyre Corporation Board of Directors
Coconut Research Board (CRB)
Scientific Committee of the CRB
Research Planning Council of the Ceylon Institute of Scientific and Industrial Research (CISIR)
Council of the Ceylon Association for the Advancement of Science (CAAS)
General Research Council of the CAAS
Standing Committee on Minor Export Crops

Research Committee on Minor Export Crops
Committee for the review of the scheme of recruitment of University teaching staff
Academic Council of the Faculty of Agriculture, Peradeniya Campus of the University of Sri Lanka
Rubber Replanting Advisory Board
Committee of the Institution of the Rubber Industry (Sri Lanka Section).

Workers from overseas

Professor Gerald Scott, University of Aston in Birmingham, our Consultant in Polymer Science & Technology, visited the Institute for an assessment of the work done by us in this field. His services to the Institute have been invaluable.

Mr. E. Pushparajah, Head of Soils Division, Rubber Research Institute of Malaysia, paid a short visit to the Institute in January and had discussions with the Staff of the Soils Chemistry Department. His assistance and interest in our work is very much appreciated.

Visiting Officers

Mr. V. Abeywardena, Biometrician, Coconut Research Institute, continued to visit the Rubber Research Institute regularly throughout the year to help us with statistical studies. We are very grateful to the Coconut Research Institute for the services rendered to us by this officer.

Mr. D. C. Golden, Assistant Soils Chemist, Tea Research Institute assisted us for three months before leaving the Island for post graduate studies. The assistance given to us by the Tea Research Institute in this connection is greatly appreciated.

Lectures

The Director made the opening address and summarised the proceedings of the Seminar on Crepe Rubber, organised by the Institute.

Publications

The following papers were prepared by the Director for publication during the year:

O.S. PERIES—Director's Review for 1973

O.S. PERIES—Review of the Plant Pathology Department

O.S. PERIES—Review of the Soils Chemistry Department

O.S. PERIES—*Ganoderma* basal stem rot of coconut; a new record of the disease in Sri Lanka. *Plant Dis. Reptr.* **58,** 293-295 (1974)

O.S. PERIES—An assessment of the significance of the food base in relation to infection of *Hevea* roots by *Fomes lignosus*. *Plant Dis. Reptr.* **58,** 295-297 (1974)

O.S. PERIES—Diseases of *Hevea* in AD 2000. Proceedings of the Indian Rubber Conference, 1974.

O.S. PERIES—Studies on the liberation of spores of *Oidium heveae*. The causal fungus of *Oidium* leaf disease of rubber (Abs.) *Q. Jl. Rubb. Res. Inst. Sri Lanka* **51,** 57 (1974).

O.S. PERIES—A study of the factors affecting spore germination in *Oidium heveae* (Abs.) *Q. Jl. Rubb. Res. Inst. Sri Lanka* **51,** 57 (1974).

O.S. PERIES—The perennation of *Oidium heveae* the causal agent of *Oidium* leaf disease of rubber (Abs.) *Q. Jl. Rubb. Res. Inst. Sri Lanka* **51,** 58 (1974).

O.S. PERIES—The ecology of *Phytophthora meadii* McRae the causal agent of Bark Rot and mature leaf-fall of *Hevea* (Abs.) *Q. Jl. Rubb. Res. Inst. Sri Lanka* **51,** 58 (1974).

O.S. PERIES—Methods for the biological control of white root disease *Fomes lignosus* of *Hevea.* (Abs.) *Q. Jl. Rubb. Res. Inst. Sri Lanka* **51,** 58 (1974).

Institute Publications

General :

Annual Review for 1973 (English)

Annual Report of the Rubber Research Board for 1971 (Trilingual) Part II (in press)

Annual Report of the Rubber Research Board for 1972 (Trilingual) Part I (in press)

Annual Report of the Rubber Research Board for 1972 (Trilingual) Part II (in press)

Annual Report of the Rubber Research Board for 1973 (Trilingual) Part I (in preparation)

RRISL Bulletin Vol. 9 Nos. 1 & 2 (in press)

RRISL Bulletin Vol. 9 Nos 3 & 4 (Special supplement for pale crepe seminar held in August 1974) in press

Quarterly Journal Vol. 51 Parts 1 & 2

Quarterly Journal Vol. 51 Parts 3 & 4 (in preparation)

'Rubber Puwath' Sinhala Bulletin Vol. 4 Nos. 1 & 2

'Rubber Puwath' Sinhala Bulletin Vol. 5 Nos. 1 & 2 (in Press)

Theses

CHANDRASIRI, G. R. Some economic aspects of rubber production in Sri Lanka (1974). *Thesis submitted for Master of Philosophy of the University of London* (*Wye College*).

JAYASEKERA, N. E. M.—Analysis of interactions in *Nicotiana rustica. Thesis submitted for Doctor of Philosophy of the University of Birmingham, England* 1974.

TILLEKERATNE, L. M. K. Correlation of hydroperoxide concentration with the polymer degradation; physical methods of analysis. *Thesis submitted for Master of Science degree of the University of Aston in Birmingham, England, August,* 1973.

Papers

BOOTH, A. AND SATCHUTHANANTHAVALE, R. Regeneration in root cuttings of *Taraxacum officinale* I. The nature and levels of endogenous hormones. *New Phytol.* **73,** 445-452.

BOOTH, A. AND SATCHUTHANANTHAVALE, R. Regeneration in root cuttings of *Taraxacum officinale* II. Effects of exgoneous hormones on root segments and root callus cultures. *New Phytol.* **73**, 453-460.

CHANDRASEKERA, L. B. *Hevea* clones recommended for planting in Sri Lanka. *RRISL Bulletin* Vol. 9 Nos. 1 & 2 (in press).

CHANDRASEKERA L. B. Plantation research (in Sinhala). *Rubber Puwath* Vol. 5 Nos. 1 & 2, (in press).

CHANMUGAM, C. Subsidies and Incentives to the rubber producer. *RRISL Bulletin* Vol. 9 Nos. 3 & 4 (in press).

COCKBAIN, E. G. Developments in latex application. *RRISL Bulletin* Vol. 9 Nos. 1 & 2 (in press)

CUNNEEN, J. I. New methods of compounding and their application to the promotion of rubber in engineering. *Q. Jl. Rubb. Res. Inst. Sri Lanka* **51**, 16—27.

DANTHANARAYANA, D. M. The incidence and control of bark rot (in Sinhala). *Rubber Puwath* Vol. 5 Nos. 1 & 2 (in press).

DAYARATNE, W. C. Oil from rubber seed (in Sinhala). *Rubber Puwath* Vol. 5 Nos. 1 & 2 (in press).

DISSANAYAKE, A. B. Present economic situation of rubber industry in Sri Lanka (in Sinhala). *Rubber Puwath* **4**, 1—3.

DISSANAYAKE, A. B. Discussion on economic and social aspects of smallholder extension services. *IRRDB Scientific Symposium, Part I, Cochin, India, Sept.* 1974, *pp.* 13/1–13/3.

DISSANAYAKE, A. B. The group processing centre as a means of improving the quality of rubber produced by smallholders in Sri Lanka. *IRRDB Scientific Symposium Part I, Cochin, India, Sept.* 1974. *pp.* 5/1–5/2.

*FERNANDO, D. M. The selection of stocks in *Hevea*. *Q. Jl. Rubb. Res. Inst. Sri Lanka* **51**, 28-30.

FERNANDO, D. M. *Hevea* planting material to 2000 A.D. *Proc. Rubber Planters' Conference, Kottayam, India, Jan.* 1974.

FERNANDO, D. M. AND PERIES, O. S. The increased use of SALB resistant material in Eastern rubber planting. *Proc. IRRDB Conference, Cochin, India, Sept.* 1974.

GUNASINGHE, U. D. V. Cultivation of pineapple in rubber lands (in Sinhala). *Rubber Puwath* **4**, 9-13.

GUNESEKERA, S. A. AND SUMANAWEERA, H. A. N. Control of blue-stain on rubber (*Hevea brasiliensis*) wood during the boron diffusion treatment. *Q. Jl. Rubb. Res. Inst. Sri Lanka* **51**, 45-56.

JEYASINHAM, J. Rubber wood is abundant and accessible, will it ever be successfully exploitable? *Q. Jl. Rubb. Res. Inst. Sri Lanka* **51, 13-15.

KARUNARATNE, S. W. Quality control, technical specifications and presentation of latex crepes. *RRISL Bulletin* Vol. 9 Nos. 3 & 4 (in press).

NADARAJAH, M. Standardisation of production methods of latex crepes to suit end-use requirements. *RRISL Bulletin* Vol. 9, Nos. 3 & 4 (in press).

NADARAJAH, M. AND MUTHUKUDA, D. S.. Stepping up of latex crepe production in existing factories. *RRISL Bulletin* Vol 9 Nos. 3 & 4 (in press).

PERIES, O. S. *Ganoderma* basal stem rot of coconut; a new record of the disease in Sri Lanka. *Plant Dis. Reptr.* **58,** 293-295.

PERIES, O. S. An assessment of the significance of the food base in relation to infection of *Hevea* roots by *Fomes lignosus. Plant. Dis. Reptr.* **58,** 295-297.

PERIES, O. S. Disease of *Hevea* in AD 2000. *Proc. IRRDB Conference Cochin, India.* (1974).

+PERIES, O. S. Studies on the liberation of spores of *Oidium heveae;* The causal fungus of *Oidium* leaf disease of rubber (Abs): *Q. Jl. Rubb. Res. Inst. Sri Lanka* **51,** 57.

+PERIES, O. S. A study of the factors affecting spore germination in *Oidium heveae* (Abs.). *Q. Jl. Rubb. Res. Inst. Sri Lanka* **51,** 57.

+PERIES, O. S. The perennation of *Oidium heveae* the causal agent of *Oidium* leaf disease of rubber (Abs.). *Q. Jl. Rubb. Res. Inst. Sri Lanka* **51,** 58

+PERIES, O. S. Methods of biological control white root disease (*Fomes lignosus*) of *Hevea* (Abs.). *Q. Jl. Rubb. Res. Inst. Sri Lanka* **51,** 58.

+PERIES, O. S. The ecology of *Phytophthora meadii* McRae the causal agent of Bark Rot and mature leaf-fall of *Hevea.* (Abs.). *Q. Jl. Rubb. Res. Inst. Sri Lanka* **51,** 58.

PERIES H. H. Replanting of rubber (in Sinhala). *Rubber Puwath* **4,** 4-6.

PIERIS, K. S. Group Processing Centres (in Sinhala). *Rubber Puwath* **4,** 14-15.

SALGADO, S. J. New trends in the production and marketing of crepe rubber: Agency House views on crepe rubber. *RRISL. Bulletin* Vol. 9 Nos. 3 & 4 (in press).

SATCHUTHANANTHAVALE, R. Hormonal control of organ formation in explants of *Hevea* stem sections *Proc. IRRDB Conference Part I. Cochin, India* (1974).

SATCHUTHANANTHAVALE, R. The influence of weather conditions on crop harvesting of *Hevea* in Sri Lanka. *Proc. Rubber Planters' Conference. Kottayam, India, Jan.* 1974.

SATCHUTHANANTHAVALE, V., SATCHUTHANANTHAVALE, R. AND DANTANARAYANA D. M. Evaluation of inherent resistance/susceptibility of *Hevea* cultivars to black stripe disease. *Proc. IRRDB Conference Part I. Cochin, India,* 1974.

SATCHUTHANANTHAVALE, V., SATCHUTHANANTHAVALE, R. AND DANTANARAYANA D. M. Screening of clones for black stripe disease in *Hevea. Proc. Rubber Planters' Conference, Kottayam, India, Jan.* 1974.

SENANAYAKE, Y. D. A., JAYASEKERA, N. E. M. AND SAMARANAYAKE, P. Growth of nursery rootstock seedlings of *Hevea brasiliensis* Muell. Arg. *Cv.* Tjir I, Part two. *Q. Jl. Rubb. Res. Inst. Sri Lanka* **51,** Parts 3 & 4 (in press).

SENANAYAKE, Y.D.A. & SAMARANAYAKE, P. (1974). Growth of nursery root stock seedlings of *Hevea brasiliensis* Muell Arg *Cv.* Tjir I, Part 3 *Journal of the National Science Council of Sri Lanka* **2 (2),** 157.

SILVA, P. A. Some aspects of marketing crepes and the problems of the Rubber Trades. *RRISL Bulletin* Vol. 9 Nos. 3 & 4 (in press).

THARMALINGAM, R. AND DEKUMPITIYA, A. S. Conversion of crepe rubber to block form at the packing stage. *RRISL Bulletin* Vol. 9 Nos. 3 & 4 (in press).

TILLEKERATNE, L.M.K. Mechanism of photo-initiation process in polythene. *Paper submitted for the International Symposium on "Stabilisation and degradation of polymers"—held in Brussels,* 11-13 *September,* 1974.

VARATUNGARAJAN, G. Strategy for Sri Lanka's latex crepe. *RRISL Bulletin* Vol. 9 Nos. 3 & 4 (in press).

WIMALARATNE, S. D. The developments of tapping systems for rubber (in Sinhala). *Rubber Puwath* Vol. 5 Nos. 1 & 2, (in press).

WIMALARATNE, S. D. AND PATHIRATNA, L. S. S. Observations on "wintering" in *Hevea. RRISL Bulletin* Vol. 9 Nos. 1 & 2 (in press).

YAPA, P. A. J. Coagulation of NR latex with papain (in Sinhala). *Rubber Puwath* **4,** 7-8.

YAPA, P.A.J. Deproteinised natural rubber. *ALEMBIC,* 73/74, University of Sri Lanka, Peradeniya Campus, (pp. 79-81).

YAPA, P. A. J. Recent developments in NR industry (in Sinhala). *Rubber Puwath* Vol. 5, No. 1 & 2 (in press).

YAPA, P. A. J. AND BALASINGHAM, C. G. The proteolytic action of papain. *Q. Jl. Rubb. Res. Inst. Sri Lanka* **51,** 1-12.

YAPA, P. A. J. AND SPANNER, D. C. Localization of ATP—ase activity in mature sieve elements of *Tetragonia*. *Planta* (Berlin) **117**, 321-328.

ZOYSA, R. P. M. DE Training classes for rubber cultivation (in Sinhala). *Rubber Puwath* Vol. 5 Nos 1 & 2 (in press).

ZOYSA, R. P. M. DE. State sponsored group processing centres (in Sinhala). *Rubber Puwath* Vol. 5 Nos. 1 & 2 (in press).

ZOYSA, R.P.M. DE The development and functioning of the smallholdings advisory department of the Rubber Research Institute of Sri Lanka. *IRRDB Scientific Symposium Part I, Cochin, India, Sept.* 1974. *pp.* 4/1–4/8.

* Reprinted from *International Symposium on seed processing,* IUFRO, Bergen, Norway, 1973.

\+ Reprinted from the abstracts of the *CAAS Proceedings of the 29th Annual Sessions,* 18—22 *December,* 1973, pp. 64, 65 & 68.

** Reprinted from *Pulp & Paper International,* June 1973, pp. 44 & 47.

Social and Sports Activities

Our cricket team did well to come up to the semifinals in the State Services Cricket Tournament, but in the Kalutara District Tournament we failed to show 'form'.

Miss Preeth Swaris, a daughter of one of our members toured Japan as a member of the Sri Lanka Table Tennis team.

Mr. Winsley Fernando, a son of another member, was awarded the trophy for the best wicket keeper at the Kalutara District Cricket Tournament.

Our colleagues from the T.R.I. were our guests for a week-end. Our victory in the cricket match played against the visitors brought back to us the 'Gun Trophy'.

We also played host to Ceylon Law College Billiards & Snooker Team.

The Annual Sports Tournament of the Club did not draw very many entries this year as the members from the Rubber Chemistry Department were unable to participate, as that Department was shifted to Colombo during the course of the year.

The Staff Club also organised two excursions:

a) Two day trip to Anuradhapura & Dambulla etc.

b) Three day trip to Yala, Kataragama & Diyaluma.

These picnics were very popular and a most enjoyable time was had by all.

REVIEW OF THE BOTANY DEPARTMENT

BY

L. B. CHANDRASEKERA

(*Head, Botany Department*)

SUMMARY

All long term Ethrel stimulation experiments which have been in progress for four years and where stimulation has been carried out at two months intervals with tapping on the S/2, d/2, 100% system, have shown a progressive decline in yield response with time. The yields at the end of the fourth year however remain above the unstimulated controls. It is of interest to note that where two applications of 10% Ethrel are made per year and tapped at 100% intensity, the plots where Ethrel was applied above the tapping cut have not shown a downward trend in yields in the third year as compared with below cut applications. Tapping at 150% intensity has continued to give higher yields in the third year as compared with Ethrel stimulation at 100% intensity.

Clones RRIC 7, 45, 52 and PB 86 have shown a progressive decline in yields when tapped daily on half spiral cuts and on full spiral and double cut tapping every third and fourth days. The clone PB 86 however has maintained satisfactory yields on the double cut fourth daily tapping system. In the control plots tapped on the S/2, d/2, 100% system, the yields of all clones have improved over the years of the experiment. The clone PB 28/59 has given a good yield response to tapping on the S/2, d/3, 67% system.

Clone RRIC 52 when tapped with the Jebong knife has continued to give comparable results with that of the Michie-Golledge knife.

The clone RRIC 36 has continued to remain the best yielding clone in the dry districts. Clone RRIM 600 has yielded well in all trials tapped so far in Sri Lanka. The other selections with good performance in large scale trials and which may be considered for moderate scale commercial planting are clones RRIC 13, 48, 89, RRIM 600, AVROS 1734, PR 252, PB 28/59, IRCI 7 and 9.

The early tapping of small scale polyclone plantings has recorded high average yields per tapper.

All trials involving the use of different types of clonal rootstocks have shown that clonal seed of most recommended clones would be suitable for use as rootstocks. Experiments have shown that the use of "leaf buds" result in earlier sprouting and faster growth rate than "scale buds" in brown buddings.

The use of rainguards in the wet districts has continued to give enhanced yields by increasing the number of annual tapping days. No deleterious effects have been observed so far, as a consequence of the increase in number of tapping days.

Tissue culture experiments carried out using *Hevea* explants have shown that organ formation on such material could be induced by the addition of auxins and kinins to modified Murashige and Skoogs medium.

A preliminary survey on the extent of nodulation of leguminous ground covers under rubber have revealed poor nodulations. This emphasises the need for seed inoculations with suitable strains of *Rhizobia* when establishing ground covers.

Staff

Mr. L. B. Chandrasekera, Head of Botany Department, Dr. R. Satchuthananthavale, Botanist, Dr. (Mrs.) A. C. I. Samaranayake, Botanist, and Dr. U. P. de S. Waidyanatha, Assistant Botanist, were on duty throughout the year.

The Senior Technical Assistant, Mr. W. G. V. Fernando, Technical Assistants, Messrs L. S. S. Pathiratne, I. Amarasinghe, J. G. de Mel, T. C. Weerasinghe, Miss C. W. Ranasinghe, and Field Assistants, Messrs D. R. Colonne, U. K. D. Lewis, D. A. Brahamana, W. T. Silva, S. Kodikara, R. B. Gunaratne and S. Wilbert were also on duty throughout the year.

Visits

The technical staff of the Department paid advisory visits to estates and routine visits to experimental areas where necessary.

Publications

Annual Review of the Botany Department for 1973.

Observations on "Wintering" in *Hevea*, S. D. Wimalaratne and L. S. S. Pathiratna, *RRISL Bulletin* **9**, Nos. 1 & 2, 1974.

The following papers were presented at the IRRDB Scientific Symposium—Part I held in Cochin, India from 26th to 28th September, 1974:

Hormonal control of organ formation in explants of *Hevea* stem sections—R. Satchuthananthavale.

Evaluation of inherent resistance/susceptibility of *Hevea* cultivars to black stripe disease—V. Satchuthananthavale.

The following papers were submitted for presentation at the Indian Rubber Conference—4th and 5th January 1974:

The influence of weather conditions on crop harvesting of *Hevea* in Sri Lanka—R. Satchuthananthavale.

Screening of clones for black stripe disease in *Hevea*—V. Satchuthananthavale, R. Satchuthananthavale and D. M. Danthanarayana.

Yield Stimulation Experiments

Field Experiment No. 58—*Ethrel stimulation experiment—Malaboda Estate: (L.B. Chandrasekera & D. A. Brahamana)*

A 10% solution of Ethrel in coconut oil is applied to a 3.8 cm (1.5 in.) strip of scraped bark below the tapping cut once in two months on panel C of clone PB 86 planted in 1946. Two tapping tasks are stimulated while two tasks serve as the controls. Tapping is on the S/2, d/2, 100% system and the yields are recorded on the basis of daily yield per tapper's task. Additional fertilizer, based on extra yields recorded, is applied to the stimulated plots. The average yields recorded for the first four years of the experiment are given in Table 1.

TABLE 1

YIELD OF ETHREL STIMULATED BLOCKS COMPARED WITH CONTROL BLOCKS

	Stimulated		Control	
	Block I	Block IV	Block II	Block III
*Average yield/tapping (1971)				
lb	28.3	27.9	12.2	12.8
kg	12.84	12.66	5.53	5.81
*Average yield/tapping (1972)				
lb	21.1	19.4	10.2	11.1
kg	9.57	8.80	4.63	5.03
*Average yield/tapping (1973)				
lb	19.4	17.7	10.2	11.5
kg	8.89	8.03	4.63	5.22
*Average yield/tapping (1974)				
lb	13.4	12.27	8.9	9.8
kg	6.08	5.76	4.04	4.45

*Inclusive of scrap

The higher yields of stimulated plots over the control plots have been maintained in the fourth year. However, there has been a progressive decline in response to Ethrel stimulation over the years.

Field Experiment No. 63—*Ethrel stimulation experiment—Eladuwa Estate:*
(*L. B. Chandrasekera & D. A. Brahamana*)

Three concentrations of Ethrel, 5%, 10% and 15%, in coconut oil, are compared with an unstimulated control in clone PB 86 planted in 1952. Applications are made on a 3.8 cm (1.5 in.) strip of scraped bark, below the tapping cut, once every two months. Tapping was on the S/2, d/2, 100% system on panel D. The experimental design is a randomized layout with each treatment replicated six times. Each plot consists of 50 trees. Extra fertilizer was applied to the stimulated plots based on the increased yields recorded. The yields recorded for the first four years of the experiment are given in Table 2, and shows a marked decline in yield in stimulated areas, over the four year period.

TABLE 2

COMPARATIVE YIELDS IN G/TREE/TAPPING OF PLOTS STIMULATED WITH ETHREL AT DIFFERENT CONCENTRATIONS

	Treatments			
	5% Ethrel	10% Ethrel	15% Ethrel	Control
*Average yield 1971	71.6	73.6	84.5	39.3
,, ,, 1972	53.9	58.2	59.7	34.8
,, ,, 1973	57.9	58.0	59.0	32.2
,, ,, 1974	41.7	44.6	47.9	34.7
Percentage of scrap 1974	17.5	17.3	16.9	11.7
,, of Brown Bast				
Partial dryness	1.8	5.0	3.6	0.7
Total dryness	3.6	3.9	3.2	2.5
Trees tapped in 1974	281–274	268–258	264–281	281–277

*Yields inclusive of scrap

Field Experiment No. 67—Ethrel stimulation experiment—Dewalakande Estate: (L. B. Chandrasekera & D. A. Brahamana)

This experiment compares a progressive intensification of tapping, eight years before replanting, with Ethrel stimulation six times a year on S/2,d/2,100% tapping system. A ten acre area of clone PB 86 planted in 1948, is divided into four tapping blocks and the two treatments are applied as follows:

1. Two blocks with 160 trees per block tapped alternate daily on a half spiral cut downwards and a quarter spiral cut upwards on high panels at an intensity of 150 per cent.

2. Two blocks with 218 trees per block tapped alternate daily on a half spiral cut downwards at an intensity of 100% and stimulated with Ethrel, applied below the tapping cut, once every two months.

The yields are recorded on the basis of daily yields per tapping block. The yields for the first three years of the experiment are given in Table 3.

TABLE 3

MEAN YIELDS OF AREAS TAPPED AT HIGH INTENSITY COMPARED WITH THOSE STIMULATED WITH ETHREL

	No Ethrel Tapped at 150% intensity	Ethrel stimulated Tapped at 100% intensity
*Average yield/tapping		
1972—lb	17.6	18.1
kg	8.0	8.21
1973—lb	14.7	12.6
kg	6.66	5.74
1974—lb	16.6	13.5
kg	7.08	6.12
Percentage of scrap 1974	14.8	18.0
*Average yield 1972		
lb/ac	1,369.8	925.5
kg/ha	1,535.3	1,037.4
Average yield 1973		
lb/ac	1,228.0	683.0
kg/ha	1,376.4	765.5
Average yield 1974		
lb/ac	1,267.5	728.8
kg/ha	1,420.6	816.8

*Inclusive of scrap

While there had been no significant decrease in response to Ethrel stimulation in the third year as compared with the second year, the yields of plots tapped at a higher intensity without stimulation continue to remain higher than those in Ethrel stimulated plots.

Field Experiment No. 68—*Ethrel stimulation experiment—Eduragalla Estate:* (*L. B. Chandrasekera & W. T. Silva*)

A 10% solution of Ethrel in coconut oil is applied to a 3.8 cm (1.5 in.) strip of scraped bark, below the tapping cut, once in two months on panel D of clone PB 86, planted in 1949. Three tappers tasks are stimulated while three tasks serve as the controls. Yields are recorded on the basis of daily yields per task. The yields recorded for the first three years of the trial are given in Table 4.

TABLE 4

AVERAGE YIELDS OF ETHREL STIMULATED BLOCKS AS COMPARED WITH CONTROL BLOCKS

	Stimulated	Unstimulated
*Average yield/tapping 1972 lb	18.2	9.9
kg	8.27	4.50
*Average yield/tapping 1973 lb	19.2	10.6
kg	8.70	4.82
*Average yield/tapping 1974 lb	16.76	11.79
kg	7.60	5.35
*Average yield 1972 lb/ac	1581	858
kg/ha	1771.98	961.65
*Average yield 1973 lb/ac	1561	839
kg/ha	708.07	380.57
*Average yield 1974 lb/ac	1456	1024
kg/ha	1631.88	1147.70

*Inclusive of scrap

There had been a decrease in response to stimulation in the third year.

Field Experiment No. 73—1972 *Ethrel stimulation experiment, Eladuwa Estate:* (*R. Satchuthananthavale, C. Weerasinghe & R. B. Gunaratne*)

The two field experiments on the use of Ethrel as a yield stimulant initiated in 1972 on clone PB 86, panel C, were continued during the year. In each of these experiments only two applications of stimulant were made, one in February and the other in November 1974. A fertilizer mixture composed of 20 parts sulphate of ammonia and 7 parts muriate of potash was applied during 1974 at the rate of $2\frac{1}{2}$ lb per tree. Tapping results of the two experiments are given in Tables 5 and 6.

Experiment No. 1

Ethrel is applied on a 3.8 cm (1.5 in.) strip of scraped bark below the tapping cut.

TABLE 5

MEAN YIELDS FROM THE VARIOUS TREATMENTS IN 1974 WITH TWO APPLICATIONS OF STIMULANT

Treatments	Mean yield in g/tree/tapping	Mean yield as % of S/2, d/2 100% (Control)
(1) Tapped S/2, d/2, 100%—unstimulated	24.98	100
(2) Tapped S/2, d/2, 100% +5% Ethrel '70-90 1'	29.88	119.62
(3) Tapped S/2, d/2, 100% +10% Eth. '70-90 I'	44.07	176.42
(4) Tapped S/3, d/2, 67%+unstimulated.	16.05	64.25
(5) Tapped S/3, d/2, 67% + 5% Eth. '70-90 I'	23.31	93.31
(6) Tapped S/3, d/2, 67% + 10% Eth. '70-90 I'	25.24	101.04
(7) Tapped S/4, d/2, 50%—unstimulated	18.44	73.82
(8) Tapped S/4, d/2, 50%+5% Eth. '70-90 I'	22.11	88.51
(9) Tapped S/4, d/2, 50+10% Eth. '70-90 I'	25.33	101.40

Experiment No. 2

The twelve treatments in this experiment include six above cut applications and six below cut applications. The applications below the cut are on a 3.8 cm (1.5 in.) strip of scraped bark while the above cut applications are on a 1 in. band on the renewing bark.

TABLE 6

MEAN YIELDS OF THE VARIOUS TREATMENTS IN 1974 WITH TWO STIMULANT APPLICATIONS

Treatment	Mean Yield g/tree/ tapping	Mean yield as % of S/2, d/2, 100% control
Above cut application		
(1) S/2, d/2, 100%—Unstimulated control	27.22	100
(2) ,, + Coconut oil	30.06	110.43
(3) ,, + 5% Ethrel (70-90 I)	40.04	147.10
(4) ,, + 10% ,, ,,	44.90	164.95
(5) ,, + 5% Ethrel (70-90 K) (with penetrant)	38.50	141.44
(6) ,, + 10% ,,	45.02	165.39
Below cut application		
(7) S/2, d/2, 100%—Unstimulated control	32.87	100
(8) ,, + Coconut oil	30.27	92.09
(9) ,, + 5% Ethrel (70-90 I)	47.16	143.47
(10) ,, + 10% ,, ,,	46.33	140.95
(11) ,, + 5% Ethrel (70-90 K) (with penetrant)	41.70	127.14
(12) ,, + 10% ,, ,,	36.99	112.53

The response to Ethrel stimulation during the third year has been slightly lower than that of the second year. However, the response has remained well above the untreated controls with only two stimulations during the year. Ten percent Ethrel has given a better yield response than 5% Ethrel as observed in the previous year. No visible ill effects were observed on renewed bark when Ethrel was applied above the cut.

Field Experiment No. 80—*Ethrel stimulation experiment—Talgaswela Estate:* (*L. B. Chandrasekera & D. A. Brahamana*)

This experiment, initiated in March 1974 compares the following treatments:

1. Tapped on S/2, d/2, 100% and stimulated three times a year
2. ,, ,, S/2, d/3, 67% ,, ,, six times a year
3. Tapped on S/2, d/2, 100% without stimulation (control)

Each treatment is applied to three tapping tasks on panel C of clone PB 86.

The yields recorded during the first 9 months of the experiment are given in Table 7.

TABLE 7

MEAN YIELDS OF STIMULATED PLOTS COMPARED WITH UNSTIMULATED PLOTS

	Tapped S/2, d/3, 67% and stimulated once in 2 months	Tapped S/2, d/2, 100% and stimulated once in 4 months	Tapped S/2, d/2, 100% control
No. of trees tapped	687	682	720
No. of Ethrel applications (9 months period)	4	2	—
*Total yield (3 tapping blocks)			
lb	4073.0	4048.5	2720.5
kg	1847.50	1836.39	1234.01
*Average yield/tapping block per day			
lb	24.2	10.5	16.4
kg	10.98	8.85	7.44

*Inclusive of scrap

Stimulation six times a year at a reduced tapping intensity of 67% has given comparable yields with tapping at 100% intensity combined with stimulation three times a year. However, stimulation at 67% intensity is likely to be more economical in view of the higher yields per tapping recorded.

Field Experiment No. 81—*Ethrel stimulation experiments—Panawatta Group:* (*L. B. Chandrasekera & D. A. Brahamana*)

These experiments are designed to assess the yield response to a progressive intensification of tapping before replanting after a period of Ethrel stimulation. Each of the following treatments are applied to two tapping tasks in each experiment on panel D of clone PB 86. Ethrel is applied on a 3.8 cm (1.5 in.) strip of scraped bark below the tapping cut and tapped on S/,2, d/2, 100% system.

Treatments

1. Ethrel stimulation once every two months (6 times a year)
2. „ „ „ „ 4 „ (3 „ „ „)
3. Unstimulated (control)

Experiment (1) 2 years stimulation before intensification of tapping commences PB 86 replanted in 1952.

(2) 3 years stimulation before intensification of tapping commences PB 86 replanted in 1954.

(3) 4 years stimulation before intensification of tapping commences. PB 86 replanted in 1956.

The yields are recorded on the basis of daily yields per tapping task. The results for the first three months of the experiments in 1974 are given in Table 8.

TABLE 8

MEAN YIELDS OF PLOTS STIMULATED AT DIFFERENT FREQUENCIES COMPARED WITH UNSTIMULATED PLOTS (TAPPED S/2, d/2, 100%)

	Stimulated once every 2 months	Stimulated once every 4 months	Unstimulated (control)
Experiment 1			
Number of Ethrel applications	2	1	—
Number of trees tapped	339	345	335
*Total yield for 3 months			
lb	961.0	774.0	705.0
kg	435.90	351.08	319.79
*Average yield/tapping/block			
lb	17.5	12.9	12.0
kg	7.94	5.85	5.44
Experiment 2			
Number of Ethrel applications	2	1	—
Number of trees tapped	209	224	224
*Total yield for 3 months			
lb	534.5	480.0	423.5
kg	242.45	217.73	192.10
*Average yield/tapping/block			
lb	18.8	16.1	14.3
kg	8.53	7.30	6.49
Experiment 3			
Number of Ethrel applications	2	1	—
Number of trees tapped	461	474	458
*Total yield for 3 months			
lb	1331.0	1091.5	852.0
kg	603.74	495.10	386.46
*Average yield/tapping/block			
lb	22.3	18.9	14.9
kg	10.1	8.57	6.76

*Inclusive of scrap

Field Experiment No. 82—Ethrel stimulation experiment—Elston Estate: (*L. B. Chandrasekera & D. A. Brahamana*)

This experiment compares the following treatments:

1) Three tapping tasks stimulated three times a year

2) „ „ „ unstimulated (control)

Ethrel is applied on a 3.8 cm (1.5) in.) strip of scraped bark below the tapping cut. All tasks are being tapped on S/2, d/2, 100% on panel C of clone PB 86 planted in 1952.

The yields recorded for the first 9 months of the experiment in 1974 are given in Table 9.

TABLE 9

MEAN YIELDS OF STIMULATED PLOTS COMPARED WITH UNSTIMULATED PLOTS (TAPPED S/2, d/2, 100%)

	Stimulated three times a year	Unstimulated (control)
Number of Ethrel applications	2	—
„ „ trees tapped	545	541
*Total yield for 9 months lb	3919.5	3015.0
kg	1777.87	1367.60
*Average yield/block/tapping lb	19.0	14.9
kg	8.62	6.76
Percentage scrap	16.1	10.8

*Inclusive of scrap

TAPPING EXPERIMENTS

Field Experiment No. 53—Tapping experiment, Dartonfield (*U. P. de S. Waidyanatha L. S. S. Pathiratne, M. A. Thilakasiri & Miss C. W. Ranasinghe*)

Six tapping systems are compared on a randomised block design with 5 tree plots replicated 8 times for clones RRIC 7, 45, 52 and replicated 6 times for clone PB 86. Tapping of all clones commenced in March 1968 on the S/2, d/2, 100% system. The various tapping treatments were introduced in 1971. The test tapping results for 1974 are given in Table 10.

TABLE 10

MEAN YIELD FOR 1974 (G/TREE/TAPPING)

Tapping system	RRIC 7	RRIC 45	RRIC 52	PB 86	Mean
S/2, d/2, 100%	30.9	29.9	34.0	33.6	32.1
S/2, d/1, 200%	15.7	19.1	23.4	25.5	20.9
S/1, d/4, 100%	33.3	41.6	45.6	56.2	44.2
S/1, d/3, 133%	24.2	36.8	44.0	65.0	42.5
2S/2, d/4, 100%	42.1	53.1	53.3	84.5	58.3
2S/2, d/3, 133%	23.9	51.1	57.4	62.3	43.7

When compared with the yields of control plots, there has been a trend towards declining yields with time for all clones tapped on tapping systems other than the S/2, d/2, 100% system. On the S/2, d/2, 100% system the yields of all clones have improved with time. However, clone PB 86 appears to have maintained satisfactory yields over the four year period of the experiment on the 2S/2, d/4, 100% tapping system.

Field Experiment No. 54—Tapping experiment, Dartonfield: (*L. B. Chandrasekera & D. A. Brahamana*)

The tapping systems S/2, d/3, 67% and S/2, d/2, 100% are compared on each of two clones PB 28/59 and RRIC 89. The two clones were planted in 1961 at approximately 650 trees per clones and tapped on S/2, d/2, 100% system since March 1968. In January 1971, each tapping system was introduced on approximately half the number of trees in each clone. The average yields recorded during the fourth year of the experiment are given in Table 11.

TABLE 11

COMPARATIVE YIELDS FOR TWO TAPPING SYSTEMS ON TWO CLONES

	RRIC 89		PB 28/59	
	S/2, d/2, 100%	S/2, d/3, 67%	S/2, d/2, 100%	S/2, d/3, 67%
g/dry rubber/tree/tapping 1973	29.9	39.7	33.7	48.0
*dry rubber/tree/year 1973				
(a) lb	9.2	8.2	10.4	9.9
(b) kg	4.2	3.7	4.7	4.5
Theoretical yield (130 tree/ac) 1973				
(a) lb/ac	1196.0	1066.0	1352.0	1287.0
(b) kg/ha	1340.5	1194.8	1515.4	1442.5
g/dry rubber/tree/tapping 1974	35.5	47.0	35.7	55.8
*dry rubber/tree/year 1974				
(a) lb	11.0	9.7	11.0	11.5
(b) kg	5.0	4.4	5.0	5.2
Theoretical yields (130 tree/acre) 1974				
(a) lb/ac	1430.0	1261.0	1430.0	1495.0
(b) kg/ha	1602.7	1413.3	1602.7	1675.6

* Theoretical value for 280 tapping days

The above results indicate that it would be more economical to tap clone PB 28/59 on the S/2, d/3, 67% system.

Field Experiment No. 59—Tapping experiment—Vogan Group (R. Satchuthananthavale & I. Amarasinghe)

This is a large scale trial in its 4th year of tapping. It compares the use of two tapping knives, the Michie-Golledge and the Jebong on two tapping systems S/2, d/2, 100% and 2S/2, d/4, 100% on clone RRIC 52. The tapping cuts were opened in 1971 at a height of 62" above the graft union. Over the four year period, standards of tapping with the Jebong knife has compared well with that of the Michie-Golledge knife. The statistics recorded during the four year period are summarised in Table 12.

TABLE 12

RESULTS OF TAPPING WITH MICHIE-GOLLEDGE AND JEBONG KNIVES

Tapping knife	Year	No. of test tapping	g/tree/tapping		Mean thickness of bark shavings in mm
			S/2, d/2, 100%	2S/2, d/4, 100%	
M–G	1971	10	17.86	58.42	1.6
J			17.04	61.90	1.5
M–G	1972	10	13.90	43.80	2.0
J			13.70	47.10	2.0
M–G	1973	12	19.48	59.63	2.6
J			19.02	63.30	2.0
M–G	1974	10	30.40	83.80	2.3
J			30.90	88.30	2.4

MEAN GIRTH INCREMENT IN CM

Year	M–G	J
1971/72	3.5	2.5
1972/73	4.9	3.1
1973/74	3.8	3.4

This trial indicates the possible use of the Jebong knife in Sri Lanka for opening trees for tapping at a height of 62" from the graft union, thereby increasing the period of tapping on virgin bark.

Field Experiment No. 74—Tapping experiment, Nivitigalakele: (*U. P. de S. Waidyanatha, S Wilbert & L. S. S. Pathiratne*)

This experiment consists of the following treatments applied to 50 tree plots replicated four times.

(1) Tapped S/2, d/2, 100% with an annual change over of tapping panels after the 3rd year.

(2) Tapped S/2, d/2, 100% down to the graft union before changing over of panels.

(3) Tapped S/2, d/1, 200% down to the graft union before changing over of panels.

Clone RRIC 45 planted in 1965 and first tapped on S/2, d/2, 100% in March 1972. The plots receiving treatment 1 are therefore still being tapped on panel A. The statistics recorded in 1973 and 1974 are given in Table 13.

TABLE 13

YIELD, GIRTH AND BROWN BAST STATISTICS FOR 1973 AND 1974

	S/2, d/2, 100%		S/2, d/2, 100%		S/2, d/1, 200%	
	1973	1974	1973	1974	1973	1974
Yield g/tree/tapping	39.1	53.9	38.1	48.5	35.1	41.8
Girth (cm)]	—	66.4	—	65.8	—	62.8
% Brown Bast	—	7.3	—	4.0	—	11.2

More trees have been affected with Brown Bast with daily tapping.

Field Experiment No. 85—*Tapping experiment—Nivitigalakele: (U. P. de S. Waidyanatha, S. Wilbert & L. S. S. Pathiratne)*

This experiment was planted in June 1970 with eight clones on a randomised block design with five replicates. Each monoclonal plot has over 50 trees and will be sub-divided into five sub-plots. Five tapping treatments will be tested on each clone after tapping commences. The girth statistics of this area for 1973 and 1974 are given in Table 14.

TABLE 14

GIRTH STATISTICS OF CLONES (IN CM) 1970 REPLANTING

Clone	1973	1974	Girth increments
RRIC 101	18.0	32.0	14.0
PR 252	19.7	28.7	9.0
AVROS 1734	17.7	29.5	11.8
RRIC 45	18.0	29.3	11.3
IRCI 2	13.8	23.7	9.0
RRIC 13	12.8	21.7	8.9
WR 101	14.9	27.3	12.4
RRIC 100	17.0	30.4	13.4

Clone Evaluation Trials

Field Experiment No. 7—1954 Clone Trial—Nivitigalakele: (*L. B. Chandrasekera & W. T. Silva*)

The test tapping yields of the two clones IRCI 7 and PB 28/59 are compared with clone RRIM 501 in Table 15. These two clones are now recommended for moderate scale commercial planting.

TABLE 15

COMPARATIVE YIELDS OF IRCI 7 AND PB 28/59 WITH RRIM 501 AS CONTROL YIELD OF DRY RUBBER PER TREE PER YEAR (140 TAPPINGS) (TAPPED S/2, d/2, 100% FROM MARCH, 1960)

	IRCI 7		PB 28/59		RRIM 501	
	lb	kg	lb	kg	lb	kg
1961	10.2	4.63	14.2	6.44	9.7	4.40
1962	9.2	4.17	15.3	6.94	11.9	5.40
1963	8.8	3.99	14.2	6.44	12.6	5.72
1964	9.5	4.31	15.1	6.85	13.6	6.17
1965	10.6	4.81	16.3	7.39	13.1	5.94
1966	13.1	5.94	19.5	8.85	13.9	6.31
1967	15.4	6.99	18.6	8.44	13.3	6.03
1968	14.8	6.71	17.2	7.80	12.5	5.67
1969	12.7	5.76	15.0	6.80	11.1	5.03
1970	10.9	4.94	13.7	6.21	10.0	4.54
1971	11.2	5.08	12.3	5.58	10.7	4.85
1972	11.3	5.13	12.0	5.44	10.0	4.54
1973	16.2	7.35	15.5	7.03	10.6	4.81
1974	17.9	8.12	16.2	7.35	13.3	6.03
Brown Bast cases	15		6		17	
Wind damage cases	1		1		3	
Mean girth 1974						
in.	32.7		35.0		29.8	
cm	82.9		88.8		75.6	

The yields from 1970 onwards are on bark of first renewal. The incidence of dry cuts in clone PB 28/59 on the S/2, d/2, 100% tapping system has been negligible. This may probably be due to the limited number of tappings that are possible in the wet districts in which this trial is located.

Field Experiment No. 14—1955 *Large Scale Clone Trial, Hedigalla.* (*L. B. Chandrasekera & S. Wilbert*)

The test tapping results of the two final selections in this trial are given in Table 16. These two clones have good secondary characters and are recommended for moderate scale commercial planting, particularly in the wet districts. The clones were first tapped in 1962.

TABLE 16

YIELD OF DRY RUBBER PER TREE PER YEAR
(140 TAPPINGS TAPPED S/2, d/2, 100%)

Year of tapping	RRIC 13		RRIC 50	
	lb	kg	lb	kg
1962	9.4	4.26	5.5	2.49
1963	10.2	4.63	10.5	4.63
1964	10.7	4.85	11.9	5.40
1965	14.0	6.35	12.4	5.62
1966	14.9	6.76	18.4	8.35
1967	16.7	7.58	18.1	8.21
1968	18.2	8.26	15.4	6.99
1969	15.2	6.89	15.4	6.99
1970	19.2	8.71	15.3	6.97
1971	17.3	7.84	15.8	7.17
1972	14.8	6.71	14.0	6.35
1973	15.1	6.85	14.0	6.35
1974	14.1	6.40	11.1	5.04
No. trees tapped 1974	437–466		344–371	
Girth 1974 in.	32.0		31.1	
cm	81.2		79.0	
Brown Bast cases	9		17	
Wind damage cases	17		5	

Field Experiment No. 16—1956 *Clone Trial, Hedigalla:* (*L. B. Chandrasekera & S. Wilbert*)

All clones are planted in monoclonal blocks of 300 trees per clone. Tapping commenced in 1963 and the test tapping results of the best selections for yield and good secondary characters are given in Table 17.

TABLE 17

YIELD OF DRY RUBBER PER TREE PER YEAR FOR 140 TAPPINGS

(TAPPED ON S/2, d/2, 100% FROM 1963)

Clone		Yield								
		1966	1967	1968	1969	1970	1971	1972	1973	1974
IRCI 9	lb	12.0	11.3	12.0	10.4	14.2	13.0	11.9	13.5	14.6
	kg	5.44	5.13	5.44	4.72	6.44	5.90	5.40	6.12	6.62
PR 252	lb	10.2	10.6	10.0	8.6	14.4	15.3	12.0	10.4	13.4
	kg	4.63	4.81	4.54	3.90	6.53	6.94	5.44	4.72	6.08
*RRIC 48	lb	12.3	12.8	10.8	11.4	12.3	10.7	8.3	12.6	11.2
	kg	5.58	5.81	4.90	5.17	5.50	4.85	3.76	5.72	5.08
PB 86	lb	8.7	9.1	8.0	8.3	11.2	12.8	11.1	10.0	10.3
	kg	3.95	4.33	3.63	3.76	5.08	5.81	5.03	4.54	4.67

*Tapped in 1964

The yield performance of all the above selections has been better than that of clone PB 86.

Field Experiment No. 19—1962 *Clone Trial, Nivitigalakele:* (*L. B. Chandrasekera & W. T. Silva*)

All clones are planted at 150 trees per clone. The test tapping results for the first six years are given in Table 18.

TABLE 18

YIELD OF DRY RUBBER PER TREE PER YEAR (140 TAPPINGS)
(TAPPED S/2, d/2, 100%)

Clone	average girth 1973			Yield					
	in.	cm		1969	1970	1971	1972	1973	1974
RRIC 5	29.3	74.3	lb	7.8	9.7	12.2	12.6	17.3	19.7
			kg	3.54	4.40	5.53	5.72	7.85	8.94
RRIC 93	25.0	63.6	lb	10.4	8.7	12.3	12.7	14.7	18.0
			kg	4.72	3.95	5.58	5.76	6.67	8.16
RRIC 39	27.7	70.4	lb	8.7	8.7	10.3	11.4	15.9	17.1
			kg	3.95	3.95	4.67	5.17	7.21	7.76
IAN 45-717	28.4	72.2	lb	9.0	8.6	7.6	8.1	12.0	14.6
			kg	5.08	3.90	3.45	3.67	5.44	6.62
RRIM 628	24.3	61.8	lb	16.0	15.1	11.3	13.4	12.3	13.9
			kg	7.26	6.85	5.13	6.08	5.58	6.31
RRIC 92	25.4	64.6	lb	10.7	11.2	10.1	10.7	9.0	13.8
			kg	4.85	5.08	4.58	4.85	4.08	6.26
PB 86	27.4	69.6	lb	9.2	8.4	8.2	8.8	10.6	13.7
			kg	4.17	3.81	3.72	3.99	4.81	6.21
RRIC 95	33.4	84.8	lb	10.6	8.1	9.2	9.7	10.3	12.9
			kg	4.81	3.67	4.17	4.40	4.67	5.85
RRIC 91	30.7	77.9	lb	7.8	9.1	9.0	10.4	11.7	12.8
			kg	3.54	4.13	4.08	4.72	5.31	5.81
RRIC 86	25.5	64.7	lb	8.1	6.3	8.8	10.4	12.7	12.6
			kg	3.67	2.86	3.99	4.72	5.76	5.72
RRIC 94	23.7	60.1	lb	13.8	12.0	10.3	11.2	12.4	12.6
			kg	6.26	5.44	4.67	5.31	5.62	5.72
RRIM 623	26.7	67.8	lb	10.3	8.7	9.6	10.3	10.9	11.5
			kg	4.67	3.95	4.35	4.67	4.94	5.22

A clone of particular interest in this trial is RRIC 5 which in addition to its promising yields is a very vigorous grower.

Field Experiment No. 23—1965 *Clone Trial—Dartonfield* (*L. B. Chandrasekera & D. R. Colonne*)

Clones RRIC 45, 88, 89, 90, 91 and RRIM 600 are planted in 50 tree plots replicated three times. The test tapping results for the first two years in tapping are given in Table 19.

TABLE 19

YIELD IN GRAMMES DRY RUBBER PER TREE PER TAPPING
(TAPPED S/2, d/2, 100% FROM JUNE, 1973)

Clone	Trees tapped 1974	Girth 1974		Yield g/tree/tapping	
		in.	cm	1973	1974
RRIM 600	103	25.2	64.0	43.5	42.5
RRIC 90	79	21.8	55.4	43.1	38.7
RRIC 89	75–73	23.9	60.7	34.0	34.9
RRIC 45	92	24.6	62.5	31.7	30.3
RRIC 91	97	27.6	70.1	27.4	27.4
RRIC 88	124	27.8	70.9	21.6	23.5

The clone RRIM 600 has been one of the best yielders in all trials where this clone has been planted.

Field Experiment No. 25—1957 *Clone Trial—Estate A—Kalutara District:*
(*L. B. Chandrasekera & I. H. Stephen*)

All clones in this trial are planted in monoclonal blocks of 300 trees per clone. Tapping commenced in March 1965 and the test tapping results from 1966 onwards are given in Table 20.

TABLE 20

YIELD OF DRY RUBBER PER TREE PER YEAR (140 TAPPINGS)
OF CLONE IRCI 2 COMPARED WITH CLONE PB 86
(TAPPED S/2, d/2, 100% FROM MARCH, 1964)

Clone		Yield							
		1967	1968	1969	1970	1971	1972	1973	1974
IRCI 2	lb	12.4	12.6	14.8	14.7	17.7	14.7	14.4	16.0
	kg	5.63	5.72	6.72	6.67	8.04	6.53	6.38	7.26
PB 86	lb	7.2	8.0	8.4	8.2	11.0	10.7	10.7	12.3
	kg	3.27	3.63	3.81	3.72	4.99	4.85	4.87	5.58

Clone IRCI 2 has consistently yielded better than the control clone PB86 and is now recommended for moderate scale commercial planting.

Field Experiment No. 26—1957 *Clone Trial—Estate B—Kalutara District* (*L. B. Chandrasekera & I. H. Stephen*)

This trial is planted in two blocks of 10 acres and 20 acres in plots of 300 trees per clone. Tapping commenced in 1964 and test tapping results of the best yielders are given in Tables 21 and 22.

TABLE 21

YIELD OF DRY RUBBER PER TREE PER YEAR (140 TAPPINGS) OF RRIM 623 AND WR 101 COMPARED WITH PB 86 (TAPPED S/2, d/2, 100% FROM MARCH, 1964)

Clone		Yield							
		1967	1968	1969	1970	1971	1972	1973	1974
RRIM 623	lb	9.9	12.0	11.9	12.1	12.3	10.6	11.0	12.2
	kg	4.49	5.45	5.45	5.49	5.58	4.81	4.98	5.53
WR 101	lb	11.4	10.0	10.2	9.2	9.4	11.8	12.2	12.5
	kg	5.18	4.54	4.63	4.18	4.27	5.35	5.52	5.67
PB 86	lb	7.9	8.4	8.5	8.5	9.7	8.9	10.7	8.7
	kg	3.95	3.81	3.86	3.86	4.40	4.04	4.84	3.95

TABLE 22

YIELD OF DRY RUBBER PER TREE PER YEAR (140 TAPPINGS) OF CLONE AVROS 1734, AS COMPARED WITH CLONE PB 86 (TAPPED ON S/2, d/2, 100% FROM APRIL, 1964)

Clone		Yield							
		1967	1968	1969	1970	1971	1972	1973	1974
AVROS 1734	lb	11.3	14.4	16.4	12.7	11.8	9.3	10.4	7.6
	kg	5.13	6.54	7.45	5.77	5.36	4.22	4.70	3.45
PB 86	lb	10.4	9.9	8.7	9.5	11.7	11.9	11.5	8.8
	kg	4.72	4.49	3.95	4.31	5.31	5.40	5.22	3.99

Clone WR 101 has been sensitive to Brown Bast on 100% intensity tapping. Clone RRIM 623 has not shown much yield improvement over the years in which it has been tapped.

The clone AVROS 1734 has recorded a yield decline on panel C.

Field Experiment No. 27—1958 *Clone Trial—Estate B—Kalutara District: (L. B. Chandrasekera & I. H. Stephen)*

All clones are planted in plots of 300 trees per clone. The test tapping results of the two selections IRCI 2 and RRIC 36 are compared with PB 86 in Table 23.

TABLE 23

YIELDS OF DRY RUBBER PER TREE PER YEAR (140 TAPPINGS) OF THE BEST YIELDING CLONES

(TAPPED S/2, d/2, 100% FROM APRIL, 1965)

Clone		Yield						
		1968	1969	1970	1971	1972	1973	1974
IRCI 2	lb	8.6	7.4	12.0	13.3	11.8	13.1	11.6
	kg	3.90	3.36	5.45	6.04	5.35	5.94	4.26
RRIC 36	lb	9.1	9.4	13.7	12.6	13.0	11.3	11.3
	kg	4.13	4.27	6.22	5.72	5.90	5.13	5.13
PB 86	lb	7.0	7.1	8.1	9.6	10.8	11.0	10.8
	kg	3.18	3.22	3.68	4.36	4.90	4.99	4.90

Clone RRIC 36 is particularly recommended for the dry districts where its yields have exceeded those of clone PB 86. The good performance of clone IRCI 2 is confirmed in this trial as well.

Field Experiment No. 29—1964 *yield trial—Salawa Estate:* (*L. B. Chandrasekera & U. K. D. Lewis*)

The four clones Nab 15, RRIC 45, 86 and 88 are planted in 150 tree plots replicated three times. Test tapping results for the first three years in tapping are given in Table 24.

TABLE 24

YIELD OF DRY RUBBER PER TREE PER YEAR (140 TAPPINGS) (TAPPED S/2, d/2, 100% FROM 1971)

Clone	Girth 1974	Yield				
			1971	1972	1973	1974
RRIC 45	in. 25.6	lb	6.6	8.9	17.3	13.3
	cm 64.9	kg	3.00	4.04	7.85	6.03
Nab 15	in. 27.8	lb	7.2	10.2	12.6	12.7
	cm 70.6	kg	3.27	4.60	5.71	5.76
RRIC 86	in. 25.9	lb	5.4	7.1	8.9	9.6
	cm 65.9	kg	2.45	3.23	4.04	4.35
RRIC 88*	in. 24.4	lb	4.9	5.8	8.0	9.5
	cm 61.9	kg	2.22	2.63	3.90	4.31

*clone RRIC 88 is susceptible to wind damage.

Field Experiment No. 41—1966 *Yield Trial—Yatawatta Estate:* (*L. B. Chandrasekera & D. R. Colonne*)

Four clones RRIC 36, 41, 86 and PB 86 are planted in 265 tree plots replicated three times. Owing to the relatively slower growth rate of rubber in this district replantings normally take an extra year or two to reach tappable girth as compared with the wet districts. Tapping this trial therefore commenced when the trees reached a girth of (18 in.) on a reduced intensity of 67 percent. It is proposed to continue tapping at this intensity for the first three years before changing over to the S/2, d/2, 100% tapping system. The test tapping results for the first two years are given in Table 25.

TABLE 25

YIELD IN GRAMMES DRY RUBBER PER TREE PER TAPPING
(TAPPED S/2, d/3, 67% FROM MARCH 1973)

Clone	Trees tapped 1974	Girth 1974 in.	cm	Yield 1973	1974
RRIC 36	443–506	20.7	52.7	27.3	28.8
PB 86	375–438	21.0	53.4	17.4	20.6
RRIC 41	529–572	21.5	54.5	15.7	17.5
RRIC 86	401–453	19.7	50.1	14.1	16.5

The performance of clone RRIC 36 in this district has been very satisfactory. There has been no incidence of panel diseases so far.

Field Experiment No. 44—1967 *Yield Trial, Udapolla Group, Polgahawela:* (*L. B. Chandrasekera & D. R. Colonne*)

Clones RRIC 36, 45, 89 and RRIM 600 are planted in 135 tree plots replicated three times. Tapping commenced in August 1973 and the test tapping results for the first two years are given in Table 26.

TABLE 26

YIELD IN GRAMMES DRY RUBBER/TREE/TAPPING
(TAPPED S/2, d/2, 100% FROM AUGUST, 1973)

Clone	Trees tapped 1974	Yield 1973	1974
RRIM 600	292/318	31.5	31.1
RRIC 36	255/335	31.1	30.6
RRIC 89	247/298	28.2	25.4
RRIC 45	261/330	21.4	24.8

The two clones RRIM 600 and RRIC 36 have recorded the best yields in this trial.

Field Experiment No. 51—1966 *Yield Trial—Dalkeith Group:* (*L. B. Chandrasekera & U. K. D. Lewis*)

Clones RRIC 45, 75, 88 and 89 are planted in 150 tree plots replicated three times. Test tapping results for the first two years are given in Table 27.

TABLE 27
YIELD IN GRAMMES DRY RUBBER PER TREE PER TAPPING
(TAPPED S/2, d/2, 100% FROM JUNE, 1973)

Clone	Trees tapped 1974	Girth 1974 in.	Girth 1974 cm	Yield 1973	Yield 1974
RRIC 89	110	18.2	46.2	20.4	24.1
RRIC 75	154	20.0	50.8	21.2	23.7
RRIC 45	95	18.1	96.0	20.7	23.0
RRIC 88	258	20.7	52.6	14.5	17.8

SPACING TRIALS

Field Experiment No. 24—*Spacing Trial, Kuruwita:* (*L. B. Chandrasekera & J. D. Karunatilleke*)

Each of the three clones RRIC 41, 45 and 52 are planted in 150 tree plots at spacings of 8' x 30' and 12' x 20' and replicated three times. Tapping commenced in 1971. The average yields and girths of clones in 1974 are given in Table 28.

TABLE 28
YIELD IN GRAMMES DRY RUBBER PER TREE PER TAPPING IN THE FOURTH YEAR

Clone	Planting spacing 8' x 30'			Planting spacing 12' x 20'		
	Girth 1974		Yield 1974	Girth 1974		Yield 1974
	in.	cm	g	in.	cm	g
RRIC 45	21.3	54.1	40.3	21.4	54.3	39.3
RRIC 41	23.8	60.5	39.0	24.2	61.4	39.7
RRIC 52	26.2	66.6	35.1	26.1	66.3	32.5
Mean	23.8	60.4	38.1	23.9	60.7	37.2

The two spacings have so far had no significant effects on either the rate of growth or yields of the three clones.

POLYCLONE TRIALS

A few small scale polyclone plantings were carried out to investigate the possibility of increasing yields from such plantings. A number of clones are planted as single tree plots distributed at random in the field. The test tapping results of two such trials are summarised below.

Field Experiment No. 83—1966 *small scale polyclone trial—Dartonfield:* (*L. B. Chandrasekera & D. M. Wickremasinghe*)

The clones RRIC 36, 45, 51, 52, 88, 89, 90, RRIM 623, 701, IAN 45-710 clone Nos. 226, 444, 451, 516, 663, 864, 1004, 1103, 1108, 1152, 1173, 1174, 1461, Nab 15 and Wagga 6278 are planted as unreplicated single tree plots. Test tapping results for the second year in tapping in 1974 are given below:

Average yield of dry rubber (g/tree/tapping)	—41.3
Average theoretical yield per tapping/tapper (250 trees)	—10.32 kg (22.8 lb)
Average girth of trees in the 8th year from planting	—75.1 cm (26.5 in.)

Field Experiment No. 84—1967 *Polyclone Trial—Hedigalla:*

Clones RRIC 41 45, 86, 88 and 89 are planted as single tree plots replicated 90 times. Of these the two clones RRIC 86 and 88 are now confirmed to be rather poor yielders. Tapping commenced in August 1974 and the test tapping results for the month of November 1974 are given below:

Average yield of dry rubber (g/tree/tapping)	—31.5
Average theoretical yield per tapping/tapper (250 trees)	— 7.87 kg (17.4 lb)
Average girth of trees in the 7th year from planting	—51.46 cm. (20.3 in.)

TABLE 29

Field expt.	Year planted	Extent		Clones	Points per clone	Average girth 1973		1974	
		ac	ha			in.	cm	in.	cm
45	1967	10	4.05	RRIC 36	175x3=525	12.2	30.9	15.1	38.3
				,, 45	,,	10.3	26.1	13.4	34.1
				,, 89	,,	11.5	29.1	14.1	35.9
				PB 86	,,	12.7	32.3	15.4	39.0
48	1969	10	4.05	RRIC 45	135x3=405	12.5	31.8	17.6	44.8
				RRIC 100	,,	11.5	29.2	15.5	39.3
				,,	,,	13.1	33.2	17.7	43.4
				AVROS 1734	,,	12.0	30.5	15.6	39.7
49	1969	27	10.93	RRIC 45	165x3=495	12.6	32.1	16.0	40.6
				,, 88	,,	11.2	28.4	14.4	36.6
				,, 89	,,	13.3	33.9	16.1	50.9
				,, 90	,,	10.7	27.3	13.8	35.1
				,, 91	,,	14.0	35.6	16.9	42.9
				,, 100	,,	11.1	28.2	14.7	37.3
				,, 101	,,	13.2	34.0	17.1	43.4
				RRIM 600	,,	13.2	33.5	16.0	50.6
				PB 86	,,	12.0	30.4	15.0	38.1
64	1971	35	14.16	RRIC 13	300x3=900	—	—	7.1	18.0
				,, 45	,,	—	—	8.0	20.3
				,, 48	,,	—	—	7.4	18.9
				,, 50	,,	—	—	6.7	17.1
				PR 252	,,	—	—	8.0	20.3
				IRCI 2		—	—	7.0	17.0
				AVROS 1734	,,	—	—	7.0	17.9
69	1970	10	4.05	RRIC 100	150x3=450	11.4	29.0	17.1	43.3
				,, 101	,,	11.4	29.0	16.4	41.7
				AVROS 1734	,,	10.8	27.4	15.6	39.6
				RRIC 45	,,	10.0	25.4	14.5	36.9
75	1972	10	4.05	RRIC 13	75x6=450	—	—	—	—
				,, 48	,,	—	—	—	—
				,, 103	,,	—	—	—	—
				PB 86	,,	—	—	—	—
77	1972	10	4.05	RRIC 102	115x3=450	—	—	—	—
				,, 103	,,	—	—	—	—
				IRCI 9	,,	—	—	—	—
				PB 86	,,	—	—	—	—

STOCK EXPERIMENTS

These experiments have been set down to evaluate the suitability of different types of clonal seedlings for replacing the now dwindling supplies of Tjir 1 clonal seed which are used as rootstocks. The results of the following trials indicate that seed from most of the recommended clones could be used as rootstocks for budgrafting.

Field Experiment No. 34—1966 *Small Scale Stock Experiment—Nivitigalakele:* (*A. C. I. Samaranayake & W. T. Silva*)

The trees in this trial had been in tapping since March 1972 on S/2, d/2, 100% tapping system. The mean girth of trees and yields recorded during the third year in 1974 are given in Table 30.

TABLE 30

Clonal family	Trees tapped	Mean girth cm	Mean yield g/tree/tapping
Tjir 1	8	64.4	32.6
RRIC 7	4	70.4	39.7
,, 41	11	65.0	35.2
,, 52	15	64.0	37.8
,, 86	10	68.7	40.3
,, 88	6	68.1	39.5
,, 89	15	62.9	36.9
H. spruceana	4	55.2	25.3

The seedlings of clone RRIC 52 were the most vigorous growers, but this growth vigour has had no marked effect on the rate of growth or yield of the scion.

Field Experiment No. 47—1968 *Small Scale Stock Experiment,—Nivitigalakele:* (*A. C. I. Samaranayake, W. T. Silva & L. S. S. Pathiratne*)

Seven seedling families are budgrafted with clone RRIC 45. The mean girth of trees at 6½ years age is given in Table 31.

TABLE 31

Clonal family	Mean girth cm
RRIC 7	50.5
,, 41	48.3
,, 52	52.0
,, 86	51.8
Glen 1	49.5
Wagga 6278	45.1
Tjir 1	46.5

Field Experiment No. 61—1969 *Stock Experiment—Nivitigalakele: (A. C. I. Samaranayake, W. T. Silva & L. S. S. Pathiratne)*

Clone RRIC 45 has been budgrafted on to six different clonal seedling rootstocks. The mean girth of trees at 5½ years of age is shown in Table 32.

TABLE 32

Clonal family	Mean girth cm
RRIC 5	43.4
,, 41	45.4
,, 52	43.6
,, 89	41.1
RRIM 623	44.1
Tjir 1	37.5

A leaf nutrient analysis carried out in collaboration with the Soils Chemistry Department indicated no significant differences in leaf N, P, K, Mg and Mn due to differences in rootstocks.

INTERCROPPING TRIALS

Field Experiment No. 71—1972 *Intercropping Trial—Farnham Estate:* (*L. B. Chandrasekera & U. K. D. Lewis*)

This trial consists of two sections both planted with clone RRIM 600 in 1971 at a spacing of 8' x 30'.

(a) Twelve plots, with a plot size of approximately 90' x 120', were selected at random and interplanted with passion fruit seedlings in July 1972. Twelve similar plots serve as the controls. A single row of passion fruit was planted centrally between the rubber rows at a spacing of 25 ft. within each row.

(b) Twelve plots, with a plot size of approximately 90' x 120', were selected at random and interplanted with bananas in June 1972. Twelve similar plots serve as the controls. A single row of bananas was planted centrally between the rubber rows at a spacing of 12 ft. within the row.

At the end of 2½ years from planting of the subsidiary crops the average girth recorded for rubber are given below.

TABLE 33

AVERAGE GIRTH OF RUBBER IN INTERCROPPING TRIALS

Crop interplanted	Interplanted plots		Control plots	
	in.	cm	in.	cm
Bananas	9.8	24.8	10.2	26.0
Passion fruit	10.2	25.9	9.8	24.9

The differences in girth of trees between various treatments are not significant.

Field Experiment No. 78—Intercropping Trial—Yatawatta Estate: (L. B. Chandrasekera & D. R. Colonne)

The clone RRIC 45 was planted at spacings of 8' x 30' in October, 1973. In the same year three plots with approximately 250 rubber planting points per plot were interplanted with bananas while three randomly distributed plots serve as the controls. The bananas were planted centrally between each pair of rubber rows spaced 12 ft. along the row. At the end of one year the growth of rubber in the interplanted plots, appears to be very satisfactory.

Field Experiment No. 79— 1973 Intercropping Trial—Yatawatta Estate: (L. B. Chandrasekera & D. R. Colonne)

This trial is set down to investigate the possibility of establishing cacao under mature rubber. Clone PB 86 is planted at spacings of 8' x 30'. A single row of cacao seedlings were planted centrally between each pair of rubber rows spaced 7 ft. along the row. At the end of one year the growth of cacao had not been satisfactory, probably due to the difficulty experienced in obtaining the necessary fertilizer.

OTHER INVESTIGATIONS

Rainguards (R. Satchuthananthavale & G. de Mel)

The field trial at Dartonfield has once again confirmed that the gutter type of rubber rainguard developed by the Botany Department could be used with advantage to minimise loss of tapping days due to wet weather conditions and thereby increase annual yields. For the year under review (1974), blocks fitted with rainguards had 53 days additional tapping which resulted in increased yields of 451.5 lb dry rubber for the two blocks. Both clones AVROS 385 and GT 1 have been moderate yielders under conditions in Sri Lanka. With high yielding material therefore, the yield increments with rainguards should be higher. No adverse effects such as increased incidence of dry trees or Bark Rot were observed. The details of tapping and crop records in this trial are given in Table 34.

TABLE 34

RAINGUARD EXPERIMENT—TAPPING AND CROP RECORDS FOR THE YEAR 1974

Month	Possible Tapping Days	CONTROL				RAINGUARD					
		Normal Tapping	Late Tapping	Rain Interference	Rain No Tapping	Normal Tapping	Late Tapping	Rain Interference	Rain No Tapping	Additional Tapping days	Additional Crop lb
Jan.	31	30	1	—	—	31	—	—	—	—	—
Feb.	27	23	3	—	1	25	2	—	—	1	7.70
Mar.	28	21	7	—	—	26	2	—	—	—	—
Apr.	26	7	6	1	12	16	6	—	4	8	62.37
May	28	13	3	1	11	17	3	2	6	5	30.40
June	30	8	5	2	15	11	12	2	5	10	95.95
July	31	6	7	1	17	11	15	2	3	14	127.20
Aug.	31	19	2	2	8	20	8	1	2	6	52.10
Sep.	30	12	2	2	14	16	7	—	7	7	58.80
Oct.	31	21	7	—	3	27	3	—	1	2	17.00
Nov.	29	27	2	—	—	27	2	—	—	—	—
Dec.	31	19	12	—	—	23	8	—	—	—	—
Total											
1974	353	206	57	9	81	250	68	7	28	53	451.52
1973	315	172	62	4	77	226	60	2	27	50	633.58

Bacterial coagulation of latex: (*R. Satchuthananthavale in collaboration with V. Satchuthananthavale, Plant Pathologist & R. Tharmalingam, Assistant Rubber Chemist*)

A bench model "fermentator" for the mass culture of bacteria in coconut water medium was made and initial trials carried out. Further progress was curtailed due to other responsibilities given to Mr. R. Tharmalingam, after his transfer to Ratmalana.

Tissue culture: (R. Satchuthananthavale, G. de Mel & C. Weerasinghe)

Hevea callus cultures were established from young stem sections of budded plants and seedlings. The callus exhibited very slow growth. Experiments were also carried out to induce organ formation in *Hevea* stem explants *in vitro*. Organ formation in such explants could be induced by the addition of auxins and kinins to modified Murashige and Skoogs medium. A high level of auxin induced root formation while a high level of kinin induced shoot development from axillary buds.

Physiology of disease resistance: (R. Satchuthananthavale in collaboration with V. Satchuthananthavale, Plant Pathologist)

Studies on total phenols of soft bark of normal and diseased tissues showed a variation in total phenols between clones and an increase in the total phenol content in diseased bark when compared with normal bark.

Nursery techniques—Variability in sprouting and growth of buds in brown buddings: (A. C. I. Samaranayake & R. B. Gunaratne)

Buds in the axils of scale leaves and normal leaves in brown bud-wood were used for budgrafting. Seedling stocks of 2-3 in. diameter at the root collar were selected. In two trials, a "scale bud" and a "leaf bud" were grafted on to each seedling at the same height, but on opposite sides. Seedlings on which both buddings were successful were cut back and planted in a completely randomised design. Table 35 gives the time taken for sprouting and rate of scion growth of budgrafts.

TABLE 35

Type of bud	Number of stumps	Number of buds sprouted	Mean time taken for sprouting (days)	Mean height of scion in cm
Trial I				20 *weeks after planting*
Scale	23	16	65.0	47.7
Leaf	23	19	51.0	56.5
Trial II				19 *weeks after planting*
Scale	44	30	56.1	44.1
Leaf	44	39	42.6	49.9

In another trial "scale buds" and "leaf buds" were grafted on to separate seedling stocks. The results of this trial are given in Table 36.

TABLE 36

Type of bud	Number of stumps planted	Number of buds sprouted	Mean time for sprouting (days)	Mean height of scion (cm) 16 weeks from planting
Scale	30	21	56.5	32.8
Leaf	30	27	38.3	48.9

In all three trials the percentage of buds that failed to sprout was significantly higher with "scale buds". The leaf buds sprouted within a shorter period and showed a higher growth rate when compared with "scale buds".

Another trial carried out to investigate whether there are differences in scion growth due to the position of "leaf buds" on budwood showed no such differences.

Latex studies: (*U. P. de S. Waidyanatha, L. S. S. Pathiratne & M. A. Thilakasiri*)

The effect of three successive tappings, at 30 min intervals between tappings, on the relative decrease in the percentage dry rubber content is being studied. Five trees from each of clones PB 86, RRIM 513, RRIC 7, 45, 52 and 88 were tapped on two separate occasions as described above. Data obtained so far are compared with plugging indices ascertained previously (Waidyanatha & Pathiratne, 1971) in Table 37.

TABLE 37

MEAN DIFFERENCE IN PERCENTAGE D.R.C. OF LATEX FROM FIRST AND LAST TAPPINGS AND PLUGGING INDICES

Clone	Mean difference in % d.r.c.	Plugging Index
RRIM 513	3.3	1.75
RRIC 45	4.2	2.45
PB 86	4.5	3.01
RRIC 52	5.7	3.59
RRIC 88	7.4	6.68

It appears that plugging index is directly related to the difference in the percentage d.r.c. of the first and last fractions of latex collected.

Nitrogen fixation by Legume Covers: (U. P. de S. Waidyanatha, L. S. S. Pathiratne & M. A. Thilakasiri)

Twenty two effective rhizobia cultures have been received from foreign institutions and are being maintained. Several of them are of the wide-spectrum type, capable of effectively nodulating on the roots of many grain legumes. They are being tested on both legume covers and on grain legumes in the laboratory before field testing.

Several methods of testing for nodulation were tried out in the laboratory. *Centrosema pubescens, Pueraria phaseoloides, Calopogonium mucunoides* and *Glycine max* (soya bean) were tested for nodulation *in vitro* by Gibson's method of partly enclosed culture on seedling agar slopes. The rhizobium "Nitragin S" in peat culture for soya bean and on agar culture of rhizobium R 968, a strain recommended by the RRIM for the cover crops mentioned were used. No nodulation was achieved. Desiccation of rootlets at the collar was noticed. Nodulation of soya bean was however observed by the same method when agar deeps instead of slopes were used. Good nodulation of several legumes was achieved in sterile sand. These successful methods are being used for testing the rhizobia available.

A survey of rhizobia in local rubber soils to ascertain their density in soil and also to select effective strains was initiated. A preliminary assessment of the frequency of nodulation was made using 6 in. deep, 8 in. diameter soil cores, extracted from three fields in Ambatenna Estate, Matugama, covered predominantly with *Pueraria phaseoloides*. Seeds of *Centrosema, Pueraria* and *Calopogonium* were sown in soil cores and the number of nodulated plants and the number of effective nodules per plant determined. These data are given in Table 38.

TABLE 38

NODULATION OF LEGUME COVERS IN SOIL CORES FROM DIFFERENT FIELDS IN AMBATENNA ESTATE

Legume	Field	% nodulated plants	Mean number of nodules per plant
Pueraria	1	80.8	2.6
	2	72.7	2.2
	3	58.3	1.7
Centrosema	1	28.0	1.8
	2	50.0	3.0
	3	0	0
Calopogonium	1	59.0	2.2
	2	0	0
	3	0	0

It is clear from the above data that the extent of nodulation was not satisfactory because nodulation of every plant is a common occurrence in soils sufficiently populated with rhizobia. The data thus emphasise the need for seed inoculation during establishment of soil covers in such situations.

Mutation Breeding (U. P. de S. Waidyanatha in collaboration with the Genetics & Plant Breeding Department)

Budwood of RRIC 100, 52, and 45 were irradiated with gamma rays from a cobalt source, available, at the C. A. R. I., Peradeniya. The number of successful buddings obtained so far were low both from irradiated and unirradiated budwood, possibly due to some factor involved in transportation or preservation of budwood.

ACKNOWLEDGEMENTS

The author acknowledges with thanks the valuable assistance given by Mr. W. G. V. Fernando the Senior Technical Assistant of the Botany Department, in the preparation of summaries and analysis of data from field experiments.

Index to field experiments

Experiment No.

7	1954 Clone Trial	—	Nivitigalakele
14	1955 Clone Trial	—	Hedigalla
16	1956 Clone Trial	—	Hedigalla
19	1962 Clone Trial	—	Nivitigalakele
23	1965 Clone Trial	—	Dartonfield
24	1965 Spacing Trial	—	Kuruwita
25	1957 Clone Trial	—	Estate A—Kalutara District
26	1957 Clone Trial	—	Estate B—Kalutara District
27	1958 Clone Trial	—	Estate B—Kalutara District
29	1964 Yield Trial	—	Salawa Estate, Hanwella
34	1966 Stock Experiment	—	Nivitigalakele
41	1966 Yield Trial	—	Yatawatta Estate, Matale
44	1967 Yield Trial	—	Udapolla Group, Polgahawela
45	1967 Yield Trial	—	Zion Estate, Rattota
47	1968 Stock Experiment	—	Nivitigalakele
48	1969 Yield Trial	—	Salawa Estate, Hanwella
49	1969 Yield Trial	—	Vogan Group, Matugama
51	1966 Yield Trial	—	Dalkeith Group, Latpandura
53	1971 Tapping Experiment	—	Dartonfield
54	1971 Tapping Experiment	—	Dartonfield
58	1971 Ethrel Stimulation Experiment	—	Malaboda Estate, Matugama
59	1970 Tapping Experiment	—	Vogan Group, Matugama
61	1969 Stock Experiment	—	Nivitigalakele
62	1971 Stock Experiment	—	Nivitigalakele
63	1971 Ethrel Stimulation Experiment	—	Eladuwa Estate, Paiyagala
64	1971 Yield Trial	—	Farnham Estate, Puwakpitiya
67	1971 Ethrel Stimulation Experiment	—	Dewalakanda Estate, Dehiowita
68	1972 Ethrel Stimulation Experiment	—	Eduragalla Estate, Ingiriya
69	1970 Yield Trial	—	Govinne Estate, Govinne
71	1972 Intercropping Trial	—	Farnham Estate, Puwakpitiya
73	1972 Ethrel Stimulation Experiment	—	Eladuwa Estate, Paiyagala
74	1973 Tapping Experiment	—	Nivitigalakele
75	1972 Yield Trial	—	Madultenne Estate, Waharaka
76	1973 Polyclone Planting	—	Dartonfield
77	1973 Yield Trial	—	Mirishena Estate
78	1973 Intercropping Trial (Bananas)	—	Yatawatta Estate, Matale
79	1973 Intercropping Trial (Cacao)	—	Yatawatta Estate, Matale
80	1974 Ethrel Trial	—	Talgaswela Estate
81	1974 Ethrel Trial	—	Panawatta Estate
82	1974 Ethrel Trial	—	Elston Estate
83	1966 Polyclone Trial	—	Dartonfield
84	1967 Polyclone Trial	—	Hedigalla
85	1970 Tapping Experiment	—	Nivitigalakele

REVIEW OF THE GENETICS & PLANT BREEDING DEPARTMENT

BY

D. M. FERNANDO

(*Head of Genetics & Plant Breeding Department*)

SUMMARY

Large scale yields of the RRIC 100 series show high initial yields for RRIC 101. Agroclimatic suitability is indicated by RRIC 100 & 101 for the wet zone, RRIC 103 for the dry zone, and RRIC 102 for areas affected by *Oidium* leaf disease. A RRIC 52 selfed clone, 4011, also showed satisfactory growth and yields at Matale. Further test at Trinidad on South American Leaf Blight (SALB) resistant selections sent from Sri Lanka in 1969 indicated that about 5 clones are worthwhile multiplying here if their yields are good. Better control of *Oidium* and *Gloeosporium* leaf disease on flowers selected for hand pollination was obtained in 1974.

DETAILED REVIEW

GENERAL

Further multiplication and screening against South American Leaf Blight at the RRIM unit at Trinidad confirmed resistance in five of the fourteen clones despatched in 1969. The yields of four of these clones are sufficient for larger scale planting. RRIC 100, 101, 102 and 103 showed better yields than the control clone RRIC 45 and RRIM 623 in many agroclimatic zones. A systemic fungicide containing Benomyl (Methyl 1—butylcarbamoyl 2—benzimidazolecarbamate) was found to effectively control *Oidium* and *Colletotrichum* attack on flowers of *Hevea* used for hand-pollination.

Food and Fibre Crops (*D. M. Fernando*):

Ramie selection R 1411 was found to grow satisfactorily on nursery beds. The newer varieties of sugar cane also showed satisfactory growth and appears promising for interplanting in young rubber if rabbit and porcupine damage can be controlled, and adequate fertilizer could be added.

Staff :

The Head of the Department was on duty throughout the year. Mr. N. E. M. Jayasekera, Assistant Geneticist, completed his Ph. D. Thesis on the "Analysis of Interactions in *Nicotiana rustica*" at the University of Birmingham. Mr. C. M. B. Ratnayake, Assistant Geneticist, continued post graduate studies at East Malling Research Station.

Visits :

The Head of the Department made 30 visits and the rest of the staff made 127 visits in connection with experimental and advisory work.

Conferences :

One paper entitled "*Hevea* Planting material for 2000 AD" was submitted to the Rubber Planters Conference at Kottayam, India, in January 1974 and another paper entitled "The increased use of SALB resistant material in Asian rubber planting" was submitted to the International Rubber Conference at Cochin, India in September 1974.

Research Investigations:

Clone evaluation: (*D. M. Fernando*)

RRIC 100, 101, 102 and 103 showed continued high yields in large scale trial. Suitability for the dry zone was shown by RRIC 103. SALB resistance was reported in further tests with clones 2473, 6004, 2418, 5329 and 8798 shipped from Sri Lanka to the RRIM unit at Trinidad in 1969. RRIC 100 and 101 could be assessed as suitable for wet low-country, RRIC 102 for upland areas where *Oidium* is prevalent and RRIC 103 for drier areas such as Passara and Moneragala. The small scale yields of RRIC 105 and RRIC 110 were outstanding and bulk purchase of budwood of these two clones were made by some estates.

Seedling variability-Tjir 1(*N.E.M.Jayasekera, Y.D.A. Senanayake & P.Samaranayake*)

Quarterly measurements of girth and micro-tappings were recorded and a paper was submitted to the Journal.

Hand-Pollinated Seedlings. (*W. D. Gunadasa, & K. B. Karunasekera*)

A micro-tapping of seedlings and budgrafts was completed and a selection of stumped budgrafts of clones with IAN & FX parentage was planted in South West Monsoon at Nivitigalakele.

Selection :

5000 seedlings from the RRIC 100 series and parents were planted at Nivitigalakele for resistance studies.

Hand-Pollination Programme: (*A. K. M. S. Senaratne*)

The RRIC 100 series on a nearby estate was used as the female parent and male flowers were transported from the different experimental stations and fields. Adequate fungicidal control was established and even though weather conditions were adverse 234 seedlings were obtained from 5326 pollinations. Progeny of SALB resistant FX 360, IAN 710, and FX 4098 were combined with RRIC 103 and RRIC 100.

Disease resistance.

Oidium: (*D. S. Gamage*)

1963 *Experiment 6A— Matale.*

Very few trees of the 45 tree plot of PB 86 could be brought into tapping in this clearing even after 10 years. The yields of RRIC 102 were as follows (tapped S/2, d/2, 100%).

YIELD IN G/TREE/TAPPING

Clone	Trees tapped	1970	1971	1972	1973	1974
RRIC 102	43	15.4	25.7	32.0	23.3	43.8
PB 86	8	—	—	—	16.4	36.1

1965 *Experiment No.* 10—*Matale* :

Yields improved in the second year of tapping. Clone 5329 and 6004, reported SALB resistant from Trinidad, were rather low yielding in the first years of tapping (Table 1). Clone 4011 of RRIC 52 selfed parentage showed appreciable resistance to *Oidium* leaf fall and could be recommended along with RRIC 102, RRIC 103 and 2427 for further planting in these districts above 1000 ft. elevation.

TABLE 1

1965 EXPERIMENT No. 10—MATALE

(TAPPED S/2, d/2, 100%)

Clone	Percentage	Trees tapped	Mean girth cm 1974	Yield g/tree/tapping	
				1973	1974
IAN 710	PB 86xF409	17	49.2	12.5	20.1
RRIC 52	Primary	8	56.6	5.7	13.7
RRIC 103	RRIC 52xPB 86	6	57.0	23.8	35.5
1108	RRIC 52xRRIC 7	14	56.4	12.3	20.5
2427	RRIC 45xFX 4098	27	51.0	11.3	24.6
2462	RRIC 88xFX 4098	32	55.9	12.3	24.8
4011	RRIC 52xRRIC 52	5	48.7	17.5	28.1
5329	IAN 3434xRRIC 52	20	55.8	9.4	20.4
5334	,, x ,,	29	53.6	15.0	18.7
6004	RRIC 52xIAN 2750	20	53.6	4.4	11.9

Phytophthora :

A heavy fruit set caused extensive defoliation in IAN 710 at Kuruwita. RRIC 103 showed some branch angle canker in a few trees caused by infection at cracks resulting from pressure of latex. In RRIC 103 clearings in tapping this tendency diminishes.

South American Leaf Blight (SALB) :

1960 *Experiment* 1 *A*. (*W. D. Armon*)

IAN 873 showed some depression in yields on being shifted from 2S/2, d/4 to S/2, d/2 tapping system in 1974 (Table 2).

TABLE 2

1960 EXPERIMENT 1A

(TAPPED S/2, d/4 UP TO 1974 AND S/2, d/2, 100% FROM 1974)

Clone	Trees tapped	Mean girth cm 1974	Yield g/tree/tapping					
			1969	1970	1971	1972	1973	1974
IRCI 7	36	79.4	48.6	39.8	41.8	45.5	41.8	47.2
IAN 873	34	82.0	38.5	33.4	35.5	29.8	30.5	29.6
PB 86	40	71.3	26.4	29.8	33.3	24.0	30.2	30.6

1965 *Experiment No.* 8. (*D. S. Gamage*) :

Clone 2473 (69.c,2) continued to show resistance to SALB at Trinidad and was multiplied for further planting. Other clones of SALB resistance origin showed favourable yields, as shown in Table 3, and arrangements to ship a second consignment for SALB test are under consideration.

TABLE 3

1965 EXPERIMENT No. 8

(TAPPED S/2, d/3, 67% AND S/2, d/2, 100% FROM 1974)

Clone	Parentage	Trees tapped	Yield g/tree/tapping					Dry bark
			1970	1971	1972	1973	1974	
RRIC 102	RRIC 52xRRIC 7	7	25.8	32.4	35.4	57.2	51.7	
6306	RRIC 36xFX 516	9	23.9	34.9	32.0	34.5	42.7	
2417	RRIC 45xFX 4098	11	21.7	31.0	30.1	39.7	49.7	
2473	RRIC 45xIAN 873	14	14.8	23.2	27.9	30.7	41.8	
1461	RRIC 52xT792	12	20.0	27.2	27.1	29.4	32.8	
2885	Ch 26xRRIC 52	13	14.6	20.9	22.7	28.1	30.5	
5352	RRIC 52xIAN 710	14						
5326	RRIC 51xF 4542	9						
6182	PB 28/59xIAN 873	13	14.7	18.7	24.7	29.3	32.5	
RRIM 623	PB 49xPilB 84	12	16.2	16.1	17.4	20.4	26.2	
RRIC 45	RRIC 8xTjir 1	121	18.7	22.7	23.1	23.7	27.0	2
IAN 710	PB 86xF 409	13	13.7	16.9	16.8	28.1	22.6	

Clone Trials :

1961 *Experiment* 1. (*B. M. S. G. Peiris*) :

In the 8th year of tapping RRIC 100 and 101 showed a small increase in yield (Table 4). These yields are economic on reduced intensity systems particularly where it has not been possible to maintain the required agricultural inputs. On clones with a very rapid rate of girthing it is seen that (Table 5) substantial yields could be obtained.

TABLE 4

1961 EXPERIMENT 1

(TAPPED 67% FROM 1970)

Clone	Trees tapped	Girth (cm) 1974	Yield g/tree/tapping				
			1970	1971	1972	1973	1974
RRIC 100	10	73.5	58.6	51.3	56.7	61.4	69.9
RRIC 100	4	70.5	78.5	59.8	60.4	66.6	73.5
RRIC 101	7	71.9	46.1	35.0	45.6	50.6	62.8
RRIC 104	3	88.6	68.4	56.4	55.1	64.5	69.0
1305	5	84.3	51.4	58.2	76.0	77.1	67.0
PB 86	37	77.9	40.2	45.7	44.8	53.4	55.2

TABLE 5

INTENSIVE TAPPING EXPERIMENT

(TAPPED 2S/2, d/3, 133% INTENSITY)

Clone	Trees tapped	Girth cm 1974	Yield g/tree/tapping				Brown Bast trees
			1971	1972	1973	1974	
715	3	82.5	124.8	104.6	117.1	87.0	1
1057	3	95.4	116.6	114.3	116.3	118.6	
1793	4	94.5	115.5	102.0	97.7	79.3	
1799	4	83.9	139.6	128.9	126.3	129.0	
1851	3	98.2	122.6	122.4	98.0	99.0	
RRIC 52	5	84.5			70.6	81.0	1
PB 86	25	83.3			57.8	92.4	

1962 *Expertment No.* 3. (*W. A. C. Wijesinghe*)

Owing to rain interference and consequent interrupted tapping the test-tapping yields tended to be uneven and the increased yields per tapping could also be due to the reduction in trees per acre after the cyclone in 1973. The yields are given in Table 6.

TABLE 6

EXPERIMENT No. 3

(TAPPED S/2, d/2, 100%)

Clone	Trees tapped	Girth cm 1974	Yield g/tree/tapping				
			1970	1971	1972	1973	1974
RRIM 701	193	70.2	51.7	51.7	70.9	55.5	52.5
RRIC 36	148	68.1	37.3	43.0	43.0	58.4	66.8
RRIM 628	115	57.5	38.0	39.6	52.4	48.5	47.0
RRIM 623	170	70.6	49.7	36.9	41.9	48.1	57.5
PB 86	161	67.6	31.9	36.1	45.8	50.8	61.9
RRIC 37	95	64.8	38.7	32.3	51.6	53.2	49.9
RRIC 7	94	64.4	37.0	26.1	34.2	31.7	47.0
RRIC 52	227	76.0	14.8	19.9	30.7	31.1	36.2

1962 *Experiments* 4 & 5. (*D. S. Gamage & B. M. S. G. Peiris*) :

Prolonged wet weather in these areas gave rather high yields on test-tap. RRIC 102 at both Nivitigalakele and Kuruwita yielded best in both small scale clone trials. In view of large scale areas of this clone coming into tapping it has been decided to close these two experiments.

1963 *Experiment No.* 6—*Kuruwita.* (*B. M. S. G. Peiris*) :

The yields and growth of RRIC 105 were very satisfactory. Clone 4011 which was found resistant to *Oidium* leaf disease at Matale also showed appreciable yields at Kuruwita. Tapping intensity was changed to S/2, d/2, 100% in 1974.

TABLE 7

1963 EXPERIMENT 6A.

(TAPPED S/2, d/3, 67% UP TO 1973 AND S/2, d/2, 100% in 1974)

Clone	Trees tapped	Girth cm 1974	Yield g/tree/tapping				
			1970	1971	1972	1973	1974
RRIC 105	5	81.2	70.8	78.8	95.1	54.9	64.0
RRIC 108	7	65.6	62.2	55.8	48.7	51.9	44.4
RRIC 109	6	80.3	49.9	73.7	57.3	68.7	58.4
4011	7	72.1	47.5	54.4	53.0	67.3	63.6
4008	10	78.8	32.8	40.7	41.0	45.1	47.7
3606	3	79.8	50.4	71.0	65.6	72.8	50.2
3076	6	63.1	56.7	43.4	50.1	67.4	47.5
1620	5	73.0	57.2	57.8	49.5	66.6	52.0
T 132	8	67.8	41.1	52.8	60.0	62.8	60.7
2994	8	76.1	42.0	53.9	55.7	53.8	54.3
PB 86	58	67.4	28.5	33.3	36.4	41.2	39.0

1964 *Experiment No.* 7. *(B. M. S. G. Peiris)* :

The tapping intensity was changed from 67% to alternate daily, half spiral, 100% and a slight decrease per tapping was observed for RRIC 102 and 110 though the yield per acre per year on this basis increased considerably, amounting to over 2500 kg/ha for these two clones (Table 8). More trees of all the clones were brought into tapping in 1974.

TABLE 8

1964 EXPERIMENT No. 7

(TAPPED S/2, d/3, 67%; * S/2, d/3, 100%)

Clone	Trees tapped	Yield g/tree/tapping				
		1970	1971	1972	1973	1974*
RRIC 102	71	44.3	46.8	49.8	63.8	62.3
RRIC 110	12	61.9	64.2	66.3	81.5	73.5
266	20	41.6	46.8	47.8	44.5	53.4
1152	15	32.5	33.4	34.1	52.4	45.6

1965 *Experiment No. 9. Moneragala :*

Test tapping in this experiment reflected rather accurately the kg/ha owing to the absence of rain interference. As shown in Table 9 RRIC 103 and 101 showed satisfactory early yields in these drier areas as evaluated from those trees in tapping from three or more replications of ten trees each. A large scale plot of RRIC 103 is expected to come into tapping in 1976. In the wet zone RRIC 101 initial yields were higher than RRIC 103 but in Moneragala, RRIC 103 approaches 1000 kg/ha while RRIC 101 approaches only 800 kg/ha in the second year of tapping. This evaluation is however after appreciable elephant damage in 1972 which reduced the number of trees per ha.

TABLE 9

EXPERIMENT No. 9—MONERAGALA

(TAPPED S/2, d/2, 100%)

Clone	Trees tapped	Yield in g/tree/tapping	
		1973	1974
RRIC 101	11	31.5	30.9
1307	10	30.2	19.0
1487	9	22.6	28.7
RRIC 102	12	20.0	20.0
RRIM 623	21	19.6	18.1
RRIC 103	16	17.8	19.1
1305	14	15.6	22.6
RRIC 104	12	15.2	20.0
RRIC 45	20	14.1	16.5
IAN 701	7	15.3	15.5
266	23	12.1	13.6

1966 *Experiment No. 11—Kuruwita (B. M. S. G. Peiris) :*

Yields per tapping were satisfactory (Table 10), but on a per ha or per ac basis yields were depressed owing to the loss of trees due to wind damage. Hence RRIC 103 exhibited approximately one-third of the yield per ha of a similar plot at Nivitigalakele.

TABLE 10

1966 EXPERIMENT No. 11—KURUWITA

(TAPPED S/2, d/3, 67%)

Clone	Trees tapped	Yield g/tree/tapping				Kg/ha
		1971	1972	1973	1974	1974
RRIC 101	176	48.2	54.5	47.4	61.6	1503
RRIC 103	110	31.7	38.1	39.1	61.9	778
RRIC 45	136	28.3	29.2	29.3	45.4	631

1966 *Experiment No.* 12—*Nivitigalakele* (*H. B. H. de Silva*) :

Yields were very satisfactory in this area (Table 11) and the wind damage observed on RRIC 103 at Kuruwita was not observed at Nivitigalakele.

TABLE 11

1966 EXPERIMENT NO. 12—NIVITIGALAKELE

(TAPPED S/2, d/3, 67%)

Clone	Trees tapped	Yield g/tree/tapping				Kg/ha
		1971	1972	1973	1974	1974
RRIC 103	246	28.7	29.8	43.5	74.2	2093
1004	201	25.7	23.6	29.1	42.7	1158
RRIC 45	175	30.8	27.7	38.4	50.0	1318

1967 *NE Experiment No.* 16—*Neboda* (*A. K. M. S. Senaratna*) :

RRIC 103 showed the best yields in this experiment (Table 13). Both clones showed satisfactory leaf but as tapping commenced at the age of 4 years and 9 months there was an incidence of dry trees observed after S/2, d/2, 100% tapping intensity combined with recovery tapping.

TABLE 13

1967 EXPERIMENT NO. 16—NEBODA

(TAPPED 67% IN 1972, S/2, d/2, 100% FROM 1973)

Clone	Trees tapped	Girth cm 1974	Brown Bast rested trees	Yield g/tree/tapping			Kg/ha 1974
				1972	1973	1974	
RRIC 103	403	65.6	12	16.2	31.0	36.4	2126
RRIC 102	236	60.2	4	27.2	28.1	33.9	2071
1004 313	313	62.5	8	14.9	19.2	21.8	1211
RRIM 623	262	59.8	10	27.0	29.1	31.9	1748

1967 *NE Experiment No.* 17—*Peenkande* (*W. D. Armon*) :

As shown in Table 14 appreciable yields on a S/2, d/3, 67% system were shown by RRIC 100 and 101. Clone 815 showed the best growth in this area and may be very suitable for part year 2S/2, d/3, 133% tapping, when prices are above average. The extra trees brought into tapping in the plots of RRIC 45 and RRIM 623 reduced the mean girth of the plots in 1974. A potential of 1500 kg/ha is shown by RRIC 101 for 1974 in this trial.

TABLE 14

1967 NE EXPERIMENT No. 17—PEENKANDE

(TAPPED S/2, d/3, 67%)

Clone	Trees tapped	Girth cm		Yield g/tree/tapping	
		1973	1974	1973	1974
RRIC 100	381	59.0	61.1	38.3	48.8
RRIC 101	357	55.5	56.3	68.0	58.9
1004	258	53.5	57.4	34.8	34.9
815	347	64.0	69.9	31.8	46.9
RRIM 623	342	56.9	56.9	49.6	44.8
RRIC 45	269	51.4	51.4	48.9	33.3

1967 *NE Experiment No. 20—Bibile (H. B. H. de Silva)* :

Tapping cuts were opened late 1974 and it is proposed to measure yields from 1975. The girths of the different clones are given in Table 15.

TABLE 15

1967 NE EXPERIMENT No. 20—BIBILE.

GIRTH MEASUREMENTS

Clone	Trees measured	Girth cm		
		1972	1973	1974
RRIC 100	542	30.7	35.4	43.4
RRIC 101	422	33.8	38.5	45.0
RRIC 103	284	32.7	38.4	46.8
IAN 710	395	26.1	33.8	30.8
1004	356	29.3	33.3	37.1
1108	502	36.4	41.4	49.8
1305	391	34.0	38.9	48.8
1010	138	24.7	28.4	32.2
RRIC 45	464	30.8	34.9	38.8

1967 *Experiment No.* 14 *Kalutara* (*H. B. H. de Silva*) :

The second year yields of RRIC 101 on a S/2, d/3, 67% tapping system were very satisfactory (Table 16). Some susceptibility to *Gloeosporium* was observed on the leaves of RRIC 102 in this clearing. It is seen that in contrast to experiment 17, clone 815 was rather low yielding and an increase in tapping intensity may be possible in regard to such clones which show a rapid rate of girthing.

TABLE 16

1967 EXPERIMENT No. 14—KALUTARA

(TAPPED S/2, d/3, 67%)

Clone	Trees tapped	Girth cm		Yield g/tree/tapping		Kg/ha
		1973	1974	1973	1974	1974
RRIC 101	267	45.8	51.5	52.0	70.3	1966
RRIC 102	211	48.7	54.7	34.2	55.9	1407
815	352	56.2	62.4	23.2	26.5	751
RRIM 623	127	49.7	53.4	28.6	32.9	799

1967 *Experiment No.* 15 (*W. A. C. Wijesinghe*) :

Clone 10570 (RRIC 45xPB 28/59) which showed very high yields in the first year of tapping had 5 of the 21 trees in tapping affected by brown bast in the second year. Clone 8798 (LCB 1320x*H. spr*) was reported rather resistant to SALB from the RRIM unit at Trinidad but the yields were very low. The yields of the other clones are given in Table 17.

TABLE 17

EXPERIMENT No. 15—KURUWITA

(TAPPED S/2, d/3, 67%)

Clone	Parentage	Trees tapped	Girth cm		Yield g/tree/tapping	
			1973	1974	1973	1974
8811	LCB 1320xRRIC 52	2	60.3	63.9	42.2	59.0
5682	Fx 25xCh 26	24	54.4	57.7	24.8	27.2
8501	RRIC 52xFx360	11	62.3	67.4	20.4	23.1
7281	IAN 873xRRIC 52	12	51.8	58.4	16.4	20.6
RRIM 623	PB 49xPil B 84	31	51.5	56.2	28.0	29.1

1968 *Experiment No. 22—Kelani Valley (W. A. C. Wijesinghe)* :

The yields of RRIC 103 as seen in Table 18 were very satisfactory in the first year of tapping. The kg/ha yields in the last column are corrected for the actual stand per hectare of trees in tapping. Though a rather large crown tends to make RRIC 103 rather top-heavy in the wet zone, avoidance of valleys and high water-tables would still be worth-while in view of the vigour, *Oidium* resistant canopy and high initial yields.

TABLE 18

1968 EXPERIMENT No. 22—KELANI VALLEY

(TAPPED S/2, d/2, 100%)

Clone	Trees tapped	Yield g/tree/tapping 1974	Kg/ha 1974
RRIC 103	774	26.6	1223
82	683	21.0	742
1173	607	28.8	921
RRIC 45	508	25.3	528
C 695	534	24.4	674

Immature Areas.

Tapping at 18 in. girth is to be commenced in 1975 on the 1968 and 1969 clone trials at Kuruwita.

1969 *NE Experiment No. 29—Eladuwa (A. K. M. S. Senaratne)* :

The mean girths of large plots contrasted with fully randomized (31 replicate) single tree plots are shown in Table 19. RRIC 103 and RRIC 101 show the best growth and tapping is expected to commence in 1975.

TABLE 19

1969 NE EXPERIMENT No. 29—KALUTARA

Clone	Trees measured	Girth cm 1974	Randomized Trees measured	Randomized Girth cm 1974
RRIC 103	532	45.3	31	48.3
RRIC 101	603	45.3	31	48.3
RRIC 100	205	41.6	32	40.3
82	500	42.3	31	44.3
1305	511	42.4	30	48.0
1173	363	42.9	—	—
1458	548	40.5	30	42.2
RRIC 45	400	40.2	176	42.2

Index to field experiments :

Field Experiment		*Description*	*District/Site*
1	1961	small scale clone trial	Kuruwita
1A	1960	clone trial	Peenkande
2	1961	clone trial	Kuruwita
3	1962	large scale clone trial	Kuruwita
4	1962	small scale clone trial	,,
5	1962	,, ,, ,, ,,	Nivitigalakele
6	1963	,, ,, ,, ,,	Kuruwita
6A	1963	,, ,, ,, ,,	Matale
7	1964	clone trial	Kuruwita
7A	1964	*Gloeosporium* test	Nakiadeniya
8	1965	small scale clone trial	Dartonfield
9	1965	clone trial	Moneragala
10	1965	clone trial	Matale
11	1966	clone trial	Kuruwita
12	1966	,, ,,	Nivitigalakele
13	1966	,, ,,	Moneragala
14	1967	,, ,,	Nivitigalakele
15	1967	small scale clone trial	Kuruwita
16	1967	clone trial	Gikiyanakande
17	1967	,, ,,	Peenkande
18	1967	,, ,,	Gampola
19	1967	,, ,,	Hedigalla
20	1967	,, ,,	Bibile
21	1968	small scale clone trial	Kuruwita
22	1968	clone trial	Pannagula
23	1968	,, ,,	Hedigalla
24	1968	,, ,,	Bibile
25	1968	,, ,,	Wariapola
25A	1968	small scale (supply)	Sirikandura
26	1969	clone trial	Sirikandura
27	1969	,, ,,	Pantiya
28	1969	small scale clone trial	Kuruwita
29	1969	clone trial	Eladuwa
30	1969	,, ,,	Hedigalla
31	1970	,, ,,	Palmgarden
32	1971	polyclone planting	Tatuwalakande
33	1971	,, ,,	Lened
34	1971	,, ,,	St. Andrews
34A	1972	stock/scion experimenting	Nivitigalakele
35	1972	seedling trial	Nivitigalakele
36	1973	clone trial	Ambatenne
37	1973	,, ,,	Bibile
38	1974	,, ,,	Nivitigalakele.

REVIEW OF THE PLANT PATHOLOGY DEPARTMENT

BY

O. S. PERIES

(Director, RRISL & Head of Plant Pathology Department)

SUMMARY

Observations made during the year showed that the incidence of leaf diseases of *Hevea* had been mild.

Laboratory and field experiments carried out on the control of different root diseases have given promising results and these methods are being further investigated. Detailed investigations on Black Root disease of rubber caused by *Xylaria* spp., to determine the symptomatology, nature of spread of the fungus and its control, have been undertaken on several outside estates.

Screening of clones to test for resistance against *Oidium* spp., *Gloeosporium* spp. and *Phytophthora* spp. and also to determine the basis of inheritance of disease resistance characters is being carried out.

DETAILED REVIEW

Staff

The Department functioned under the overall supervision of the Director, Dr. O. S. Peries. The Plant Pathologist, Dr. (Mrs.) V. Satchuthananthavale and the Assistant Plant Pathologist, Dr. A. de S. Liyanage were on duty throughout the year. Mr. G. W. Liyanage, Assistant Plant Pathologist, continued his post graduate studies at Wye College, University of London, U.K.

Mr. Z. E. Irugalbandara who was acting Senior Technical Assistant of the Department was confirmed in that post. Messrs D. M. Dantanarayana, L. Halangoda and S. S. Jayasooriya, Technical Assistants, were on duty throughout the year.

Messrs A. Dharmaratne, W. Amaratunga and S. Wettasinghe were appointed Technical Assistants on 4th March 1974.

Mr. S. A. R. D. Sebastian, Technical Assistant, resigned from the services of the Institute in August.

The Director attended two meetings convened by the UNIDO to study the impact of the rubber industry, both natural and synthetic, on the environment. Both meetings were held in Vienna, Austria the first in April and the next in September.

Visits

The Departmental staff paid the following visits during the period under review for advisory, experimental and other purposes:

Advisory	16
Experimental	81
Others	14
Total	111

These include:

Smallholders' Conferences	4
Planters' Association Meeting, Kegalle	1
Field day on Black Root disease for Kegalle Planters at Parambe Group	1
Committee Meetings of the Section B of the CAAS	2
Formulary Committee Meetings	2
Annual Session of the CAAS.	

Publications

The following papers were prepared for publication by the staff of the Department, during 1974:

1. V. Satchuthananthavale, R. Satchuthananthavale & D. M. Dantanarayana —Screening of clones for Black Stripe disease in *Hevea*—presented at the Indian Rubber Conference.

2. V. Satchuthananthavale, R. Satchuthananthavale & D. M. Dantanarayana —The evaluation of inherent resistance/susceptibility of *Hevea* cultivars to black stripe disease.

3. O. S. Peries—Director's Review for 1973.

4. O. S. Peries—Review of the Plant Pathology Department.

5. O. S. Peries—Review of the Soils Chemistry Department.

Laboratory Investigations

Physiology of Disease Resistance in Hevea

a) Plants in the nursery were tested for disease reaction; by a screening technique adopted for mature rubber trees, disease reaction was found to be similar to that observed on mature trees.

b) Low concentrations of zoospores in suspension were used to inoculate both mature trees and immature plants. Concentrations as low as ten zoospores per ml caused infection in susceptible clones.

c) Total phenolic content of the bark of both healthy and artificially inoculated *Hevea* trees is being investigated. A paper entitled "Studies on disease resistance in *Hevea* with reference to Black Stripe" is being prepared for publication.
(V. Satchuthananthavale, R. Satchuthananthavale & D. M. Dantanarayana)

Biology of Phytophthora palmivora

Studies on variation within isolates occurring on *Hevea*—Studies carried out so far indicate that the cultural and morphological characteristics are not reliable criteria to group the isolates into two types. Variations in cultural and morphological characteristics occur within isolates as well as within single zoospore isolates of the same species, so that one and the same species could be easily placed under different specific epithets. (V. Satchuthananthavale)

Cultures were sent to the Commonwealth Mycological Institute, Kew, U.K. and to the Central Bureau Voor Schimmelcultures, Baarn, Holland for identification.

Isolates belonging to Group II were induced by the presence of *Trichoderma* species to produce oospores in single culture within a week. Some of the Group I isolates were subjected to similar conditions but they failed to produce oospores.

In studies on nutrition and other factors affecting growth and sporulation of *Phytophthora* isolates from *Hevea*—rubber leaf extract agar is being tried out for growth and sporulation in place of Lima Bean Agar.

Various concentrations of rubber leaf extract with various concentrations of glucose and nitrates have been tried out. Indications are that the fungus will grow normally and produce sporangia on a medium with a low concentration of rubber leaf extract and nitrates alone. Further work is required to modify the medium to induce good sporangia formation. (V. Satchuthananthavale & S. S. Jayasooriya).

Studies on Fomes lignosus

Hevea roots of various sizes were buried in soil amended with sulphur and in soil without any treatment (control). All the roots buried in both soils had decayed completely at the end of three and a half years and sulphur treatment had not affected the decomposition in any manner.

In an experiment it was demonstrated that H_2S is the volatile substance evolved in the sulphur treated soils. Its effect on *Fomes lignosus* is being investigated. (V. Satchuthananthavale & L. Halangoda).

Soil Microbiology

The studies on the fungi associated with the various rubber growing soils in Sri Lanka, were concluded. The results of these studies will be written up for publication in due course. (O. S. Peries & S. A .R .D. Sebastian).

Bacterial Coagulation

A table model culture vessel was used for culturing the specific bacterium and this culture was tried out for coagulation of latex. (V. Satchuthananthavale, R. Satchuthananthavale & R. Tharmalingam).

Screening of fungicides against Gloeosporium spp.

Several fungicides were tested in the laboratory to select the most effective ones, prior to testing them in the field. (A. de S. Liyanage & A. Dharmaratne).

Studies on Gloeosporium *leaf disease*

Several isolates of *Gloeosporium* were collected from Dartonfield and other estates to be used in laboratory experiments. (A. de S. Liyanage, W. Amaratunga & A. Dharmaratne).

Anatomy of bark

The anatomy of virgin bark, renewed bark and bark callus is being studied to find out the distribution of latex vessels in each of them. The results of the study will indicate the economic value of scraping out diseased bark in the curative treatment of Bark Rot, according to the recommendations made by this Institute. (O. S. Peries & Z. E. Irugalbandara).

Anatomy of roots

The anatomy of roots infected by *Xylaria* spp. is being studied to compare the infection pattern with that of *Fomes* infection. (A. de S. Liyanage & Z. E. Irugalbandara).

Fungal associations

Soil dilution and soil plate methods were used to isolate fungi associated with healthy roots and roots infected with *Xylaria* spp. Fungi isolated were preserved for identification and further experimental work. (A. de S. Liyanage, A. Dharmaratne & S. Wettasinghe).

Field Experiments

Root disease control experiments

Effect of sulphur and collar protectant in the control of *Fomes* root disease—Experiments laid out in 1970 at Milleniya and Malaboda Estates. Census of diseased trees were taken twice during the year. Only two trees were dead due to white root disease infection at Malaboda Estate while at Milleniya Estate the experimental area was free of *Fomes* root disease. Roots had begun to intertwine only this year. The need for the use of collar protectants did not arise in these estates.

Minimum quantity of sulphur required to control *Fomes* root disease in young clearings at Dartonfield Estate (1973 clearing). Census of the diseased plants were taken twice during the year. Results indicate that there is a significant response to increase in dosage of sulphur used to amend the surface soil of planting holes. The incidence of root disease has been low in all treatments. (V. Satchuthananthavale & L. Halangoda).

Mulching as a method of detection of *Fomes* infected trees in the old stand prior to felling. Results obtained using mulching for detection of *Fomes* in the old stand suggests that it is a useful and economic method.

Results of all these experiments have been compiled in the paper entitled "Studies on the control of white root disease in young *Hevea* replantings"—This paper is being prepared for publication. (V. Satchuthananthavale & L. Halangoda).

Incidence of Phytophthora *disease and meteorological data*

Observations were made only in Dartonfield Estate in 1974, incidence of leaf-fall was light during the season. Leaf-fall occurred again in October.

A thermohygrograph was maintained at Dartonfield Estate right through the year. (V. Satchuthananthavale & D. M. Dantanarayana).

Studies on epidemiology of Oidium *leaf disease*

Leaf-fall assessments were made on both RRIC 45 and RRIC 7. These studies have indicated that RRIC 7 is more susceptible to *Oidium* than RRIC 45. The pattern of leaf-fall in both clones showed a very close similarity, with the heaviest leaf-fall occurring on 2nd March, 1974. (A. de S. Liyanage & W. Amaratunga).

Analysis of long-term weather records on the incidence of disease of Hevea

The probability of satisfying specified conditions for an outbreak of *Phytophthora* leaf disease was calculated for Ratnapura district using weather records for 34 years. It was found that the probability of obtaining 'Peries Periods' was extremely low with a maximum of the order of 12% and 15% occurring during May 14-24 and July 8-12 respectively. (A. de S. Liyanage & G. A. J. P. R. Gunasekera).

Clonal screening for leaf and panel disease of Hevea

101 clones have been budded to be used in an experiment to screen clones against *Oidium* spp. *Gloeosporium* spp. and *Phytophthora* spp. and also to determine the basis of inheritance of disease resistance characters. (A. de S. Liyanage, D. M. Fernando & A. Dharmaratne).

The effect of methods of clearing on the incidence of Fomes *infection*

The area selected for the experiment at Woodend Estate, was surveyed to determine the pre-treatment infection level before blocking out the plots. (A. de S. Liyanage, W. Amaratunga & S. Wettasinghe).

Studies on Black Root disease of rubber caused by Xylaria *spp.*

Detailed investigations on the symptomatology and nature of spread of the fungus were undertaken at Parambe Group, Undugoda and Urumutta Estate, Akuressa. Also a field experiment was laid out at Parambe Group, Undugoda, involving five treatments to determine the most effective method of control. (A. de S. Liyanage & S. Wettasinghe).

Studies on coconut wilt caused by Ganoderma *spp.*

A detailed study was made on the symptomatology and nature of spread of the fungus at Sithrakala Estate, Ambalantota. (A. de S. Liyanage & O. S. Peries).

REVIEW OF THE SOILS CHEMISTRY DEPARTMENT

BY

C. G. SILVA

(*Soils Chemist*)

SUMMARY

The output of soil and leaf analytical work has improved. About 11,000 acres of rubber were surveyed and the results indicate that while in the Kalutara District the deficient nutrients are usually nitrogen and potassium, in the Kelani Valley District even phosphorus may be wanting. Leaf analysis of all the experimental areas has also revealed that of the major nutrients required for the nutrition of *Hevea* nitrogen in association with potassium are the most important.

One cover crop experiment has indicated that grass is better than a legume cover. This result must be carefully checked as it is contradicted by the results of another experiment which has shown that for the second consecutive year a sown mixed legume cover is far superior to a ground cover of naturals even if these natural cover areas are supplied with extra nitrogen. The residual beneficial effect of the previous manuring regime and the rotation of crops, has been demonstrated in the experiment where rubber has been planted on land previously occupied by tea.

DETAILED REVIEW

Staff

Mr. C. G. Silva, Soils Chemist was on duty throughout the year. Mr. M. K. S. A. Samaraweera was appointed Assistant Soils Chemist and assumed duties on 21.06.74. Mr. N. Yogaratnam continued with his post-graduate studies at East Malling Research Station, U.K. Mr. D. C. Golden, Assistant Agricultural Chemist at the T. R. I. worked with us for a few months.

Mr. M. H. Sulaiman, Experimental Officer, Messrs T. Kanthasamy and F. P. W. Silva, Senior Technical Assistants, Messrs H. A. Seemon, A. M. A. Perera, B. P. M. Arsecularatne, G. Jayawardene and L. J. Wickremasinghe, Technical Assistants and Messrs W. M. Abeysinghe, M. A. Mendis, A. D. M. Karunaratne, K.S. A. C. Peiris and J. Wijenayake, Field Assistants were on duty throughout the year. Mr. V. Gunasekera resigned from the services of the Institute towards the beginning of the year.

Visits

The following visits were paid for advisory, experimental and other purposes by the Soils Chemist.

Advisory	9
Experimental	19
Miscellaneous	23
Total ..	51

Meetings and Conferences

The Soils Chemist attended the following meetings :—

Working Group on Fertilizers
Miscellaneous Meetings at Ministries *etc.*

Publications

Fertilizer requirements of Smallholdings in Sri Lanka, —IRRDB Scientific Symposium, Part (1) India, 1974.

Advisory Work

The amount of advisory visits to estates was reduced mainly because of shortage of staff and transport facilities. All the Smallholders Conferences were attended and addressed by the Soils Chemist. These Conferences have helped us to appreciate the problems a smallholder has to face, in supplying the nutrient requirements of rubber.

Research Investigations

Commercial rubber productivity survey :

It was decided to continue this work but at a reduced rate. The soil and foliar survey of the large acreage carried out during the year would show certain high yielding as well as low yielding situations. Therefore, an analysis of this data with their yield levels would be used in this study.

Hevea *leaf nutrient content investigation :*

Leaf samples were taken from the two clones PB 86 and RRIC 45 at regular intervals according to a pre-arranged schedule. The leaf analytical data collected from this trial indicates a decrease in leaf nutrients with time with respect to nitrogen, phosphorus, potassium and an increase with respect to calcium and magnesium.

Soil survey of selected estates :

A greater part of the acreage, which was covered under the soil and foliar survey scheme, was soil surveyed. Soil as well as leaf samples were removed from these areas on the basis of the soil surveys.

Collection and analysis of soil and plant materials :

The number of samples collected were :

955	leaf	samples
1612	soil	samples

The number of determinations were as follows :—

Soil

Total nitrogen	—	554
Acid extractable phosphorus	—	1516
Acid extractable potassium	—	1102
Exchangeable potassium	—	1376
Exchangeable calcium	—	1376
Exchangeable magnesium	—	1376
Organic carbon	—	931

Leaves

Nitrogen	—	1037
Phosphorus	—	950
Potassium	—	855
Calcium	—	843
Magnesium	—	844
Manganese	—	834

Soil surveys and the collection of soil samples was initiated by Mr. F. P. W. Silva but was completed by the Experimental Officer Mr. M. H. Sulaiman and Mr. K. S. A. C. Peiris. The collection of leaf samples from the experimental areas was started by the Experimental Officer and was later extended to cover about 11,000 ac of mature PB 86 rubber in all the planting districts where rubber is largely grown. The untiring efforts of Mr. M. H. Sulaiman and Mr. K. S. A. C. Peiris in the collection of samples is recorded with appreciation. However, if not for the shortage of refrigeration facilities for storing leaf samples and the difficulties encountered in transportation, this programme of leaf and soil collection would have been completed before schedule. Because of these difficulties a trial was conducted at Panawatte Group where leaf samples were collected by the estate staff under our supervision, in addition to the samples collected by us. Both these sets of leaves were analysed in the laboratories similarly. The analytical data differ to a certain extent but these differences are not consistent and could therefore be treated as differences between trees. It was however decided to continue sampling this year as well, on the same basis and to compare estate staff sampling with our sampling again this year.

Considerable difficulty was experienced in the determination of potassium using the atomic adsorption equipment. This was however corrected. It was clear that once we have our own equipment and our own staff to handle it, such impediments to the speedy analysis of samples can be avoided.

Soil studies

A pot experiment was initiated by Mr. D. C. Golden to study the relationship between phosphorus and aluminium uptake in the *Pueraria* plant. This was to be continued with its effects on *Hevea* nutrition. Three levels of aluminium 300 mg (A_2), 150 mg (A_1), and 0 mg (A_0) and three levels of $(NH_4)_2HPO_4$ 500 mg (P_2), 250 mg (P_1) and 0 mg (P_0) were used. Germinated *Pueraria* seeds were planted on 14th March 1974. The fertilizer schedule was as follows:

P_2	P_1	P_0	
166 mg	83 mg	0 mg	16th April
,, ,,	,, ,,	,, ,,	30th April
,, ,,	,, ,,	,, ,,	20th May
A_2	A_1	A_0	
100 mg	50 mg	0 mg	30th March
,, ,,	,, ,,	,, ,,	30th April
,, ,,	,, ,,	,, ,,	30th May

The crop was harvested on 20th June, 1974. The analysis of soil and plant material for nitrogen, calcium, magnesium, potassium and phosphorus was completed. The analysis of soils for aluminium was also done. But the analysis of plant material for aluminium could not be completed because considerable difficulty was experienced in the methodology.

Intercropping

A land form map of the Alutgama one inch map was prepared so that areas for intercropping may be demarcated. A few other areas were also mapped on this basis using the most recent aerial photographs of the scale 1: 25,000.

Soil and leaf nutrient surveys

Fertilizer recommendations were made to nine estates in the Kalutara District covering an acreage of about 2000 ac on the basis of soil and leaf nutrient surveys. Since these recommendations were made in consultation with the RRIM there was a delay in sending the final recommendations to the estates concerned. This survey has revealed that in these areas phosphorus and magnesium levels are adequate while nitrogen and potassium are in short supply.

Field experiments

Experiment No. 9: *Eladuwa Estate, Kalutara District,* 1949 *Replanting, Clone PB* 86 (*W. M. Abeysinghe*)

The yield and girth data from this area do not show any significant differences due to the treatments. The leaf analytical data as given in Table 1 indicates that, with the increase in levels of P and consequently Ca in the fertilizer mixture the levels of leaf P & Ca also increase. This is of course to be expected. This would also mean that the uptake of Ca by the tree is high at the higher level of fertilizer and might therefore explain the absence of higher yields with increase in fertilizer as a result of the effect of calcium in depressing yields, through pre-coagulation. A decrease in leaf potassium levels with increase in fertilizer potassium is however a feature which requires further investigation.

TABLE 1

LEAF NUTRIENT LEVELS IN EXPERIMENT NO. 9

Treatment	N	P	K	Ca	Mg
Control	2.78	0.23	1.97	0.48	0.25
R 463 + Mg 2 lb	2.75	0.24	1.93	0.52	0.25
R 463 + Mg 4 lb	2.94	0.24	1.75	0.60	0.26
R. 463 + Mg 6 lb	2.78	0.26	1.70	0.63	0.25
D.P.*	2.83	0.25	1.79	0.54	0.26

* D. P. stands for diagnostic physiologique.

Experiment No. 11: *Kuruwita Sub-station,* 1961 *Replanting, Clone PB* 86 (*K. S. A. C Peiris*)

This experiment is designed to test the effects of two levels of the three nutrients nitrogen, phosphorus and potassium on the growth and yield of rubber. The yield data do not show any significant differences due to the treatments. The girth data, however, as shown in Table 2 show that there is a response to potassium. The leaf nutrient data of this area as shown in Table 3 show that with respect to all the three nutrients tested, the respective leaf nutrient level increases with increase in level of fertilizer. These leaf analysis data also indicate that when nitrogen is applied with potassium the highest levels of leaf nitrogen and of leaf potassium are attained. The highest level of phosphorus is reached only when P is applied with N.

TABLE 2

GIRTH DATA FROM EXPERIMENT NO. 11

Treatment	Mean girth in cm	L.S.D.
N_0	64.26	
N_1	65.53	
P_0	64.07	5.13
P_1	65.72	
K_0	61.70	
K_1	68.09	

It is also a significant fact that when P is applied alone leaf N as well as P are the lowest—lower even than the control.

TABLE 3

LEAF NUTRIENT LEVELS OF EXPERIMENT NO. 11

Treatment	N	P	K	Ca	Mg
N_0	2.75	0.252	1.235	0.661	0.281
N_1	2.85	0.203	1.225	0.633	0.276
P_0	2.86	0.193	1.295	0.553	0.275
P_1	2.75	0.206	1.163	0.741	0.283
K_0	2.77	0.209	1.041	0.750	0.309
K_1	2.84	0.190	1.417	0.544	0.249
O	2.80	0.198	1.089	0.580	0.294
N	2.87	0.198	1.130	0.586	0.294
P	2.60	0.217	0.964	1.036	0.328
K	2.87	0.193	1.474	0.506	0.253
NP	2.80	0.236	0.982	0.801	0.321
NK	2.89	0.195	1.483	0.541	0.261
PK	2.77	0.178	1.409	0.525	0.253
NPK	2.83	0.195	1.304	0.605	0.231

Experiment No. 12: Levels of nitrogen and phosphorus, Kuruwita Sub-station, 1961 Replanting, Clone PB 86 (K. S. A. C. Peiris)

The girth and leaf data do not show any significant differences due to the treatments.

Experiment No. 22: Response of mature rubber to fertilizers, Malaboda Estate, Matugama 1947 Replanting, Clone PB 86 (W. M. Abeysinghe)

The relative importance of the three nutrients: nitrogen, phosphorus and potassium are being tested. The yield and girth data do not show any significant differences due to the treatments. The leaf analytical data as given in Table 4 shows that the leaf nitrogen levels are high when nitrogen is applied in combination with phosphorus and potassium. Conversely the uptake of phosphorus and potassium is highest in the presence of nitrogen.

TABLE 4

LEAF NUTRIENT LEVELS IN EXPERIMENT NO. 22

Treatment	N	P	K	Mg
O	2.63	0.227	1.56	0.351
PK	2.54	0.239	1.86	0.307
NK	2.70	0.228	2.05	0.333
NP	2.68	0.255	1.97	0.305
NPK	2.58	0.216	1.96	0.324

Experiment Nos. 24 and 26:

In these experiments the effects of manuring young rubber in relation to ground covers are studied. They are intended to study the effect of extra amounts of nitrogen in non-legume areas.

Experiment No. 24: Pussella Group, Parakaduwa, 1972 Replanting, Clone RRIM 623 (K. S. A. C. Peiris)

The 1974 girth measurements given in Table 5 indicate that there is a significant increase in growth if phosphorus is added to the cover and that this increase is greater if phosphorus is added to the rubber as well as the cover. The fact that a similar result has been shown for the last two years, is important.

TABLE 5

MEAN GIRTH OF PLANTS IN EXPERIMENT NO. 24

Treatment	Mean girth in in.	L.S.D.
P_0	14.82	
P_r	15.99	
P_c	17.05	1.77
P_{cr}	17.40	

Experiment No. 26: Hedigalla Division, Dartonfield Group, 1970 Replanting, Clone RRIC 101 (A. D. M. Karunaratne)

The analysis of girth measurements indicates that the growth of the plants is better in the area with grass than in the other two areas. It is possible that in areas such as this where the rainfall is high and the terrain steep the ground cover may not compete for moisture but could assist in the conservation of soil. From that restricted point of view grass may be considered to be as good as any other cover.

Experiment No. 27: Effect of different levels of nitrogen, phosphorus and potassium on the yield and growth of rubber, Lowmont Estate, Kalutara, 1964 Replanting, Clone RRIM 623 (J. Wijenayake)

The yield data do not show any difference due to the treatments. There is an increase in yield with increase in the levels of potassium but this result is not statistically significant. The leaf analysis data of this experimental field as given in Table 6 show that phosphorus is the only nutrient which increases consistently in the leaf with an increase in level of that particular fertilizer element.

TABLE 6

LEAF NUTRIENT LEVELS IN EXPERIMENT NO. 27

Treatment	N %	P %	K %
N_0	3.046		
N_1	3.160		
N_2	3.135		
P_0		0.236	
P_1		0.256	
P_2		0.266	
K_0			1.875
K_1			1.900
K_2			1.841

Experiment No. 28: Effect of three levels of the standard fertilizer mixture R. 463 + Mg on a tea area replanted with rubber, Neuchatol Group, Neboda, 1971 Replanting Clone PB 217 (J. Wijenayake)

The girth measurements as given in Table 7 show that the application of half the amount of the standard fertilizer mixture gives the same growth as the full dose, in tea areas planted with rubber. Both levels of fertilizer gave significantly better growth than the control where no fertilizer was added. The fact that a similar response to fertilizer has been observed last year also, is interesting.

TABLE 7

MEAN GIRTH OF PLANTS IN CM

Treatment	Girth in cm	L.S.D.
Control	32.72	
$\frac{1}{2}$ the standard mixture	35.68	1.63
Standard mixture	36.52	

Experiment No. 29: Urea comparison trials on Boralu soils

Out of the twelve sites selected for this study, the work at Paradise Estate, Kuruwita, had to be discontinued because with the change of management the manuring schedule was not maintained as desired by us. The yield and girth data of the sites receiving the standard fertilizer as well as those receiving the discriminatory fertilizer do not show any differences due to the treatments. This means that urea may be used either forked or broadcast in these soils instead of ammonium sulphate, without any harmful effects.

The leaf analytical data for the past 3 years are given in Table 8.

TABLE 8

LEAF NUTRIENT LEVELS

Year	N	P	K	Mg
1972	3.42	0.292	1.32	0.285
1973 standard	3.12	0.253	1.36	0.349
1973 discriminatory	3.11	0.258	1.49	0.349
1974 standard	3.01	0.235	1.67	0.264
1974 discriminatory NK_0	2.90	0.237	1.86	0.249
1974 discriminatory NK_1	3.05	0.248	1.71	0.264
1974 discriminatory NK_2	2.96	0.264	1.83	0.272

For the year 1974 it is seen that the discriminatory treatments have maintained almost the same levels of nitrogen while the phosphorus as well as the leaf potassium levels have improved as a result of the discriminatory treatments. The observation, that between 1972 and 1974 the levels of nitrogen, phosphorus and magnesium have decreased, while potassium has increased in both the standard as well in the discriminatory treatments is worthy of comment.

Experiment No. 30: Management of ground covers, Katuhena Division, Sorana Group, Horana, 1972 Replanting (A. D. M. Karunaratne)

This experiment serves to study the importance of ground cover management in immature rubber areas. The treatments in this experiment are as follows:—

1. Sown mixed legume cover—L
2. Selective removal of non-legumes from the natural cover—L:S
3. Non selective control of natural cover wthout supplementary nitrogen to tree row—N:NS
4. Non selective control of natural cover with supplementary nitrogen to tree rows according to standard practice—N:NS N_1
5. Non selective control of natural cover with supplementary nitrogen to tree rows controlled by leaf analysis, to levels of sown mixed legume cover areas—N:NS N_2

The girth data of this experiment show that the best growth is obtained in areas with a sown mixed legume cover and also that there exists only a marginal difference between this treatment and those areas in natural cover where there has been a selective removal of non-legumes. There is however a significant difference between those two treatments and the other three as shown in Table 9.

TABLE 9

GIRTH MEASUREMENTS IN CM

Treatment	Mean girth in cm	L.S.D.
L	18.00	
L:S	17.17	
N:NS N_1	14.88	2.05
*N:NS N_2	14.40	
N:NS	13.71	

The leaf analysis data of this experimental area as given in Table 10 show that the highest leaf nitrogen, phosphorus, calcium and magnesium values are in the sown mixed legume areas, and that the lowest leaf nitrogen, phosphorus and magnesium values are in the areas with non selective control of naturals without any extra nitrogen to the trees. The growth in these areas is also significantly low.

TABLE 10

LEAF NUTRIENT LEVELS IN DIFFERENT AREAS

Treatment	N %	P %	K %	Ca %	Mg %
L	3.03	0.180	1.31	1.20	0.176
L:S	2.91	0.153	1.43	1.14	0.148
N:NS N_1	2.91	0.157	1.45	1.06	0.146
*N:NS N_2	3.03	0.150	1.58	1.17	0.141
N:NS	2.77	0.139	1.49	1.20	0.121

*The manuring of the rubber plants on the basis of leaf analysis was not done.

Experiment No. 31: *The use of locally available Apatite as the source of phosphorus for young rubber, Dartonfield,* 1973 *Replanting* (*W. M. Abeysinghe*)

The girth measurements show that there is no significant difference in growth which could be attributed to the different sources of phosphorus.

Miscellaneous

We are very thankful to the RRIM for having allowed Mr. E. Pushparajah to visit us for a short period. His assistance and guidance is very much appreciated.

REVIEW OF THE RUBBER CHEMISTRY DEPARTMENT

BY

M. NADARAJAH

(Head of the Rubber Chemistry Department)

SUMMARY

The Rubber Chemistry Department with the exception of the Biochemistry section was shifted from Agalawatte to its new laboratories at Telawela Road, Ratmalana and this took considerable time of the research and assistant staff and led to some disruption of the work.

The Rubber Chemistry Department continued to give advice to large estates on problems connected with the manufacture of raw rubber. The Department also increased its role as a Technical Advisory Service Unit to the rubber based industries.

Research was successfully carried out to improve the stability of centrifuged formaldehyde stabilized latex. Further work on centrifuged formaldehyde stabilized natural rubber (NR) latex has enabled its commercial use as a general purpose adhesive. The bringing up of the pH of fresh field latex to about 9 with sodium hydroxide solution and maintaining at this pH as well as the addition of about 0.5% formaldehyde on the latex are essential steps in this process. The compressive strength of Portland cement-NR formaldehyde stabilized field latex mixes were very low and this is due to the adverse effect that free formaldehyde has on the properties of Portland cement. This defect has been overcome and this work is being done in collaboration with the Ceylon Cement Corporation.

Prevulcanised NR field latex with extenders such as wheat flour and kaolin has been successfully used as an adhesive for plywood for tea chests. Prevulcanised NR centrifuged latex in blends with urea formaldehyde resin fortified with melamine formaldehyde resin has been successfully used as the adhesive for commercial plywood.

A Crepe Rubber Development Unit was formed to step up crepe production to implement the factory development subsidy scheme announced by the Rubber Controller and to handle the marketing aspects as well. A major use of latex crepe in consuming countries is to reconvert it into sole crepe. A correct strategy for Sri Lanka crepe is to exploit this use and become the World's largest producer of sole crepe. Steps necessary to ensure this must be investigated and implemented. A leading Italian importer of Sri Lanka 5L has informed us that Italy uses the 5L Grade to manufacture sole crepe and this explains the new use which has utilised all the increasing production of 5L. A major shift in policy in crepe manufacture in Sri Lanka from latex crepe to sole crepe is necessary and Sri Lanka instead of exporting any SCR 5L should export it after conversion to sole crepe.

About 14,000 tons of rubber seed was milled in 1974, this quantity being much less than the 25,000 tons milled in 1973. This shortfall was due to drought during flowering and *Phytophthora* pod rot at a later stage. The prices paid for the seed fluctuated from Rs. 25/= to Rs. 42/= per cwt. in returnable gunny bags.

Prevulcanised formaldehyde stabilized natural rubber latex was successfully used as a binder for pigments in blends with synthetic rubber latices in emulsion paints, in screen printing of textiles and in finishing leather. Formaldehyde stabilized natural rubber latex was successfully used in tyre cord dipping, in the manufacture of rubber products such as rubberised fibre and dipped articles such as gloves. Action was initiated in collaboration with the National Textile Corporation to manufacture rubber components needed by the Textile Industry.

Biochemical work was done a) in investigating the lipids in natural rubber latex, in collaboration with the Medical Research Institute, b) alkali treatment of papain coagulated rubber to prepare deproteinised rubber, c) low nitrogen—CV rubber obtained by treating latex with hydroxylamine and papain, d) the phenols present in natural rubber latex, e) use of purified papain as a coagulant and f) incidence of mould and its dependence on manufacturing methods.

Development work on cyclised rubber has now made it possible for it to be manufactured on a commercial scale for use as a reinforcing filler in the rubber industry and as a resin in the paint and printing ink industries. Cyclised rubber has great promise for the export market, as a non-traditional product and to earn more foriegn exchange than the export of raw rubber.

The Chief Specifications Officer, Mr. S. W. Karunaratne was involved in setting up the Central Specifications Laboratory at Ratmalana. All the staff of the Specifications Laboratory were transferred from Dartonfield to the Central Specifications Laboratory in May, 1974 and routine tests in Block Rubber samples commenced on the 23rd of May, 1974. Most of the block rubber samples tested were from Mawanella Block Rubber Factory and Cenat Factory, Paiyagala, as the Peenkande Group stopped Hevea-crumb production on the 21st of January, 1974.

A modified version of the IR heating unit for the measurement of dirt content was designed and constructed. The advantages are less fire risk and more uniform temperature distribution.

DETAILED REVIEW

The Head of the Rubber Chemistry Department was on duty throughout the year. The Rubber Chemist was on duty till the end of the 3rd Quarter. During the last Quarter, he was on a FAO fellowship in the University of Akron, U.S.A. The Assistant Rubber Chemists, Mr. R. Tharmalingam, Dr. P. A. J. Yapa, Dr. A. Coomarasamy and Dr. G. Varathungarajan were on duty throughout the year. The Assistant Rubber Chemists, Messrs A. M. A. Amarapathy, W. S. E. Fernando and L. M. K. Tillekeratne continued their Post Graduate studies at the University of Aston in Birmingham and Mr. M. R. N. Fernando returned to the Department in October after finishing his course of studies there. Mr. C. G. Balasingham, Experimental Officer, resigned from the Institute's services in October, 1974. Mr. W. C. Dayaratne, Senior Technical Assistant, went on a Colombo Plan Scholarship in October, 1974 and Mr. E. G. Mendis, Senior Technical Assistant rejoined the Department on 1st July, 1974. Technical Assistants, Messrs A. S. Dekumpitiya, W. D. Dharmasena, P. P. Jayasinghe, S. Kasinathan, D. D. Medagama, H. Narangoda and K. A. Piyadasa were on duty throughout the year. Messrs L. Goonewardene and J. K. Kirubakaran resigned from the Institute's services towards the end of the year. The number of Junior Officers who have resigned to accept more lucrative employment outside, shows that the training given to these Officers is much appreciated by the private sector. The Institute accepts this as a part of its duties *i.e.* to train personnel for the rubber goods manufacturing industry.

New staff was taken to the Specifications Section and the Staff in 1974 was as follows:

Technical Assistants :	1. A. S. Dekumpetiya
	2. R. M. Kularatne*
	3. P. V. A. G. Perera*
	4. M. S. C. de Silva*
Technical Assistant/Technician :	1. Donald Weerasooriya*
Specification Assistants :	1. Sugath Wijesekera
	2. T. M. Ahamadeen
	3. Deepal Peiris
	4. Miss S. Wickremanayake*
	5. T. A. S. Siriwardena*
	6. A. G. R. S. Perera*
	7. R. Abraham*
	8. S. M. C. D. Sebastian*

* New recruits

Conferences

A two day Seminar on latex crepe production and marketing was organised by Dr. G. Varathungarajan and the following papers were presented by the Rubber Chemistry Department :—

1. Strategy for Sri Lanka's Latex Crepes by G. Varathungarajan.
2. Standardisation of production methods of latex crepes to suit end use requirements by M. Nadarajah and D. S. Muthukuda.
3. Stepping up of latex crepe production in existing factories by M. Nadarajah and D. S. Muthukuda.
4. Quality control, technical specifications and presentation of latex crepes by S. W. Karunaratne.
5. Conversion of crepe rubber to block form at the packing stage by R. Tharmalingam and A. S. Dekumpitiya.

At this two day Seminar, the Rubber Controller announced his subsidy scheme for factory modernisation.

Mr. M. Nadarajah gave a talk on "Uses of rubber in the Textile Industry" at the Seminar on "Local substitutes for auxiliaries in the Textile Industry" conducted by the Sri Lanka Section of the Textile Institute and held on 15.11.74.

Papers

The following papers were written for publication by the staff of the Department:—

1. Deproteinised natural rubber, (P. A. J. Yapa, 1974). *ALEMBIC*, 73/74 *University of Sri Lanka, Peradeniya Campus.*

2. Localisation of ATP-ase activity in mature sieve elements of *Tetragonia* (P. A. J. Yapa, 1974) *Planta,* **117,** 1974, 321-328.

3. Use of dried papaw milk (papain) as a coagulant. (P. A. J. Yapa, 1974) *Rubber Puwath* **4,** 7-8 (in Sinhala)

Serving on panels

Mr. M. Nadarajah functioned as Committee Member for IRI (Sri Lanka Section). Messrs M. Nadarajah, S. W. Karunaratne, K. A. Piyadasa and H. Narangoda gave 24, 20, 43, and 99 lectures respectively on Rubber Chemistry and Technology to students reading in the course leading to the L.I.R.I., at the University of Sri Lanka, Katubedde Campus.

Messrs M. Nadarajah, R. Tharmalingam and Drs. A. Coomarasamy and G. Varathungarajan gave 2, 13, 3 and 10 one hour lectures to the M.Sc. course in Polymer Science and Technology at the University of Sri Lanka, Vidyodaya Campus.

Mr. S. W. Karunaratne attended 8 meetings of the SRMC, 7 meetings of the Bureau of Ceylon Standards, and one meeting on metrication. Dr. G. Varathungarajan attended two meetings at the Bureau of Ceylon Standards and one meeting at the Ministry of Industries on centrifuged latex. Mr. R. Tharmalingam attended a meeting for consortium of engineers on scrap project and two meetings on metrication and one meeting at the Bureau of Ceylon Standards.

Patents

A complete Sri Lanka Patent No. 7184 has been applied for the use of field and centrifuged formaldehyde stabilized natural rubber latex for the manufacture of rubber products.

RUBBER TECHNOLOGY

Use of easy processing rubber in tyre manufacture (H. Narangoda, E. G. Mendis & M. Nadarajah) :

A Group Processing Centre (Kalalgoda GPC) has been selected to produce easy processing rubber on a commercial scale for use by M/s. Don Somapala Corporation and the Sri Lanka Tyre Corporation.

Room temperature curing (G. Varathungarajan, P. P. Jayasinghe & K. P. N. de Silva) :

Several curing systems are being investigated for room temperature curing of dry rubber and for the prevulcanisation of latex. The rates of cure at different temperatures was investigated for these systems with a view to determining the rates of cure at room temperature.

Use of NR latex as an adhesive in plywood manufacture (M. Nadarajah & A. Coomarasamy) :

This work was done in collaboration with the Sri Lanka Plywoods Corporation. Prevulcanised formaldehyde stabilized NR field latex mixed with fillers such as kaolin and wheat flour is suitable for use as the adhesive in the manufacture of plywood for tea chests with very little practical deviation from normal manufacturing procedures. The Sri Lanka Plywoods Corporation is taking steps to initially manufacture 10% of their plywood for tea chests using as the adhesive prevulcanised formaldehyde stabilized NR field latex. This if successful will result in a new use for 600 tons of NR annually in Sri Lanka.

Adhesives for commercial plywood were developed using centrifuged prevulcanised formaldehyde stabilized NR latices and mixing them with Urea formaldehyde (UF) resin fortified with 15% Hardener containing Melamine formaldehyde (MF) resin. A mix containing 65% NR and 35% UF resin fortified with MF resin gave satisfactory properties for commercial plywood. This new use of NR for commercial plywood would result in the consumption of NR of the order of tens of thousands of tons in countries such as Malaysia, Indonesia, India and Sri Lanka which have a NR plantation and a plywood Industry.

Promotion of rubber based industry in the estate sector (S. W. Karunaratne) :

A technical report on the manufacture of household and industrial gloves at Padukka Group was prepared for Messrs Shaw Wallace & Hedges Ltd.

ADVISORY SERVICE TO PRODUCERS

Routine Advisory Work

The following advisory visits were done by Mr. D. S. Muthukuda, Assistant Development Officer :—

	RSS Manufacture	Pale Crepe Manufacture	Sole Crepe Manufacture	Latex Weighing	Other Visits	Total
1st Qtr.	8	9	2	4	10	33
2nd Qtr.	9	10	2	2	16	39
3rd Qtr.	10	10	2	1	22	45
4th Qtr.	14	10	3	2	25	54
Total	41	39	9	9	73	171

With the acquisition of some of the private owned estates by the Land Reform Commission and with the commencement of the factory development scheme, the volume of advisory service has greatly increased.

Mr. D. S. Muthukuda assisted the State Rubber Manufacturing Corporation for two days per week in its pale crepe project.

Latex crepe manufacture (G. Varathungarajan) :

A report was submitted to the Ministry of Plantation Industries and the Rubber Research Board on the strategy for crepe rubber to set up a crepe development unit within the RRI. A crepe development unit was formed during the 3rd quarter, the staff comprising Dr. G. Varathungarajan, Messrs E. G. Mendis and P. P. Jayasinghe and visits were made to crepe factories regarding factory modernisation and also regarding manufacture of latex crepe using smallholders' latex.

Sole crepe (G. Varathungarajan) :

Advisory service on the manufacture of coloured sole crepe was extended to several estates. Work was done on the production of various shades of sole crepe using conventional grades of rubber. An even coloured sole crepe was produced

from crumb rubber from Mawanella Block Rubber Factory dried crumb. Good quality sole crepe of even colour and texture was produced on an experimental basis from smoked sheet and sheet cuttings. By carefully selecting the smoked sheets and soaking them overnight in water, it is possible to produce this sole crepe. If the exporters can find the markets for these naturally coloured sole crepes, it is recommended that factories producing sole crepe should manufacture these rubbers on non-cropping days.

Strategy for Sole crepe manufacture in Sri Lanka (M. Nadarajah & G. Varathungarajan) :

The main use for the increased production of 5L is in sole crepe in consumer countries. It would be possible for a country such as Sri Lanka which already produces sole crepe to convert all 5L manufactured into sole crepe in existing crepe factories by working extra shifts or in seasons when crop is low. Suitable planning is necessary that maximum foreign exchange earnings is obtained for all SCR 5L produced in Sri Lanka and conversion to sole crepe is a way of doing this.

It is understood that even latex crepe imported from Sri Lanka is converted into sole crepe in the consuming countries. If this is true, then additional incentives are necessary for factories who put in additional facilities to enable more sole crepe to be manufactured.

Rubber Seed (M. Nadarajah) :

The Sri Lanka Government has banned the import of linseed oil and of alkyd resin and this step has promoted the collection and utilisation of rubber seed in Sri Lanka.

The biggest miller of rubber seed in 1974 was Sedawatte Oil Mills, who produced 800 tons of oil. The price they paid fluctuated from Rs. 25/= to Rs. 42/= per cwt. in returnable gunny bags. The seeds obtained were mainly from estates and purchases were co-ordinated through Messrs Forbes & Walker Ltd. A feature of their purchasing was their facilities for quick unloading and immediate payment.

The overseas price paid for rubber seed oil was in the region of £ 200 per ton [for oil with free fatty acid (FFA) less than 20%], whilst linseed oil is about £ 450 per ton. It thus appears that rubber seed oil in international markets fetches about 50% of linseed oil prices, but is certainly worth much more. With increasing production and increasing awareness of the potentialities of rubber seed oil, it would be anticipated that rubber seed oil prices would come much closer to linseed oil prices in the near future.

The price of rubber seed oil in local markets was in the region of Rs. 4,500/- per ton. The price paid for cake by the Fertiliser Corporation was Rs. 375/= to Rs. 400/- per ton and by the Oils and Fats Corporation was Rs. 325/- per ton. The other producers of rubber seed oil were Sena Oil Mills Ltd. (500 tons of oil), Paints and General Industries Ltd. (250 tons of oil), Lankem (Ceylon) Ltd. (100 tons of oil), Kanapathy (100 tons of oil) and B.C.C. Ltd. (100 tons of oil).

Seed fall during 1974 was poor due to drought during flowering and *Phytophthora* pod rot later but due to the high prices paid for the seed, most of the seed that fell was collected. The total milled to 1973 was 25,000 tons of seed and in 1974 about 14,000 tons of seed.

The total oil produced in 1974 is about 2,400 tons and about 500 tons is the estimated local demand, The balance is being exported.

Another important byproduct of rubber seed is the pods which would be used to manufacture activated charcoal.

Advisory Services in rubber and latex technology

a) *Preparation of graft polymers of NR with acrylamide (A. Coomarasamy & J. K. Kirubakaran) :*

This work was done in collaboration with Miss S. Lokuge of University of Sri Lanka. Acrylamide was successfully grafted on to natural rubber in the latex phase. It was found that the efficiency of grafting is better with the persulphate initiator system compared to the cumene hydroperoxide initiator system. The polymerisation reaction was faster in the case of PB 86 latex compared to the latex from RRIC 7.

b) *Use of NR latex in the printing of textiles (M. Nadarajah, A. Coomarasamy & K. P. N. de Silva) :*

Prevulcanised formaldehyde stabilized centrifuged latex in blends with synthetic binders gave satisfactory results.

c) *Use of NR latex as a general purpose adhesive (M. Nadarajah, J. K. Kirubakaran & A. Coomarasamy)*

Formaldehyde stabilized field latex and formaldehyde stabilized centrifuged latex have been found to be suitable adhesives by the "Shoe Factory of the Ceylon Leather Products Corporation".

Messrs Lever Brothers (Ceylon) Ltd. and British Ceylon Corporation Ltd. have found formaldehyde stabilized centrifuged latex as a suitable adhesive for roller and dip applications and they are using this on a commercial scale. The viscosity of the latex can be increased by adding high quality Kaolin *e.g.* Grade H from Ceylon Ceramics Corporation at up to 10 parts per 100 of latex.

d) *Use of NR latex in finishing leather (M. Nadarajah):*

This work was done in collaboration with the Tannery section of the Ceylon Leather Products Corporation. When formaldehyde stabilized prevulcanised field latex was used to finish leather, it was found that all properties were satisfactory except rub fastness. This property was improved by using the prevulcanised latex in combination with synthetic binder blends in the ratio 25: 75 and plating at 70°C.

e) *Use of formaldehyde stabilized NR latex in tyre cord dipping (M. Nadarajah):*

This work was done in collaboration with the Ceylon Tyre Corporation. The results show that formaldehyde stabilized field latex gives very satisfactory results and can be used instead of ammonia preserved centrifuged latex. It was also interesting to note that prevulcanised formaldehyde stabilized also gives satisfactory results above the minimum bond strength of 130 kg.

f) *Use of formaldehyde stabilised NR latex in rubber products (M. Nadarajah & W. D. Dharmasena):*

Formaldehyde stabilized centrifuged latex was successfully used in the manufacture of rubberised fibre, care being taken to eliminate the use of non-ionic stabilisers and increasing the dosage of ZnO and ZDC. Formaldehyde stabilized prevulcanised field latex was successfully used to proof cotton fabrics and formaldehyde stabilized prevulcanised centrifuged latex was successfully used in dipping to rubberised gloves made out of cotton.

g) *Use of NR latex in emulsion paints (M. Nadarajah) :*

Work done by Ceylon Paint Industries Ltd. on our advice has shown that prevulcanised formaldehyde stabilized latex can be satisfactorily used in emulsion paints if blended with at least 20 to 25% synthetic latex emulsion of the PVA type.

h) *SP rubbers (R. Tharmalingam) :*

Satisfactory results were obtained in the preliminary investigations regarding the production of SP rubbers in powder form using formaldehyde stabilized prevulcanised field latex.

Rubber Components for the Textile Industry (S. W. Karunaratne & K. A. Piyadasa) :

Work was initiated on the manufacture of rubber components for the textile industry in collaboration with the National Textile Corporation and the Ceylon Tyre Corporation for development work in regard to the manufacture of rubber based spare parts for the Textile industry which had earlier been made of rubber or plastics or leather or such other materials but could be satisfactorily replaced with natural rubber. A mould was turned out at the National Textile Corporation to turn out braker plates used in the textile industry from cheaper compounds and using bead wire as a source of reinforcement. Several sets of buffers were also made at the National Textile Corporation Workshops and were found to be serviceable for considerably long periods.

Factory Development Scheme

a) *Factory development advisory visits (G. Varathungarajan, D. S. Muthukuda, E. G. Mendis & P. P. Jayasinghe):*

Advisory visits for crepe rubber factories development were carried out.

b) *Factory development subsidy Scheme (G. Varathungarajan & E. G. Mendis) :*

Four inspections on factory development were carried out for the Rubber Controller and reports on these factories were submitted for the award of the subsidy.

c) *Rubber Controller's Questionnaire (P. P. Jayasinghe & K. A. Piyadasa) :*

The Rubber Controller's questionnaire on "Data on the manufacture of rubber" was sent to all crepe rubber producing units. The completed questionnaire was systematically collected from estates where no reply has been received.

Disposal of factory effluents (M. Nadarajah, P. A. J. Yapa & W. C. Dayaratne) :

In view of the world shortage of fertilizer and in view of the nutrients in rubber serum, it would be opportune to find a simple way of utilising rubber serum as a fertilizer. A possible way is by using it to manufacture compost as rubber serum being a food base for microbiol organisms will accelerate decay of organic matter. Waste leaves and organic matter can be easily obtained on rubber estates. Rubber serum being acidic, it may be necessary to neutralise with lime before use. This use of rubber serum is being investigated.

Crepe rubber properties and manufacturing methods (G. Varathungarajan & P. P. Jayasinghe) :

The dependence of the technical properties of crepe rubber on manufacturing methods is being investigated with the view to "grading" or "classifying" crepes according to their mode of manufacture and end product applications.

BIOCHEMISTRY

Non-rubber constituents of Hevea *latex (P. A. J. Yapa, M. Nadarajah & S. Kasinathan):*

Work on the lipids of NR latex was initiated in collaboration with Dr. S. Sentheshanmuganathan of the MRI, Colombo, and a paper was prepared for the RRIM Silver Jubilee Conference, 1975.

Deproteinised natural rubber (P. A. J. Yapa):

The reduction of nitrogen content by papain coagulation is in the region of 40-50%. For the preparation of DPNR by a near complete removal of proteins, possibility of employing an alkali treatment on papain coagulated rubber was investigated. The results of these studies were promising. The PRI is adversely affected by the alkali treatment and this draw back was rectified by a subsequent chemical treatment of alkali treated rubber. The effect of five other commercially available proteolytic enzymes on latex proteins was studied.

Low nitrogen—CV rubber (P. A. J. Yapa) :

It was observed during our studies on the use of papain as a coagulant that hydroxylamine hydrochloride can successfully be used in combination with papain to produce a viscosity stabilised rubber with a low nitrogen content. The nitrogen content of the rubber is reduced by about 30—40% by this process. Hydroxylamine sulphate and semicarbazide hydrochloride were also tried with papain and they were also found to be satisfactory for use in place of hydroxylamine hydrochloride. Technological properties of low nitrogen—CV rubber were studied. Curing properties showed a noticeable improvement.

Use of papain as a coagulant (P. A. J. Yapa):

Work on this project was continued. It was found that the use of purified papain is the answer for the problem of high ash content in papain coagulated rubber. Sodium cyanide gave the best results out of a number of chemical activators tried with papain on latex proteins.

Enzymic discoloration of rubber (*P. A. J. Yapa*) :

Studies on phenolics in natural rubber latex which are thought to be responsible for discoloration were continued. Amongst several phenolic compounds detected two were found to be predominant. One of them was identified as tyrosine, the other is probably a hydroxyindole. There were indications that dihydroxyphenylalanine (DOPA) which is an intermediate compound in the formation of melanin type pigments is present in latex.

Clonal variation of thiol content was studied. Discoloration of crepe manufactured from latex collected from an Ethrel stimulated area was brought to our notice by one of the Estates during the year. Analysis of latex of this area showed a slight increase in the phenolic content.

Incidence of mould and manufacturing methods (*G. Varathungarajan, & P. P. Jayasinghe*) :

A study of the incidence of mould in raw rubber and its dependence on methods of manufacture and storage has been started in collaboration with the Plant Pathology Department.

POLYMER CHEMISTRY

Cyclised rubber (*A. Coomarasamy, M. Nadarajah, H. Narangoda & C. G. Balasingham*) :

The effect of various compounds on cyclisation was studied using the techniques developed by Mr. R. Tharmalingam for heating the rubber with the aid of infrared bulbs. It was found that alkaline compounds such as sodium sulphite and sodium bisulphite retard cyclisation and that fractionated rubber and rubber with lower nitrogen contents cyclises faster than the unfractionated rubber and rubber with higher nitrogen contents. Successful trials were carried out in the use of cyclised rubber for microcellular formulations at Relaxo Industries and Hettiaratchi & Co. with good results. A successful trial in the use of cyclised rubber for printing inks was carried out at Sithara Ltd. The SRMC and several other private firms are interested in the commercial manufacture of cyclised rubber and Dr. A. Coomarasamy wrote a project report on the manufacture of cyclised rubber and RRI is putting up a pilot plant to demonstrate the method of manufacture of cyclised rubber and to further investigate the uses of the cyclised rubber produced. A paper on this work was written up for the International Rubber Conference, Kuala Lumpur 1975.

Cyclised rubber (*R. Tharmalingam*) :

A 100 lb/day capacity pilot plant was designed and constructed using IR lamps as the heat source. Further experiments will be carried out to compare its performance to using an electrically heated oven.

DEVELOPMENT WORK

Rubber in roads

a) *Supply of latex* (*E. G. Mendis*):

Arrangements were made to supply field latex to Highways Department, Horana through a Group Processing Centre in Horana.

b) *Use of natural rubber latex-colas mixes (M. Nadarajah and E. G. Mendis) :*

Investigations were carried out on the effect of storage time on stability of NR latex-colas mixtures in which various stabilisers had been added to field latex. The latex tends to cream on standing and our objective was to obtain a stable NR latex-colas mix. A combination of sodium hydroxide at 0.6% on the latex and Nonidet 40 P (non-ionic stabiliser) 0.25% on the latex was found to be suitable, the mix being stable for at least six months. However, sodium hydroxide alone at 0.6% on the latex or Nonidet 40 P alone at 0.25% on the latex were unsuitable. Formaldehyde at 0.25% on the latex could be added in addition as a bactericide. The order of addition of the chemicals are sodium hydroxide, formaldehyde and finally Nonidet 40 P.

Rainguards for rubber trees (R. Tharmalingam) :

A nozzle for the extruder in the Rubber Chemistry Department was designed and fabricated at M/s. Walkers Sons Ltd., in order to extrude rubber rainguards. The capacity of the banbury mixer available was not sufficient for continuous production. The nozzle has been handed over to M/s. Richard Pieris & Co. Ltd. to be used as a mould to produce rubber rainguards on a commercial scale. The nozzle has now been returned as the above firm has now fabricated one for itself.

Rubber Specifications (S. W. Karunaratne & R. Tharmalingam) :

Setting up new Specifications Laboratory :

Messrs S. W. Karunaratne and A. S. Dekumpitiya were involved in setting up the new Specifications Laboratory in collaboration with Mr. H. C. Baker.

Mr. R. Tharmalingam was appointed as Acting Specifications Officer on the 1st April, 1974, in order to handle the Specifications Section, while the Chief Specifications Officer was in Colombo, organising the new Specifications Laboratory.

Routine work on Block Rubber specifications commenced in the new Specifications Laboratory on the 23rd May 1974. Mr. Tharmalingam visited the Specifications Laboratory twice a week till early September to assist the Chief Specifications Officer. The Chief Specifications Officer left the island on a UNDP fellowship to University of Akron, U.S.A. in early September and Mr. Tharmalingam was appointed as Acting Chief Specifications Officer with effect from the 6th September, 1974.

Block Rubber :

From the beginning of the year block rubber samples were received from the Cenat Factory, Paiyagala, Peenkande Group and the Mawanella Block Rubber Factory. The Peenkande factory stopped Block rubber (Hevea crumb) production from 21st January, 1974. The total number of samples received from the three factories during the year 1974 is as follows:—

TABLE 1.

Producer	No. of Samples
Peenkande Group	112
Cenat Factory, Paiyagala	1740
Mawanella Block Rubber Factory	3120

The Rubber Research Board decided to levy a charge of Rs. 10/- per sample for testing technically specified rubber of the State Rubber Manufacturing Corporation with effect from 26th May, 1974. Until then tests were done free of charge in order to assist them to build up and maintain their export markets.

Test results of Block Rubber samples :

Test results of block rubber samples from Mawanella Block Rubbber Factory, Cenat Factory and Peenkande Group are given below in tabular form.

TABLE 2.

Raw material	SLR Grade	Tonnage(Approx)
Whole latex	5 L	400
,, ,,	5	111
,, ,,	10	28
,, ,,	20	5
,, ,,	50	—
,, ,,	out of spec.	—

Cenat Factory, Paiyagala :

Table 3 gives the different grades of block rubber produced (Dynat process) by the Cenat Factory in tonnes.

TABLE 3.

Grade raw material	SLR 5	SLR 10	SLR 20	SLR 50	out of Sp.
RSS	50	252	78	57	53
Cuplump	—	—	—	50	50

Peenkande Group produced about 12.5 tonnes of Hevea crumb. All the 12.5 tonnes were graded as SLR 10.

Crepe rubber :

Crepe rubber samples from Dartonfield factory and from few other commercial factories were tested. Total number of crepe rubber samples tested is about 500.

Experimental samples :

Experimental samples from the Rubber Chemistry Department were tested and reported.

Miscellaneous:

Acid samples from crepe factories and latex samples from centrifuged latex manufacturers were tested and reported.

New Test Methods—Modified version of IR testing unit to measure dirt content (R. Tharmalingam) :

A modified version of the IR heating unit for the measurement of dirt content was designed and constructed. The aim of the modification is to minimise fire risks, over heating and non-uniform temperature distribution experienced with the existing set-up.

MISCELLANEOUS

Ratmalana Technological Laboratory (A. Coomarasamy & G. Varathungarajan) :

Discussions were held with State Engineering Corporation personnel and recommendations were made to make the necessary amendments in the detailed plan of the laboratories.

A complete list of equipment necessary for the new laboratories was prepared and handed over to the British Council, to enable them to order the necessary equipment on ODA grant.

Shifting of equipment (*G. Varathungarajan, A. Coomarasamy & M. R. N. Fernando*)

The shifting of machinery and equipment from Dartonfield to the Ratmalana laboratory was organised.

Talks

Dr. P. A. J. Yapa gave a talk on "Recent developments in the rubber industry" at the Agriculture Training College, Kuliyapitiya in June.

Block Rubber (*R. Tharmalingam*) :

Attended 5 meetings on machinery specifications for the scrap block rubber factory and carried out trials on scrap rubber at the Mawanella Block Rubber Factory to finalise a process flow line.

Preliminary studies of the performances of the machinery installed in the Mawanella Block Rubber Factory were carried out and a report submitted.

REVIEW OF THE STATISTICAL SECTION

BY

G. A. J. P. R. GUNASEKERA

(*Assistant Statistician*)

Analysis of data collected in the studies 'effect of weather factors on *Hevea* yields' and 'variability in *Hevea* yields' was continued throughout the year. It was seen that all trees did not respond alike to environmental stimuli; a few showed no correlation with the majority and there were also trees with significant negative correlations with the others in the yield characteristic. The Engineering Faculty of the University of Sri Lanka, Peradeniya Campus extended its cordial assistance to us in making use of the computer of the University for plotting a large number of scatter diagrams in this analysis. Assistance of the computer division of the Engineering Corporation obtained for computational work in the process is also gratefully acknowledged.

Growth characteristics of plants in a young clearing at Dartonfield were continuously recorded at fortnightly intervals. Leaf samples were collected for the study on the estimation of leaf areas. Analyses would be undertaken as time permits. Research on a mathematical model for latex flow was continued.

The requests of research officers for advice in statistical problems, new experimental designs, analysis of experiments and field visits to investigate experimental layouts were fulfilled. Dr. C. H. Proctor of the North Carolina University continued to extend his assistance to us in statistical work.

Weather readings were recorded twice daily at the Dartonfield climatological station maintained by this Section. A summary for the year under review is given in the Table. An analysis of variance of 35 years monthly rainfalls did not show statistically significant differences between years. This station has been selected for inclusion in the Agrometeorological Project of the Department of Meteorology which is sponsored by the WMO. Requirements for the maintenance of pluviographs at Kuruwita Sub-station, Atale, Eladuwa, Elpitiya, Nakiadeniya and Parambe Estates were attended to.

Messrs S. D. Ranasinghe, L. T. Peiris and S. L. Weerasinghe were attached to the Section throughout the year. The writer attended post-graduate lecture courses in Mathematical Programming and Statistical Inference conducted by the Colombo Campus of the University. I am thankful to Mr. G. R. Chandrasiri, Assistant Agricultural Economist, for officially acknowledging my assistance in his post-graduate work abroad.

Longitide—60° 09' E

Latitude—6°32' N

Height above sea level 6553.2 cm

METEOROLOGICAL STATISTICS

DARTONFIELD

MONTH	PRECIPITATION				SHADE TEMPERATURE			GROUND TEMPERATURE										MINIMUM TEMP. ON GRASS	ATMOSPHERIC PRESSURE		TOTAL HOURS OF SUNSHINE
								Average at 8.30 a.m.					Average at 3.30 p.m.								
	Monthly Total	Greatest daily fall and Date	No. of rainy days	Mean Daily Max.	Highest Max. and Date	Mean daily Min.	Lowest Min. and Date	Depth 122 cm	30 cm	20 cm	10 cm	05 cm	122 cm	30 cm	20 cm	10 cm	05 cm		Mean at 8.30 a.m.	Mean at 3.30 p.m.	
JAN.	23	19 (8)	2	33.3	35.0 (23)	18.8	17.0 (6,7,25)	27.9	27.6	26.8	26.1	25.6	28.1	28.6	28.8	29.0	30.4	13.3	758.05	755.70	247
FEB.	280	135 (25)	6	32.9	35.0 (16)	19.3	16.2 (10)	28.1	27.7	26.9	26.3	25.6	28.3	27.9	28.1	29.2	30.5	16.5	758.32	756.71	172
MAR.	432	69 (20)	21	33.3	35.0 (8,25)	21.1	19.8 (3)	28.3	28.5	27.7	27.3	26.7	28.4	28.6	29.3	30.2	31.3	18.5	758.60	756.28	221
APR.	1030	211 (25)	23	31.1	33.7 (3)	21.4	20.0 (15,16)	—	27.5	26.7	26.5	26.2	—	27.8	27.8	28.3	28.8	21.0	756.26	754.52	113
MAY	765	224 (9)	21	31.0	33.2 (16)	22.5	21.0 (11)	—	28.0	27.5	27.2	27.0	—	28.0	29.0	30.0	30.2	22.0	756.78	755.65	128
JUNE	526	89 (21)	27	30.4	32.0 (13)	22.6	21.0 (23)	28.0	27.9	27.3	27.0	26.7	28.2	27.7	28.1	28.8	28.9	21.8	757.16	755.73	118
JULY	587	85 (18)	27	30.8	31.9 (2)	22.4	21.5 (10)	28.0	28.1	27.1	26.8	26.4	28.2	27.9	28.0	29.6	30.6	21.3	757.23	754.74	114
AUG.	218	30 (15)	17	30.8	31.5 (23)	22.4	19.2 (30)	27.8	—	27.5	27.1	26.0	28.0	—	28.9	29.7	30.9	20.6	757.53	753.58	157
SEP.	565	74 (15)	22	29.5	32.5 (4)	21.5	20.0 (6)	27.8	—	27.2	26.8	26.3	27.8	—	27.6	28.9	29.7	19.1	758.00	756.10	102
OCT.	145	29 (27)	14	30.0	33.0 (24,25)	20.5	17.5 (18)	27.7	—	27.5	27.0	26.8	28.7	—	28.7	29.0	31.0	18.1	757.89	775.63	214
NOV.	130	61 (8)	7	31.5	35.0 (15,18)	20.2	16.0 (5)	27.9	—	27.4	26.9	26.5	28.8	—	29.0	29.7	30.8	16.0	758.24	756.06	196
DEC.	306	51 (10)	14	31.4	35.0 (2)	20.3	18.0 (3)	27.8	—	26.9	26.2	25.9	27.9	—	28.0	29.8	30.4	18.3	758.77	756.62	158
TOTAL	5007		201																		
MEAN	417			31.3		21.1		27.9	27.9	27.2	26.8	26.3	28.2	28.1	28.4	29.4	30.3	18.9	757.74	755.78	1940

All measurements are in standard metric units; figures given within parentheses are the respective dates.

REVIEW OF THE ADVISORY SERVICES DEPARTMENT AND THE ECONOMIC RESEARCH UNIT

BY

A. B. DISSANAYAKE

(Head, Advisory Services Department & Economic Research Unit)

SUMMARY

With effect from 01.06.1974 the Smallholdings Department, the Estates Advisory Department and the Economic Research Unit were amalgamated to form the Advisory Services Department and Economic Research Unit.

Unusual rainfall conditions during the first three quarters had an adverse effect on the tapping of rubber and the advisory activities of the Department. The field staff devoted a considerable part of their time to new Rubber planting and subsidy work. The field staff, contour lined for planting holes 1313 holdings comprising of 1995 ac while 1094 holdings consisting of 1642 ac were contour lined for soil conservation measures in new plantations and replantations. The field staff also paid a total of 36168 visits to new planting and replanting areas for advice to smallholdings. Further a total of 3984 inspections were carried out for the Rubber Control Department. Four smallholders rubber conferences were held during the year. The Department participated in 4 exhibitions. The organisation of Group Processing Centres (GPCs) were carried out by the field staff for the improvement of the quality of rubber manufactured by smallholders. There are now 30 GPCs in operation while 14 are ready to begin operations. Another 45 GPCs are under construction bringing the total to 89. Further surveys have been completed for another 20 GPCs. Collecting centres for the supply of latex for crepe manufacture at a number of Company estates were organised for the benefit of smallholders. The Department also assisted, through the GPCs, the collection of rubber seeds by the State Rubber Manufacturing Corporation.

76 Fertilizer demonstration plots started in 1972 were maintained during the quarter. 24 Tapper training classes were organised and of these in 19 classes, trainees have been tested orally. A total of 338 trainees are entitled to receive certificates. A total of 3419 demonstrations were held by the field staff in subjects which need a certain amount of skill.

Visits to small medium and large estates have been made to give advice on all aspects of the rubber industry from planting to manufacture.

A number of economic research studies have been carried out on cost of production, the Economics of production of GPCs, Marketing of smallholder rubber and other subjects of importance. A total of 9 papers have been submitted for scientific conferences here and abroad by officers of the Department during the year.

Details of Expenditure

	Expenditure for the quarter ending 31st December '74	Cumulatve Total as at 31st December 1974	Budget for raise 1974
DESCRIPTION			
Recurrent Expenditure	Rs.	Rs.	Rs.
Emoluments ..	198,984	838,024	887,618
*Overtime ..	983	1522	6000
*Travelling & Subsistence ..	38,893	147,671	294,720
Working Expenses ..	12,697	32,473	60,000
Sulphur Dusting Scheme ..	2339	5277	74,100
Soil Conservation ..	31	418	15,000
Capital Expenditure			
Plant & Machinery ..			33,100
Furniture & Fittings ..		905	7000
Office Equipments ..	6000	6000	33,300
Film ..			6000

*Expenses for the month of December, 1974 is not included.

General :

With effect from 01.06.74. the Smallholdings Department, the Estates Advisory Department and the Economic Research Unit were amalgamated to form the Advisory Services Department and Economic Research Unit. However, the work done by the combined department falls into three categories and will be dealt with as follows.

a) Advisory Services to Smallholders

b) Advice to Estates

c) Economic Research

Unusual rainfall was experienced during a greater portion of the year under review which had adverse effect on tapping of Rubber and the advisory activities of the Department. The field staff devoted a considerable part of their time to new planting and subsidy work.

The Rubber Instructors also paid special attention to the organisation of Group Processing Centres.

Staff :

The Head, and the Deputy Head and one Assistant Advisory Officer were on duty throughout the year. The Chief Advisory Officer, Smallholdings, was on duty till the 5th June 1974 when he retired from the services of the Institute after serving 26 years in the Smallholdings Department.

The sudden death of Mr. R. A. Somadasa, Office Assistant, Advisory Services Department on 28.09.74 is recorded with deep regret. Mr. Somadasa served the Smallholdings Department for over 27 years.

Mr. B. D. Pedrick, Divisional Advisory Officer, Panadura retired from services on 20.01.1974 having served the department for over 36 years.

Mr. W. D. Abeysena, Rubber Instructor, retired from service on 18.03.74 after completion of 25½ years.

We wish to place on record our appreciation of the meritorious service to the smallholders and the Department by Mr. H. H. Peiris the former Chief Advisory Officer Smallholdings, Mr. B. D. Pedrick the former Divisonal Advisory Officer, Mr. R. A. Somadasa former Office Assistant and Mr. W. D. Abeysena, Rubber Instructor.

Mr. M. B. Dissanayake former Divisional Advisory Officer, Smallholdings, Kegalle who was transferred from the Department to the Crumb Rubber Project in 1971 was released to the State Rubber Manufacturing Corporation.

Mr. W. A. A. Perera, Clerk/Translator, resigned from the service of the department on 01.08.1974.

Rubber Instructors, Mr. J. R. Malagala and Mr. S. A. Weerawarna who were attached to Dodampe and Akuressa ranges respectively resigned their posts as from 01.08.1974 and 30.09.1974 respectively.

Mr. A. Sooriyarachi, Rubber Instructor was promoted to the post of Divisional Advisory Officer.

The following were appointed as Rubber Instructors during the year.

Mr. S. Weerakoon, Mr. L. T. Perera, Mr. S. Senewickrema, Mr. R. W. U. Rajapakse, Mr. A. S. A. Gunasekera, Mr. S. S. Waidyakularatne, Mr. M. Sirisena and Mr. L. Kirdena.

One Assistant Advisory Officer was away on overseas study leave. Mr. G. R. Chandrasiri, Assistant Agricultural Economist who was on overseas study leave resumed duties during the last quarter after obtaining the post graduate degree of M. Phil from Wye College, London.

Other Administrative matters :

Loans :

Five officers were granted loans of Rs. 29,000.00 for the purchase of Vehicles and 8 officers were granted loans of Rs. 11,569.50 for repairs of vehicles.

Correspondence :

Inward	..	6189
Outward	..	7739

With the Rubber Controller

Inward	..	2612
Outward	..	2229

From the Rubber Instructors to smallholders .. 1807

Advisory services to smallholders

New planting

The following visits were carried out

First visits	..	74
Subsequent visits	..	6232

Lining :

	No. of permits	acreage
This year's permit areas ..	108	179
Soil conservation ..	49	79
Planting holes ..	59	100
Last year's permit areas ..	50	85
Soil conservation ..	25	38
Planting holes ..	25	46
Marking of trees for tapping ..	37	1850 trees
Soil conservation grants ..	6 permit holders	Rs. 208.92

Replanting :

Visits

Permits issued	..	2213
Visits this year's permit areas	..	2752
Visits previous years' permit areas	..	24,828
Special reports	..	787

Lining

		permits	acres
This year's permit areas :	Soil conservation works —	957	1114
	Planting holes —	953	1398
Previous years' permit areas:			
	Soil conservation works —	263	411
	Planting holes —	276	451

Marking trees for tapping	— 276 holdings	10186 trees
Planting material checks	— 118 inspections	21458 plants

Special inspections for Rubber Control Department

Visits for preliminary reports	..	431
Visits for special inspection reports (replanting)	..	789
Visits for final inspection reports and special reports (new planting)	..	2229

Visits for recommendation of subsidy payments by Divisional Advisory Officers and few Senior Rubber Instructors .. 535

Smallholders' Rubber Conferences :

During the year under review, 4 Smallholder conferences were held in the following places:

(i) Gabbale, Kotawela Group Processing Centre on 22.02.1974.
(ii) Amaragedera Group Processing Centre on 17.05.1974.
(iii) Mihindu Maha Vidyalaya, Agalawatta on 23.08.1974.
(iv) Kesbewa Maha Vidyalaya, Kesbewa on 08.11.1974.

The Hon. Minister of Plantation Industries, Dr. Colvin R. de Silva participated in the proceedings of all these conferences. Others who participated in these conferences were Mr. Mangala Moonasinghe, Member of the National State Assembly for Bulathsinhala, The Director, Rubber Research Institute, Head, Advisory Services Department and Senior Research Officers of the Institute. A representative gathering of smallholders were present.

They discussed at length the urgent problems confronting them with the Hon. Minister and the Rubber Research Institute officials.

Meetings and conferences

i) The Director, Rubber Research Institute of Sri Lanka attended the monthly conference in all the 10 Divisions in February 1974. The Deputy Chief Advisory Officer (Smallholdings), accompanied the Director on these visits.

ii) The Head, Advisory Services Department, the Chief Advisory Officer (Smallholdings), and the Deputy attended conferences at the Ministry of Plantation Industries.

iii) On 25.10.74 the transfer committee of the department met at the Rubber Research Board Office to discuss the requests for a transfer.

vi) The Advisory Services Department staff conference held on 18.11.74 at the Rubber Research Board office was attended by all Divisional Advisory Officers.

Publications

No new publications were made during the year. Reprints of articles published in the Sinhala magazine "Rubber Puwath" were used for distribution to smallholders.

Exhibitions

The Department participated in the following exhibitions.

(i) The Agricultural exhibition at Baduraliya.
(ii) The Agricultural exhibition at Matugama.
(iii) The Ceylon Association for Advancement of Science exhibition at Hanwella.
(iv) The exhibition at the Meegahatenna Maha Vidyalaya.

Improvement of Smallholders' sheet :

Every possible effort was made and necessary advice and assistance was given to smallholders by the field staff to improve their sheet rubber. Priority was given to the construction of Group Processing Centres.

The position of the Group Processing Centre programme is as follows :—

1.	Group Processing Centres in operation	— 30
2.	Group Processing Centres awaiting commencement of operation	— 3
3.	Group Processing Centres work completed	— 11
4.	Group Processing Centres under construction	— 45
5.	Group Processing Centres survey completed	— 20
6.	Group Processing Centres surveys going on	— 19

The details are given below.

Societies at Kahagalla, Milleniya, Kalupahana, Hataraliyadda, Yatalamatta, Nugadanda/Ihalagama, Govinna, Dangampola, Galatura, Etnawala, Palugama, Homagama, Maliduwa, Rantotuwila, Walagedera, Kalalgoda/Talawatugoda, Olaboduwa, Kandana, Yatagampitiya, Tambadiya, Karapagala, Kumbuke, Kotawella, Ittapana, Pinnawala, Pore, Amaragedera, Udawela/Halambe, Opella, Warakapola/Tolangamuwa are in production.

At the end of the year under review the following Group Processing Centres have been equipped and are awaiting commencement of processing operation:— Polgampola, Telikada/Marjuwana, Udalamatta.

The following centres have completed buildings and are awaiting rubber rollers. Teppanawa, Hathella, Weihena/Martupitiya, Pallekanugala, Hinguralakanda, Ganhela, Weligampitiya, Nape Colony, Makura, Galpothugoda and Ganegama.

The following centres were under construction :

Iddamalgoda, Pitigala, Malmaduwa, Gantuna, Walallawita, Gurugoda/Meewanapalana, Delwala, Katugahahena/Nauthtuduwa, Maniyamgama, Haltota, Devipahala, Galatura, Artigala, Hemmeliya, Bopetta, Weragoda, Warakagoda, Neluwa, Arandara, Dambara, Pelanwatta, Nakkawita, Lewangama, Welmilla, Omatta, Ranwala/Panakawa, Diwalkada, Nattaweka, Welgama, Medagoda, Ganepalla, Pimbura, Kodurawa, Jalatara/Betawilla, Malwana, Kurupita, Yatawara, Bollatawa, Malwala, Karagoda/Uyangoda, Meddapola, Aludeniya, Gabbala/Panapitiya, Dangalla, Kevitiyagala.

In addition surveys have been completed in the following centres :

Angampitiya, Uragasmanhandiya, Paragastota, Pahala Hewassa, Kitulgoda, Kadugoda, Gettiyamulla, Hindurangala, Ellehena, Horawella, Siyabalagoda, Hokandara, Pahala Welgama, Morawatta, Lahupona, Dompe, Kurugala, Gulawita.

Feasibility surveys are being conducted for centres to be located at Udumulla, Pelawatta, Moragala/Meegahatenna, Avittawa, Ketapola, Karannagoda, Eswatta, Lollupitiya, Gorakaella, Parape, Epitawala, Warakapitiya, Tawalama, Amitirigala North, Ihala Hewassa, Paragoda, Amitirigala South and Pathakada.

During the years this Department has assisted through the Group Processing Centres the collection of rubber seeds by the State Rubber Manufacturing Corporation.

The Department also helped in the following:-

(i) Organisation of collecting centres for Elston Estate and Penrith Estate, Puwakpitiya.

(ii) Arranging for the supply of latex from Karapagoda Group Processing Centre for Latex Crepe Manufacture at Elpitiya Group, Elpitiya.

(iii) Two surveys were undertaken at the request of the managers of Peenkanda and Nakiyadeniya Groups to select areas for collecting latex in close proximity to these estates.

Other visits

A total of 5937 visits to Rubber Co-operative societies and 683 visits to demonstrations and ordinary smoke houses were made.

Tapper training classes

24 Tapper training classes were organised during the year under review. Of these 19 classes were tested orally by the end of the year and 338 trainees have been successful.

Fertilizer plots

76 Fertilizer demonstrations plots started in 1972 were maintained during the year.

Demonstrations

The following demonstrations were given by the field staff during the year.

Sheet making	—	1413
Tapping	—	638
Disease control	—	460
Miscellaneous	—	908

Visitors

(i) Mr. Austin Perera, Managing Director, State Rubber Manufacturing Corporation, visited the Department and attended the Divisional monthly conference of field staff in March 1974.

(ii) Dr. Moeljono Partosoedarco (Secretary General, ANRPC) was taken round on inspection of smallholdings by the Deputy Chief Advisory Officer and Assistant Advisory Officer during his visit in April 1974.

(iii) On 08.07.1974 the Deputy Head, accompanied Mr. Brookson and Mr. Ellinger of FAO/IRRDB to Avissawella and Gampaha divisions and showed round smallholdings in various stages of growth, and the Group Processing Centres.

(iv) The Assistant Advisory Officer accompanied Mr. James Morlu of the Ministry of Agriculture, Liberia, to Commodity Purchase Depots, Mawanella Block Rubber Factory and smallholdings.

(v) Mr. Vidinlive, Head of Rubber Cheminport, Bulgaria, visited the Department on 18th September, 1974. The Deputy Head, Advisory Services Department accompanied him to Dartonfield, Agalawatta.

Advice to Estates

Visits to Estates :

The number of visits done were very small as only one Assistant Advisory Officer was on duty and also due to the rise in the cost of petrol.

A total of 30 visits have been made to medium and large estates during the year under review.

Other visits

The following visits were done by officers of the Department in attending Committee meetings, discussions, other Government Institutions, Scientific Conferences Seminars *etc.*

Discussions with Government Departments *etc.*	..	38
Committee meetings	..	7
Interviews	..	10
Taking visitors around	..	6
Conferences & seminars	..	14
Others	..	6
Total	..	81

State Rubber Manufacturing Corporation

The Head attended 20 Sri Lanka State Rubber Manufacturing Corporation Board meetings for the year 1974. In addition he participated in the activities of the Corporation by attending Boards of Interview, discussions with firms and visiting the factories under construction.

Studies

The Head attended two, 3 day and 5 day courses on Marketing and Project Appraisal and Formulation at the Academy of Administrative studies.

Talks

The following talks were given by the Head during the year.

1. The extension Service for the Natural Rubber Industry of Sri Lanka at the Faculty of Agriculture, University of Sri Lanka, Peradeniya.

2. An Agro-Economic Norm for the NR industry of Sri Lanka at the Planters Association, Kegalle.

The following talks in Sinhala were given at the Smallholders' Conference at Rambukkana, Bulathsinhala, Agalawatta and Kesbewa.

3. Factors affecting production efficiency of rubber.

4. The improvement of profitability of smallholdings.

5. The economics of production of smallholdings.

6. Re-organisation of the Advisory Services Department of the Rubber Research Institute of Sri Lanka.

Economic Research

Surveys on the Economics of production of rubber

Medium and large estates

This study was completed and the report submitted to the Director.

Small estates (25—<100 *ac*)

The above survey too was completed and the report submitted to the Director.

Smallholdings

This survey could not be started in the year under review due to shortage of staff. The questionnaire is being prepared for the survey to be started in 1975.

Survey of Income levels, availability and utilization of time saved and employment opportunities by smallholders in the Mawanella area:

This study was undertaken at the request of the State Rubber Manufacturing Corporation in 1974. The survey was completed and the report submitted during the year under review.

Survey of the Economics of Group Processing Centres

A survey of the economics of eight Group Processing Centres which had been in operation for over 6 months was conducted. The report was submitted to the Director.

An Agro-Economic Norm for the World NR industry

In preparation for the above an Agro-Economic Norm for the NR industry in Sri Lanka was worked out. Data from other important NR producing countries has been requested for.

The effect of the fuel crisis on the NR industry of Sri Lanka

The prices of inputs to the NR industry are still rising so that the study is delayed till some stability in prices is achieved. The study will therefore be continued into 1975.

The marketing of Smallholder rubber in Sri Lanka

The collection of data on the above has been completed and they are being studied. The report will be ready in 1975.

The following papers were presented from the Department at scientific conferences held in Sri Lanka and abroad.

Indian Rubber Conference-January 1974

Price fluctuations in NR and the necessity for stabilising prices by A.B. Dissanayake.

The NR industry by 2000 AD by A. B. Dissanayake.

Ceylon Studies seminar of the University of Sri Lanka, Peradeniya-August 1974

An analysis of Production Costs and Profitability in rubber estates by A. B. Dissanayake.

IRRDB. Symposium on Rubber, Cochin, India-September 1974

The Group Processing Centre as a means of improving the quality of rubber produced by smallholders in Sri Lanka by A. B. Dissanayake.

The economic and social aspects of smallholder extension services by A. B. Dissanayake.

The development and functioning of the Smallholdings Department of the Rubber Research Institute of Sri Lanka by R. P. M. de Zoysa.

Thesis at Wye College, London

Some economic aspects of Rubber Production in Sri Lanka by G. R. Chandrasiri for M. Phil at Wye College, London-October, 1974.

Ceylon Association for the Advancement of Science-December, 1974

An agro-economic norm for the NR industry of Sri Lanka by A. B. Dissanayake.

The following draft papers have been prepared for the ANRPC meeting on Development of Smallholdings in February, 1975.

Improving the quality of Smallholders' rubber in Sri Lanka by A. B. Dissanayake.

Replanting Rubber Under the Rubber Replanting Subsidy Scheme in Sri Lanka by A. B. Dissanayake.

The marketing of Smallholders' rubber in Sri Lanka by A. B. Dissanayake, R. A. Wijewansa & S. K. de Silva.

In addition a study of the tax structure for rubber was made and suggestions for its improvement were made to the Rubber Controller.

REVIEW OF THE ESTATE DEPARTMENT

BY

S. G. FERNANDO

(*Acting Estate Superintendent*)

SUMMARY

The Institute's Group of Estates, generally known as Dartonfield Group, comprised of Dartonfield Division, in Agalawatta, Nivitigalakele Division, in Matugama, and Hedigalla Division, in Lathpandura, has an extent of 1,548 acres, 3 roods and 30 perches which includes 377 acres, 3 roods and 38 perches of jungle. The planted acreage is 975¼ acres of which 733¼ acres were in tapping during the year. The immature area acreage stood at 242 acres with an additional acreage of 17¼ acre nurseries.

The weather conditions especially at Hedigalla Division, were not favourable for harvesting of crop. The prolonged drought in January and heavy rainfall in April, May, June, July and September disrupted the collection of crop. The crop harvested was 399,325 lb representing an average yield of 544 lb per acre. The crop so secured fell short of the estimate by 26.05%.

The incidence of *Oidium heveae* was light in general, but the late wintering clones at Hedigalla Division were mildly affected by the disease. Extra spot dustings of Sulphur were carried out as a precautionary measure.

The incidence of *Phytophthora* and *Gloeosporium* leaf-fall was negligible this year. A few cases of Bark Rot were treated in the Group.

A lesser demand for budwood was noticed during the year.

Routine weeding, manuring and other agricultural operations were carried out in both mature and immature areas of the Group.

Estimates for 1975 in connection with the working of the Group were prepared and submitted to the Rubber Research Board for approval.

DETAILED REVIEW

Staff

Mr. S. de S. Daluwatta ceased to be the Estate Superintendent from 11.06.1974. Mr. S. G. Fernando who succeeded Mr. D. H. Ariyaratne, the Assistant Estate Superintendent at Hedigalla Sub-station, on 1st March 1974, was appointed as the Acting Estate Superintendent from the above date and carried out work at Dartonfield Group during the rest of the year. Mr. A. Jayasena, Field Officer at Hedigalla Division assisted the Acting Estate Superintendent in many ways during this period.

Mr. A. A. Ariyaratne assumed duties as a checkroll clerk cum typist on 15th February, 1974. He was confirmed in his post with effect from 15th February, 1974.

The Field Assistant of Dartonfield Division has been under interdiction from 7th December 1974 pending the findings of a Departmental inquiry.

The Estate Department cadre stood at 27 at the end of the year, made up as follows:

Intermediate Staff	1
Assistant Staff	17
Minor Staff	9
Total	27

Correspondence

Inward	588
Outward	973

Acreage Summary

	Dartonfield	Nivitigalakele	Hedigalla	Total
	Acres	Acres	Acres	Acres
Mature	90¼	83½	559¾	733¼
Immature	25¾	48½	167¾	242
Nurseries	6½	9¾	1	17¼
Total	122½	141½	728½	992½
Abandoned	2	10¼	69¾	82
Building sites *etc.*	50½	15½	8¼	74¼
Pinewood plantation	—	—	1¼	1¼
Roads	6¼	1	9	16¼
Swamp area	—	½	¾	1¼
Streams & reservations	¼	—	2	2¼
Jungles *etc.*	—	2	376	378
Total	181½	170¾	1195½	1548

Visiting Agent

The Visiting Agent, Mr. M. R. C. Peiris paid two visits to Dartonfield Group on 24th and 25th May and 12th and 13th December, 1974.

Weather (estate gauge)

Month	Dartonfield		Nivitigalakele		Hedigalla	
	1974	1973	1974	1973	1974	1973
	in.	in.	in.	in.	in.	in.
January ..	2.00	2.32	1.46	3.27	2.00	2.45
February ..	11.05	4.70	9.27	4.26	4.26	14.59
March ..	17.00	17.77	10.67	13.78	17.57	18.67
April ..	41.23	14.73	33.70	9.26	25.32	12.02
May ..	29.04	18.82	31.68	15.19	30.35	18.58
June ..	21.04	20.24	21.20	18.04	22.81	24.32
July ..	23.46	23.04	21.05	21.66	31.28	19.39
August ..	8.81	4.99	8.96	10.88	9.71	8.06
September ..	22.60	7.10	20.63	5.39	28.27	7.74
October ..	5.76	20.44	4.05	23.38	6.26	25.97
November ..	5.88	22.55	4.04	14.16	4.23	17.71
December ..	10.22	10.33	16.02	7.08	13.06	18.51
Total ..	198.09	167.03	182.73	146.35	195.98	188.01
Average (five-year period) ..	169.00 in.		154.24 in.		183.44 in.	
Total No. of wet days ..	225		203		227	

The total rainfall for the year at Dartonfield, Nivitigalakele and Hedigalla Divisions amounted to 198.09", 182.73" and 195.98" respectively. The second third and fourth quarters of the year were very wet. The rainfall recorded in April at Dartonfield Division was the highest and amounted to 41.23".

Crop

The major factors contributing to the deficit of the crop during the year were:

(1) Unusual and uneven rainfall during the months of March, April, May, June, July and September.

(2) The intensification of the replanting programme at Hedigalla Division resulted in the uprooting of a large acreage which caused considerable loss in crop.

(3) Lesser out-turn of village tappers, especially at Hedigalla Division, during the late tapping days.

	1974	1973
Estimated ..	540,000 lb	570,000 lb
Harvested ..	399,325 lb	475,635 lb
Deficit ..	140,675 lb	94,365 lb

The crop harvested for the year was 73.94% of the season's estimate.

Comparative yield records of individual fields

Dartonfield

		Acreage in tapping	Total yield in lb		Yield in lb per acre	
			1974	1973	1974	1973
1950/51	Replanted area	12¾	682*	3708	—	290.8
1952	,, ,,	27	17047	18674	631.4	691.6
1953	,, ,,	8	4612	4984	576.5	623.0
1954	,, ,,	2½	1566	1735	626.4	694.0
1955	,, ,,	5	3873	3445	774.6	689.0
1955/56	,, ,,	4⅝	3196	3555	672.8	748.4
1960/61	,, ,,	31½	22989	24255	729.8	770.0
1965	,, ,,	11½	6686	4839	581.4	420.8
*Slaughter tapping		103	60651	65195	672.0	633.0

Nivitigalakele

1953	Clearing	10	4393	5414	439.3	541.4
1954	,,	10	4726	5886	472.6	588.6
1962	,,	16¾	19990	18999	1193.5	1134.3
1963	Replanted area	14	12998	12369	928.4	883.5
1964	,, ,,	8	7557	7172	946.6	896.5
1965	,, ,,	10	7528	7224	752.8	722.4
1966	,, ,,	5¾	3671	3054	638.5	531.1
1967	,, ,,	8¾	3911	3139	447.0	358.7
		83¼	64774	63257	778.1	759.8

Hedigalla

1949	Clearing	—	—	11813	—	339.9
1950/51	,,	—	—	8990	—	499.4
1952	,,	79½	59785	65342	752.0	821.9
1953/1965	Clearing	144	66232	91080	459.9	632.5
1954	Clearing	171	7533	79673	444.1	465.9
1955	,,	78	28951	37473	371.2	480.4
1956	,,	60	34019	40436	567.0	673.9
1957	,,	17¼	8101	10943	469.6	634.4
1967	Replanted area	10	879	—	87.9	—
		559¾	273900	345750	489.3	573.9
Earth scrap	..	—	—	1433	—	—
Total for the Group	..	733¼	399325	475635	544.6	603.0
Other sources	..		246586	129246		
Total	..		645911	604881		

Tapping

Tapping was stopped due to wintering in March: 4 days at Dartonfield, 3 days at Nivitigalakele and 3 days at Hedigalla Division.

All tapping panels in experimental areas were treated with Antimucin, but no panel fungicides were used in commercial areas. On the recommendation of the Scientific Departments, tapping cuts were marked with appropriate guide lines for bark consumption.

The following fields due to be replanted in 1975 ceased to be tapped :

Hedigalla 1953 .. 35 acres

Dartonfield 1974 .. 7 acres (balance to be replanted in 1975).

Analysis of tapping rounds on Dartonfield Group for 1974 (1973 *figures in brackets*)

Dartonfield

	Early tapping		Late tapping		No tapping: Winter rest		Rain		Holidays		Strike	
1st Qtr.	74	(70)	11	(15)	4	(—)	1	(—)	—	(1)	—	(4)
2nd ,,	28	(37)	18	(15)	—	(—)	38	(33)	7	(6)	—	(—)
3rd. ,,	37	(55)	16	(17)	—	(—)	39	(20)	—	(—)	—	(—)
4th ,,	68	(44)	20	(23)	—	(—)	3	(24)	1	(1)	—	(—)
	207	(206)	65	(70)	4	(—)	81	(77)	8	(8)	—	(4)

Nivitigalakele

1st Qtr.	67	(71)	14	(15)	3	(—)	5	(4)	1	(—)	—	(—)
2nd ,,	24	(37)	7	(14)	—	(—)	55	(35)	5	(5)	—	(—)
3rd ,,	27	(50)	14	(15)	—	(—)	51	(27)	—	(—)	—	(—)
4th ,,	61	(44)	19	(16)	—	(—)	12	(32)	—	(—)	—	(—)
	179	(202)	54	(60)	3	(—)	123	(98)	6	(5)	—	(—)

Hedigalla

1st Qtr.	64	(65)	7	(9)	2	(—)	17	(16)	—	(—)	—	(—)
2nd ,,	16	(41)	30	(13)	1	(—)	39	(39)	5	(8)	—	(—)
3rd ,,	22	(62)	19	(4)	—	(—)	51	(26)	—	(—)	—	(—)
4th ,,	54	(43)	13	(6)	—	(—)	25	(43)	—	(—)	—	(—)
	156	(211)	69	(32)	3	(—)	132	(124)	5	(8)	—	(—)

Manufacture

A summary of the various forms of manufacture during the year is given below:—

Latex grades	Total lb	Percentage
Pale Crepe No. 1 ..	239558	59.99
,, ,, No. 2 ..	12557	3.15
,, ,, No. 3 ..	101420	25.40
	353535	88.54
Scrap grades		
Scrap Crepe No. 1 ..	7341	1.85
,, ,, No. 2 ..	19513	4.87
,, ,, No. 3 ..	18936	4.74
	45790	11.46
Total ..	399325	100.00
Outside sources ..	246586	
	645911	

Difficulties were encountered in the manufacture of No. 1 crepe due to the following reasons :—

(1) High number of wet days in some months, pre-coagulation occurring in the latex during these periods was above normal.

(2) Over 200 varieties of budded rubber in tapping out of which RRIC clones alone number from 1 to 99. The latex obtained from all these clones is not entirely suitable to achieve a satisfactory out-turn of No. 1 crepe.

(3) The tapping intensity at Hedigalla (*i.e.* 72% of the total acreage) ranges from 133 to 400% due to the future replanting programme, the 'yellow' latex resulting is not suitable for manufacture of No. 1 crepe.

Rubber from outside sources

177,511 lb latex collected by the Multi-purpose Co-op. Society, Lathpandura, from smallholders, were manufactured into pale crepe and sold for them. The manufacturing and transport charges of 22 cts. per lb remained at the same level as last year. 64,584 lb latex received from Barrowdale Estate were manufactured into crepe.

Factory machinery

(1) Mill No. 1 (a) Driving motor of this mill went out of order with burnt field coils in April and was repaired by Messrs Colombo Commercial Company. The motor was out of commission for about 3 weeks.

(b) Shafting bearings were replaced with 3" split copper bearings.

(2) Mill No. 2—Two driving shaft bearing sole plates were replaced with new ones.

(3) Mill No. 6 (a) Broke down with a heated main bearing, and was out of commission for about 8 days until repaired.
(b) Fitted with a new Brown's improved internal water cooling equipment, replacing the defective old one.

(4) Mill No. 9—Supplied with new Brown's improved internal water cooling equipment, replacing the defective old one.

Pests and diseases

Oidium heveae—A mild attack of *Oidium* leaf disease was recorded at Hedigalla Division in the late wintering areas but a satisfactory control was achieved by sulphur dusting.

Gloeosporium—The incidence of *Gloeosporium* was negligible this year.

Phytophthora—The attack of *Pytophthora* leaf-fall was very mild and there was no marked leaf-fall in any area.

Storm damage

The loss of trees due to storm damage on Dartonfield, Nivitigalakele and Hedigalla Divisions was 464.

Capital account—agricultural development

Dartonfield Division

1973	Replanted area	..	15 acres
1974	Replanting area	..	10⅜ „

Nivitigalakele Division

1968	Replanted area	..	2½ acres
1970	„ „	..	17½ „
1971	„ „	..	11½ „
1972	„ „	..	6 „
1974	„ „	..	11½ „

Hedigalla Divison

1967	Replanted area	..	7 acres
1968	„ „	..	9¼ „
1969	„ „	..	22½ „
1970	„ „	..	26¼ „
1971	„ „	..	17 „
1972	„ „	..	20 „
1974	„ „	..	64 „

1967 *Replanted areas*

(a) 10 acres at Hedigalla Division: This area is planted with clones RRIC 41, 45, 86, 88, 89, 101, Nos. 451, 1004, 1010, 1108 and 1174.

(b) 7 acres at Hedigalla Division: The old budwood nursery established in 1967 was converted to a clearing. The clones in this area are the RRIC series and RRIM 600.

1968 *Replanted areas*

(a) 2½ acres at Nivitigalakele: This area includes plants of clones RRIC 5, 41, 52, 89, RRIM 623 and Tjir 1. The growth is satisfactory.

(b) 9½ acres at Hedigalla: This area consists of clones RRIC 45 and RRIC 101, also Nos. 135, 451, 1004, 1152, 1174 and 1305. The growth is vigorous and ground covers are satisfactory.

1969 *Replanted areas*

22½ acres at Hedigalla Division: The clones in this area are RRIC 45, 100, 101, and Nos. 451, 1103, 1175 and 1458. The plantation is quite good.

1970 *Replanted areas*

(a) 17½ acres at Nivitigalakele: The plantation consists of 2 acres of stumped buddings with clone RRIC 45 and the balance of clones RRIC 13, 45, 100, 101, PR 252, IRCI 2, WR 101, AVROS 1734. The growth is satisfactory.

(b) 26¼ acres at Hedigalla Division: 8 acres are planted with stumped buddings of clones RRIC 45, the balance acreage consists of clones RRIC 100 and 101. The growth is satisfactory.

1971 *Replanted areas*

(a) 11½ acres at Nivitigalakele: Budded stumps of clones RRIC 50 are planted in a 4½ acre block. The balance 7 acres are planted according to the requirements of the Botany Department. The plantation is satisfactory.

(b) 17 acres at Hedigalla: This area consists of clones RRIC 15, 48, 50, 101 and PR 252.

1972 *Replanted area*

(a) 6 acres at Nivitigalakele: This is an experimental plantation by the Genetics & Plant Breeding Department. The clones in this area are RRIC 45, 110, No. 506 and selected seedling of experimental material.

(b) 20 acres at Hedigalla Division: The area is planted with clones RRIC 100 and 101.

1973 *Replanted area*

(a) 15 acres at Dartonfield: 3½ acres consists of clone RRIC 101 and comes under the Soils Chemistry Department experiments. 10 acres are planted with clone PB 86 for the Pathology Department experiment. The balance 1½ acres is planted by the Botany Department with multiple clones.

(b) 11 acres at Nivitigalakele: This area which was due to be replanted in 1973 was postponed for 1974 on the advice of the Genetics & Plant Breeding Department. This acreage was planted in May 1974.

1974 *Replantings*

(a) 10¾ acres at Dartonfield: 3½ acres consisting of clone PB 86. The balance acreage is due to be replanted in 1975.

(b) 64 acres at Hedigalla: 64 acres planted with clones RRIC 102, RRIC 103 and PB 86.

Nurseries

Budwood multiplication nursery—5½ acres at Dartonfield and 7½ acres at Nivitigalakele.

(a) Routine weeding, manuring, cleaning of drains and other agricultural operations were carried out.

(b) All over-matured budwood plants were lopped off for fresh budwood.

Seedling stock nurseries—1 acre at Dartonfield, 2½ acres at Nivitigalakele and 1 acre at Hedigalla.

(a) Seedling stock nurseries were maintained and routine agricultural operations were carried out.

(b) Stocks were budded to meet both experimental and commercial requirements.

Budwood issues

(a)	To outside Estates	1585	yards
(b)	To Estate Department	143	,,
(c)	To Botany Department	292	,,
(d)	To Plant Pathology Department	495	,,
		2515	,,

Budded stump issues

(a)	To Estate Department	2441

Field and technological experiments

The Rubber Chemistry, Botany, Plant Pathology, Genetics & Plant Breeding and Soils Chemistry Departments were given labour and necessary assistance for carrying out their field and technological experiments.

Roads

All motorable roads, within the estate and approach roads were maintained in good order, effecting surface repairs where necessary.

Estimates

Estimates for 1975 both capital and revenue in respect of Dartonfield Group were prepared and submitted to the Rubber Research Board for approval.

Labour and health

Labour force

Though the labour force was adequate during normal periods, the out-turn of tappers especially at Hedigalla Division was unsatisfactory.

Applications for refund of E.P.F. dues in respect of 24 individuals were made during the year. In all 24 cases were settled in full, inclusive of previous years out-standing claims. A, B & H membership forms to the E.P.F. which were in arrears in respect of 382 members were attended to and a balance of 93 cases is out-standing still.

Five labourers reaching the age limit were retired. Six workers left on medical grounds. Two labourers of Indian Origin, with their family members, were repatriated in accordance with the Indo-Ceylon Repatriation Act. Retiral Gratuity & Ex-gratia dues were paid to these labourers in accordance with the provisions stipulated.

Four labour tribunal cases were reported during the year. Three applications were dismissed and one had to be re-instated. In all cases the Estate Superintendent appeared for the Management.

Five Trade Unions operated in the Group during the year. The United Corporation & Mercantile Union has the largest membership.

Wages

Wages were paid during the year in accordance with the Wages Board's Ordinance in force. In addition to the minimum wages the following allowances are paid:

(1) Emergency Special Allowance
(2) Temporary Interim Allowance and
(3) Price Wage Supplement.

Dartonfield Group

Working Ceylonese	Resident	Non-resident	Total
Men	73	143	216
Women	69	122	191
Children	—	—	—
Working Immigrants			
Men	36	—	36
Women	27	—	27
Children	—	—	—
	205	265	470

Line rooms

Line room accommodation was satisfactory. Repairs to lines and labour cottages, where necessary, were carried out.

Annual holidays

Annual holidays with pay were given to all labourers who were entitled to same, in accordance with the Labour Ordinance.

Festival advances

Substantial advances were paid to all labourers to celebrate their main festival, monies will be recovered in 10 months.

Maternity benefits

Eighteen full and 5 alternative maternity benefit payments were made.

Workmen's compensation

Nine accidental injuries sustained by workers during working hours were reported and compensation was paid according to regulations.

Feeding children

Instead of the issue of free bread and flour the value of flour continued to be paid to children during the year.

Co-operative stores

The two Co-operative stores at Dartonfield and Hedigalla Divisions continued to cater to the needs of the resident labour force.

Workers' Councils

Two Workers' Councils, one at Hedigalla Division and one at Dartonfield and Nivitigalakele Divisions, continued to function and assisted the Management.

Health

The health of the members of the Institute's staff and of the estate labourers was satisfactory. There were two minor epidemics of Influenza during the year.

Immunisation against Polio and vaccination against Small Pox were carried out. The Anti T. B. Unit of Chest Clinic, Kalutara, carried out a round of B.C.G. vaccination of pre-school children. Most of the resident staff members were given the Anti-cholera vaccine.

Births

Twenty three births were recorded in the group during the year.

Deaths

Five deaths occurred during the year in the Group.

A list of diseases treated by the Institute's Estate Medical Assistants is given below :—

Influenza	..	728
Ulcers	..	505
Roundworm	..	508
Diarrhoea and enteritis	..	306
Eye and ear diseases	..	372
Other diseases	..	6701
Total	..	9120

General

During the year the following estates were handed over to the Estate Department for Management :—

Name of the Estate		*Date of handing over*
Upper Mukalana	..	15th February 1974
Malambe Estate	..	9th April 1974
Lower Mukalana	..	15th April 1974
Nelun Uyana	..	11th July 1974
Horagoda	..	25th July 1974

These estates functioned under the Estate Department until the New Manager (Vested Estates), Mr. L. R. Cooray, assumed duties on 1st August 1974.

REVIEW OF THE KURUWITA SUB-STATION

BY

SALIE M. DIAS

(*Visiting Superintendent*)

Acreage Statement :

MATURE RUBBER.

		A	R	P
1961	Replanting	83	0	00
1962	Replanting	38	3	00
1963	Replanting	22	2	00
1964	Replanting	18	0	00
1965	Replanting	19	2	00
1966	Replanting	10	0	00
1967	Replanting	10	0	00
1968	Replanting	10	0	00
1969	Replanting ..	10	0	00
	Total Rubber in Tapping ..	221	5	00
	Nurseries	2	0	20
	Paddy	5	2	00
	Roads, Buildings & uncultivated ..	17	1	10
	Grand Total ..	247	0	30

Weather

	Rainfall	*Wet days*
1973 ..	156.67 in	218
1974 ..	190.37 „	215

The year under review commenced with the seasonal drought which was prolonged resulting in crop intakes coming down. Rain commenced in March and from April to September a prolonged period of wet weather continued, interfering with tapping. The final quarter of the year was relatively dry and heavy crops were gathered.

Crop :

	1973	1974
Estimate ..	165,000 lb	165,000 lb
Secured ..	147,554 lb	163,363 lb
Decrease ..	Nil	Nil
Increase ..	4,845 lb	15,809 lb

It is pleasing to report that inspite of the long wet spell from April to the end of September, the highest crop ever harvested was gathered. The 1968 and 1969 clearings, together 20 acres in extent were brought into tapping from October on the double three system. The average intake per tapper over the year was 16.15 lb. This would have been higher, but for the low intakes from the two replantings brought into bearing since October, 1974.

Manufacture :

Coagulam continued to be supplied to Maha Oya Estate throughout the year. From the last quarter, Maha Oya Estate pays —/10 cts. less than the R.S.S. I weekly average. The sub-station could not revert to manufacture of Smoked Sheet, as the factory was handed over to the State Rubber Manufacturing Corporation, which intends to commence conversion of the factory for the manufacture of Pale Crepe.

Buildings :

One of the staff bungalows vacated by the Scientific Department has also been handed over to the State Rubber Manufacturing Corporation.

Staff :

Mr. M. C. Perera continues as Senior Field Assistant.

Labour :

Labour out-turns and out-puts are not in keeping with what is acceptable. The labour appears to have the misguided notion, that the property being State owned, means, anything is good enough. It has been difficult to impress upon labour the need to take greater interest in the welfare of the property as it is State owned. The labour belongs to three leftist Unions, all pro-Government.

General :

The property made for the 2nd year in succession a profit of -/20 cts. per lb for the season. Due to the rapid depression in prices during the last three months the profit margin has been reduced.

Mr. M. R. C. Peiris continues as the Visiting Agent and has given valuable advice and assistance.

I wish to place on record my thanks for the assistance and co-operation I have received from the Director, Administrative and Scientific Staff during the year under review.