20th ANNUAL REPORT 1972

Mauritius Sugar Industry

Research Institute

ANNUAL REPORT 1972

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HER MAJESTY THE QUEEN

An outstanding event occurred in March 1972 when Her Majesty Queen Elizabeth II was graciously pleased to visit Mauritius.

Her Majesty, accompanied by His Royal Highness the Duke of Edinburgh, visited Mon Désert-Alma where the royal party were conducted on a tour of the sugar factory and an exhibition, comprising stands of The Mauritius Sugar Producers' Association, Planters' Associations, the Sugar Syndicate, the Chamber of Agriculture and the Mauritius Sugar Industry Research Institute, illustrating the structure and achievements of the sugar industry of Mauritius.

Her Majesty the Queen and His Royal Highness the Duke of Edinburg visiting the stand of the M.S.I.R.I. at Mon Désert-Alma, 24th March, 1972

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MEMBERS EXECUTIVE BOARD

Mr. J. Maurice Paturau, C.B.E., *Chairman, representing the Chamber of Agriculture*

Mr. B.D. Roy, *representing Government (Jan.-May)*

Mr. R. Burrenchobay, *representing the Ministry of Agriculture (June-Dec.)*

Mr. K. Venkatachellum, *representing the Ministry of Finance (June-Dec.)*

Mr. M. Bagwant, *representing the Ministry of Economic Planning & Development (June-Dec.)*

Mr. E. Seriès

Mr. S.D. de R. de St. Antoine } *representing factory owners*

Mr. G. Langlois

Mr. G.H. Wiehe, *representing large planters*

Mr. G. Beeharry } *representing small planters*

Mr. R. Seeruttun

MEMBERS RESEARCH ADVISORY COMMITTEE

Mr. R. Antoine, *Chairman*

Mr. B.D. Roy, *representing the Agricultural Services of the Ministry of Agriculture*

Mr. K. Lutchmeenaraidoo, *representing the Extension Service of the Ministry of Agriculture*

Mr. A. Harel, *representing the Chamber of Agriculture*

Mr. C. Couacaud } *representing the Société de Technologie Agricole et Sucrière*

Mr. F. North Coombes

and the senior staff of the Research Institute.

STAFF

Director

R. Antoine, B.Sc. (Lond.), A.R.C.S., Dip. Ag. Sci. (Cantab.), Dip. Agr. (Maur.)

Assistant Director

J. D. de R. de Saint Antoine, B.S. (L.S.U.), Dip. Agr. (Maur.)

Plant Breeding and Biometry

Plant Breeder and Biometrician	...	J.A. Lalouette, Dip. Agr. (Maur.)
Associate Plant Breeder	...	P.R. Hermelin, Dip. Agr. (Maur.)
Assistant Plant Breeder	...	Z. Peerun, B.Sc. (Wales) (as from 1.10.72)
Assistant Biometrician ...	...	L.C.Y. Lim Shin Chong, B.Sc. (Leicester)
Field Assistant ...	...	S. Duchenne

Plant Pathology

Chief Plant Pathologist	...	C. Ricaud, B.Sc., Ph.D. (Lond.), D.I.C.
Associate Plant Pathologist	...	J.S. Félix, Dip. Agr. (Maur.)
Experimental Officer ...	...	S. Sullivan
Scientific Assistants ...	...	A.P.F. Chan Wan Fong, Dip. Agr. (Maur.)
		P. Ferré

Entomology

Chief Entomologist ...	...	J.R. Williams, B.Sc., M.Sc., Ph.D. (Bristol), D.I.C., F.I. Biol.
Assistant Entomologists	...	H. Dove, Dip. Agr. (Maur.)
		M.A. Rajabalee

Botany

Botanist	...	H.R. Julien, B.Sc., Ph.D. (Reading)
Assistant Botanist ...	...	G.C. Soopramanien, B.Sc., M.Sc. (Lond.), Dip. Agr. (Maur.) (as from 16.6.72)
Scientific Assistant ...	...	A. Bastide

Weed Agronomy

Weed Agronomist ...	...	G. Mc Intyre, Dip. Agr. (Maur.)
Scientific Assistants ...	...	J.C. Autrey
		J. Pitchen

Sugar Cane Agronomy

Chief Agriculturalists	G. Rouillard, Dip. Agr. (Maur.)
Associate Agriculturalists ...	M. Hardy, Dip. Agr. (Maur.)
	R. Ng Ying Sheung, Dip. Agr. (Maur.)
Senior Field Officer	L. Thatcher, Dip. Agr. (Maur.)
Field Officer	J.R. Moutia, Dip. Agr. (Maur.)
Technical Officer	G. Mazery, Dip. Agr. (Maur.)

Food Crop Agronomy

Technical Officer i/c	R. Mamet, Dip. Agr. (Maur.)
Assistant Agronomists	A.R. Pillay, B.Sc. (Q.U.B.), M.Sc. Agr. (Sydney), Dip. Agr. Micro (Sydney)
	A.J. Vaudin, N.D. Agri. E.
Experimental Officer	J.C. Carmagnole, Dip. Agr. (Maur.)
Scientific Assistant	H. Toohim
Temporary Asst. Agronomist ...	Z. Peerun, B.Sc. (Wales) (until 30.9.72)

Soils and Plant Nutrition

Chief Chemist	Y. Wong You Cheong, B.Sc., B. Agr., Ph.D. (Q.U.B.), F.R.I.C.
Senior Assistant Chemists ...	P.Y. Chan, B.Sc., M.Sc. (Lond.), A.R.I.C.
	L. Ross, Grad. R.I.C., Dip. Agr. (Maur.)
Assistant Chemists	P.J. Deville, B.Sc. (Wales), Dip. Agr. (Maur.), A.R.I.C.
	L.C. Figon
	P. Nababsing, B.Sc. (Exeter), Ph.D. (Lond.), A.R.I.C.
Scientific Assistants	D. Ah Koon
	C. Cavalot
	L. d'Espagnac
	Mrs. J. Gauthier
	I. Jhoty
	H. Maurice

Sugar Technology

Sugar Technologist	J.T. d'Espaignet, B.Sc. (Glasgow), A.R.C.S.T., Dip. Agr. (Maur.)
Chemist	E.C. Vignes, B.Sc., M.Sc. (Lond.), F.R.I.C., Dip. Agr. (Maur.)
Senior Assistant Chemist ...	M. Randabel, Dip. Agr. (Maur.)
Assistant Sugar Technologists ...	R. Kwok Tak Hing, B.S. (L.S.U.), Dip. Agr. (Maur.), A.I. Che., A.S.S.C.T. (as from 15.7.72)
	J.F.R. Rivalland, B.E. (Chem.) (Queensland)
Scientific Assistants	M. Abel
	L. Le Guen
	R. Wan Sai Chong, Dip. Agr. (Maur.)
Temporary Sugar Technologist ...	A. Bérenger, Dip. Agr. (Maur.), (until 30.6.72)

Library

Librarian	Miss M. Ly-Tio-Fane, B.A. (Lond)

Draughtsmanship & Photography

Draughtsman-Photographer ...	L.S. de Réland, Grad. N.Y.I.P.
Asst. Draughtsman-Photographer	J. Forget

Public Relations

Liaison Officer	L.P. Noël, Dip. Agr. (Maur.)

Administration

Secretary-Accountant	P.G. du Mée
Senior Asst. Secretary-Accountant	J. Desjardins
Clerks	Miss M.N. Durup (until 31.8.72)
	Miss P. Julien
	Mrs. M. Montocchio
	Miss A. North Coombes (as from 1.7.72)
	Mrs. M.T. Rae
	Mrs. A. Williams
Consultant Agronomist	P. Halais, Dip. Agr. (Maur.) (retired 31.12.72)

THE MAURITIUS HERBARIUM

Curator	H.R. Julien, B.Sc. Ph.D. (Reading)
Herbarium Assistant	J. Guého

Introduction

INTRODUCTION

Origins of the Institute

Organized agricultural research in Mauritius can be said to have started when the *Station Agronomique* was inaugurated on 30th June 1893. The results of the valuable work of the *Station* are embodied in 18 *Annual Reports* and various *Bulletins* and papers.

In the first decade of the twentieth century, it was felt that to keep pace with the times a new central organization was needed to guide the efforts of the agricultural community. Consequently, in 1913, the Colonial Office created the Department of Agriculture and the *Station Agronomique* and the Bureau of Agricultural Statistics of the Chamber of Agriculture were absorbed in the new organization. The next development was in 1930, when in order to cater for research and experimentation directed particularly towards improving efficiency in the sugar cane industry, a Sugar Cane Research Station was organized as a Division of the Department of Agriculture. The Station operated until 1952 and the results of its work are to be found in 23 *Annual Reports* and 19 *Bulletins*, which include important contributions to knowledge of the sugar cane plant.

In 1953 the work of the Sugar Cane Research Station was taken over by the Mauritius Sugar Industry Research Institute, which was created following a recommendation made in 1947 by the Mauritius Economic Commission that the sugar industry should organize and undertake its own research.

Organization and Finance

Established by Ordinance No. 9 of 1953, the objects of the Institute were originally "to promote by means of research and investigation the technical progress and efficiency of the sugar industry". In recent years, however, the Institute has become increasingly involved in the country's battle for self-sufficiency, in particular with crop diversification by production of secondary crops in cane interlines and on cane land between crop cycles. A programme of research on this subject was initiated in 1968, with the aid of a grant from the Chamber of Agriculture, and was expanded with financial assistance from the Government and the private sector until in 1970 a Division of Foodcrop Agronomy became an integral part of the Institute. Sugar cane cultivation and sugar manufacture remain, however, the main preoccupations of the Institute.

The Institute is governed by an *Executive Board*, composed of representatives of Government and the Sugar Cane Planting Community. Its programme of research is elaborated through a *Research Advisory Committee*, which maintains close co-operation with the Agricultural Services of the Ministry of Agriculture, the Mauritius Chamber of Agriculture and the University of Mauritius.

The Institute's head office at Réduit comprises divisions of Plant Breeding and Biometry, Plant Pathology, Entomology, Botany, Weed Agronomy, Sugar Cane Agronomy, Food Crop Agronomy, Soils and Plant Nutrition, and Sugar Technology. In addition there are three experimental stations in other climatic zones of the island.

The Institute is financed mainly by means of a cess on sugar borne by all cane growers.

During the year under review, some important changes were made by Act No. 7 of 1972 to the legislation governing the Institute (Ordinance No. 9 of 1953). These changes concerned the composition of the Executive Board and the cess levied on sugar. Thus, representatives of the Ministry of Finance and of the Ministry of Economic Planning and Development were added to the Board, the membership of which is now as follows :

(a) Appointed members :

One to represent the Chamber of Agriculture, three to represent the owners of sugar cane estates with factories, one to represent large planters, and two to represent small planters.

(b) Nominated members :

One from the Ministry of Agriculture and Natural Resources, one from the Ministry of Finance, and one from the Ministry of Economic Planning and Development.

The cess, originally levied on sugar exported, and from 1969 on sugar produced, was of a uniform rate for all sugar producers; it has now been substantially increased for Miller-Planters, increased to a lesser extent for large planters (producing not less than five thousand tons of sugar cane annually), and slightly reduced for small planters.

The Library

The scope of the library is concomitant with the research activities of the Institute, its primary function being to serve the needs of the Institute's staff. Its facilities are, however, available to any *bona fide* research worker or student.

The Library was started in 1953, at the inception of the Institute, with collections of technical literature on sugar cane agronomy and sugar manufacture. It was gradually enlarged and also enriched with collections of prints and original drawings of sugar cane varieties and of early publications on the history of the sugar cane. Today it contains 13,381 volumes and the periodicals and reports that are received total 509 titles. While possessing a most comprehensive collection of publications on sugar cane cultivation and sugar manufacture, the library's acquisitions now encompass many aspects of tropical agriculture and various disciplines of biological science.

Owing to distance from other research centres, library policy has been to concentrate on acquiring runs of relevant periodical literature and today complete sets of many agricultural periodicals, some of them rare, are available for consultation. It has also been library policy to collect scientific publications and reports relating to the Mascarenes and other islands of the Western Indian Ocean.

Cooperation with other organizations includes liberal exchange of publications, those of the Institute being *Annual Reports, Occasional Papers, Technical Circulars, Weed Flora* leaflets and occasional monographs.

In 1960, the Mauritius Herbarium was transferred to the Institute and with it a collection of rare literature on the flora of the Mascarenes.

A joint catalogue of sugar periodicals in the library and in the Berlin Sugar Institute is currently in preparation.

The Mauritius Herbarium

The origin of the Herbarium goes back to the early 19th Century. First housed in the Royal College, Port Louis, the collections were transferred in 1868 to the Royal Botanic Gardens, Pamplemousses, then under the control of the Director of Forests and Gardens. After a period of decline which lasted nearly fifty years, it was decided in 1928 to start a botanical section, regional in character, at the Mauritius Institute (Public Library and Museum) and the Mascarene specimens at the Royal Botanic

Gardens were restored as far as possible to form the basis of the new botanical section of the Museum.

In 1958, it was proposed that the herbaria of the Department of Agriculture and of the Sugar Cane Research Station should be combined with that of the Mauritius Institute and housed in air-conditioned quarters at the newly founded Sugar Industry Research Institute. The work of transferring and combining the three herbaria was completed two years later and the Mauritius Herbarium came into being. Finally, at the end of 1969 it was decided that the Herbarium should become integrated with the Botany Division of this Institute, the Botanist in charge assuming the post of Curator.

The Herbarium now possesses upwards of 18,000 specimens and has become not only an excellent reference collection for the identification of plants but also a centre for research, by local and visiting specialists, on the flora of the Mascarene Islands.

General Report

GENERAL REPORT

Board Membership

The changes on the Board for the year under review were the replacement of Mr. B.D. Roy by Mr. R. Burrenchobay (as from 1st June), of Mr. H. Kœnig by Mr. G. Langlois, and of Mr. H. Lallmohamed by Mr. R. Seeruttun.

In June, two additional members were nominated to the Board, Mr. K. Venkatachellum, to represent the Ministry of Finance, and Mr. M. Bagwant, to represent the Ministry of Economic Planning and Development.

Establishment

Mr. J.D. de R. de Saint Antoine, who had occupied the posts of Assistant Director and Chief Sugar Technologist, gave up the latter to become full-time Assistant Director and thus take a larger share of administrative duties.

Mr. J.T. d'Espaignet became Head of the Sugar Technology Division. Mr. R. Kwok Tak Hing was appointed Assistant Sugar Technologist following the resignation of Mr. A. Bérenger, Temporary Sugar Technologist.

Mr. P. Halais, Consultant Agronomist, resigned at the end of the year.

Mr. J.C. Carmagnole, Officer in charge of the Pamplemousses Experiment Station, was transferred to the Division of Food Crop Agronomy and replaced by Mr. J.R. Moutia from the Plant Pathology Division. This led to the promotion of Mr. S. Sullivan as Experimental Officer and the transfer of Mr. A.P.F. Chan Wan Fong from the Division of Food Crop Agronomy to that of Plant Pathology.

Mr. M. Herchenroder, Temporary Statistician, resigned in December. Mr. Z. Peerun, Temporary Assistant Agronomist in the Food Crop Agronomy Division, was appointed Assistant Plant Breeder in October. Mr. A.R. Pillay returned from study leave in Australia and resumed duty in the Food Crop Agronomy Division in December.

The Botany Division was strengthened by the appointments of Mr. G.C. Soopramanien as Assistant Botanist and Mr. A. Bastide as Scientific Assistant.

Mr. S. Félix was promoted Associate Plant Pathologist and Mr. L. Thatcher was promoted to Senior Field Officer.

Miss A. North-Coombes was appointed as Clerk-Typist following the resignation of Miss M.N. Durup.

Technical Assistance

Within the framework of the Franco-Mauritian cultural and technical assistance scheme the services of two French Agronomists, Messrs D. Delanoe and G. Delavouet, were given to the Institute for a period of fourteen months. Both are graduates of the *Ecole Nationale Supérieure Agronomique* of Toulouse and assumed duty in early February. Mr. Delanoe, who holds a Doctorate in Phytopathology, worked in close collaboration with Dr. C. Ricaud on the resistance mechanism to gumming disease, with the object of devising a more reliable method of evaluating the reaction of new cane varieties. Mr. Delavouet worked with Dr. R. Julien on certain aspects of cane maturation.

Mr. David Lorence, a U.S. Peace Corps volunteer, joined the Institute three years ago as a Research Assistant in the Botany Division and the Herbarium. He has worked on a number of projects concerning plant taxonomy and physiology, the most important being the preparation of a section on the fern genus *Elaphoglossum* for the *Flora of the Mascarene Islands.*

Finance

A long-term loan, free of interest, was received from Government to write off the overdraft which had grown over the last few years.

Unfortunately, the cess by means of which the Institute is mainly financed is still levied on sugar produced and not on "insurable sugar" as recommended by the auditors in their report on future financing of the Institute (*vide* Annual Report, 1971, p. 19). As a result, annual income will still fluctuate with the size of the crop and a dangerous situation may again arise in cyclonic years unless substantial reserves are built up. However, the Minister of Agriculture and Natural Resources is empowered by Act No. 7 of 1972 to change the cess, after consultation with the Board, in such a manner and at such rate as he may prescribe.

As for work on crops other than sugar cane, which is financed by Government, funds will have to be substantially increased if research is to be maintained at the present level and on the same range of crops.

Building Programme

In the Annual Report for 1971 the hope was expressed that it would be possible, in 1972, to extend the building now housing the Divisions of Entomology and Food Crop Agronomy in order to accommodate the Sections of Soil Physics and Draughtsmanship-Photography. Lack of funds did not make this possible but the extension will be constructed in 1973.

Apart from costs for a few minor additions and modifications to existing buildings, there was no capital expenditure on buildings during the year under review.

Director's Missions

In February, the Director, as a member of the Mauritian delegation, attended the Conference held in Brussels on the accession of Mauritius to the Yaoundé Convention.

In November, he attended an International Sugar Symposium in Paris organized by the *Compagnie des Commissionnaires Agréés près de la Bourse de Commerce de Paris* and on the way visited the sugar cane areas and saw the development schemes in the Sudan.

During the two visits to Europe already mentioned, and another in May, he visited the *Museum d'Histoire Naturelle, Département de Phanérogamie,* in Paris and the Kew Herbarium, Richmond, England, in connection with the *Flora of the Mascarene Islands*, preparation of which is now well under way.

Staff Movements

The following officers went on overseas leave during the year : Mr. J.D. de R. de Saint Antoine, Dr. C. Ricaud, Mr. J.T. d'Espaignet, Mr. R. Hermelin, Mr. J. Desjardins and Mr. R. Ng Ying Sheung. All spent some of their time visiting scientific research institutions and discussing aspects of their work with specialists in their own fields.

Mr. de Saint Antoine met Mr. F. H. Tate and Mr. M. Atfield of Tate & Lyle Ltd., and visited Thames Refinery. In France he had discussions at the *Syndicat National des Fabricants de Sucre* at *Fives Lille-Cail Co.*, and at *Sucres et Denrées S.A.*

Dr. Ricaud visited a number of Research Organizations in the U.K., Australia, France and Holland, mainly in connection with the production of seed potatoes in Mauritius, gumming disease of sugar cane, and selection of cane varieties for resistance to diseases. He also spent some time at the Imperial College of Science and Technology to study a maize virus. In Australia he had discussions at the C.S.R. and at the Bureau of Sugar Experiment Stations on methods of testing cane varieties in the greenhouse for resistance to Fiji disease.

In South Africa, Mr. d'Espaignet had discussions at the Sugar Milling Research Institute, at Mount Edgecombe Sugar factory, and with the technicians of Smith Tech and of S.A. Philips. In Europe he visited the Berlin Sugar Institute and Schmidt & Haensch saccharimeter manufacturers in Germany, *Fives Lille-Cail Co.* and Sucatlan Engineering in France, Tate and Lyle Ravensbourne Research Laboratories, Thames Refinery, and the Tropical Products Institute in Britain.

Mr. Ng Ying Sheung attended the 20th International Course in Rural Extension at Wageningen, Holland, and also followed part of the Pest Management Course organized by the U.K. Overseas Development Administration. During his stay in Britain he also paid visits to Chesterford Park Research Station, the Weed Research Organization, and Reading University.

A number of scientific missions were also effected during the year. Thus :

Dr. J. R. Williams and Mr. M. A. Rajabalee went to Kenya and Tanzania to collect parasites and predators of the sugar cane scale insect, while Dr. Williams also went to Queensland for the same purpose after attending the 14th International Congress of Entomology in Canberra.

Dr. C. Ricaud visited Madagascar in connection with the control of Fiji Disease.

Mr. J. Guého accompanied Mr. J. Bosser of *O.R.S.T.O.M.*, France, and Dr. L.H. Bailey, of the Ithaca Hortorium, New York, on a visit to Rodrigues in connection with the preparation of the *Flora of the Mascarene Islands.*

Comité de Collaboration Agricole

The 21st Annual Conference of the *Comité de Collaboration Agricole Maurice-Réunion-Madagascar* was to have been held in Madagascar in 1972 but was cancelled as a result of the disturbances there. The activities of the *Comité* were thus drastically reduced in 1972 and the only mission under its auspices was that of Messrs. Delaître and Oogarah of the Ministry of Agriculture and Natural Resources to Réunion to study developments in the fields of fodder, livestock and tobacco production.

Personalia

The following visitors were welcomed at the M.S.I.R.I. during 1972 : M. & Mme. Augagneur, *Sucreries Marseillaises de Madagascar*, Namakia, Madagascar; Mr. V. Austin, National College of Agricultural Engineering, SILSOE, Bedford, U.K.; Mr. Donald Baron, Commonwealth Sugar Exporters Association, London; Mr. Marcel Barre, Sucatlan Engineering, France; Prof. A. Borel, *Institut Supérieur d'Agriculture de Lille*, France; Mr. N'Dni Brou, Ministry of Agriculture, Abidjan, Ivory Coast; Dr. C.O. Browning, Department of Entomology, Waite Agricultural Research Institute, University of Adelaide, Australia; Mr. A.J.M. Carnegie, Mount Edgecombe Sugar Experiment Station, Natal, South Africa; Dr. Phyllis Cartwright, Dr. B. Okwuosa and Mr. R. Mead, Reading University, England; Mr. R. Caty, UNESCO, Paris; Mr. N. Chandappa, Gangavati Sugars Ltd., Madras, India; General J.N. Chaudhuri, India; Mr. E.W.J. Crawley, British High Commission, Mauritius; Mr. D.A. Cook, McKinsey & Co., London, England; Mr. P. Cumming, Ove Arup Group Ltd., England; Mr. R. Dadant, *IRAT*, Réunion; Mr. P. Dart, British Council, Mauritius; Mr. D.

d'Emmerez de Charmoy, *Station d'Essai et de Génétique de la Canne*, Réunion; Mr. A.K. Devarajan, Aruma Sugars Ltd., Madras, India; M. Yves Drouhet, *Direction des Bibliothèques et de la Lecture Publique, Bibliothèque Centrale de Prêt*, St. Denis, Réunion; Mr. B.C.A. Enyc, Faculty of Agriculture, University of Dar-es-Salaam, Tanzania; Brother Antony Francisco, St. Louis Villa, Southern India; Mr. John G. Groft, University of Western Ontario, Canada; Mr. J.V. Harbord, Hunting Technical Services Ltd., Herts, England; Mr. G.R. Henderson, World Bank, Washington D.C., U.S.A.; Dr. Glyn James, Rhodesia Sugar Association Experimental Station, Rhodesia; The Honourable R. Jeetah, M.L.C.; Dr. J.N.R. Kasembe, Kibaha Sugar Cane Breeding Station, Tanzania; Mr. Lambert Konan, SODESUCRE, Abidjan, Côte d'Ivoire; Messrs. J.P. Lamusse & John Fitzgerald, Sugar Milling Research Institute, Durban, South Africa; Dr. John M. Liwenga, Research and Training Institute, Mwanza, Tanzania; Mr. B. Mahajar, Chief Evaluation Service, FAO, Rome; M. J. Malet-Buisson, *Secrétariat d'Etat aux Affaires Etrangères*, Paris; Mr. J. Miocque, *Coopération Central dos Produtores de Açucare Alcohol do Estado de Sao Paulo*, Brazil; Mr. Alvin Moore Jr., Library of Congress, Nairobi; Prof. H.E. Moore Jr., L.H. Bailey Hortorium, Cornell University, New York; Mgr. Amédée Nagapen, Evêché, Port Louis; Dr. J.J. Njoroge, Ministry of Agriculture, Nairobi, Kenya; Mr. William Payne, UNDP Consultant; Mr. W. Devier Pierson, Sharon, Pierson Semmes, Washington D.C., U.S.A.; Dr. T.R. Preston, Animal Production and Health Division, FAO, Rome; Mr. J.V. Price, University of Dar-es-Salaam, Tanzania; Mr. Jean Pierre Romera, Sucatlan Engineering; Mr. Simbwa-Bunnya, Kawanda Sugar Cane Disease Testing Station, Uganda; Mr. H.C. Sood, The Triveni Engineering Works Ltd., Allahabad, India; Mr. F.H. Tate and Mr. Attfield, Tate & Lyle Refineries, London, England; Mr. J. Velly, *IRAT*, Madagascar; Mr. A. Venkatesiah, Industrial Adviser & Consultant, Madras, India; Mr. R. Viner, Department of Agriculture, Legalega Research Station, Fiji; Mr. E. Whayman, Sugar Research Institute, Mackay, Queensland; Mr. J. Willems, World Bank, Washington D.C., U.S.A.; Mr. B.W.R. Wilson, World Bank, Nairobi; Drs. Wolfran, U. Drewes and H. Pu, International Bank for Reconstruction & Development, Washington D.C., U.S.A.

Research Visitors, Study Groups and Advisers

The following visitors spent some time working at the Institute, or else called at the Institute on one or more occasions while on mission to Mauritius during the year: A delegation from Gilbert & Ellice Islands, South Pacific, composed of Mr. Telavi Fati, Executive Member, Mr. B. Areieta and Mr. Tim Ioteha, Legislative Council Members and Mr. T. Tekaai, Senior Civil Servant; a delegation from Taïwan composed of Dr. Lii-Sin-Leu, Pathologist, Taïwan Sugar Experiment Station, Dr. M.H. Sun, Joint Commission on Rural Reconstruction, Taipei, and Messrs. Sheng-Ten-Lee and Yi-Shong-Liu, Ministry of Economic Affairs, Taipei; a delegation from Madras, composed of Mr. V. Guruswamy, Plant Manager, K.C.P. Ltd., Mr. L.B. Varma, Chief Engineer, K.C.P. Ltd., Dr. K.R. Das and Messrs. H.N. Misra, K.R. Sambasivara, B. Babu Rao, V.S.V. Prasada Rao, S.P. Magar, R. Rajagopalan & P. Gopalakrishna Rao, all Sugar Technologists, K.C.P. Ltd.; Dr. Gad-El-Kareem, Messrs. Ismail and M. Hassanen of the *Société des Sucreries et de Distillerie d'Egypte;* Messrs. P. Baudan, Duarte and Dedini, Engineers from M. Dedini S.A., Sugar Equipment Manufacturers of Brazil; Mr. Amadou B. Baro, an Agricultural Engineer from Mauritania, spent a month at the Institute studying problems connected with sugar cane generally; Mr. J. Bosser of *O.R.S.T.O.M.*, Paris, worked in the Herbarium on the *Flora of the Mascarene Islands.*

Aimé de Sornay Scholarship

The Scholarship was awarded in 1972, for the second time running, to a girl, Miss Danielle Lam Ming Kam, who came out 13th, with 69.5% of the marks, at the entrance examinations of the University of Mauritius held in June.

University of Mauritius

The Director sat on the Council, and the Assistant Director on the Senate, of the University of Mauritius. In addition, membership of various Boards and Committees of the University was as follows : Sugar Technology Advisory Committee; Messrs. J.D. de R. de Saint Antoine and J.T. d'Espaignet : Board of Examiners, School of Agriculture; Messrs. J.T. d'Espaignet, E.C. Vignes, M. Randabel and J.F.R. Rivalland : Board of Examiners, School of Industrial Technology; Mr. Lim Shin Chong.

Lectures were delivered at the University by Dr. J.R. Williams, Dr. C. Ricaud, Dr. R. Julien, Mr. C. Soopramanien, Mr. G. Rouillard, Mr. J.T. d'Espaignet, Mr. C. Vignes, Mr. R. Rivalland, Mr. M. Randabel and Mr. J. Lim Shin Chong.

Representation on Boards and Committees by Members of Staff

Board of Directors, Mauritius Institute

Director (Chairman) and Mr. D. de R. de Saint Antoine.

Committee, *Société de Technologie Agricole et Sucrière de Maurice*

Director, Messrs. D. de R. de Saint Antoine, Rouillard, Mamet and d'Espaignet.

Council, Royal Society of Arts and Sciences of Mauritius

Director, Messrs. D. de R. de Saint Antoine, Rouillard, Mamet and Ricaud.

Conseil d'Administration, La Revue Agricole et Sucrière de l'Ile Maurice

Director, Dr. Williams and Mr. Rouillard, while Mr. Randabel was one of the editors.

Board of Examiners for the Registration of Agricultural Chemists

Messrs. D. de R. de Saint Antoine and Vignes.

Mauritius National Committee for ICUMSA (International Commission for Uniform Methods of Sugar Analysis)

Mr. D. de R. de Saint Antoine (Chairman) and Mr. Vignes, who, in addition, was an Associate Referee for the Committee.

Committee on the Manufacture of Concentrates based on bagasse and molasses

Dr. Wong and Mr. d'Espaignet

Mauritius Sub-Committee for the preparation of the *Flora of the Mascarene Islands*

Director (Chairman), Dr. Vaughan and Dr. Julien.

Cane Release Committee

Director (Chairman), Dr. Ricaud, Mr. Lalouette.

Mauritius National Commission for UNESCO

Dr. Ricaud (Man and the Biosphere Sub-Committee), Dr. Julien (Science Sub-Committee).

Pesticide Control Board

Dr. Williams and, in Sub-Committee, Dr. Ricaud and Mr. Autrey.

Also, Mr. Mazery represented the Director on the Irrigation Committee set up by the Board of Agriculture, Fisheries and Natural Resources; Mr. d'Espaignet was one of the three members of a Committee of Enquiry appointed to investigate the grievances of small planters of the sugar industry; Mr. Mamet sat on the Food Crop Development Committee set up by the Chamber of Agriculture; Mr. Rouillard on the Ancient Monuments and National Reserves Board and the Committee of the *Société de l'Histoire de l'Ile Maurice;* Dr. Wong on a Committee set up by the Ministry of Works (Hydrology Section) for the International Hydrological Decade, and Dr. Ricaud on the Plant Importation and Quarantine Standing Committee. Drs. Vaughan and Julien were members of the Permanent Advisory Committee, Royal Botanic Gardens, Pamplemousses.

The Director remained as Regional Vice-Chairman, International Society of Sugar Cane Technologists (ISSCT), member of the Board of Agriculture, Fisheries and Natural Resources, and Regional Vice-Chairman, *Comité de Collaboration Agricole, Maurice-Réunion-Madagascar.*

Television Talks

Weekly talks, lasting 15 minutes, were delivered on television every Thursday between the 20th of January and the 8th of June. The talks were given in creole, the local patois understood by everyone in Mauritius, were well illustrated by pictures, charts and tables, and had been specially prepared for small planters. A series of eleven talks were devoted to sugar cane and eight to food crops cultivated in sugar cane lands. The talks were well received by the planting community and will henceforth be a regular annual feature.

Lectures and Meetings at Head Office

25th January — LEIF EKMANN, (International Computers Ltd.). A possible future information system for the sugar industry.

10th April — J. MONRO, (Institute of Technology, Brisbane, formerly assigned to the Joint F.A.O. International Atomic Energy Agency, Division of Atomic Energy in Food and Agriculture, Vienna). The sterile male technique in the eradication or control of insect pests.[1]

13th April — T.R. PRESTON, (Chief of Animal Nutrition Unit, F.A.O.). The development of livestock feed using sugar by-products.[1]

18th April — J.T. d'ESPAIGNET. *Quelques aspects de la première année de diffusion à St. Antoine.*([2])

25th April — R. ANTOINE. *La M 377/56* [2]

18th May — Conference on aspects of the 14th Congress of the I.S.S.C.T.

23rd May — R. ANTOINE. *Revue des travaux du M.S.I.R.I. en 1971.* [2]

30th May — Y. WONG YOU CHEONG and E.Z. ARLIDGE. *La carte de vocation des sols.* [2]

13th June — R. MAMET. *Exposé des travaux sur le maïs et la pomme de terre.*
S. FELIX. *Controle des maladies de la pomme de terre.* [2]

20th June — *En marge du 14ème Congrès de l'I.S.S.C.T.*

82th June — R. ANTOINE. Food crops research — a critical study of results obtaines. [2]

11th July — C. MONGELARD. Experiments on sub-surface irrigation in Hawaii.

25th July — C. RICAUD. (i) *Quelques aspects du* yellow spot *de la canne à sucre.* (ii) *L'importance de la sanitation dans le contrôle des maladies de la canne à sucre.*

23rd August — F. STAUB & JEAN-PAUL ALLES. *Oiseaux de Rodrigues et de l'Ile Maurice.* Slide Projection — Rivaltz Chevreau de Montléhu [3]

26th September — J.R. WILLIAMS. (i) Potato tuber moth. (ii) Aphid vectors of disease in relation to production of seed potatoes — results of preliminary studies. [2]

25th October — G. SAUZIER. *La situation actuelle du marché de sucre et plus particulièrement les points suivants : 1. Renouvellement de l'Accord International 2. Entrée des sucres du Commonwealth dans le Marché Commun Européen. 3. Marché du Canada et des Etats-Unis.*

31st October — R. JULIEN. *Résultats préliminaires des études sur la maturation de la canne.* [2]

16th November — E. WHAYMAN. (Sugar Research Institute, Mackay). Clarification of sugar cane juices.

12th December — R. ANTOINE. *Les variétés de canne à sucre.* [2]

(1) Meeting under the auspices of the Ministry of Agriculture and Natural Resources.

(2) Talk specially prepared for Extension Officers of the Agricultural Services of the Ministry of Agriculture and Natural Resources, and for Field Staff of the Sugar Estates.

(3) Meeting under the auspices of the Royal Society of Arts and Sciences of Mauritius.

Publications

ANON. (1972). Notes sur la culture du maïs hybride. *Tech. Circ. Sug. Ind. Res. Inst. Mauritius* **38 :** 12 pp. (mimeo).

This short guide describes the more important aspects of hybrid maize cultivation under Mauritian conditions, namely, identification of varieties and hybrids, cultural practices, fertilization and water requirements, harvesting and drying of grains. Notes on pest control and a list of the main diseases are also given.

ANON. (1972). Report of the delegates of the XIVth ISSCT Congress, Louisiana. *Priv. Circ. Rep. Sug. Ind. Res. Inst. Mauritius* **26 :** 72 pp. (mimeo).

BASS, K.C. & NABABSING, P. (1972). Homolytic substitution reactions of heteroaromatic compounds in solution. 47 pp. *In* Williams, G.H. (*ed.*), *Advances in Free-Radical Chemistry*, Vol. 4, London.

JULIEN, M.H.R. (1972). The photoperiodic control of flowering in *Saccharum*. *Proc. int. Soc. Sug. Cane Technol.* **14 :** 323-333.

Flowering in two clones of *S. spontaneum* was shown to be controlled by photoperiod. The response to daylength depended on the stage of development. The effects of inductive cycles were annulled by night breaks : red and green were the most effective wavebands.

LY-TIO-FANE, M. (ed.) (1972). *Société d'Histoire Naturelle de l'Ile Maurice. Rapports Annuels, I-V* (1830-1834). Royal Society of Arts & Sciences, Mauritius. xxii , 220 pp., front., 8 pl.

Only the first of these early reports of the *Societe d'Histoire Naturelle de l'Ile Maurice* has hitherto been printed. The reports constitute an interesting source of information on the beginnings of scientific research in Mauritius, and early experiments in sugar technology are also recorded. A check list of the manuscripts of the *Société* is given and the objectives of the scientific societies of Mauritius are described.

MAMET, J.R. (1972). Notes sur la culture du gingembre à l'Ile Maurice. *Tech. Circ. Sug. Ind. Res. Inst. Mauritius* **37 :** 26 pp. (mimeo).

Notes are given on the soil requirements, cultivation methods, harvest and storage of ginger. It is remarked that Mauritian ginger accords with the U.S. and U.K. standards for that commodity. An exhaustive list of references is given.

MONGELARD, J.C. (1972). Pre-emergence and post-emergence herbicide treatments of sugar cane fields in Mauritius. *Proc. int. Soc. Sug. Cane Technol.* **14 :** 1161-1165

More efficient weed control resulted from post-emergence than pre-emergence herbicide treatments because they controlled emerged weeds, germinating weed seeds, and also provided residual pre-emergence control. The conditions when post-emergence treatments would prove advantageous in field practice are described.

PILLAY, A.R. and MAMET, J.R. (1972). Rhizobium I : Preliminary field studies on groundnuts (*Arachis hypogaea*), and dwarf beans (*Phaseolus vulgaris*) in Mauritius. *Revue agric. sucr. Ile Maurice* **51 :** 242-248

Local strains of *Rhizobium* of groundnut are present in Mauritian soils. Observations at Médine, La Laura and Olivia showed the unfavourable effect of soil acidity on nodulation, and indicated a pH level (5.0) under which nodulation is severely reduced. Results of trials at Réduit showed that inoculation of Dwarf beans with a foreign *Rhizobium* strain greatly increases yields.

PILLAY, A.R. & TCHAN, Y.T. (1972). Study of soil algae, VII. Adsorption of herbicides in soil and prediction of their rate of application by algal methods. *Pl. Soil* **36 :** 571-594

Algal techniques were used to evaluate the inherent phytotoxities of different herbicides. The order of toxicity obtained was diuron > neburon > monuron > atrazine > simazine > atratone. The techniques were also used to study effects of soil factors on herbicide toxicity and to predict application rates of diuron and simazine in wheat fields. Field trials showed that the predictions were correct and more reliable than commercial recommendations.

RICAUD, C. (1972). Assessment of yield loss due to yellow spot. *Sug. Cane Path. Newsletter* **8 :** 27.

Benomyl sprays, which are effective against yellow spot of sugar cane when applied frequently, were applied to a susceptible variety harvested at different dates to assess the effect of the disease. The sucrose content of canes in untreated plots was reduced most in plots harvested early while cane yield was effected in the plots harvested late.

RICAUD, C. (1972). The effects of certain soil organic amendments on chlorotic streak infection. *Proc. int. Soc. Sug. Cane Technol.* **14 :** 1034-1044.

An attempt to control chlorotic streak disease of sugar cane by organic soil amendments was unsuccessful. The factory residues that were used favoured infection in plants grown from hot-water-treated cuttings.

ROUILLARD, G. (1972). Histoire des Domaines Sucriers de l'Ile Maurice — Plaines Wilhems. *Revue agric. sucr. Ile Maurice* **51 :** 153-172, 217-235

The settlement of the district of Plaines Wilhems, with details of road construction and land utilization, is described. Of the 40-odd mills operating during the last century, only Highlands and Réunion remain, many having disappeared as a result of urban development.

VIGNES, E.C. (1972). Clarification of cane juices. *Z. ZuckInd.* **22 :** 629-638

The changes that have occured in recent years at the clarification station of Mauritian sugar factories are reviewed. The factors affecting juice behaviour are discussed and the measures adopted to overcome the difficulties encountered are described.

WILLIAMS, J.R. (1972). The biology of *Physcus seminotus* Silv. and *P. subflavus* Annecke and Insley (Aphelinidae), parasites of the sugar cane scale insect *Aulacaspis tegalensis* (Zhnt.) (Diaspididae). *Bull. ent. Res.* **61 :** 463-484.

Physcus seminotus and *P. subflavus*, from Uganda and Tanzania, respectively, have been purposely introduced into Mauritius against the sugar cane scale insect. The biology of both species is described in detail.

WILLIAMS, J.R. (1972). Control measures for pests of groundnuts and potatoes. *Tech. Circ. Sug. Ind. Res. Inst. Mauritius* **36** : 6 pp. (mimeo).

The currently recommended insecticidal treatments against pests of groundnuts and potatoes are described. Attention is drawn to the precautions necessary for the safe used of the chemicals mentioned.

WILLIAMS, J.R. (1972). The white scale, *Aulacaspis tegalensis* (Zehnt.), on sugar cane. *Proc. int. Soc. Sug. Cane Technol.* **14** : 477-480.

A short account is given of the distribution and economic importance of the scale insect, *Aulacaspis tegalensis*, on sugar cane. Control measures are discussed.

WILLIAMS, J.R. & DOVE, H. (1972). Damage to potato tubers by insect and other pests in 1971. *Revue agric. sucr. Ile Maurice* **51 :** 88-90

A survey of potato fields in 1971 to determine the incidence of tuber damage by various pests showed that the tuber moth, *Phthorimaea operculella*, often caused much damage in late (July-Aug.) plantings. Other tuber damage was by cutworms and root-knot nematodes. The % damage by wt. of tubers caused by these pests is given.

WONG YOU CHEONG, Y., HEITZ, A. & DEVILLE, J. (1972). Foliar symptoms of silicon deficiency in the sugar cane plant. *Proc. int. Soc. Sug. Cane Technol.* **14 :** 766-776

Deficiency symptoms of silicon (leaf freckling) were successfully reproduced on the leaves of sugar cane growing in pure nutrient solution. Fresh symptoms disappeared when silicic acid was added to the solution. The symptoms always developed on the physically upper surface and would seem to require direct sunlight for development.

WONG YOU CHEONG, Y., HEITZ, A. & DEVILLE, J. (1972). The effect of silicon on enzyme activity *in vitro* and sucrose production in sugar cane leaves. *Proc. int. Soc. Sug. Cane Technol.* **14 :** 777-785

Silicon deficiency led to a decrease in the rate of photosynthesis in symptom-free leaves of the sugar cane plant, indicating that the lower efficiency of Si-deficient leaves was connected with some metabolic function of Si, not with decreased photosynthetic area. No *in vitro* effect of Si on cane and yeast invertase or cane tyrosinase was observed.

Donations to the Library

The following donations to the Library are gratefully acknowledged :

(i) A collection of twenty reference books presented on the 20th June by the Acting British High Commissioner, Mr. R.G. Giddens, under arrangements provided by the Overseas Development Administration Book Programme.

(ii) A set of the monumental *Library of Congress National Union Catalog of Manuscript Collections* presented by Library of Congress Gift and Exchange Division.

(iii) Private donations included a collection of rare nineteenth century publications on sugar, part of the family archives of the family Adam, owners of the old-established firm Adam & Co. Also, a collection of offprints of papers by Marc Herchenroder on meteorological and statistical questions, presented by the author.

Acknowledgements

In concluding the General Section to this Report, it is once more a pleasant duty to express my gratitude to Estate Managers and their personnel for the assistance so readily given in the conduct of field experiments, with a special word of thanks to the Estate Agronomists for their close and unstinted co-operation. I also wish to express my thanks to the Permanent Secretary, Ministry of Agriculture and Natural Resources, and the Chief Agricultural Officer and the staff of the Agricultural Services for their collaboration. The advice and support received from the Chairman and Members of the Executive Board is acknowledged with gratitude and, finally, a special word of appreciation for the staff who have responded as usual with loyalty and efficiency.

Director

Technical Report

GENERAL

Plate I. View of the landscape from above Plaine des Calebasses towards the northwest showing in the fore and middle-ground sloping lands of the Lower Mountain Slopes (land unit 10.2), in the background the almost flat to gently undulating lands of the Northwestern Intermediate Lava Plains (land unit 2.1), and the Mountainous Lands (land unit 11.1) at Mt. Bonamour (middle right)

TECHNICAL REPORT

GENERAL

LAND RESOURCE SURVEY

Land Suitability Classification

The Land Capability Classification carried out in conjunction with Dr. E.Z. Arlidge of F.A.O. (under U.N.D.P./T.A. Country Projects) was retermed Land Suitability Classification. While the criteria of land characteristics upon which the classifications are based are the same, the new classification attempts, instead of the former 6-class system, to classify land in terms of actual and potential suitability for defined types of land utilization, e.g. sugar cane cultivation, mixed cropping, protective afforestation. The classification for Mauritius was completed during the year and shows 44 different land units which are related to topography, soil and climate : three having different suitability ratings are illustrated in Plate I. The classification for Rodriguez, started early in the year, was also completed. Land Complexes Maps for both Mauritius and Rodriguez were prepared to relate land units to geographical and physiographic features. The maps when printed will appear as Land Resources and Agriculture Suitability Maps.

Land use recommendations

Discussions were held with the Tea Development Authority on the availability of land, especially at Vuillemin, for cultivation of tea.

It was determined by aerial photo-interpretation that some 1370 ha (3245 arp.) were suitable for rice cultivation in the west of the island, within 8 km of the coast between Le Morne and Solitude.

On behalf of the Development Works Corporation, suitable areas for animal husbandry and crop production on Crown Lands and *Pas Géométriques* were defined using the Land Suitability Map of Mauritius. A total of 6973 ha (16520 arp.) and 1099 ha (2580 arp.) were found to be suitable for animal husbandry and crop production in the two categories of land respectively. Integration of forestry and livestock production as a more rational mode of land utilization for the wet Crown Lands and irrigation as an essential prerequisite for the cropping of land in the *Pas Géométriques* were subsequently recommended.

Recommendations were also made on land utilization for the Midlands Mixed-Cropping Project.

A study on land utilization as at August, 1972, carried out for the Economic Planning Unit, showed that some 8442 ha (20,000 arp.) of undeveloped land with gradients of less than 13% were suitable for crop production, animal husbandry, forestry and industry.

Data and maps were supplied to the School of Administration, University of Mauritius, on land suitability, land use and land ownership for the area in the Northern Plain Overhead Irrigation Scheme.

Preparation of maps showing land suitability, land use, deer farming areas, Nature Reserves, National Parks and land ownership was undertaken for the World Bank mission in Mauritius for the Rural Reconstruction Programme.

In conjunction with Mr. Butzler, FAO, a map showing potential areas for deer farming was prepared.

Consultants of the Ove Arup Planning Group for the SUROIT PROJECT, which is concerned with the development of agriculture and tourism in the south-west of the island, were supplied with basic data on land suitability and ownership.

Surveys involving aerial photo-interpretation were carried out mainly to correlate soil development with the different phases of lava flows of the Late Lavas. Some slope measurements were also made.

Chamarel Development Project

The land appraisal study of the Chamarel area, started in 1971, was continued. The landform was classified into 3 broad land slope units and sites for soil pits and variety trials were selected on each.

A definite relation between slope forms and geological parent material was found from slope-profile analysis by stereoscopic examination of aerial photographs. Thus, it was possible to distinguish on the photographs soils developed from volcanic ash and soils developed from basalt. Physical and chemical analysis of soils confirmed the results obtained by aerial photo-interpretation. The relation between land slope unit and slope form, parent material, and soil properties is illustrated in Table I.

Preliminary work indicated that about 338 ha (800 arp. gross) of undeveloped land with slopes generally below 30% are suitable for development in the area. Further investigations are to be made on the best means of utilizing such lands and their potential productivity.

Table 1. Relationship between landform, nature of parent material and soil properties

Land slope unit & slope-form	*Parent material*	H_2O^+	*NaF test for allophane*
Moderate slopes. Summital convex-rectilinear.	Volcanic ash	13.2	+ ve
Gentle slopes. Summital convex-rectilinear.	Volcanic ash	15.7	+ ve
Steep slopes. Sharp summital convex-rectilinear	Volcanic ash	12.8	+ ve
Gentle slopes. Rounded convex-rectilinear	Basalt	23.0	— ve
Moderate slopes. Convex-rectilinear concave	Basalt	20.5	— ve

SOILS

Moisture characteristics

A compilation of the moisture characteristics of Mauritian soils was started. Determinations of soil moisture content under different suctions were carried out with samples of air-dried, 2 mm-sieved soils using the pressure membrane and the pressure plate.

The Clod Method, the Core Method and the Excavation and Sand Filling Method were tried for measurements of soil bulk density. For the investigation at hand, the last gave the most reliable results and was easier and less time-consuming than the other methods. Free-flowing sand particles passing through a 1 mm sieve and retained on a 0.5 mm sieve were used.

Behaviour of potassium in Mauritian soils

Virgin soils of the major groups when potted and exhaustively cropped with groundnuts showed different capacities to supply potassium. The amount of potassium released from reserves ranged from 133 to 314 kg k/ha and the contribution of this potassium to the total uptake by the plant ranged from 19% for the Latosolic Reddish Prairie to 86% for the Humic Ferruginous Latosol. It appeared that potassium depletion was associated with increased uptake of manganese in Low Humic Latosol and Latosolic Brown Forest soils. In spite of severe depletion of potassium in some soils, the level of extractable potassium (boiling HNO_3 method) was never lower than 0.10 m.e.% (39 ppm K).

The exchangeable (NH_4 OAc) and extractable (boiling HNO_3) potassium contents of both Latosols and Latosolic soils did not change much when dried from the field-moist to the air-dry state. However, oven-drying did give significantly lower values of both forms of potassium. By contrast, a Dark Magnesium Clay with a very low potassium saturation showed a gradual increase of exchangeable K with drying. The importance of potassium saturation in such studies still has to be assessed.

Preliminary studies on potassium fixation were started but the extraction procedure and the level of potassium added to the soils were found to influence the degree of fixation. Thermodynamic aspects of fixation are being studied.

Soil analyses

Laboratory facilities were provided to estate chemists for determination of phosphorus (1240 samples), silicon and PH (900 samples), and potassium (640 samples) in soils.

SUGAR CANE

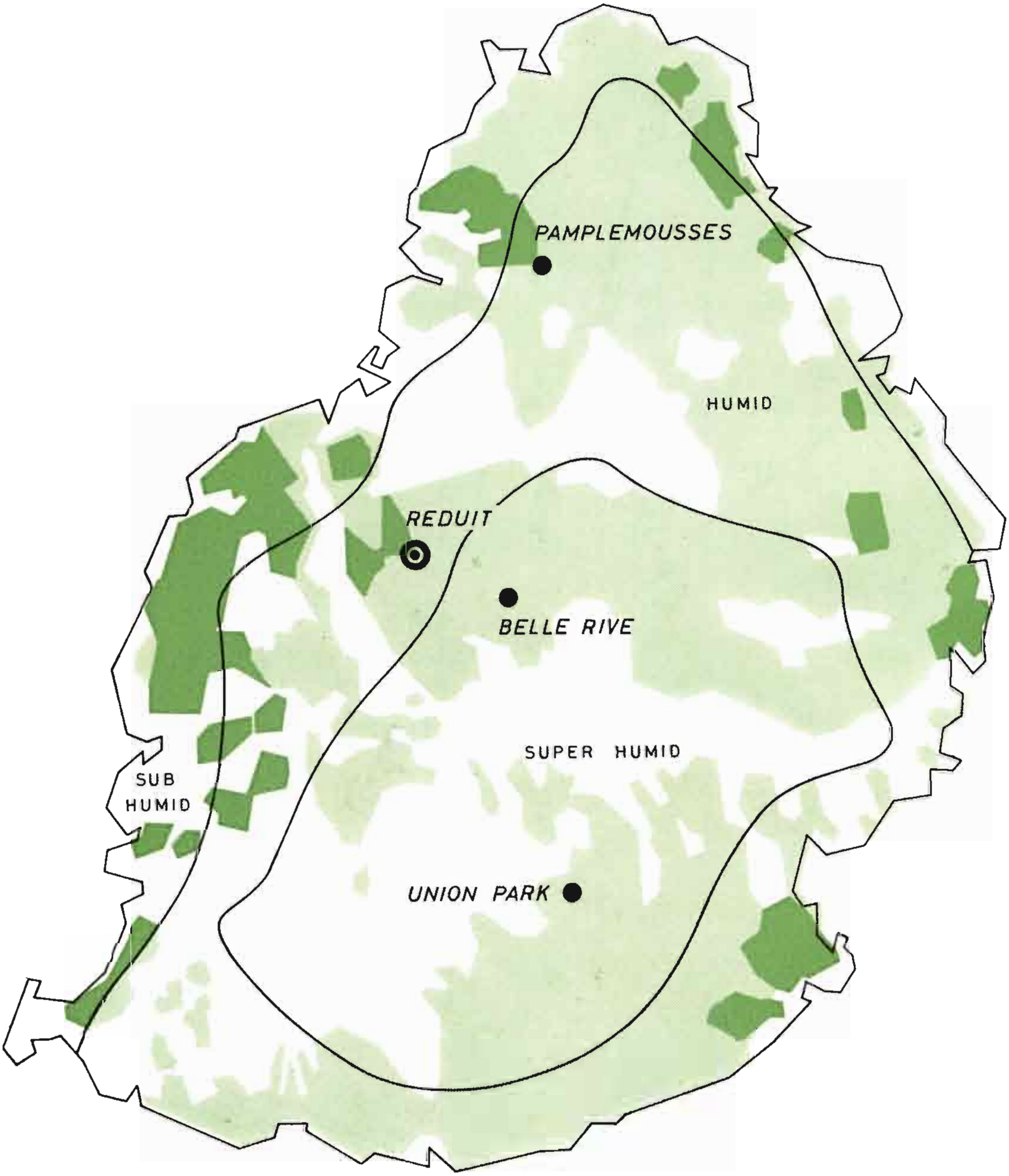


Fig. 1. The three main climatic zones, the sugar cane areas (light green, non-irrigated; dark green, irrigated), and the location of Sugar Experiment Stations.

General description of sugar cane sectors in Mauritius

Sector	*West*	*North*	*East*	*South*	*Centre*
Districts	Black River	Pamplemousses & R. du Rempart	Flacq	Grand Port & Savanne	Plaines Wilhems & Moka
Orientation	Leeward	—	Windward	Windward	—
Physiography	Flat & sloping	Lowlands	Flat & sloping	Flat & sloping	Plateau
Geology	Late lava — Pleistocene				
Petrology	Compact or vesicular doleritic basalts and subordinate tuffs				
Pedology	Soil Families				
Low Humic Latosol	«Richelieu»	«Richelieu» «Réduit»	«Réduit» «Bonne Mère»	«Réduit»	«Réduit» «Ebène»
Humic Latosol	—	«Rosalie»	—	«Riche Bois»	«Riche Bois»
Humic Ferruginous Latosol	—	—	«Sans Souci»	«Belle Rive» «Sans Souci» «Midlands» «Chamarel»	«Belle Rive» «Sans Souci» «Midlands»
Latosolic Reddish Prairie	«Médine»	«Labourdonnais» «Mont Choisy»	«Mont Choisy»	«Labourdonnais» «Mont Choisy»	«Médine»
Latosolic Brown Forest	—	—	«Rose Belle»	«Rose Belle» «Bois Chéri»	«Rose Belle» «Bois Chéri»
Dark Magnesium Clay	«Lauzun» «Magenta»	«Lauzun»	—	—	—
Grey Hydromorphic	«Balaclava»	«Balaclava» «St. André»	«Balaclava»	—	—
Low Humic Gley	—	—	«Valetta»	—	«Valetta» «Petrin»
Lithosol	—	«Melleville»	«Pl. des Roches» «Melleville»	«Melleville»	—
Altitude	Sea level-275 m	Sea level - 175 m	Sea level-350 m	Sea level-350 m	275 - 550 m
Humidity province	Sub-humid	Sub-humid to humid	Humid to super-humid		
Annual rainfall, mm. range	1125 (750-1500)	1400 (1000-1900)	2400 (1500-3200)	2300 (1500-3200)	2600 (1500-3800)
Months receiving less than 50 mm.	June to October	September to October	None		
Average temperature °C — *Jan.*	27.0°	26.5°	25.5°	25.0°	23.5°
Average temperature °C — *Jul.*	21.0°	20.5°	19.5°	19.0°	17.5°
Cyclonic winds, exceeding 50 km/h during 1 hour	December to May				
Irrigation (area in ha)					
Overhead — intensive	1253	1110	703	520	392
Overhead — occasional	—	492	633	440	—
Surface — intensive	2696	713	282	818	599
Surface — occasional	395	1178	215	148	435
Area (1000 ha) — Total	24	38	30	68	27
Area (1000 ha) — Under cane	5	23	20	27	11
Cane production, 1972 (1000 tonnes)	436	1589	1574	1942	774
Sugar production, 1972 (1000 tonnes)	51	165	165	218	87

SUGAR CANE

The 1972 crop

Weather during the 1972 crop season was close to normal in the growing period but was very unfavourable to cane ripening in the maturation period.

During the growing period (November-June), rainfall was on the whole well distributed. It was above normal in November, February and June, close to normal in April and below normal during the other months. Rainfall deficits amounted to 380 mm (normal 435 mm). The mean air temperature for November to February was 25.1°(normal 25.0°C) and for March to June 23.8°C (normal 23.5°C).

Several cyclones passed near Mauritius during the growing period and Eugénie, which passed on the 12th of February at 240 km off the N.W. coast, caused winds that very nearly reached the critical threshold for crop damage.

On the whole, weather was conducive to good vegetative growth.

However, rainfall, particularly, and temperature were higher than the normals during the maturation period (May-October) and were very unfavourable to ripening. Rainfall excess for the months July to October amounted to 261 mm (normal 65 mm). Actual rainfall for the months May to July was 544 mm (normal 429 mm) and for August to October 427 mm (normal 250 mm). Mean minimum temperatures for the same periods were 18.6°C (normal 18.1°C) and 18.2°C (normal 17.6°C), respectively.

Table 2. The 1972 crop

	1972		1971	
Area cultivated, hectares*	86,600	(205,242)	86,390	(204,744)
Area harvested, hectares* :				
Miller-Planters	43,383	(102,818)	43,000	(101,910)
Planters	36,849	(87,332)	36,877	(87,398)
Total	80,232	(190,150)	79,877	(189,308)
Weight of canes, tonnes	6,314,667		5,255,570	
Tonnes cane per hectare *				
Miller-Planters	90.1	(38.0)	79.9	(33.7)
Planters	65.2	(27.5)	49.4	(20.9)
Average, Island	78.7	(33.2)	65.9	(27.8)
Commercial sugar recovered % cane	10.87**		11.82***	
Tonnes sugar per hectare *				
Miller-Planters	9.79	(4.13)	9.44	(3.98)
Planters	7.09	(2.99)	5.82	(2.46)
Island	8.55	(3.61)	7.78	(3.28)
Total duration of harvest (days, Sundays and public holidays excluded)	164		152	
Sucrose % cane	12.33		13.41	
Fibre % cane	12.87		13.19	
Tonnes sugar 98.5° pol	687,885		622,706	

* Equivalent figures for arpents are given in brackets.
** Equivalent to 9.2 tonnes of cane per tonne of sugar.
*** Equivalent to 8.5 tonnes of cane per tonne of sugar.

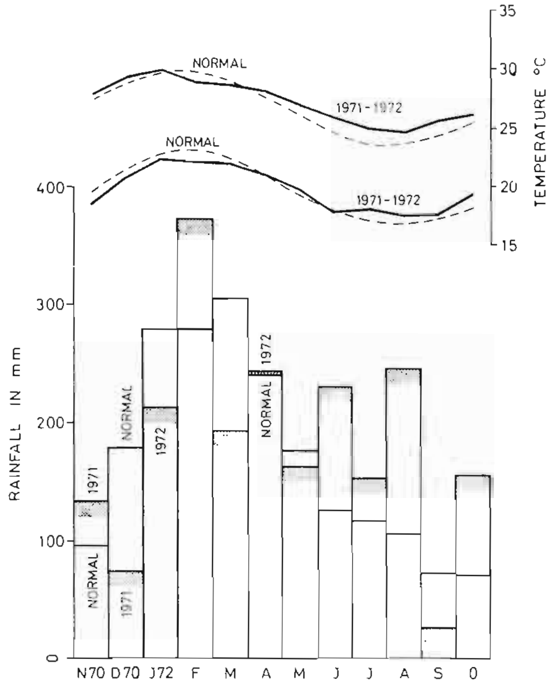


Fig. 2. Average rainfall, and maximum and minimum temperatures over the cane area in 1972 compared to normal.

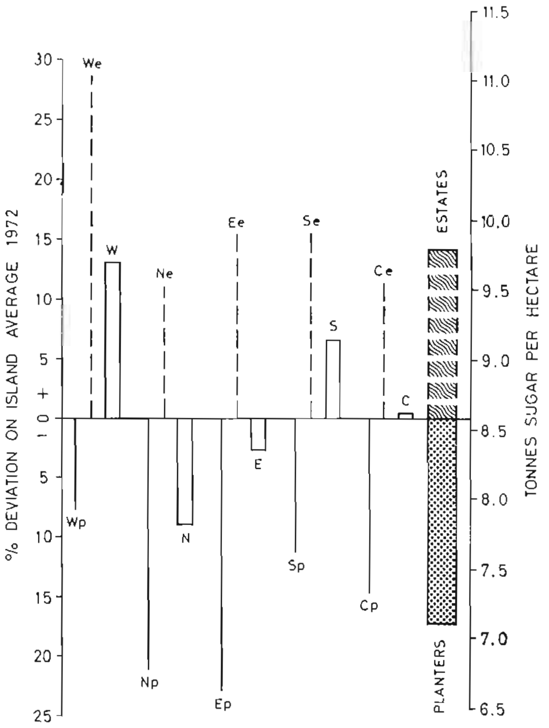


Fig. 3. Relative yields of sugar/ha in different sectors. Average island yield 8.54 tonnes of 98.8 pol sugar/ha (3.60 tonnes/arp). Plain line, planters; broken line, estates; columns, sector averages.

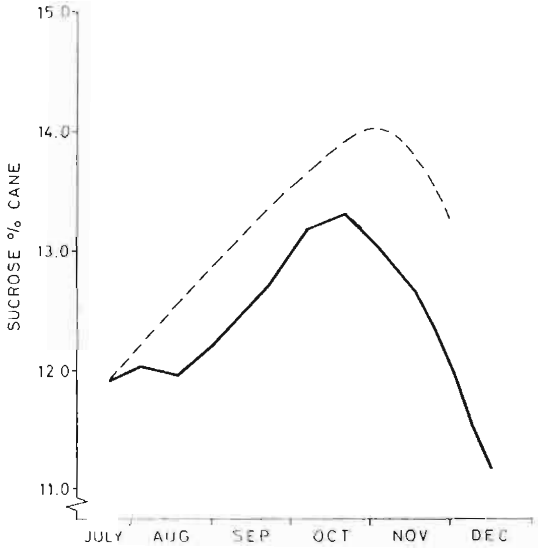


Fig. 4. Variation in sucrose % cane during the harvest season of 1972 (plain line) compared to the 1967-1971 average (broken line).

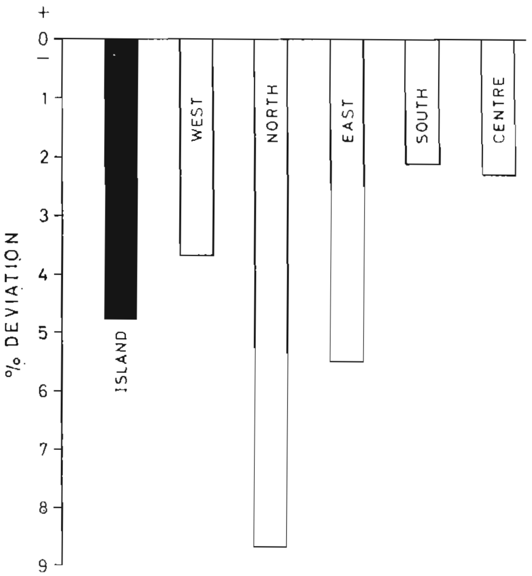


Fig. 5. Sugar manufactured % cane in 1972 for the various sectors expressed as % deviation from the 1967-1971 average.

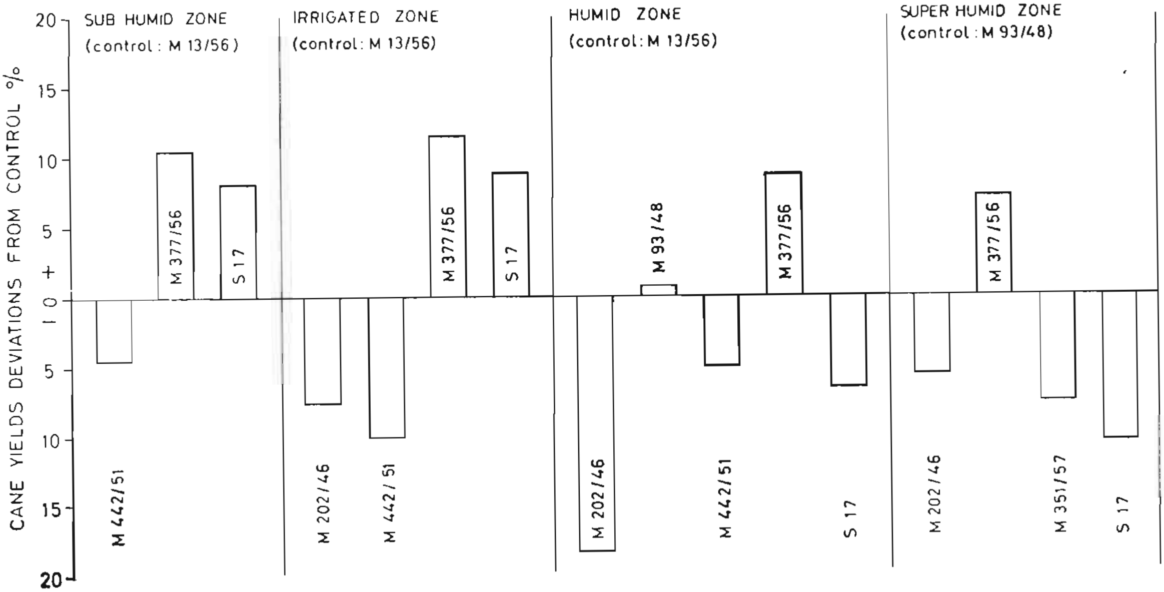


Fig. 6. Yields of cane varieties on estates in 1972, expressed as % deviation from standard varieties in the same categories, in the four climatic zones.

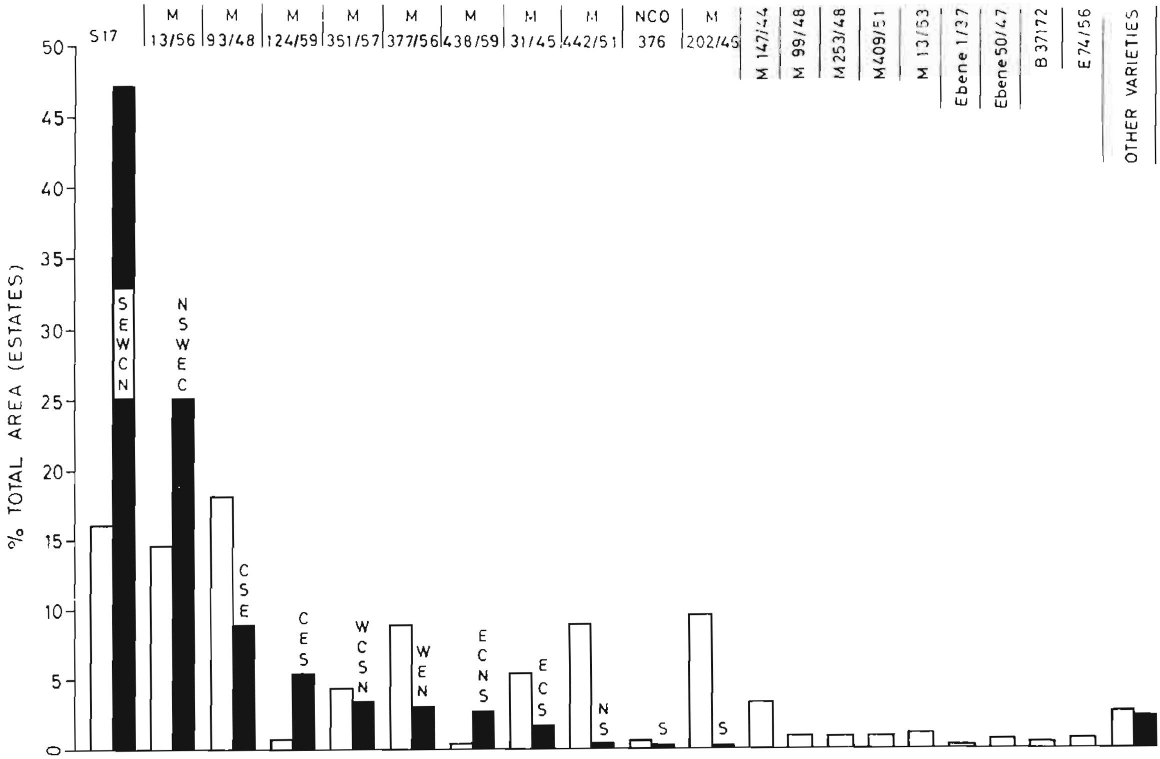


Fig. 7. Varietal trend in 1972 as illustrated by area under cultivation (plain columns) and area planted during the year (black columns). Letters denote sectors arranged in descending order of magnitude of plantations.

Adding to the effects of unfavourable ripening conditions, cropping was unduly prolonged and cyclone Ariane caused heavy rains at the end of November.

In conclusion, although weather during the growing period was very favourable to cane production,despite the passage of cyclone Eugénie, the long cropping season and the abnormally warm and wet conditions which then prevailed severely affected maturation. The net result was that sugar production amounted to 687,885 tonnes (98.5° pol), and sugar per hectare 8.55 tonnes, both record figures, but the profitability indices for 1972 and 1963 (the previous record year for sugar production) were 5.43 and 5.57, respectively.

Details of the 1972 crop, of weather during the crop year, and of the varieties cultivated, are given in Table 2 and Figs. 2-7.

BREEDING

Crossing

The crossing period lasted for 10 weeks, from 15th May to 26th July. A total of 1441 crosses were made involving 951 combinations and 332 different parents, the latter comprising 41 clones as male, 201 as female and 90 as both male and female. The nobilization programme accounted for 265 crosses involving 204 combinations. As in 1971, seedlings produced exceeded requirements. Consequently, an initial random discard from every combination that produced more than 600 seedlings was made and the offspring of these high-yielding combinations were transplanted as 2 bunches of 3 per location. Seedlings of the M/72 series were transplanted to the fields in the second half of February 1973 and comprised 20,298 locations with a total of 55,311 seedlings, the nobilization programme accounting for 3524 and 6503 of these locations and seedlings, respectively.

In addition, 82 naturally-produced seedlings collected in the fields at Réduit were potted individually and transplanted, 1 plant per location. Some of the excess seedlings from the 1972 series that were to have been discarded were also transplanted in bulk from the germination trays, giving 47 locations each of about 250 seedlings.

Good progress was made with seed extraction and it is hoped that sowing of seed instead of fuzz will soon become a reality.

Selection

Preliminary phases

A summary of the preliminary phases of variety testing in 1972 is given in Table 3.

Final phase

About 2.95 ha (7 arp.) of multiplication plots containing 108 varieties were established at Médine in 1972. Four varieties were also planted in the first nurseries (M 3), which occupied about the same area.

It was decided to concentrate all the multiplication plots at Médine in one place and to this effect a substation of about 32 ha (75 arp.) was opened at Mon Desert Filao. It will be gradually occupied. All planting material used for M 1 and M 2 was given a short hot water treatment (52°C/20 min), while for M 3 about half the amount planted received the long treatment of 50°C/2 hr. The M 3 nurseries were planted at two periods, in June and October. Cuttings delivered from multiplication plots for planting trials or for further multiplication numbered 436,980.

Two new stages, M 4 and M 5, were added to the system of multiplication of varieties with the object of being able to provide an adequate supply of planting material at the time of release. These

Table 3. Summary of variety testing in 1972. Preliminary phases

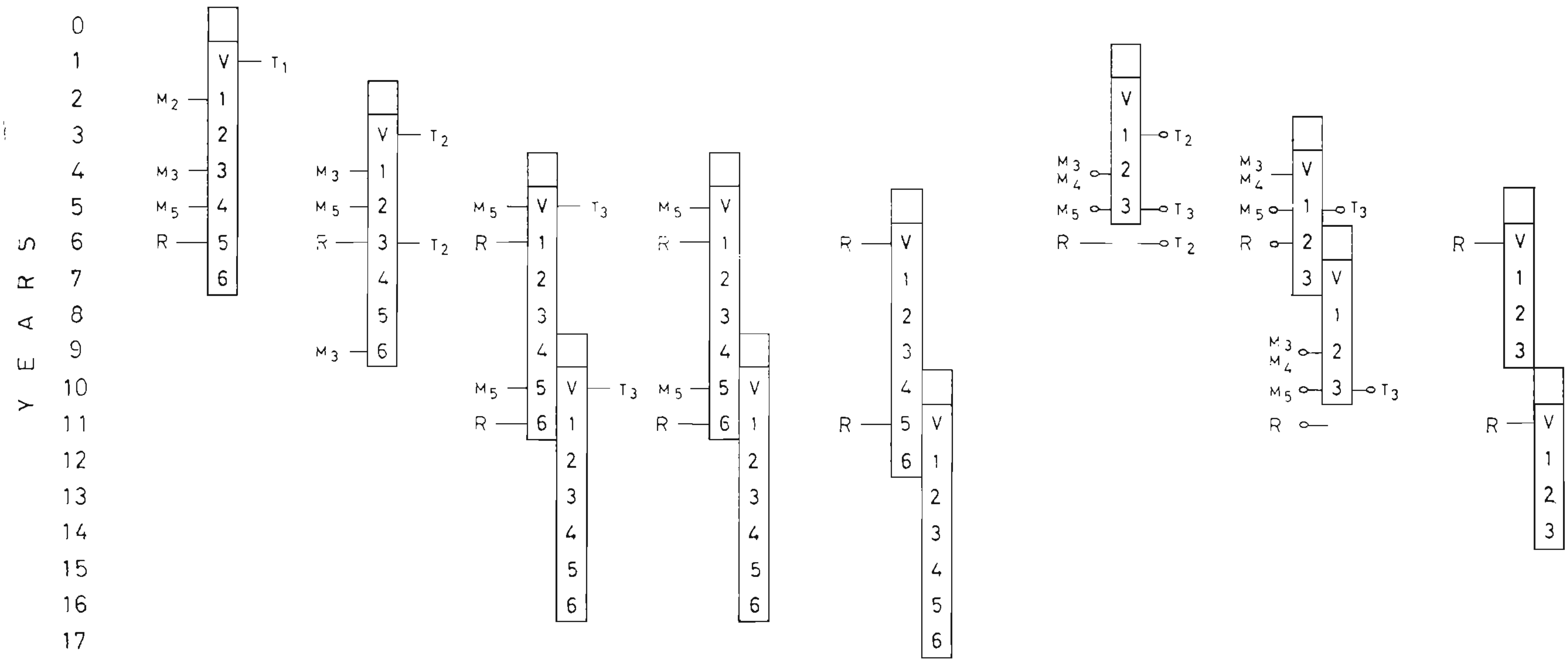
	Stage	*Series*	*Crop cycle*	*Different varieties*	*Total locations*
		(i) Stages measured & selected			
1.	Seedling	M/70	Plant cane	47396	19612
2.	Bunch Selection Plot	M/69	Plant cane	17042	17042
3.	Propagation Plot	M/67	1st Ratoon	1553	2364
	,, ,,	M/66	,,	1237	1991
	,, ,,	*Total*	,,	*2790*	*4355*
4.	1st Selection Trial	M/64	2nd Ratoon	37	41
	,, ,,	M/63	,,	59	67
	,, ,,	Foreign	,,	40	80
	,, ,,	*Total*	,,	*136*	*188*
		Total measured & selected		*67364*	*41197*
		(ii) Stages Measured			
3.	Propagation Plot	M/68	Plant cane	2130	3710
4.	1st Selection Trial	M/66	Plant cane	167	184
	,, ,,	Foreign	,, ,,	18	36
	,, ,,	*Total*	,, ,,	*185*	*220*
	,, ,,	M/64	1st Ratoon	164	182
		Total measured		*2479*	*4112*
		(iii) Stages Planted			
1.	Seedling	M/71		39493	19787
2.	Bunch Selection Plot	M/70		15591	15591
3.	Propagation Plot	M/69		2145	3449
4.	1st Selection Trial	M/67		81	86
	,, ,,	M/66		83	88
	,, ,,	Foreign		27	54
		Total		*191*	*228*
5.	1st Multiplication	M/64		9	9
	,, ,,	M/63		13	13
	,, ,,	Foreign		8	8
		Total		*30*	*30*
		Total planted		*57450*	*39085*
		Grand Total		*127293*	*84394*

two stages will be established at several sites over the island to facilitate eventual distribution of material. When the system becomes operative, the nursery area available per variety released for commercial use will vary between 13-25 ha (30-60 arp.) . The area planted under M 4 in 1972 was 1.33 ha (3.15 arp.) and comprised 4 varieties.

The Flow Chart overleaf depicts the system of testing and multiplication in the Final Phase.

— FLOW CHART OF A SUGAR CANE VARIETY AT THE FINAL PHASE OF TESTING —

	Multiplication plots MEDINE			nurseries FACTORY AREAS				
STAGE	M1	M2	M3	M4	M5	T1	T2	T3
AREA PLANTED (glts)	40	40	800	1820 minimum 3420 maximum	27824 45844	144	240	576
Area harvested for sucrose determination (glts)						12	20	48
Area left over to provide planting material (glts)						132	220	528



M = multiplication plots. *T* = trials. R = release. (glts) = gaulette. [1 hectare = 1 900 glts approx]
(multiplication assumed rate = 10 1)

i) 1st Testing : T 1

One series of 4 trials was planted in 1972 and included 18 varieties laid out in 5 x 5 lattice squares with 3 replications. A special series of 4 trials, laid out as 4 x 5 rectangular lattices, and including a total of 20 varieties, was also planted; the object of this series is to compare the performance of important commercial varieties of the past with those now cultivated. Table 4 gives details ofvarieties undergoing testing at Stage T1.

ii) 2nd Testing : T2

One series of 4 trials, laid out as 4 x 4 balanced lattices, with 5 replicates, and including a total of 9 varieties, was planted. Table 5 gives details of varieties undergoing testing at Stage T2.

Table 4. Varieties planted in 1st test : T1

Varieties	**1969**	**1970**	**1971**	**1972**	*Total*
M 59	7	1	—	—	8
M 60	19	1	—	—	20
M 61	6	9	1	—	16
M 62	—	4	25	—	29
M 63	—	—	—	14	14
Sub Total	*32*	*15*	*26*	*14*	*87*
Foreign	—	6	2	4	12
Total	*32*	*21*	*28*	*18*	*99*
No. of Series	2	1	2	1	6
No. of Trials	8	4	8	4	24

Table 5. Varieties planted in 2nd test : T2

Varieties	**1969**	**1970**	**1971**	**1972**	*Total*
M 51	2*	—	—	—	2
M 53	3	—	—	—	3
M 54	2	—	1	—	3
M 55	—	3	2	—	5
M 56	1	6	—	—	7
M 57	4†	3	3	1	10
M 58	1	1	2	—	4
M 59	8††	—	6	—	14
M 60	—	—	6	2	8
M 61	1**	—	—	4	5
M 62	—	—	—	1	1
Sub Total	*22*	*13*	*20*	*7*	*62*
Foreign	2†††	1	1	2	6
Total	*24*	*14*	*21*	*9*	*68*
No. of series	2	1	2	1	6
No. of Trials	6	4	8	4	2

* Variety M 428/51 was planted in 2 series of trials in 1969
** Variety M 907/61 was planted in 2 series of trials, one in 1969 and the other in 1971
† Variety M 351/57 released 18.9.70
†† Varieties M 124/59 & M 438/59 released 29.12.71
††† S 17 included here was released on 28.8.70

iii) 3rd Testing : T3

Nine paired trials were planted. As usual, one trial of each pair will be for harvest in the 1st half of the crop period and the other for harvest in the 2nd half of the crop period. These trials were laid out as randomized blocks of 12 treatments with 3 replications and they included 5 varieties. Table 6 gives details of varieties undergoing testing at Stage T 3 and Table 7 gives details of all varieties being tested in the Final Phase.

Table 6. Varieties planted in 3rd test : T3

Varieties	1970	1971	1972	*Total*
M 53	1	—	1	2
M 54	—	—	1	1
M 56	1	—	—	1
M 57	1†	—	2	3
M 59	2††	—	1	3
M 61	1	—	—	1
Sub Total	*6*	—	*5*	*11*
Foreign	2†††	—	—	2
Total	*8*	—	*5*	*13*
No. of Series	2	—	2	4
No. of Trials	30	—	18	48

Table 7. Summary

Varieties	1963—1967	1969	1970	1971	1972	*Total*
Planted T1	—	32	21	28	18	99
Planted T2 & T3	51	—	—	—	—	51
Total	*51*	*32*	*21*	*28*	*18*	*150*
Released	4	—	—	—	—	4
Discarded	9	6	5	1	7	28
Net Selectionable	38	26	16	27	11	118

† M 351/57 released 18.9.70

†† M 124/59 and M 438/59 released 29.12.71

††† S 17 included here, was released on 28.8.70

As no trial had been planted in the Final Phase in 1968, there was none to harvest in 3rd ratoon in 1972. No varieties were released in 1972. The performance of standard varieties in the special second testing (T2) series planted in 1969, and harvested in 2nd ratoon during the year, confirmed previous findings (see Annual Report for 1971, p. 40). The results are presented in Table 8.

Table 8. Performance of standard varieties in special T2 F
Cumulative Results : Plant cane + 1st Ratoon + 2nd Ratoon*

Estate	*Mon Desert-Alma*				*Beau Champ*			
Section	Valetta				Belle Rive			
Soil Type & Family	F 1				H 2			
Altitude (m)	400 (1400 ft)				120 (400 ft)			
Normal Rainfall (cm)	300 (120 in)				300 (120 in)			
Date & Age (wks) harvested : P. Cane	3.11.70 : 62				4.11.70 : 63			
Date & Age (wks) harvested : 1 R	12.11.71 : 53				9.11.71 : 53			
Date & Age (wks) harvested : 2 R	16.11.72 : 53				16.11.72 : 53			
	W	*I*	*S*	*P***	*W*	*I*	*S*	*P***
Standard Error of one variety :	± 2.58(1.09)	± 0.18	± .30(.13)	± .22(.09)	± 2.90(1.23)	± 0.16	± .36(.15)	± .26(.11)
Varieties								
M 93/48	75.4 (31.8)	10.2	7.7 (3.2)	4.6 (2.0)	106.1 (44.8)	11.9	12.7 (5.3)	8.4 (3.5)
M 377/56	62.5 (26.4)	10.5	6.5 (2.8)	4.0 (1.7)	110.4 (46.6)	12.0	13.3 (5.6)	8.9 (3.8)
M 351/57	79.8 (33.7)	10.1	8.1 (3.4)	4.9 (2.1)	105.1 (44.4)	12.2	12.9 (5.4)	78. (3.7)
S. 17	66.0 (27.9)	10.6	7.0 (2.9)	4.3 (1.8)	89.3 (37.7)	14.2	12.7 (5.3)	9.0 (3.8)
Average Standards	70.9 (29.9)	10.4	7.3 (3.1)	4.6 (1.9)	102.7 (43.4)	12.6	12.9 (5.4)	8.7 (3.7)
Average Trial	68.3 (28.8)	10.7	7.3 (3.1)	4.6 (1.9)	91.2 (38.5)	12.5	11.3 (4.8)	7.7 (3.3)

* Individual Results based on 5 replicates in each trial

** W = Tonnes cane/ha (tonnes cane/arp in brackets)
I = Industrial Recoverable Sugar % Cane
S = Tonnes sugar/ha (tonnes sugar/arp in brackets)
P = Tonnes profitable sugar/ha (tonnes profitable sugar/arp in brackets)

The variety situation

Owing to unusual weather during the crop period, results of trials harvested during the year must be interpreted with caution. Large variations in sucrose content occurred. It is to be emphasised that recommendations concerning planting and harvesting of newly released varieties can only be of a general nature.

The variety situation should be dynamic with new varieties being continually released. The necessity of varietal replacement must therefore be accepted and the potential of varieties under different circumstances assessed to obtain optimum results from them in commercial plantings. It is important to generalize on the major characteristics of varieties. The most important single criterion is the sugar produced per unit area throughout the crop period and in this connection three main kinds of variety may be postulated :

(a) early maturers, i.e. varieties that tend to yield most sugar per unit area at the beginning of the crop period; generally, the higher sucrose of such varieties late in the crop season does not compensate for the lower cane tonnage when cropped late in successive years.
(b) stable yielders, i.e. varieties that produce a reasonably constant amount of sugar per unit area throughout the crop period, any drop in cane tonnage being fully compensated by the increase in sucrose content.
(c) late maturers, i.e. varieties with a definite increase in sugar produced per unit area towards the end of the crop period; this is frequently due to a marked increase in sucrose content from the beginning to the end of the crop.

Another very helpful criterion is the general relative sucrose content of a variety (as given below for current commercial varieties). The location of a variety will also affect its performance, bearing in mind the great diversity of climates, soils, and other environmental factors in the cane areas of Mauritius. In addition, it can sometimes be profitable to harvest a late maturer early or an early maturer late, depending on the availability of varieties for cultivation at a particular place. The relative merits of the major commercial varieties, bearing in mind the above remarks, are given below.

Variety	*Sugar content, general level*	*Sugar/unit area optimum harvest period*
M 31/45	Low	Late
M 93/48	Low	Late
M 13/56	Low	Stable
M 377/56	Average	Stable-Late
M 351/57	Very Low	Late
M 124/59	Average	Late
M 438/59	Average	Stable
S 17	Very high	Stable

Once the major characteristics of a variety are established, the problem of order of harvest can be examined; this will depend for any given estate or section on the availability of the different varieties and their performance relative to each other.

It is to be noted that M 124/59 and M 438/59 appear to be at least as good as M 377/56. Further, there are indications that M 438/59 could profitably replace M 13/56 in several areas.

General recommendations on the order in which varieties should be harvested are as follows :

Sub-humid conditions	:	M 438/59, S 17, M 13/56
Humid conditions	:	M 438/59, S 17, M 13/56, M 93/48, M 31/45, M 124/59
Super-humid conditions	:	M 438/59, S 17, M 93/48, M 124/59, M 351/57

Varieties imported in 1972

The following varieties were imported in 1972 and are undergoing quarantine :

Country of origin	*Variety*
Barbados	B 5480, B 5992, B 6160, B 59162, BJ 5924, BJ 6014
Fiji	Homer, Mali, Spartan, Waya
Hawaii	H 52-246, H 54-775, H 49-3945, H 50-2036, H 57-5174, H 59-3775
Rhodesia	M 383/41
South Africa	L 76, N 6, N 7, N 8
Taiwan	F 157, F 161, F 164, F 166, F 167, F 170, F 172
USA	L 65-69

Approved cane varieties

The cane varieties authorized for commercial cultivation are listed in Table 9.

Table 9. List of Approved Cane Varieties, 1973

Varieties	*Cane Release Advisory Committee Meeting*	*Proclamation*
B 37161	26. 3.53	5 (*1956*)
B 37172	26. 3.53	5 (*1956*)
E 1/37	1951	5 (*1956*)
E 50/47	29.12.61	18 (*1962*)
M 134/32	1937	10 (*1946*)
M 134/32 — Striped	16.12.55	5 (*1956*)
M 134/32 — White	16.12.55	5 (*1956*)
M 147/44*	13.12.55	5 (*1956*)
M 31/45	13.12.55	5 (*1956*)
M 202/46	8.12.59	13 (*1960*)
M 93/48	8.12.59	13 (*1960*)
M 99/48	12. 2.65	20 (*1966*)
M 253/48	29.12.61	18 (*1962*)
M 409/51	24. 5.66	20 (*1966*)
M 442/51	18. 2.64	20 (*1966*)
M 13/53	24. 5.66	20 (*1966*)
M 13/56	24. 5.66	20 (*1966*)
M 351/57	18. 9.70	8 (*1972*)
M 124/59	29.12.71	8 (*1972*)
M 438/59	29.12.71	8 (*1972*)
N Co 376	24. 5.66	20 (*1966*)
S 17	28. 8.70	8 (*1972*)

* To be uprooted before 31.12.73. (Proclamation 3 of 1967)

AGRONOMY AND PLANT PHYSIOLOGY

Irrigation

To determine, when using overhead irrigation, the water regime giving the most profitable return and the effect of moisture stress on sucrose content, 4 experiments were begun on different soil groups, viz., 2 on Latosolic Reddish Prairie at Médine and St. Antoine Sugar Estates, 1 on Low Humic Latosol at Tamarin, and 1 on Dark Magnesium Clay at Les Guibies.

Irrigation intervals in each experiment are being kept at 1,2 and 3 weeks throughout the growth cycle. However, in all 3 treatments water is applied at each irrigation so as to restore, as far as is practicable, the soil moisture within the root zone to near field capacity. The equipment used is the Senior Target Master at Les Guibies, the Junior Target Master at Tamarin, and the Boom-O-Rain at Médine and St. Antoine. Data on tillering and cane elongation are being acquired and leaf samples are taken periodically and analysed for N, P and K.

De-rocking

A preliminary experiment at Beau Champ Sugar Estate, where irrigation practice is 31 mm/ 11 days, indicated that de-rocking by heavy machinery after each rotation, instead of hand de-rocking, lowers cane yields. It is also more expensive.

Plant nutrition

Nitrogen

Field trials to compare sulphate of ammonia and calcium ammonium nitrate as sources of nitrogen were harvested in 3rd ratoons. On the whole, the two forms of N gave similar results except at one site where sulphate of ammonia was consistently better.

Potassium

The 11 field trials laid down in 1971 with five different levels of potassium applied to soils of various potassium content were harvested as plant canes. A significant yield response to K was obtained in 3 out of 5 potassium-deficient soils. Samples of canes and tops were analysed to determine the amounts of nutrients removed from the soil by the plants.

Silicon

Trials laid down in 1967 and 1969 continued to show significant yield responses to calcium silicate applied at planting. Yield increases were significantly correlated with the initial silica content of the 3rd leaf and there was also significant correlation between the silica and calcium content of that tissue. In the 1969 series, it appears that very high levels of calcium silicate (28.4 tons/ha) depressed yields.

A series of trials laid down by Estate Agronomists has shown a general response to calcium silicate applied in silicon-deficient soils.

Physiological investigations on silicon deficiency continued, with emphasis on phenolic metabolism. Although deficiency of Si causes an increased production of polyphenols, no effect of Si on the activities of peroxidase, polyphenol oxidase, phenyl alanine ammonia lyase and tyrosine ammonia lyase, which are the main enzymes of phenolic metabolism in plants, could be detected *in vitro.*

The level of sucrose precursors can be boosted by increasing the pool of phosphate esters : this might be achieved by inhibiting acid phosphatase, an enyme that breaks down sugar phosphates —these being the immediate sucrose precursors. *In vivo* assays have shown that acid phosphate is more active in Si-deficient plants.

Studies on the relationship between Si and cations tend to show that Si nutrition in culture solution leads to an incraesed level of Ca in the leaf. However, the leaf levels of total cations (K + Mg + Ca) remain unchanged; the Mg level is decreased while the level of K stays constant.

Foliar diagnosis

Final variety trials (1968)

The series of Final Variety Trials planted in 1968, and described in the Annual Report for 1970, was completed in 3rd ratoons. The results indicate that varieties S 17 and M 377/56 are superior to the reference varieties M 442/51 and M 93/48 in all regions and for all dates of harvest (early, medium and late). The variety N Co 376 also appears to be superior to the reference varieties when it is harvested early in the season.

Foliar diagnosis was carried out in the trials on varieties M 93/48, M 442/51, S 17 and N Co 376. The leaf nitrogen values (FDN) for the varieties M 442/51 and M 93/48 were combined with those obtained in the 1966 series of trials and the optimum leaf nitrogen levels calculated for different types of soil. The nitrogen requirements based on leaf nitrogen analysis are given according to soil type in Table 10.

Table 10. Interpretation of foliar diagnosis data for nitrogen

Leaf N % dry matter	*Additional nitrogen requirement (Kg. N/ha) according to soil types*		
	LRP, DMC, Lithosols	*LHL, HL*, Grey Hydromorphic*	*HL**, HFL, LBF, Low Humic Gleys, Mountain Slopes Complexes*
1.60	75	125	135
1.65	65	115	130
1.70	55	105	125
1.75	45	95	115
1.80	30	85	105
1.85	15	70	95
1.90	0 (optimum)	55	85
1.95	—	40	75
2.00	—	20	65
2.05	—	0 (optimum)	50
2.10	—	—	35
2.15	—	—	20
2.20	—	—	0 (optimum)

* Rainfall >2400 mm.

** Rainfall <2400 mm.

Leaf samples from the 70 kg N/ha treatment in the 1968 series were collected at 3 different times of the year to establish age corrections for foliar diagnosis data.

Estate samples

The results of analyses of samples from Permanent Sampling Units over the past 8 years are summarized in Table 11. It should be mentioned that most instances of nitrogen deficiency occurred in dry areas whereas potassium deficiency was more widespread.

Table 11. Deficiencies in permanent sampling units

	Total number of samples		*% deficient units (mean of 2 or 3 years)*			
	Estates	*Large Planters*	*N*	*P*	*K*	*Si*
1965	548	126	39.5	35.9	18.7	—
1966	493	71	38.1	26.1	17.9	—
1967	465	48	43.5	28.1	27.9	—
1968	434	61	53.7	18.5	34.1	—
1969	374	56	42.1	21.9	33.3	—
1970	297	19	39.7	12.2	21.4	15.8
1971	496	38	32.5	8.7	33.6	14.5
1972	534	73	28.2	4.8	44.7	15.0

Flowering

During studies on the physiology of flowering, particular attention was given to (i) the effect of water stress at different stages of development, (ii) the juvenile stage, (iii) flowering in contrasting environments.

Preliminary results have indicated that a soil moisture tension of 3 Atm inhibits floral development when applied during the early stages of differentiation but is not effective during the later stages of differentiation or during elongation of the inflorescence.

Studies on the juvenile stage were started using the two commercial varieties S 17 and M 351/57. Preliminary data indicate that node number, stalk height and leaf area are among the most important factors determining juvenility.

Flowering in contrasting environments was investigated using varieties S 17, M 351/57 and M 13/56. Flowering was earliest, and its incidence greatest, in the intermediate environment (Fig. 8). No flowering occurred in the hottest and driest part of the island. These findings will be important for the siting of breeding plots.

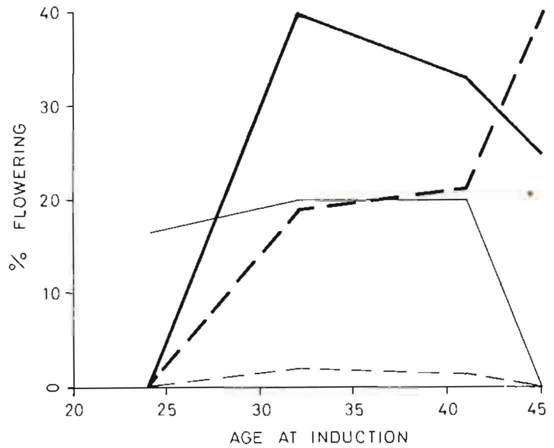


Fig. 8. Effect of age of plant at induction on flowering in varieties S 17 and M 351/57 planted in two environments (plain lines, S 17; broken lines, M 351/57 : bold lines, location Rosalie; thin lines, location Hermitage).

Growth and ripening

The 4 experiments laid down in 1971 to study the effects of plant age, climate and season on maturity behaviour in plant cane were sampled sequentially prior to their respective harvest dates to determine growth and ripeness. The trials were sited in contrasting environments and included 3 varieties, M 13/56, M 351/57, and S 17.

Other trials were also planted in 1971 to determine the effects of similar factors in ratoon cane. The plots were reaped sequentially on nine dates (at a fixed age of 65 weeks) from early July to late November to obtain the required treatments in ratoons in 1973. The results for the plant crop show a lower fresh weight yield for the 3 varieties during the latter part of the harvest season, especially in the late planted and late harvested plots. However, in most of the trials, the IRSC tended in the 3 varieties to increase to a maximum in late September-early October with a significant drop near the end of the season (November) in some treatments. Results in the 1973 crop will show whether or not the results were due to the exceptional weather during the 1971-72 crop period.

Sugar cane ripeners

Investigations on the ripener Mon 945 were continued and the two new ripeners Racuza and Ethrel were also tested.

Results obtained in 1972 with Mon 045 confirmed those obtained earlier. Increases of sucrose content occurred when the chemical was applied in March and April on varieties S 17 and M 13/56 (Fig. 9) and in May on variety M 93/48. However, marked inhibition of growth was also observed, particularly after the March and April applications. Nevertheless, the total yields of dry matter and of sucrose were significantly higher in treated plots, particularly at the dosage rates of 4 and 6 kg/ha.

The possible effect of Mon 045 on ratooning was investigated. It appeared that ratooning is poor after early harvest (3 weeks after application) but not after later harvests (6 and 9 weeks after application). This effect of the chemical on ratooning does not appear to be of importance because optimum responses are obtained 6 to 9 weeks after application.

Racuza and Ethrel gave only slight increases of sucrose content when applied on varieties M 13/56 and M 442/51 at dosage rates of 1/2, 1 and 2 kg/ha. New trials were laid down to study the effect of a high dosage (4 kg/ha) on canes younger than those previously used.

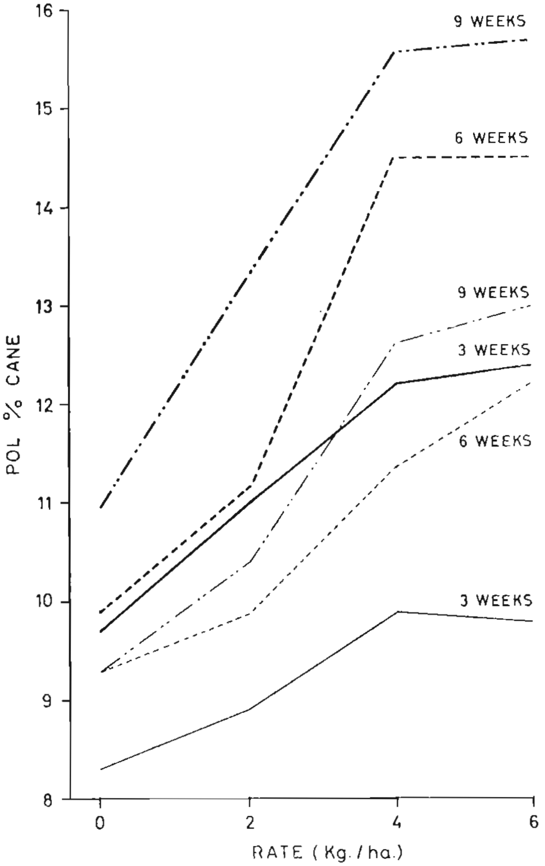


Fig. 9. Effect of ripener MON 045 on pol % cane in varieties S 17 and M 13/56 harvested 3, 6 and 9 weeks after application (bold lines, var. S 17; thin lines, var. M 13/56).

DISEASES

Disease situation and control

None of the major sugar cane diseases was particularly prominent during the year.

Gumming (Xanthomonas vasculorum)

Incidence of gumming disease was not high except in areas where many fields of M 147/44 still exist. In one such area, where the disease inoculum has been building up since 1964, some moderately resistant varieties, such as M 351/57, were found to have contracted infection. In the same area, the disease was also found on maize in fields adjacent to heavily infected M 147/44; this is unusual, the only previous record of infected maize in Mauritius being in 1932.

The control of gumming disease is based on the selection and cultivation of resistant varieties but a corollary to this is that highly susceptible but tolerant varieties, such as M 147/44, must be removed from cultivation to minimize the amount of inoculum in the environment. Failure to do this could favour the development of new strains of the pathogen adapted to varieties at present considered resistant. The legislation for the eradication of M 147/44 and the present ban on the planting of M 377/56 are measures that conform to the policy of minimizing the amount of inoculum in cane fields generally.

An extensive survey on 18 estates was carried out with the help of estate agronomists to estimate the extent of infection in var. M 377/56. Results are shown in Table 12. The incidence of systemic infection was probably underestimated because of the difficulty of detecting it in M 377/56.

Table 12. Incidence of gumming disease in estate fields of M 377/56

No. of fields surveyed	*No sign of infection*	*Trace*	*Mild infection*	*Medium infection*	*Heavy but localized infection*	*Heavy and widespread infection*	*Fields with systemic infection*
1128	38.7%	27.0%	8.3%	15.4%	8.1%	2.4%	2.9%

Ratoon stunting disease (*virus*)

Two hundred tons of cuttings were given the long hot water treatment in the Institute's tank at Réduit to establish 18 ha of A Nurseries on estates and 2 ha at the Central Nursery; in addition about 36 ha were established after treatment in estates' tanks. About 520 ha of B Nurseries were planted on estates.

Quarantine and export of varieties

A new quarantine cycle was started with 29 varieties (see p. 37).

Twenty-nine varieties were sent to the following countries: Ceylon (5), Egypt (4), Hawaii (3), Réunion (14), Rhodesia (3).

Disease-resistance testing

Agreement was reached with the Taiwan Sugar Corporation Experiment Station for the mutual testing of varieties to major cane diseases. Mauritian varieties will thus be assessed in Taiwan, as well as in Madagascar and Réunion, for their resistance to at least 4 major foreign diseases

Gumming

A substation of about 4 ha for testing the resistance of varieties to gumming disease was created at Ferney to group together the resistance trials carried out annually on that estate. Facilities for spray irrigation are to be provided to ensure proper establishment of the trials and to create, as necessary, conditions favouring spread of the disease. Trials established in 1971 were handicapped by unfavourable weather; a quarter of the varieties tested could not be rated owing to poor establishment of the trials and a low level of infection. The results of these trials are summarized in Table 13.

Trials to assess resistance of varieties to gumming disease have been conducted in Mauritius since 1931. The method originally adopted is still used and relies on natural infection of the varieties being tested by inoculated susceptible canes in adjacent rows. Although this procedure has proved satisfactory and enabled the elimination of the disease for 20 years in commercial plantations, its reliability is subject to weather conditions, and repetition of tests in different years and in different climates does not altogether overcome this drawback.

A new method of testing resistance by inoculation of cut leaves, which are then incubated with controlled humidity, was developed during the year (Plate II). The method shows promise and gave results for certain standard varieties that agree with the known field reaction of those varieties (Table 14). It is hoped that, with improvement, the method will eventually become routine for testing new varieties. It may also prove a useful means of studying host-parasite relationships and distinguishing strains of different pathogenicity in the laboratory.

Table 13. Results of gumming resistance trials in 1972

Resistance testing stage	*Stage of varieties in selection programme*	*No. of varieties tested*	*% discarded due to susceptibility*	*% with intermediate reaction*	*% promoted in selection programme*		
					Resistant		*Reaction* undetermined*
I**	Propagation plot	2230	6.3	8.0	60.2	+	23.6
II**	1st selection trial	196	3.6	14.8	74.5	+	7.1
III***	1st multiplication	15	20.0	40.0	40.0		—

* Dead or poor growth

** One trial

*** Three trials in different localities

Table 14. Comparison between results of the excised-leaf test and field reaction to gumming disease

Variety	*Disease index (excised leaf test)*	*Field reaction*
D 109	7.6a*	Highly susceptible
M 147/44 (Highly susceptible control)	6.8ab	,, ,,
M 377/56	6.0abc	,, ,,
55-1182	5.2bcd	,, ,,
M 93/48	5.0bcde	Moderately susceptible
M 442/51	4.2cdef	,, ,,
M 438/59	3.6defg	Resistant
M 13/56	3.2defg	,,
M 31/45 (Resistant control)	1.6g	,,

* Figures with same letter are not statistically different at the 5% level (Duncan's multiple range test)

Leaf scald (Xanthomonas albilineans)

A trial was laid down to assess the resistance of 14 Mauritian and 10 foreign varieties to leaf scald. The latter varieties were included to determine if their resistance under local conditions is similar to that elsewhere.

General investigations

Chlorotic streak and ratoon stunting diseases

Plants infected with chlorotic streak disease were treated with four tetracyclines and two other antibiotics, and with two systemic fungicides, in attempts to determine the nature of the causal agent. None had any affect on the disease.

The marked effect of long hot water treatment (50°C/2 hr) of planting material may sometimes be the result of its therapeutic action on setts infected with both chlorotic streak and ratoon stunting diseases, rather than with RSD alone. Improved growth following treatment therefore does not necessarily reflect the importance of RSD, which is often difficult to demonstrate by inoculation of plants. Trials were initiated to compare the effects of a short hot water treatment (50°C/30 min), which cures only chlorotic streak, with those of the long treatment, which cures both.

Gumming

Attempts to develop mutants of M 377/56 resistant to gumming by γ-irradiation were not successful.

Antibiotics were screened *in vitro* (Plate II) for their action against the gumming pathogen with a view to developing a combined antibiotic and hot water treatment for the elimination of gumming from cuttings with systemic infection.

Streak (virus)

Three varieties were planted on the site formerly occupied by the H 53-263 canes that showed symptoms of streak disease in 1971. Two of the varieties, H 53-263 again and RP 8, showed the same symptoms and it seems evident that the disease is identical with that reported on RP 8 in 1928.

Leaf scald

Investigations on apparent differences of aggressiveness among isolates of the leaf scald pathogen were resumed to verify results obtained in 1970.

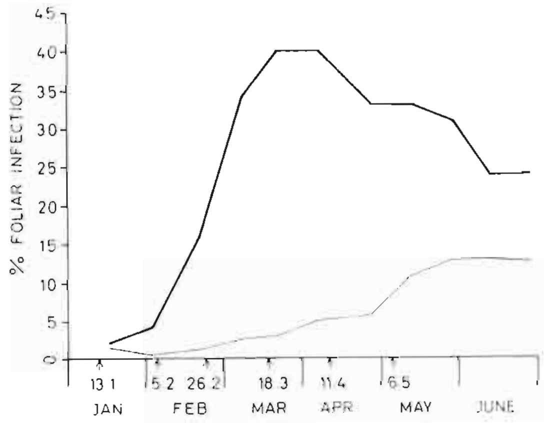


Fig. 10. Effect of successive Benomyl sprays on incidence of yellow spot of sugar cane (bold line, unsprayed; thin line, sprayed).

Yellow spot (*Cercospora kœpkei*)

The trial on the effect of yellow spot on canes harvested at 3 different dates (see Annual Report for 1971) was continued. Marked differences between control plots and plots sprayed with Benlate were evident but they disappeared later because, owing to weather conditions, the infection period was unusually prolonged and continued after spraying was stopped (Fig. 10). Differences of sucrose content at harvest were slight but differences of cane yield were considerable, the treated plots outyielding the untreated.

Pineapple disease (*Ceratocystis paradoxa*)

Studies were continued on the use of Benomyl for the treatment of cuttings and in particular to assess its rate of settling and its deterioration when added to hot water tanks.

PESTS

Biological control of the scale insect (*Aulacaspis tegalensis*)

Samples of scale-infested canes taken from various localities in May-July confirmed that the parasite *Physcus seminotus* Silv. (Aphelinidae), introduced from Uganda in 1969 and released during 1969-1971, is well established (Plate III). In addition to the localities mentioned in the Annual Report for 1971, the parasite was recovered at Savannah, Sauveterre, Tamarin and Case Noyale. Regular sampling at selected sites was started to assess the relative incidence of primary and secondary parasites, including *P. seminotus*. Early data indicate that *P. seminotus* is becoming the dominant parasite wherever it occurs and it can be assumed that it will shortly spread to all areas where the scale insect is troublesome.

Breeding and release of *Physcus subflavus* Ann. & Ins., introduced from Tanzania in November, 1970, was discontinued in April. This species has not been recovered in the field, despite its release in large numbers in most areas where scale insect is a problem, and it would appear that it cannot adapt to local conditions.

Two missions to collect other natural enemies of the scale insect were made in 1972. The first, in March, by the Chief Entomologist and Mr. Rajabalee, was to Ramisi on the Kenya coast, where 6500 adults of *Chilocorus distigma* Klug (Coccinellidae) were collected in plantations infested by *A. tegalensis*. Dr. D.J. Greathead of the Commonwealth Institute of Biological Control, East African Station, helped in the collection of the beetles, which proved an arduous task, and his knowledge of local conditions was invaluable. The beetles were taken to Mauritius by air by Mr. Rajabalee and released on March 21-23, 4000 of them at Tamarin and the balance at Pamplemousses. The insect was observed breeding in the field at Tamarin in the subsequent months before harvesting began. It may be noted that this was a second attempt to establish *C. distigma*, the first having been in 1969 when about 1400 beetles were released in small and possibly inadequate numbers over a period of 6 months.

After the collection of *C. distigma* at Ramisi, the Chief Entomologist went to Arusha Chini, Tanzania, to collect the parasite *Metaphycus* sp. (Aphelinidae). With the assistance of the staff of the Tanganyika Planting Company, several hundred pupae of this parasite were collected and brought to Mauritius where a laboratory culture was started.

The second mission, in September, was to Queensland, Australia, where the Chief Entomologist sought parasites of the related scale insect, *Aulacaspis madiunensis* (Zehnt.). Some 200 pupae of an undescribed *Aphytis* sp. (Aphelinidae) and 290 pupae of a species provisionally identified as *Physcus nigriclavus* were obtained and with these cultures were started in Mauritius. The assistance of the Bureau of Sugar Experiment Stations in the collection of these parasites is gratefully acknowledged.

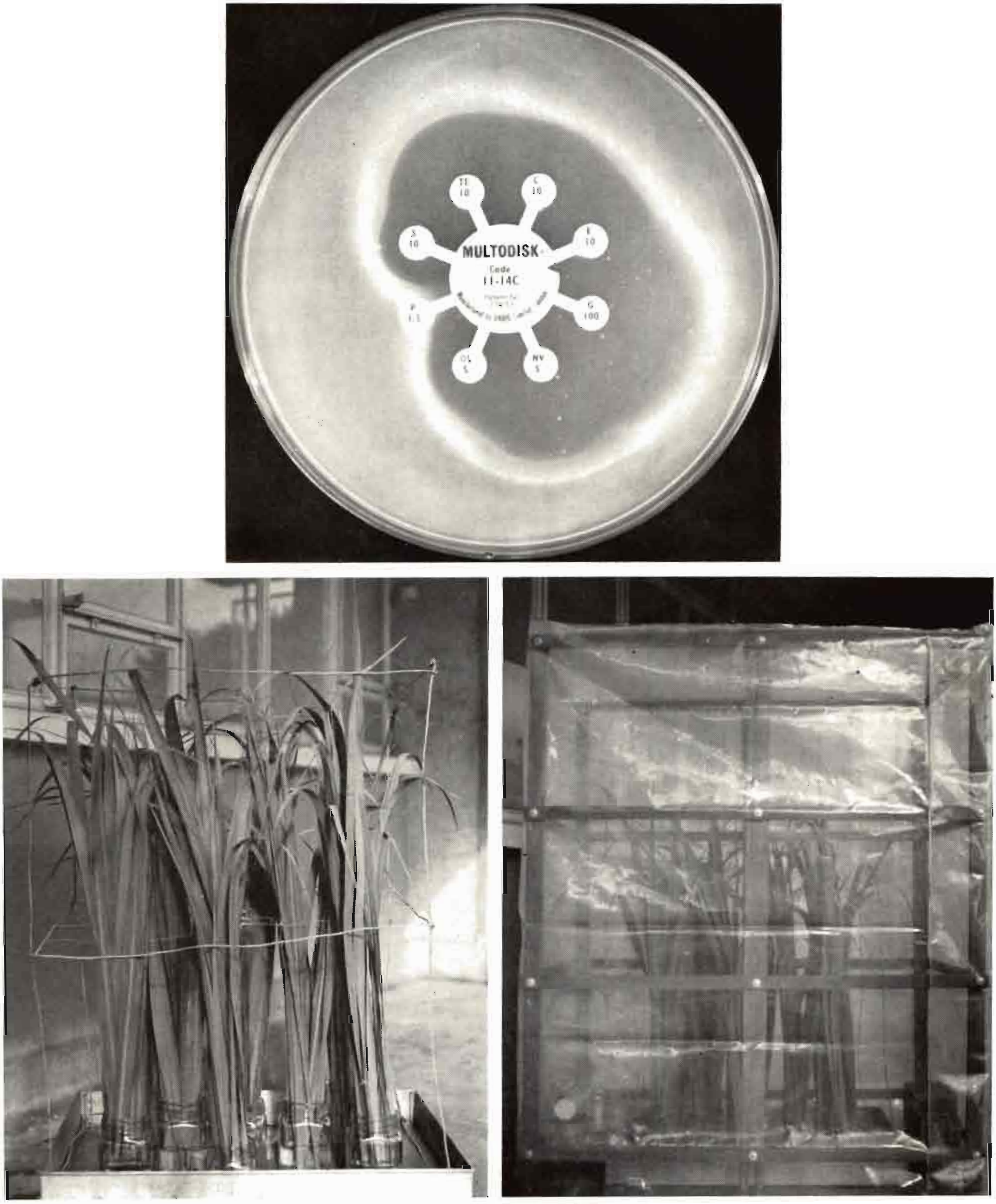


Plate II. Gumming disease. Top, screening *in vitro* antibiotics effective against the pathogen. Bottom, testing varietal resistance using detached leaves showing (right) moist chamber with heating elements for temperature control

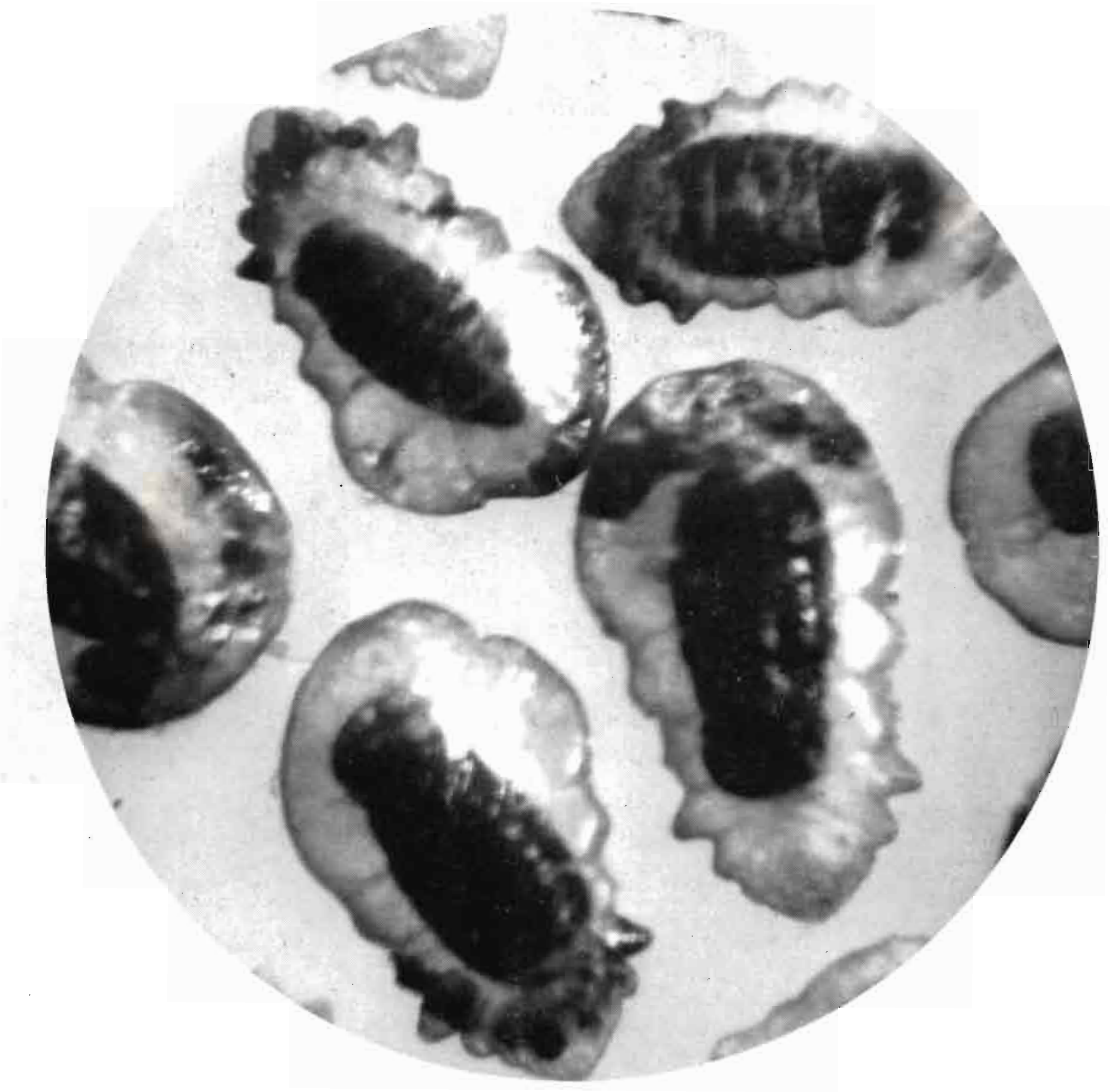


Plate III. Scale insects (*Aulacaspis tegalensis*) destroyed by the parasite *Physcus seminotus*. The parasite pupae are visible within the empty bodies of the scale insects. The actual length of the latter is about 2 mm.

Thus, during the closing months of the year, 3 introduced Aphelinid parasites were being cultured — *Metaphycus* sp. from Tanzania, *Aphytis* sp. and *Physcus nigriclavus* from Queensland — with the intention of widely distributing all 3 species in scale-infested fields during the early months of 1973.

Population dynamics of the spotted borer (*Chilo sacchariphagus*)

Monthly sampling in a field of virgin S 17 at Labourdonnais was carried out to obtain data on seasonal trends of *Chilo* populations and their relation to damage incidence and vegetative growth. This was essentially a pilot experiment to determine the difficulties involved and the suitability of the methods adopted for sampling on an extensive basis to include different climates and cultivation practices.

The white borer (*Argyroploce schistaceana*)

Loss of young shoots by this insect is considerable in some fields of virgin cane and appears to be strongly influenced by date of planting. The insect also contributes to loss caused by *Chilo* in young ratoon growth, which is greatest in high-rainfall areas.

Assessment of shoot loss by white borer in virgin cane at Britannia S.E. was begun and will be continued in 1973.

Enquiries were initiated to determine the feasibility of parasite introductions against the white borer.

WEEDS

Logarithmic trial with new herbicides

Two herbicides, Bladex [2-(4-chloro-6-ethylamino-s-triazin-2-ylamino)-2-methyl-proprionitrile] and Sencor [4-amino-6-tertiary-butyl-3-(methylthio)-1,2,4-triazin-5-on] were compared to Diuron [N-(3,4-Dichlorophenyl) NN′ dimethyl urea] in the super humid zone at Belle Rive S.E.S. using the Chesterford logarithmic spraying machine. Dosage rates ranged from 5.38 — 1.34 kg a.i. per hectare. Fourteen weeks after spraying Sencor compared fairly well with Diuron while Bladex was much less effective (Table 15). The chemicals had no ill-effect on germination and growth of cane variety M 93/48.

Table 15. Weed assessment data 111 days after spraying

(Frequency Abundance method, expressed as % of control)

Herbicides	*Dosage rate (kg. a.i./ha)*				
	5.38—4.09	*4.09—3.06*	*3.06—2.31*	*2.31—1.77*	*1.77—1.34*
Diuron	12.3	13.1	15.4	17.7	24.6
Sencor	17.1	18.5	24.9	31.4	42.1
Bladex	36.6	38.8	43.5	53.1	63.1

Pre-emergence trials with new herbicides — small plot technique

Five trials were laid down in the humid zone and four in the super humid zone at high and low altitudes. Experimental plots were sprayed in March, April and May and surveyed fourteen weeks after spraying. Owing to abundant rainfall, weed infestation was severe. HOE 2991, Sencor and Venzar at 4.30 kg a.i./ha gave better control than the standard treatments Diuron and Atrazine at same dosage rate. Sencor and Venzar at 3.23 kg a.i./ha were superior to Atrazine but inferior to Diuron. The other treatments, namely VCS 438 at 4.30 kg a.i./ha, Bladex at 3.23 and 4.30 kg a.i./ha, Lasso-D at 4.30 kg a.i./ha and Sencor at 2.15 kg a.i./ha gave poor results (Tables 16 and 17).

However, as Sencor and Venzar are at present very expensive chemicals, it is unlikely that they will be used in Mauritius. Varietal susceptibility and large scale trials will be laid down with HOE 2991 in 1973 to assess its potentialities.

Table 16. Pre-emergence trials in plant canes Humid zone

(Frequency Abundance % control)

Herbicides	*Dosage (kg. a.i./ha)*	*Gros Bois*	*Union St. Aubin*	*Bagatelle*	*Unite*
Hoe 2991	4.30	31.1	51.7	42.9	51.3
Venzar	3.23	39.6	41.7	56.3	56.3
Venzar	4.30	30.7	44.4	51.8	55.5
Sencor	2.15	51.4	55.9	69.3	83.0
Sencor	3.32	47.2	48.0	67.3	69.9
Sencor	4.30	30.3	50.0	53.6	56.8
Bladex	3.23	63.1	83.7	78.4	83.8
Bladex	4.30	59.2	62.8	92.9	72.2
Lasso-D	4.30	54.0	54.9	77.4	78.8
VCS 438	4.30	59.0	51.7	75.1	80.4
Atrazine	4.30	46.8	59.4	53.6	66.2

Table 17. Pre-emergence trials in plant canes Superhumid zone

(Frequency Abudance % control)

Herbicides	*Dosage (kg. a.i./ha)*	*Eau Bleue*	*Bel Etang*	*Etoile*	*Le Val*	*Alma*
Hoe 2991	4.30	39.9	37.7	36.6	35.4	38.7
Venzar	3.23	34.7	46.4	46.2	55.5	57.1
Venzar	4.30	32.6	44.9	36.3	61.6	39.1
Sencor	2.15	39.9	48.0	59.5	57.0	57.3
Sencor	3.23	38.4	52.4	55.9	46.0	54.2
Sencor	4.30	36.7	42.8	41.6	49.5	43.7
Bladex	3.23	58.4	70.7	81.1	73.8	82.2
Bladex	4.30	54.3	71.7	62.4	59.0	63.8
Lasso-D	4.30	—	57.8	69.9	64.4	61.7
VCS 438	4.30	57.0	53.9	50.2	50.0	68.8
Diuron	4.30	35.7	43.3	42.7	55.6	49.8

Plate IV. *Top*, *Colocasia antiquorum* (Songe). Untreated, left; 7 weeks after spraying with MON 2139 at 2.15. kg a.e./ha (2 lb a.e./arp), right
Bottom, *Paspalidium geminatum* (Herbe Sifflette). Untreated, left; 4 weeks after spraying with MON 2139 at 4.3 kg a.e./ha (4 lb a.e./arp), right.

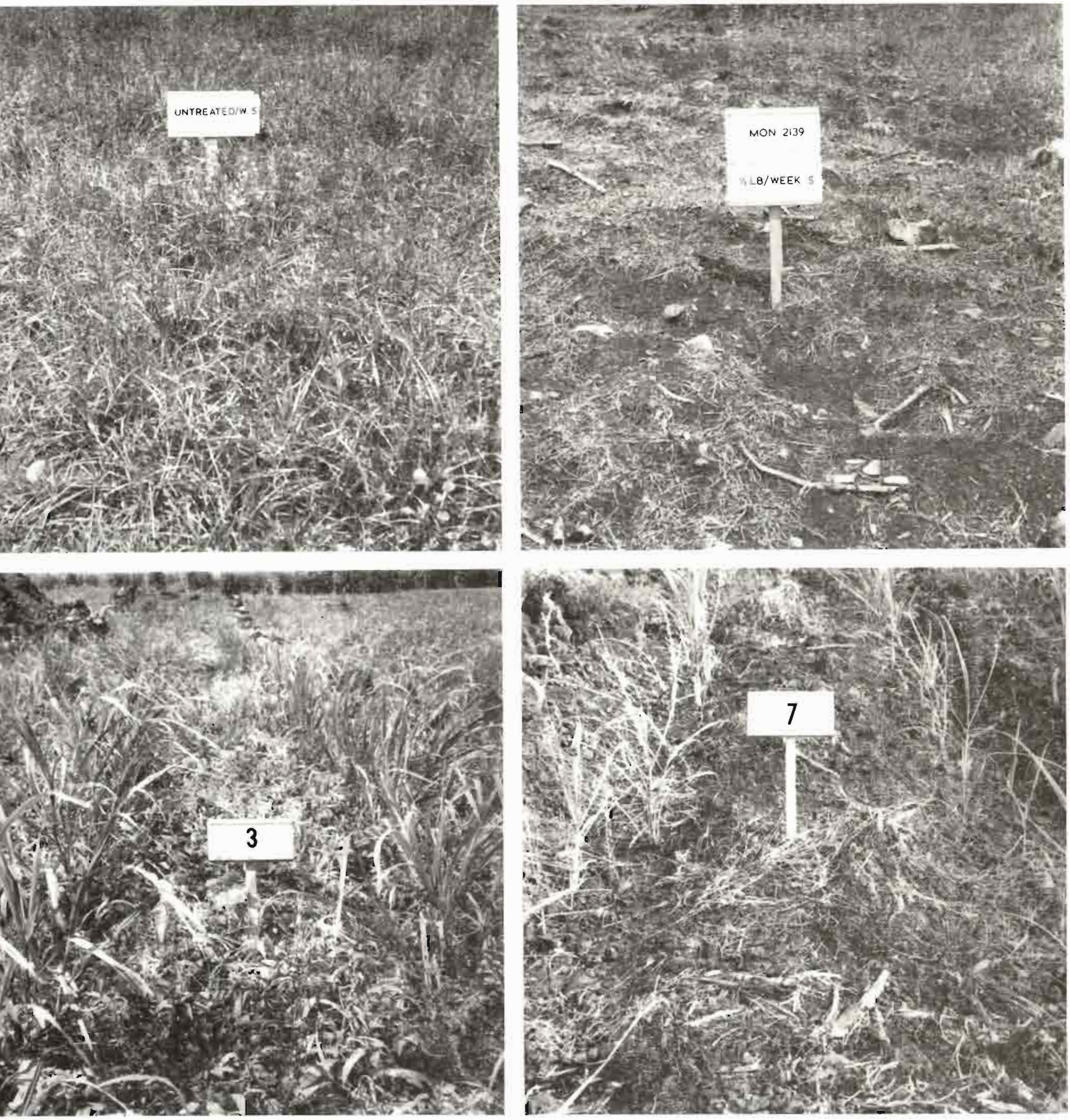


Plate V. *Top, Cyperus rotundus* (Herbe à oignons). Untreated, left; 5 weeks after spraying with MON 2139 at 0.54 kg a.e./ha (0.5 lb a.e./arp), right.
Bottom, Setaria barbata (herbe bambou). Untreated, left; 15 days after spraying with MON 2139 at 2.15 kg a.e./ha (2 lb a.e./arp), right.

Post-emergence trials in plant canes

The post-emergent chemicals BAS 3510 and Amchem 7169, and mixtures of Sencor and BAS 3510 with 2,4-D, were compared to Actril-D. In four out of six trials, in both the superhumid and humid zones, when results were assessed 8 weeks after spraying, Sencor at 1.08 kg a.i./ha + 2,4-D at 2.15 kg a.e./ha proved better than Actril-D at 1.61 kg a.e./ha. BAS 3510 at 3.23 and 4.30 kg a.i./ha, BAS 3510 at 2.15 kg a.i./ha + 2,4-D at 2.15 kg a.e./ha and Amchem 7169 at 1.61 kg a.e./ha gave inferior results.

Eight weeks after spraying, Diuron at 2.15 kg a.i./ha in combination with the mixture Sencor + 2,4-D gave the best weed control in two of the three trials laid down in the super humid zone. In the humid zone where Atrazine at 2.15 kg a.i./ha was added to each treatment, results obtained were less uniform. At Helvetia (Mon Désert Alma S.E.) the mixture BAS 3510 + 2,4-D and at Olivia (Beau Champ S.E.) the mixture Sencor + 2,4-D gave better control than the standard Atrazine + Actril-D treatment. On the whole, however, the last-named mixture proved to be the best. It should be pointed out that the treatment Sencor + 2,4-D gave slight burn of leaves of cane varieties M 124/59, S 17 and M 93/48.

Special weed problems

Exploratory work with MON 2139 [N-(phosphonomethyl) glycine] on *Cyperus rotundus* (3 trials), *Cynodon dactylon* (2 trials), *Colocasia antiquorum* (2 trials) and *Paspalidium geminatum* (2 trials) were carried out on non-crop lands (Plates IV & V). Although these trials were not completed by the end of the year, preliminary results show that this new chemical has outstanding post-emergence properties. Its use between two cane rotations for the eradication of these troublesome perennials may be advocated if results obtained in 1973 confirm those already obtained.

The annual *Setaria barbata* (herbe bambou, herbe bassine), which grows profusely in the humid zone and is tolerant to Atrazine, was satisfactorily controlled by the mixtures Diuton 1.08 kg a.i./ha + Actril-D 1.3 kg a.e./ha and Diuron 1.08 kg a.i./ha + 2,4-D (as amine salt) 2.15 kg a.e./ha in a trial laid down in three months old plant cane of variety M 13/56, at Belle Vue S.E. in July. The other treatments, namely Asulox at 2.15 and 3.23 kg a.i./ha, Asulox at 2.15 kg a.i./ha + Actril-D 1.3 kg a.e./ha, Asulox 3.23 kg a.i./ha + Actril-D 1.3. kg a.e./ha gave poor control. It should be noted that MON 2139 at 2.15 kg a.e./ha, also included in the trial, gave an excellent control of the weed, 100% kill within one week after spraying. Although the chemicals were applied in directed spray with flood jet at low pressure (1.0 kg per cm2) to ensure minimum wetting of cane foliage, all the cane shoots in experimental plots treated with MON 2139 were killed. No ill effect was observed on the crop with the other treatments.

SUGAR MANUFACTURE & SUGAR BY-PRODUCTS

The performance of the Saturne diffuser, St. Antoine factory

In 1972, nearly all the canes processed at St. Antoine factory went through the milling diffusion plant. The remainder were crushed by the milling tandem that existed prior to the commissioning of the Saturne diffuser about two thirds of the way through the 1971 sugar crop.

The cane preparation department was equipped with an additional unit consisting of a set of 268 thin-bladed knives having a high tip velocity. However, this set of knives, which is located at the top of the first mill's feeding chute, was not in continuous use because it interfered with the feed control system of the 1st mill. It was only about one month before the end of the crop that the problem was solved satisfactorily.

Following observations made during the 1971 crop, it was intended to evaluate the performance of the milling-diffusion plant from long test-runs over which weight of cane, diffusion juice, mixed juice and bagasse, respectively, were to have been determined by direct weighing. However, late commissioning of weighing equipment for bagasse and diffusion juice did not permit this.

Extraction performance was therefore assessed as in 1971, from pol % fibre balance around the system. The tests were carried throughout the whole season at various operating temperatures and bagasse residence times. No significant difference between performances under the various operating conditions could be shown. The average results obtained from these tests are given in Table 18, where average mill extraction and reduced mill extraction for the whole island and for the whole crop are included for comparison.

Table 18. Extraction performance

Pol extractions from pol % fibre balance				*Sucrose extractions as per factory chemical control (Crop averages)*			
ST. ANTOINE				*ST. ANTOINE*		*ISLAND*	
1st Mill	*Diffuser +dewatering mills*	*Overall mill*	*Reduced to 12.5% fibre*	*Overall mill*	*Reduced to 12.5% fibre*	*Overall mill*	*Reduced to 12.5% fibre*
55.8	37.5	93.3	95.0	93.9	95.7	95.8	95.9
SD 7.2	SD 7.4	SD 1.3	SD 1.1	—	—	—	—

In addition to assessing diffuser performance by the above method, investigations involving the concept of "difficult brix" (Ferguson *et al.*, 1972) were carried out. The analytical techniques were modified to suit available facilities : sample weights were 250 gm and iodide concentrations were determined volumetrically using an adsorption indicator (Rose Bengal). For the sake of comparison, the same technique was utilized on bagasse from two conventional milling tandems, both of which achieve a R.M.E. higher than the island's average. Fig. 11 shows the ranges into which fit the results worked out from this investigation. It must be emphasized, however, that since mill discharge bagasse and diffuser discharge bagasse differ very much in physical properties, no hasty conclusion must be drawn from this study.

Table 19. Relationship between particle size and pol content of bagasse

	Retained on 25.4 mm		*Retained pn 9.5 mm*		*Retained on 4.8 mm*		*Through 4.8 mm*		*Unsieved*	
	1st Mill bagasse	*Final bagasse*	*1st Mill bagasse*	*Final bagasse*	*1st Mill bagasse*	*Final bagasse*	*1st Mill bagasse*	*Final bagasse*	*1 st Mill bagasse*	*Final bagasse*
% by Wt	10.9	3.7	39.2	27.0	10.1	13.3	39.8	56.0	—	—
SD	3.8	0.9	3.1	4.3	1.5	1.3	2.5	5.7	—	—
Pol %	8.5	4.0	8.1	3.1	8.5	2.4	8.0	1.2	7.8	2.1
SD	0.9	0.3	0.8	0.8	0.8	0.8	0.8	0.5	0.7	0.3

Efforts were again directed towards assessing the influence of particle size on the performance of the diffuser proper, but the investigation had to be abandoned because of difficulties in sieving wet bagasse. The investigation was therefore confined to first mill and final bagasse only. The average results (Table 19) showed that the pol % of the various fractions separated by dry sieving was nearly the same for first mill bagasse. However, for final bagasse, the finer fractions contained less pol.

Finally, a study was started to investigate the clarifying and filtering actions taking place in the diffuser.

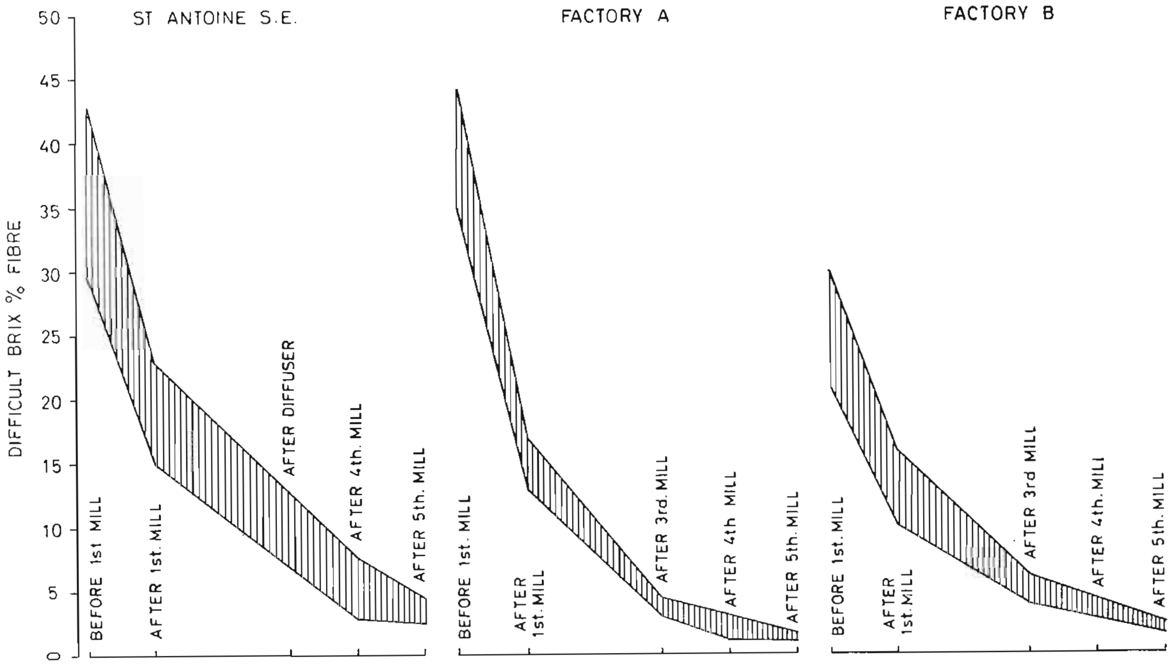


Fig. 11. Evaluation of difficult brix % fibre along tandems of three extraction plants.

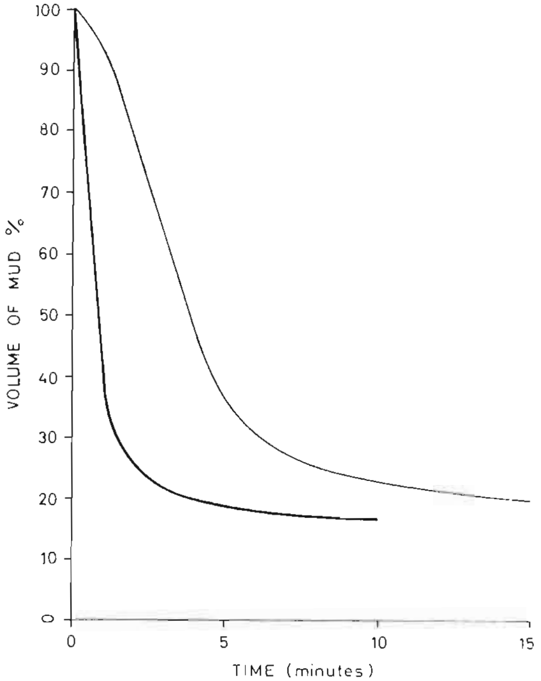


Fig. 12. Typical settling curves (thin line, without polyelectrolyte; bold line, with polyelectrolyte).

Settling characteristics of local cane juices

Several factories have shown interest in the high capacity subsider developed by the Sugar Research Institute, Mackay. In this connection, settling tests were carried out in four factories following a request made by the local agents of Fletcher & Stewart Ltd., who have acquired licensing rights in respect of the S.R.I. subsider. A test kit designed by S.R.I. was used to determine settling rate of limed juice with and without addition of polyelectrolyte settling aids. Typical settling curves are shown in Fig. 12.

This study has indicated that settling curves may be used with advantage a) to choose the best flocculant under particular conditions in respect of juice quality and b) to determine the most economical level at which the flocculant should be used, consistent with satisfactory clarification.

The cause of low B.H.E. at certain factories

At certain times during the crushing season, the boiling house efficiency of certain factories shows a sharp decrease. This may arise from inflated assessment of the sucrose entering the boiling house, sucrose losses during processing, inadequacy of the SJM formula or interactions between any of these factors. The deterioration has been observed to occur more frequently when a large proportion of burnt or young plant canes are milled and also when high temperatures obtain in the vacuum pans. These circumstances suggest that dextran, which is often associated with burnt canes, and sucrose destruction due to high 'boiling' temperatures, could account for a deterioration of B.H.E. The investigation was therefore confined to these two aspects.

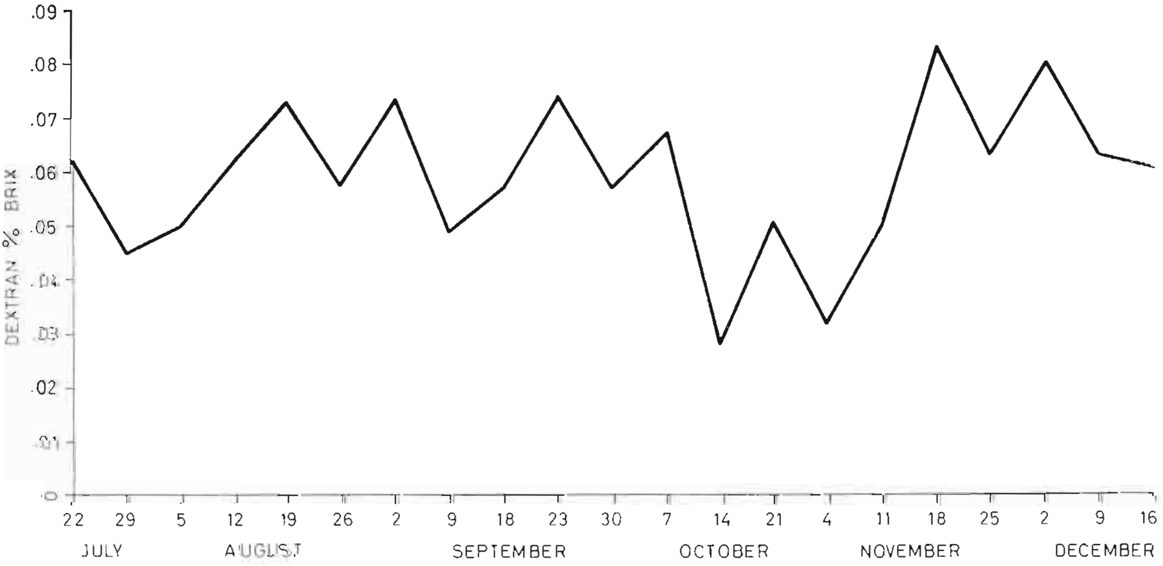


Fig. 13. Dextran content of mixed juice, 1972.

The study included (a) daily determinations of dextran content of mixed juice in a factory throughout the crop (b) ascertaining the effect of addition of dextran on pol and sucrose in mixed juice and (c) determining the effect of temperature and time on sucrose losses in A and B molasses. Results were as follows :

(a) Variations in the dextran content of mixed juice are shown in Fig 13. it will be noted that this was under 0.1% on Brix. Corresponding figures obtained from spot tests carried out in other factories were of the same order.

(b) The effect of addition of dextran on pol and sucrose in mixed juice is shown in Tables 20 and 21, respectively, where it is seen that dextran affects the direct pol of the juice, but has no effect on sucrose. Since the chemical control of the factory is based on the latter, the sucrose balance will not be affected by variations in the dextran content of the juice. At concentrations normally obtaining in mixed juice, dextran cannot therefore be the cause of fall in BHE of the factory.

Table 20. Effect of addition of dextran (0.5% and 1.0% Brix) on pol

Sample	*Pol % g (control)* (*a*)	*Pol % g in juice containing 0.5% dextran* (*b*)	*Difference* (*b-a*)	*Pol % g in juice containing 1.0% dextran* (*c*)	*Difference* (*c-a*)
1	9.60	9.76	+ 0.16	9.93	+ 0.33
2	9.64	9.77	+ 0.13	9.96	+ 0.32
3	10.79	10.97	+ 0.18	11.19	+ 0.40
4	9.81	9.97	+ 0.16	10.15	+ 0.34
5	11.37	11.56	+ 0.19	11.78	+ 0.41
Average			+ 0.16		+ 0.36

Table 21. Effect of addition of dextran (0.5% and 1.0% Brix) on sucrose

Sample	*Sucrose % (Control)* (*a*)	*Sucrose % in juice containing 0.5% dextran* (*b*)	*Difference* (*b-a*)	*Sucrose % in juice containing 1.0% dextran* (*c*)	*Difference* (*c-a*)
1	10.92	10.95	+ 0.03	10.91	—0.01
2	9.82	9.81	—0.01	9.79	—0.03
3	10.92	10.91	—0.01	10.96	+ 0.04
4	9.95	9.96	+ 0.01	9.93	—0.02
5	11.53	11.52	—0.01	11.60	+ 0.07
Average					+ 0.01

(c) A survey made during 1971 showed that massecuite temperatures of around 80°C are sometimes registered in vacuum pans. In order to investigate the effect of such high-temperature boiling on sucrose losses, samples of A and B molasses were kept at two temperatures, 70°C and 80°C, for varying lengths of time. At 70°C there was no significant change in sucrose or reducing sugars for times up to 10 hours. At 80°C there was an increase in the reducing sugars in the molasses, but a decrease in B molasses. The resultant sucrose losses at 80°C (Table 22) indicate that, as would be expected, more sucrose is lost at lower pH values.

Table 22. Average loss of sucrose % in *A* & *B* molasses at 80°C

Molasses	*pH*	*Loss of sucrose % after* 4 *hours*	6 *hours*	10 *hours*
A	> 6.0	0.0	0.2	1.2
	< 6.0	0.4	1.3	2.4
B	> 6.0	0.1	0.2	0.9
	< 6.0	0.9	1.8	5.3

This study indicated that if high temperatures prevail in vacuum pans, losses in sucrose are to be expected and they could cause a fall in the BHE of the factory. It is planned to broaden the scope of this study in future work and attempt to assess sucrose losses in the boiling house on a quantitative basis and under industrial conditions.

Exhaustibility of final molasses

Boiling-down tests were resumed towards the end of the year after replacement of the previous Vane type vacuum pump by a liquid ring pump of ample capacity.

It would appear that 'boiling' temperatures lower than 50°C can now be maintained throughout the boiling process. Efforts are continuing towards developing a reproducible technique.

Determination of the water content of final molasses by the Karl Fischer Method

Investigations, using the Karl Fischer method, to develop a reproducible technique for determining moisture in molasses were successfully concluded. For dispersing the molasses before titration with the reagent, methanol was preferred to formamide because it gave more consistent results. The reliability of the method was evaluated by repeating the whole procedure ten times on the same molasses sample and analysing the results statistically. A standard deviation of ± 0.1438 and fiducial limits of ± 0.032 at 95% confidence level were found. Figures of the same order have been obtained in other countries where cane molasses have been analysed by the K.F. method. The method was tested by analyzing 4 samples of South African molasses of known water content and results are shown in Table 23. Considering the number of variables, such as viscosity, end-point setting, weight of molasses used in the determination, etc., the figures denote satisfactory agreement and hence confidence in the reproducibility of the method developed.

Table 23. Moisture in molasses by the Karl Fischer Method

Sample	*South Africa*	*Mauritius*
1	20.38	20.71
2	19.02	19.53
3	19.42	19.49
4	20.84	20.86

Determination of Reducing Sugars in molasses using the constant volume modification of the Lane & Eynon method

In his report to the 15th Session of ICUMSA 1970, the referee for Subject 14 recommended the use of the Lane & Eynon method in its Constant Volume modification for the determination of reducing sugars. During discussions at the Session, it emerged that certain countries had not studied

Plate VI. The Karl Fischer Titrator

Plate VII. The M.S.I.R.I. cane analysis laboratory the modification while others had not obtained satisfactory results with it. In the usual Lane & Eynon method, tables have to be used because the concentration at which reduction takes place is variable. There is thus no proportionality between the titre and the strength of the titrant solution. The Constant Volume modification has the advantage of dispensing with tables. The final volume in the flask is kept at 75 ml by addition of the requisite amount of water to the Fehling solution, which is standardized under identical conditions against standard invert solution. During the inter-crop period both methods were used to determine reducing sugars in a sample of final molasses and the results were compared. Recovery tests were also carried out. The average figures obtained are shown in Tables 24 and 25. It would appear that the Lane and Eynon method is slightly more precise with the 2% dilution and the Constant Volume modification with the 1% dilution.

Table 24. Reducing sugars % final molasses

	Lane & Eynon method		*Constant volume modification*	
Solution used	2% w/v	1% w/v	2% w/v	1% w/v
Reducing sugar % (average)	12.35	12.42	12.44	12.57
Standard deviation	0.013	0.033	0.020	0.015

Table 25. Recovery of reducing sugars from final molasses

	% Recovery	
Solution used	*Lane & Eynon method*	*Constant volume modification*
2 % w/v	99.8	99.4
1 % w/v	98.9	100.5

Determination of sucrose in final molasses

It was mentioned in the 1971 Annual Report that the chemical method using acid inversion has certain advantages; the double polarization method usually employed for determining sucrose in final molasses gives, in general, higher results. Further work was carried out on the subject during the year. Four samples of South African molasses previously analysed for sucrose at the S.M.R.I. (Durban) using the Isotopic Dilution technique, which is generally accepted as giving the true value for sucrose, were analysed by (a) the Double Polarization method, (b) the chemical method, and (c) the Sugar Research Institute (Mackay) procedure.

As compared with the Isotopic Dilution results, those obtained by the chemical method were lower, whilst those given by the Double Polarization technique were higher. The S.R.I. procedure gave even higher results. However, because of the small number of samples examined and of possible differences in the composition of local and South African molasses, it is felt that further investigation is required.

Determination of Sulphated Ash in final molasses

The handbook of Official Methods of Chemical Control for use in local sugar factories recommends, as the final step, igniting the residue at 800°C to constant weight while the time recommended in the System of Cane Sugar Factory Control of the ISSCT for the final ignition is 15 minutes. As there is some uncertainty among factory chemists about the duration of this final ignition, the S.T. Division carried out a number of ash determinations involving heating sulphated ash at 800°C for different lengths of time. Twenty four molasses samples were examined and it was found that no further loss in weight occurred after 3/4 hour. Heating at 800°C for 3/4 of an hour will henceforth be recommended.

Comparison of Temperature Corrections for Pol of Sugars

ICUMSA states that polarizations not determined at a temperature of 20.0 ± 0.2°C shall be corrected to 20°C and that for quartz wedge saccharimeters the correction shall be made by adding to the observed polarization the quantity (t-20) (0.00032S-0.004R) where t (°C) is the temperature of the solution as read in the saccharimeter, S is the approximate % sucrose in the sample and R is the approximate % reducing sugar (as invert sugar) in the sample. In Mauritius the pol corrected to 20°C (P_{20}) is taken as $P_t + 0.03$ (t-20), P_t being the pol at t°C (as above).

During the intercrop period, and in cooperation with the Mauritius Sugar Syndicate chemist, who kindly supplied the figures for average Pol & Reducing Sugars for each factory in respect of the 1971 crop, corrected polarizations using both temperature correction formulae were calculated. The differences never exceed ± 0.01. Hence a change in the method of calculating the correction factor is not warranted.

The effects of steam on bagasse

Interest has recently been aroused in the changes occurring when bagasse is subjected to the action of steam under pressure. The major interest lies in the increased digestibility of the treated bagasse when fed to cattle.

Efforts were directed towards finding the optimum pressure-temperature-time combination.

Furfural is also produced during the steaming process and investigations into the economics of the recovery of this chemical will have to be considered..

Miscellaneous

Expected and actual true purities of final molasses, as determined by factory chemists, were published monthly.

The number of cane samples analysed for the various divisions of the Institute and for estate agronomists increased from 8,530 in 1971 to 11,739 in 1972.

POTATO

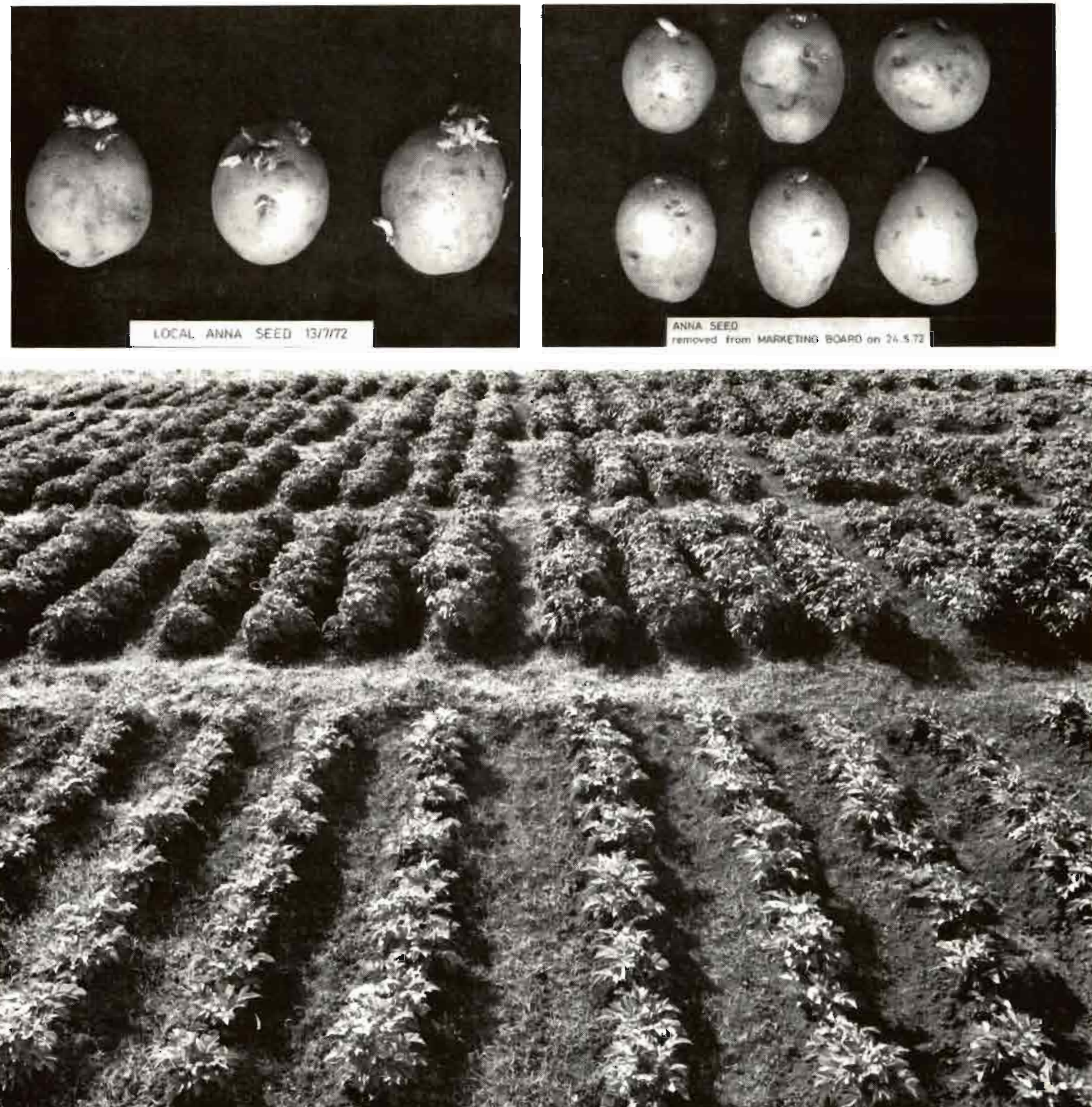


Plate VIII. *Top*, Local seed potatoes after 8 months (right) and 9 1/2 months (left) storage at 3-4°C.
Bottom, Potassium response in potatoes growing at Belle Rive Experiment Station (deficient plants in foreground).

POTATO

Varieties received in 1972

The following varieties were introduced during the year :

(a) From : *La Station de la Pomme de terre*, Libramont, Belgium :
Roxane.

(b) From : *La Fédération Nationale des Producteurs de Plants de Pomme de terre*, Paris, France :
Apollo, Bintje, Kevano, Kennebec, Krasava.

(c) From : *Instituut voor Rassenonderzœk van Landbourogewassen*, Wageningen, Holland :
Amigo, Marijke.

(d) From : The Western Australia Potato Marketing Board, Perth, Australia :
Kennebec, Norland, Sebago.

(e) From : The Seed Potato Marketing Board, Belfast, Northern Ireland:
Record.

The cooperation of the above-mentioned institutions in generously supplying certified seed is gratefully acknowledged. The varieties, except those received from Western Australia, which were received late in the season, were tested in the super-humid, humid and sub-humid zones together with other varieties received during the past two years. Owing to exceptionally unfavourable weather during the 1972 season (both temperature and rainfall being higher than normal), no definite conclusion could be drawn from the results of these plantings. However, in the super-humid zone, varieties *Apollo, Pentland Dell, Désirée, Donata, Greta, Mariline, Maris Peer, Record, Regale and Resy* outyielded the control, *Up-to-Date*, because of their tolerance to late blight and soft rot. In the humid zone, the newly-introduced varieties *Amigo, Apollo, Kenavo, Krasava, Marijke* and *Record* also outyielded *Up-to-Date* and were more resistant to late blight. These varieties will again be tested in 1973. Other varieties that outyielded *Up-to-Date* in the humid zone were *Désirée, Donata, Furore, Mariline, Nervia, Radosa, Regale, Resy* and *Spartaan*. All the French varieties, including those received in 1971, were tested in the sub-humid (irrigated) zone, where *Apollo* and *Regale* appeared to be better yielders than *Up-to-Date*.

It appeared from the 1972 plantings that :

(a) *Désirée* and *Mariline* were superior to *Up-to-Date* in the superhumid and humid zones. This is accord with previous assessments.

(b) Of the varieties received in 1971, *Donata, Regale* and *Resy* outyielded the others.

(c) Of the varieties received in 1972, *Apollo* and *Record* outyielded the others in all the zones where they were grown.

The variety *Mariline*

Seed (grade : *Elite*) of this variety, which was found in 1971 to be highly tolerant to bacterial wilt (*Pseudomonas solanacearum*), was imported from Belgium for the specific purpose of producing seed locally and for assessing the behaviour of the variety in semi-commercial plantings. In May, 0.32 ha was planted at Réduit Experimental Station and Plants showing symptoms of major diseases were systematically rogued. A yield of about 6.5 tonnes was obtained and all tubers, after grading, were forwarded to the Agricultural Marketing Board for storage at 0-2°C. These tubers will be planted for seed production in 1973.

Fertilizers

Field experiments have shown that response to nitrogen is linear and positive and that the economic level is between 175 and 200 kg N/ha.

There is an increase in yield with the application of phosphorous fertilizers when the soil phosphorus is low (Truog P 30 ppm). A dressing of 170 kg P_2O_5 per hectare would suffice.

Response to potassium also is evident when available K is below 0.15 m.e. % of the soil (Plate VIII). The optimum dressing would then be around 250 kg K_2O/ha.

Use of cut seed

Cut and uncut local seed, with and without fungicide treatment, were compared. Results obtained so far have shown that seed in good condition may be cut and planted at the recommended cool season planting dates without risk of decay.

Pests and diseases

Late blight (*Phytophthora infestans*)

Owing to very wet weather, late blight was severe in the 1972 season. At Henrietta and Highlands, the disease reached epiphytotic proportions and serious attacks occurred even in the Black River District where the disease is normally of little importance.

The resistance of 14 varieties, 8 newly imported, to late blight was assessed in two localities, Réduit and Union Park. *Apollo*, *Amigo* and *Spartan* were rated as highly resistant, *Marijke*, *Kenavo* and *Mariline* as resistant to moderately resistant, *Krassava*, *Record*, *Kennebec*, *Alpha* and *Désirée* as moderately susceptible to susceptible, and *Roxane*, *Bintje* and *Up-to-Date* as highly susceptible. The blight progress curves for a few varieties are shown in Figs 14 and 15.

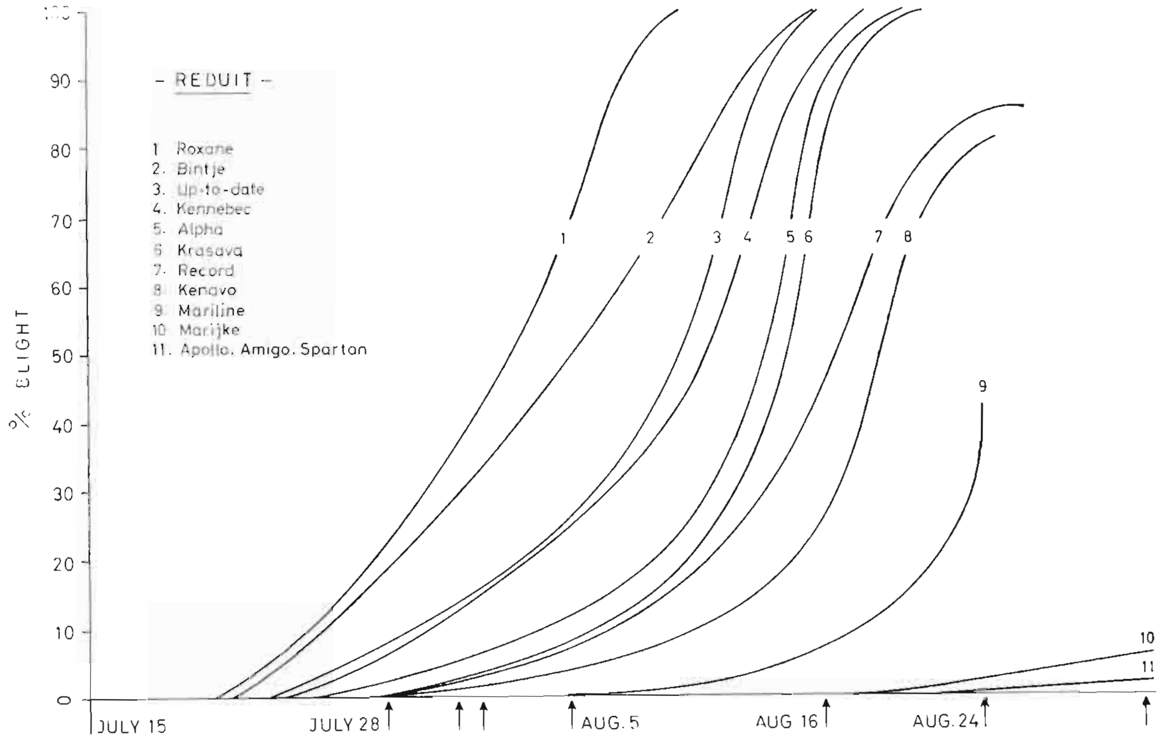


Fig. 14. Blight progress curves in potato varieties at Réduit Experiment Station (humid zone).

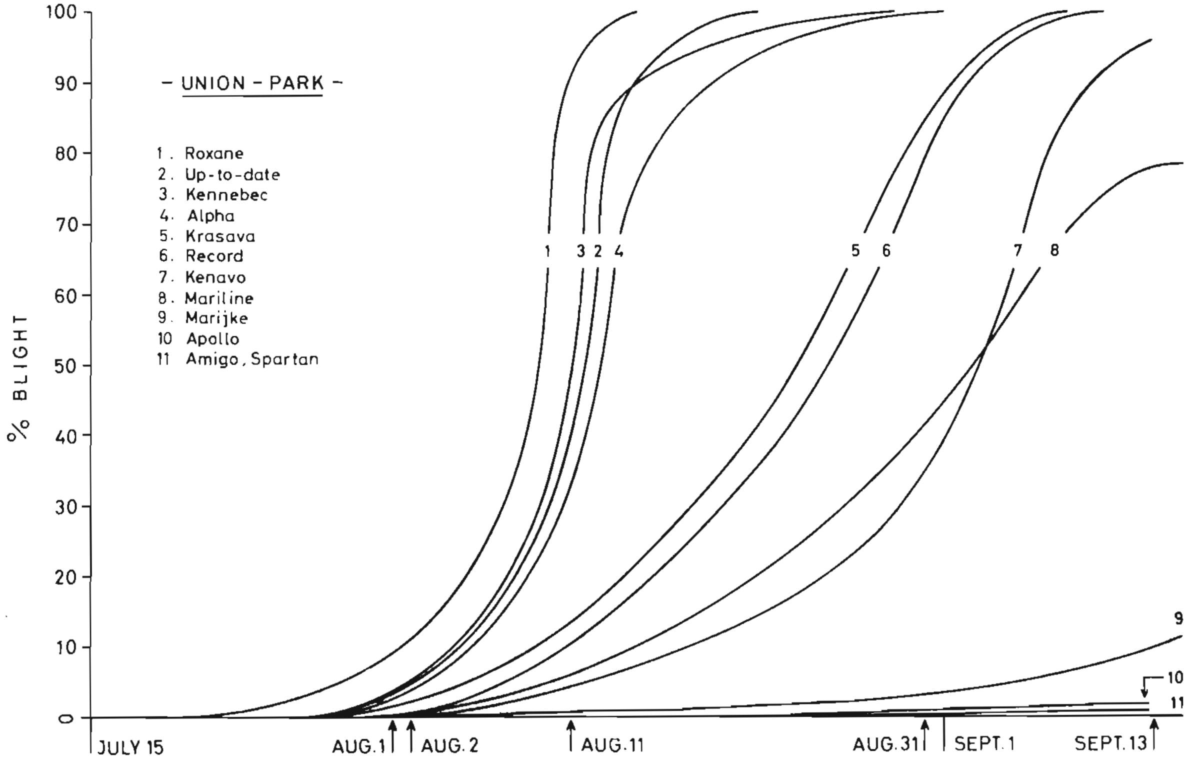


Fig. 15. Blight progress curves in potato varieties at Union Park Experiment Station (superhumid zone).

Two fungicide trials were carried out. In one, at Belle Rive in July, when blight was severe, the efficacy of spraying $2\frac{1}{2}$ kg Dithane M45/ha (2 lb/arp./16,000 ft row) at application rates of 280, 560,1125 and 1400 litres/ha (25,50,100 and 125 gal/arp.), using knapsack power sprayers, was assessed. Adequate control resulted from all treatments but the best result was obtained by spraying twice along the rows at 560 litres/ha (Table 26). The other trial compared dosage rates of $2\frac{1}{2} - 3\frac{3}{4}$ kg/ha (2-3 lb/arp) of the same fungicide applied at different intervals of from 3 to 7 days. However, only moderate infection occurred and no difference between treatments was apparent.

Table 26. Effectiveness of various volumes of sprays for control of potato blight

Treatment (spray volume)	*Method of spraying*	*Mean yield (Tonnes/ha)*
25 gal/arpent	once along the row	15.9
50 ,,	twice along the row	17.1
50 ,,	once along the row	15.2
100 ,,	twice along the row	15.6
150 ,,	twice along the row	14.7
Control		2.6

Bacterial wilt (Pseudomonas solanacearum)

Twenty eight varieties were tested for resistance to bacterial wilt. *Mariline*, *Greta*, *Electre*, *Claustar* and *Kerné* were found to be somewhat tolerant but all the other varieties were susceptible or highly susceptible.

Sixteen clones from Colombia and 16 *S. tuberosum* x wild potato hybrids from Wisconsin, which had been tested for resistance in 1971, were again tested. The resistance of 4 clones from Colombia and 1 from Wisconsin was confirmed. Three other clones from Colombia and 1 from Wisconsin were found to be fairly tolerant.

Certified Seed Production Scheme

In 1971, 30 tons of potatoes from selected, insecticide-treated fields that had been harvested in both cool and warm seasons were placed in storage at 3-4°C for subsequent use as seed (Plate VIII). No special packing was used. In 1972, the seeds were grown in commercial plantations on 11 estates (2-3 tons seed per estate) and yields compared favourably with those obtained from imported A-grade certified seed, showing that seed produced locally can be safely stored for up to 12 months without loss of germination capacity. The average infection of the seed with leaf roll was satisfactorily low, as shown below, and other virus diseases seemed unimportant.

Origin of seed	*% leaf roll*
Beau Champ	0.63
Beau Plan	1.38
Anna	2.91
Britannia	10.51

By comparison, 33% leaf roll infection occurred with seed kept from a plantation that had neither been sprayed with insecticide nor rogued.

Eight randomized block trials were carried out in different climatic areas, with early, medium and late planting dates, to compare more precisely yields from imported seed with those from locally produced seed harvested in both the cool and the warm seasons. The results confirmed that local seed of *Up-to-date* is in no way inferior to imported seed. The former germinated quickly, but produced more shoots than the latter so that more small tubers resulted. Nevertheless, the yields of commercial-grade tubers were comparable.

Plans for increasing production of local seed to 100 tons in 1972 were handicapped because fields planted with supposedly superior-grade seed from Israel showed up to 95% leaf roll, in addition to 1% potato virus Y, and had to be abandoned. However, 55 tons of seed (38 tons of 2nd generation, i.e. once locally grown, and 17 tons of 3rd generation) were obtained from 7 different localities. This seed will be compared with imported seed in 1973.

A full report on the implementation of the local Seed Production Scheme is in preparation.

Potato aphids

As mentioned in the Annual Report for 1971, four species of aphids have been found to breed on potato in Mauritius. These are *Myzus persicae* (Sulz.), *Macrosiphum euphorbiae* (Thos.), *Aulacorthum* sp. prob. *solani* (Kltb.), and *Aphis gossypii* Glov. The first three are incriminated as vectors of the virus causing Leaf Roll of Potato, a disease of particular importance in connection with local production of seed potatoes. Other potato diseases are also transmitted by these aphids.

An experiment was made to obtain data on the abundance of the four species on potatoes grown at different periods of the year in two climatically different localities and in the absence of insecticidal treatments. One arpent, half *King George* and half *Up-to-Date,* was planted in pure stand at Belle Rive and at Pamplemousses in April, July and October. Sampling to assess the populations of immature and adult aphids of each species was carried out fortnightly. It should be noted that the 3rd (summer) planting grew badly, as was to be expected, and excessive stem elongation followed by strong wind caused severe lodging that compromised sampling procedures.

A. solani was scarce in all plantings at all times and in the present context appears to be an unimportant species. *M. persicae*, the notorious vector of potato diseases, infested in the 1st (April) planting about 20% of the plants at Belle Rive and 50-100% at Pamplemousses; in the 2nd (July) planting it infested 75-100% of plants in both localities but was virtually absent in the 3rd (Oct.) planting. *M. euphorbiae* infested a high percentage of plants in the three plantings but was also most abundant in the 2nd planting (Fig. 16). It was evident that these two important species appeared earlier, spread most quickly, and became most abundant in the July planting. The detailed results of this experiment will be described elsewhere.

Systematic trapping of winged aphids was started using Moericke water traps and cylindrical stricky traps.

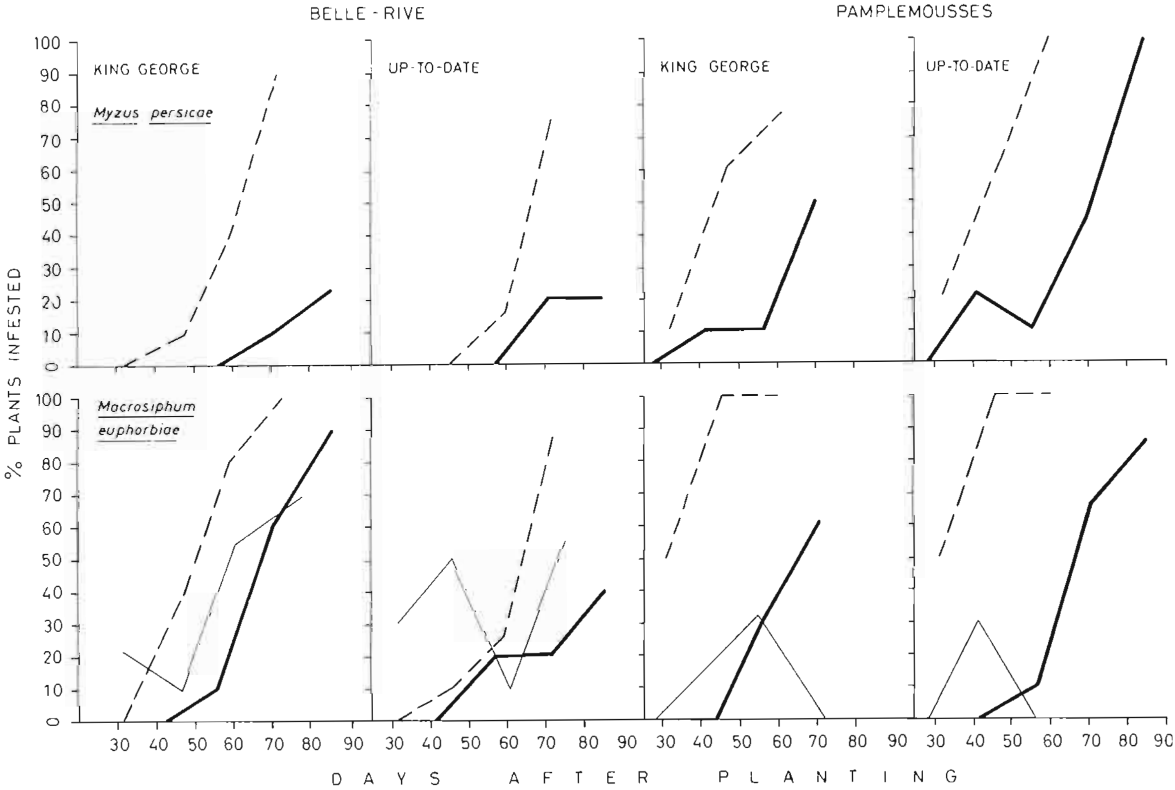
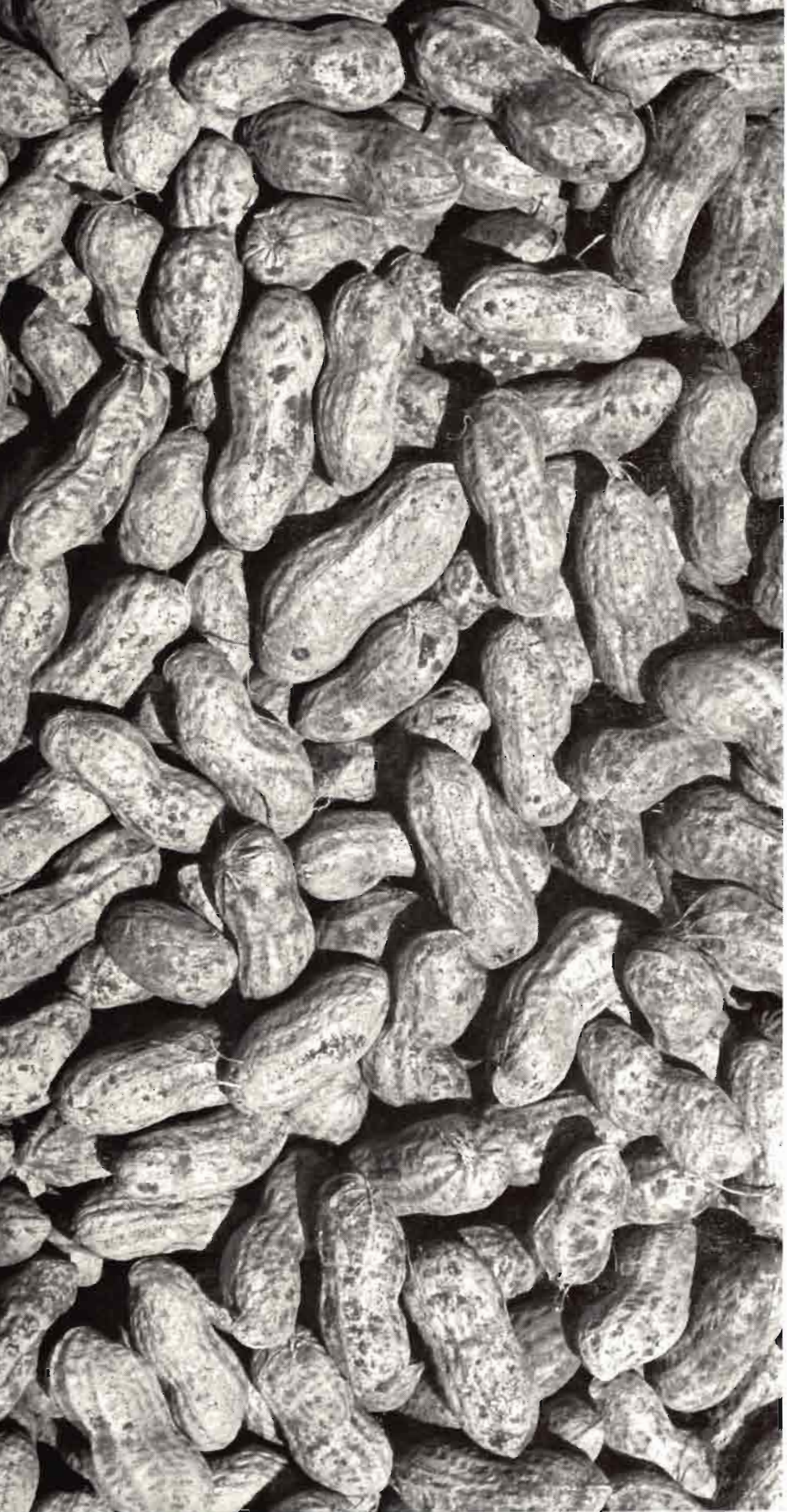


Fig. 16. Percentage of potato plants bearing *Myzus persicae* and *Macrosiphum euphorbiae* in plantings at two contrasting localities in April (bold line), July (broken line) and October (thin line).



GROUNDNUT

Plate IX. Groundnuts (left) defoliated by *Spodoptera littoralis*.

GROUNDNUT

Introduction of new varieties

The following new varieties were introduced during the year :

(*a*) *Schwarz 21, VA 61 R, Ac 15714* (a sister line of *NC17*), *Ac 15753, Ac 15754* and *Ac 15755* were received through the courtesy of Mr. J.C. Wynne of the North Carolina State University, U.S.A. The last three are selections from *Shulamit.*

(*b*) *Nan Kai 76, Tai'nan Selection No. 9, Tai Nung No. 3, Nung Yu 922, Nung Yu 991* and *Nung Yu 1137* were kindly supplied by the Republic of China's Agricultural Mission in Mauritius.

Some of the above-mentioned varieties are being propagated to assess their yielding capacity and the oil content of their seeds. Others were planted in variety trials late during the year.

Effect of date of planting on yield

Trials had been carried out in October-November 1971 in four locations (sub-humid, irrigated; humid; humid, irrigated; and super-humid) to determine the effect of time of planting on yield. There were four planting dates at 15-day intervals and the varieties used were the Virginian *NC2, Virginia Bunch Improved, Shulamit, GH 119/20,* and the local Spanish variety *Cabri.* Data from each location were analysed separately and results are given in Table 27.

Table 27. Effect of date of planting on yield of groundnuts in different environments during the October-November 1971 season

	Average yield across locations at each planting date (tonnes/hectare)				*Average yield across planting dates at each location (tonnes/hectare)*			
	October		*November*		*October*		*November*	
Varieties	*1st fortnight*	*2nd fortnight*	*1st fortnight*	*2nd fortnight*	*Sub-humid irrigated*	*Humid*	*Humid irrigated*	*Super-humid*
NC2	5.12	5.07	4.19	3.37	3.79	5.66	6.14	2.16
Virginia Bunch Improved	5.69	4.86	4.12	3.27	3.67	5.62	6.16	2.49
Shulamit	6.16	5.71	5.76	4.03	4.86	5.74	7.35	3.58
GH 119/20	4.48	4.48	3.41	3.39	3.51	4.88	4.88	2.18
Cabri	3.72	3.41	4.03	3.93	3.44	4.95	4.95	4.10

The effect of planting date was highly significant at the four locations. The earliest planting (first forthnight in October) resulted in the highest yields. The low yield obtained in the super-humid zone was attributed to a dry spell following planting, which resulted in poor initial growth and stunting.

Variety effects were significant at the four locations. Averaged across locations and dates, variety *Shulamit* gave the highest and most consistent yields.

The interaction between varieties and sowing date was significant at all locations, indicating that the magnitude of the differences between dates was affected by the varieties.

The results indicate that planting date is an important factor influencing yields of groundnuts planted during October-November. They also show a difference in response of the Virginia type groundnuts and the local Spanish variety to date of planting. Sowing in the first forthnight of October consistently gave the highest yields for the Virginian varieties while the local variety (Spanish type) gave the highest yields when planted in November.

Fertilizers

Yield responses to fertilizers have been inconsistent and appear to be greatly influenced by the past fertilization of the fields concerned. Trials laid down on estates following a cane rotation gave no positive response with various levels of fertilizers. However, it is important to replace the amount of nutrients removed by the crop.

The amounts of fertilizers recommended are 125 kg Monaphos and 190 kg muriate of potash/ha giving roughly 12.5 kg N, 60 kg P_2O_5, and 114 kg K_2O/ha.

Diseases

Cercospora leaf spot

Trials were laid down at Belle Rive, Réduit and Pamplemousses at approximately monthly intervals to determine, by comparison of fungicide-treated plots with untreated plots, the losses caused by *Cercospora* leaf spot at different periods. Results confirmed preliminary observations that disease incidence reaches its peak at the end of the hot season. Disease incidence and yield losses are shown in Table 28.

Table 28. ***Cercospora*** **infection and resultant yield losses in groundnuts**

	Pamplemousses (sub-humid)		*Reduit (humid)*		*Belle-Rive (super-humid)*	
	% infection at harvest	*Yield loss %*	*% infection at harvest*	*Yield loss %*	*% infection at harvest*	*Yield loss %*
September	53.7	17.8	39.5	13.6	26.0	19.9
October	78.1	30.0	71.5	45.2	36.0	14.5
November	—	—	—	—	69.0	21.3
December	—	—	81.0	33.4	100.0	69.7
January	94.4	22.7	95.0	66.3	100.0	91.0
February	100.0	44.1	94.0	74.1	100.0	100.0
March	84.0	50.4	95.0	71.0	100.0	100.0
April	—	—	88.3	68.6	96.1	96.0
June	69.6	36.1	—	—	—	—

Eleven fungicide trials were conducted in 4 localities. The results of the trials were as follows:

(a) Using Dithane M 45 + Benlate at 1.2 + 0.3 kg/ha (1 + 1/4 lb/arp./25,600 ft row), application rates of 280, 560 and 1125 litres/ha (25, 50 and 100 gal/arp.) with mistblowers, and 2250 litres/ha (200 gal/arp) with knapsack sprayers, were equally effective, there being no significant difference of foliage and pod yields. The highest rate was considered excessive because considerable run-off occurred. The recommended application rate with mistblowers is 50 gal/arp.

(b) The most economical interval between treatments was 15 days.

(c) Between 2 and 7 treatments were necessary for good control depending on whether leaf spotting appeared late or early during crop growth (Fig. 17). Disease control and yields were much less when spraying was started after the appearance of symptoms than before the appearance of symptoms (Table 29).

(d) Benomyl was more effective than Thiabendazole in terms of both disease control and yield. With both fungicides, the highest of the 3 dosage rates used was slightly phytotoxic.

(e) The addition of an oil adjuvant to the recommended Benlate + Dithane M 45 spray did not improve the degree of control under conditions of high rainfall and disease incidence.

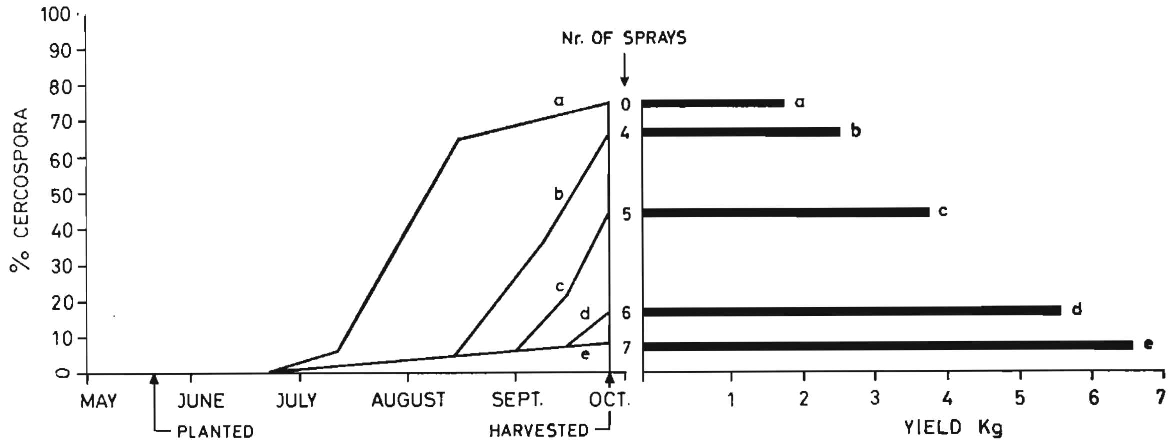


Fig. 17. Efficacy of spraying schedules against *Cercospora* leaf spot in groundnut. a, no spray ; b, 4 sprays to 56 days of harvest ; c, 5 sprays to 42 days of harvest ; d, 6 sprays to 27 days of harvest ; e, 7 sprays to 15 days of harvest.

Table 29. Efficacy of Dithane M/45 + Benlate sprays for control of *Cercospora* on groundnut with varying initial levels of infection

% infection at 1st spraying	*No. of sprayings*	*% infection at harvest*	*Comparative Yield*
0	6	34.4	232
5	5	65.0	192
10	4	82.3	182
50	3	84.1	182
control	0	90.4	100

Mud spot (*Mycosphaerella argentinensis*)

Mud spot has been of increasing importance in wet localities and wherever the crop is irrigated. It is believed that the disease can cause up to 40% loss of yield. Thirteen fungicides that might be suitable for control of the disease were screened on agar plate and mycelial growth was controlled best by Benlate, Natriphene, Difolatan, Thiram, Dithane M 45 and Du Ter. Eleven of the fungicides were tested in the field but Du Ter, Melprex, Phygon and copper oxychloride were phytotoxic and promising results were obtained only with Dithane M 45, Daconyl and Difolatan. Dithane M 45 was the best of these and was effective at the rate of $2\frac{1}{2}$ kg/ha (2 lb/arp.). It is therefore recommended that, under conditions favouring mud spot, the amount of Dithane M 45 in the usual Benlate + Dithane M 45 fungicide mixture be increased to that amount.

Virus diseases

The leaf curl condition occasionally encountered in groundnuts does not appear to be of virus origin because plants showing leaf curl symptoms produced healthy foliage when grafted on to healthy rootstocks.

Symptoms of peanut mottle, first reported in Mauritius in 1970, were found on about 35% of the plants in a field of *Cabri* in the Black River District but on the whole the disease was unimportant.

Weeds

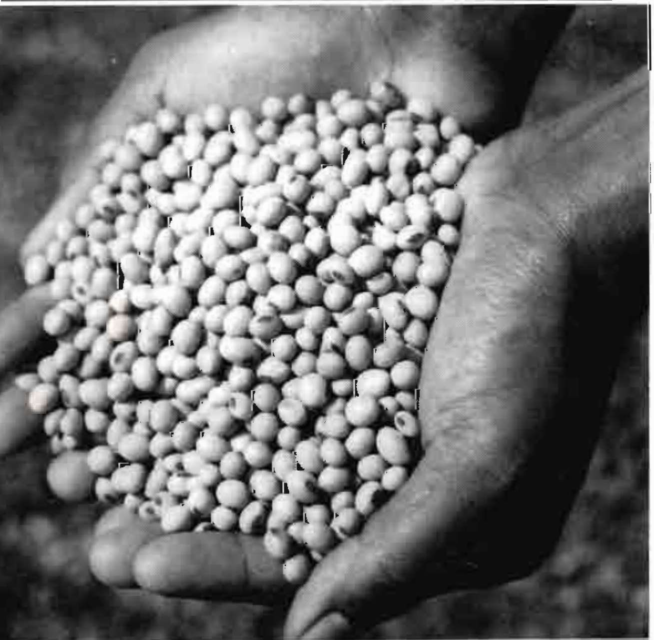
In 1970 screenings of R.P. 17623, Igran, Linuron, Diuron, Atrazine and Etazine were carried out in fields of Virginia-type groundnuts. Apart from Igran, they all proved toxic to the crop at 3.23 kg a.i./ha. A trial in the same season with R.P. 17623, Igran, Linuron and Diuron at 2.15 kg a.i./ha gave increased yields in the treated plots.

In 1971 six trials were laid down with the local Cabri and Virginia Bunch varieties. Diuron, Linuron, Preforan, Lasso, Lasso-D at 2.15 kg. a.i./ha and Sencor at 1.61 kg a.i. /ha were sprayed in pre-emergence of the crop. Data from four trials indicated yield increases in treated as opposed to hand-weeded plots. Diuron, Linuron and Preforon checked weed growth better than Lasso and Lasso-D. Sencor though giving good weed control proved toxic to the crop. Igran was not available for inclusion in these trials and R.P. 17623 was omitted because its price precludes its use in groundnut.

Five trials were carried out in October-November 1972 to study the economics of herbicide use by comparing manual weeding alone to herbicide application plus manual weeding as might be necessary. The experimental layout used in sugar cane was adopted (M.S.I.R.I. Ann. Rep. 1970, 1971). Three chemicals, Diuron, Linuron and Preforan at 2.15 kg a.i./ha were sprayed in pre-emergence of the crop and weeds. These trials will be harvested in March 1973

MAIZE

GINGER



SOYA

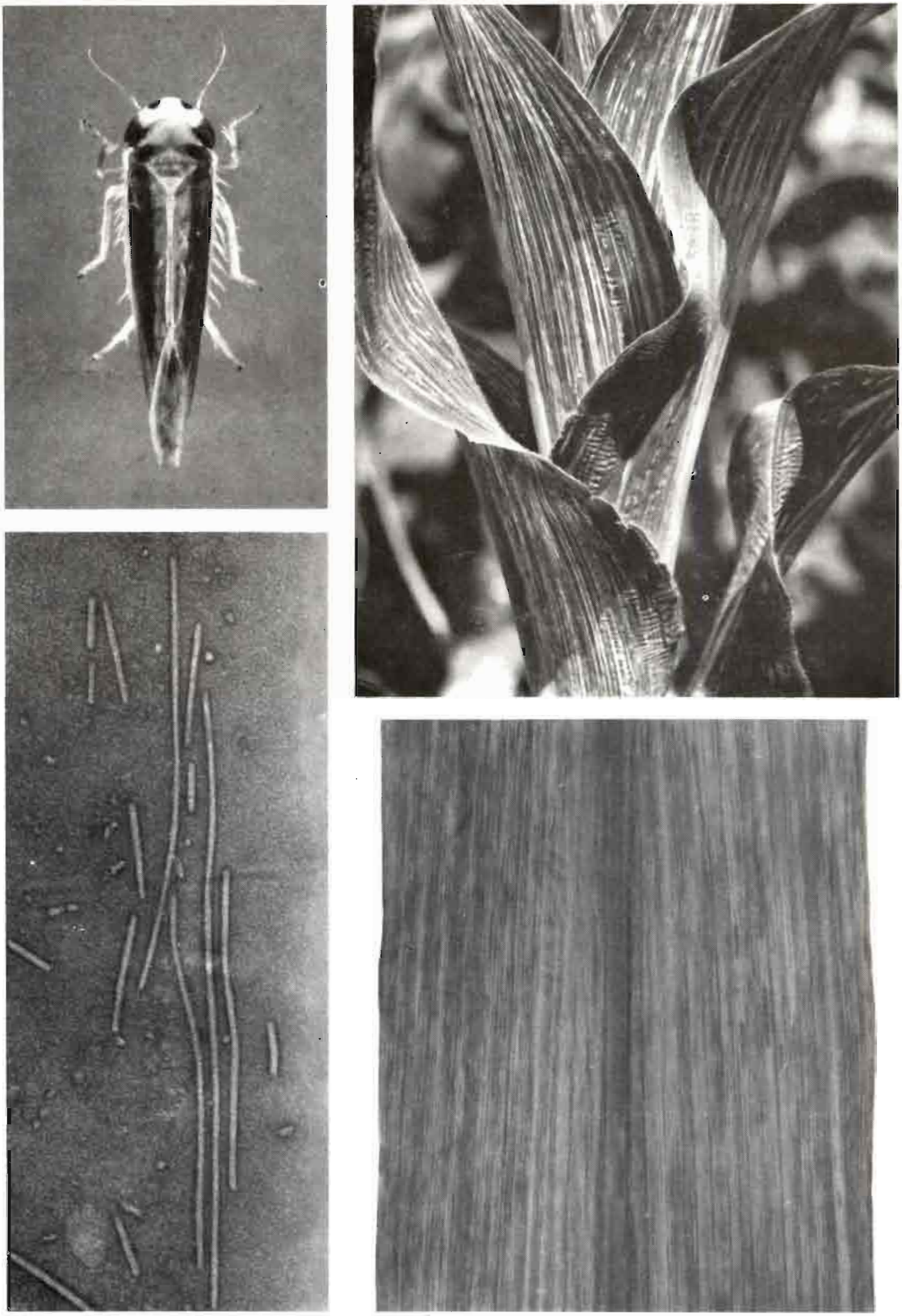


Plate X. *Top*, Streak disease of maize with its vector *Cicadulina mbila*
Bottom, Maize dwarf mosaic showing symptoms (right) and particles of the causal virus, × 100,000 (left).

MAIZE

Breeding and Selection

Fourth generation selfing of pure lines from the basic material collected in Flacq and Savanne (Annual Reports for 1970 and 1971) was completed. These pure lines show suitable uniformity of growth characteristics and will now be used for production of hybrid maize locally. The individual lines selected vary greatly in vigour, plant type and time of maturity.

Seeds from second selfing of material from Nouvelle Découverte, Pailles, Richelieu, Le Morne, Solitude and Rodrigues were harvested. Selfing for pure lines will be continued to the fourth generation. It appears that only four generations of selfing are necessary for the stabilization of growth characteristics of the local maize.

Apart from selection of inbred lines from the local maize to produce hybrids, introduced varieties were tested and crosses made between such varieties and selected local maize. Use was also made of a number of selfed lines to build up a synthetic variety which will maintain its yielding capacity when cultivated in the island.

Synthetic Varieties

The main objective in developing synthetic varieties from material that possesses desirable characters is to increase the gene frequency for these specific characters. A higher frequency of better or more desirable genotypes would be expected in these synthetic varieties.

Four groups of inbred lines from material from Flacq and Savanne are being used to build up synthetic varieties.

Top Crosses

In a preliminary evaluation of 18 single hybrids kindly supplied in 1971 by the *Station d'Amélioration des Plantes* of Clermont-Ferrand, France, top crosses were carried out with a local variety.

The top crosses so obtained were compared between themselves and against a local variety in a yield trial set up at Pamplemousses Experimental Station in March 1972. A randomized complete block design with 3 replicates was used. Each hybrid plot consisted of 2 rows 11.5 m long. The distance between rows was 100 cm and between seeds in the row 27 cm, approximating a planting rate of 37,000 plants/ha. Data were analysed for grain yields.

The results indicated that *A220* × *D228*, *F19* × *A619*, *F64* × *F52*, *F544b* × *W182E*, and *W64A* × *A619* were the best single hybrids which could be used in crosses with selected local maize lines.

Variety trials

Yield trials with hybrids from Holland and France(kindly supplied by Universal Development Corporation (Pty) Ltd., Port Louis) and the local variety were planted at Réduit Experimental Station in September and at Pamplemousses Experimental Station in March and September. Table 30 summarizes some agronomic characters of the hybrids that yielded best. Results obtained in March 1971 at Réduit were also included in the analysis.

Of all the hybrids that were tested, *Anjou 360* was the most promising. It not only gave the most consistent yields and the highest average yield, but was also the one hybrid that significantly outyielded the rust-tolerant local variety in a trial that was severely affected by the disease. Hybrids *Anjou 500* and *MA 1178* compared very favourably with *Anjou 360* as far as yields were concerned, but both were slightly less resistant to rust and blight. *MA 1178* was later maturing than *Anjou 500* and

Anjou 360. Because of their earliness and low ear-setting, the potential of hybrids *U 302*, *PRO 480* and *BC 240* in particular, as well as others that gave good yields, is expected to be great when grown both in the interrows of sugar cane and in full stand.

Hybrids *INRA 400* and *U 530* scored well in two trials in which they were included and warrant further testing.

Table 30. Some agronomic characters of the highest-yielding imported maize hybrids

Hybrid	*Type*	*Average total height of plant (cm)*	*Average height of ear setting (cm)*	*50% silking (days)*	*Average dry yield at 12% mc. as % of local maize*
ANJOU 360	Single cross	166	61	46	129.5
ANJOU 500	Double cross	183	69	47	124.5
MA 1178	—	194	82	51	122.0
ANJOU 510	3-way cross	178	57	47	110.0
U 32 A	Double cross	187	67	51	107.0
U 302	Double cross	160	54	41	105.0
PRO 480	Single cross	154	51	48	104.0
BC 420	Double cross	170	64	43	103.0
ANJOU 450	Double cross	173	59	46	102.0
Local maize	—	*235*	*151*	*70*	*100.0*

Hybrid maize in interrows of ratoon cane

Preliminary trials with the hybrids *Anjou 500* and *U* 32 *A* carried out at Beau Plan, Case Noyale, Beaux Songes, Ebène and Rose Belle, showed that high yields of maize are possible when cultivation is in the interrows of ratoon cane. However, the effect of such a method of cultivation on cane yields will have to be assessed before it can be decided if it is an economic proposition.

Diseases

Reaction of newly-introduced varieties to diseases

Of 21 newly-introduced varieties that were tested, 4 had about the same reaction to rust (*Puccina polysora*) as the local variety, i.e. were moderately susceptible, while the others were more susceptible. All the varieties except one were more susceptible to leaf blight (*Trichometasphaeria turcica*) than the local variety.

Maize dwarf mosaic

Mild symptoms of a mosaic disease were observed on a few plants of the local maize variety at Le Morne and owing to the possible relationship of the disease to sugar cane mosaic, which does not exist in Mauritius, immediate action was taken to identify it fully. Transmission to other varieties of maize by inoculation was effected easily and some varieties showed a high degree of susceptibility, but inoculation into 8 cane varieties and 8 grasses was without result. Positive agglutination occurred in microprecipitation tests with sugar cane mosaic antiserum provided by the *Ecole Nationale Supérieure Agronomique*, University of Madagascar. Subsequently, leaf material taken to the Imperial College of Science & Technology, London, enabled the virus to be purified, photographed (Plate X) and identified as maize dwarf mosaic virus, which although serologically related to the sugar cane mosaic virus is not of direct importance to cane.

A survey in the area where the disease was found did not reveal other infected plants. The disease has no evident effect on the local maize variety and is not thought to be of any economic importance under present conditions.

Streak and stripe

Symptoms of streak and stripe diseases, which have many characteristics in common, have been reported on several occasions in the past. Both diseases were observed during the year on the local variety of maize.

Streak was confined to fields in the Black River — Morne area, where maize is a major crop and has been extensively cultivated for many years. The disease is evidently important in this area and in some fields infection reached 30%. A search for leafhoppers of the genus *Cicadulina*, several species of which are known in southern and eastern Africa to transmit the causal virus, revealed the presence of *C. mbila* Naudé (Plate X). This insect is a proven vector in Africa but had not hitherto been recorded in Mauritius. It was found on the diseased maize in Black River and subsequently in other localities where the disease was absent. Generally, it could be collected only in small numbers but it was very abundant in one field examined at Pamplemousses. The biology of the insect is under study to determine in particular its host plants other than maize. Other species of *Cicadulina* are also being sought. Early observations indicated that *C. mbila* breeds on at least one common graminaceous weed and that congeneric species are present.

Stripe was observed in many fields throughout the island but the level of infection was always low. The local maize variety appears to be quite resistant to the disease but several of the newly-introduced varieties are susceptible.

Further work on the transmission of both streak and stripe under local conditions is proposed, while it seems advisable to ensure, if possible, that varieties for local cultivation are resistant to both diseases.

Miscellaneous

Leaf blight of maize, caused by *Cochliobolus heterostrophus* (conidial state *Drechslera maydis*) was recorded for the first time.

Symptoms of severe stunting with leaf deformations and enations were observed in one field of the local maize variety and attributed to maize rough dwarf virus, known in Australia as Wallaby ear.

GINGER

Fertilizer and spacing trials

Increased interest in the cultivation of ginger prompted research on this plant to increase the comparatively low yields which hitherto have been obtained in local plantations.

Two preliminary trials were carried out to investigate the effect of farmyard manure, plant density and mulching on yields. The trials were laid down at Mon Songe on 1st October 1971 and harvest took place on 15th July 1972. Cultural practices were according to methods described in Technical Circular No.37 of September 1972. Fertilization was as shown in Table 31 and results are given in Tables 32 and 33. Analysis of the results of the first trial (Table 32)revealed that :

(i) Application of farmyard manure significantly increased yields;
(ii) Spacing at 20 cm between seeds was superior to either 30 or 40 cm;
(iii) Planting at 40 cm between rows gave slightly higher yields than planting at 60 cm or 80 cm. It must be emphasized that difficulties in cultural operations encountered when planting at 40 cm between rows showed that it would be impracticable and uneconomic to plant at that spacing. It is suggested that a row spacing of 50 cm be adopted in commercial plantations.

In the second trial, seeds were planted at 30 cm in the row, while mulching with bagasse and earthing up took place simultaneously in the respective plots. Analysis of the results (Table 33) showed that :

(i) Mulching with bagasse improved yields considerably;
(ii) Application of farmyard manure significantly increased yields;
(iii) There was no significant difference in yields at the row spacings used in this trial.

Table 31. Fertilizer treatments in ginger trials

Fertilizer	*With F.Y.M.*	*Without F.Y.M.*	*Time of Application*
Farmyard manure	71 tonnes/ha	—	At planting
Sulphate of ammonia	—	300 kg/ha	At planting
Single superphosphate	535 kg/ha	825 kg/ha	At planting
Muriate of potash	355 kg/ha	575 kg/ha	At planting
Sulphate of ammonia	355 kg/ha	355 kg/ha	Plants 15 to 20 cm. high
Muriate of potash	355 kg/ha	355 kg/ha	Plants 15 to 20 cm. high
Sulphate of ammonia	355 kg/ha	355 kg/ha	4 months after planting

Table 32. Effect of row and seed spacings and application of farmyard manure on ginger yields (Tonnes/ha)

	Spacing between rows								
	40 cm			*60 cm*			*80 cm*		
	Spacing between seeds			*Spacing between seeds*			*Spacing between seeds*		
	20 cm.	*30 cm.*	*40 cm.*	*20 cm.*	*30 cm.*	*40 cm.*	*20 cm.*	*30 cm.*	*40 cm.*
With F.Y.M.	41.40	43.54	33.27	39.01	33.84	26.47	38.13	39.15	26.62
Without F.Y.M.	38.16	27.11	23.23	35.79	28.44	23.79	32.71	25.00	30.52

Table 33. Effect of row spacing, application of farmyard manure and mulching or earthing up on yields of ginger (Tonnes/ha)

	With F.Y.M.		*Without F.Y.M.*	
	Spacing between rows		*Spacing between rows*	
	40 cm.	*60 cm.*	*40 cm.*	*60 cm.*
Mulching	44.46	50.91	38.63	38.56
Earthing up	39.58	40.31	35.43	27.68

Leaf spotting

Severe leaf spotting occurred in several localities of the superhumid zone. The symptoms have been observed frequently in the past and are presumably caused by a pathogen. Symptoms developed on healthy plants sprayed with a maceration of spotted leaves. Two bacteria were isolated from leaves showing leaf spotting but their inoculation into healthy plants was without result.

SOYA BEAN

Variety trials

Five medium-late varieties, namely *Bragg*, *Delmar*, *Lee 68*, *Semmes* and *Shih Shih* (growth cycle : 86-100 days; plant height : 35-50 cm), which could eventually be grown in the interrows of plant cane, were tested under irrigation at Pamplemousses (sub-humid zone) in March and at Réduit (humid zone) in September. Prior to sowing at 5 cm apart, the seeds were inoculated with an appropriate strain of *Rhizobium*. The fertilizers applied in the furrows (40 cm apart) before sowing were sulphate of ammonia, single superphosphate and sulphate of potash at rates of 240, 700 and 825 kg/ha, respectively. Results showed that varieties *Bragg* and *Lee 68* were the best yielders. Further, yields recorded in the trial planted in September were higher than those of the March trial.

Statistical Tables

WEIGHTS AND MEASURES

(S.I. units are adopted throughout this report)

1 metric ton	=	1000 kilogrammes (kg) 1 Megagramme (Mg) 1 tonne
1 pound	=	0.454 kg
1 kilogram	=	2.205 pounds (lb)
1 inch	=	25.4 millimetres (mm)
1 millimetre	=	3.94 hundredths of an inch
1 mile	=	1.61 kilometres (km)
1 kilometre	=	0.621 mile
1 Imperial gallon	=	4.55 litres(1)
1 cu ft	=	0.0283 cu metre (m^3) or 28.32 litres(1)
1 cu metre	=	35.31 cu ft
1 hectare	=	2.37 arpents (arp)
1 arpent	=	0.422 hectare (ha)
1 gaulette	=	3.24 metres (m)
1 lb per arpent	=	1.075 kg per hectare (kg ha^{-1})
1 kg ha^{-1}	=	0.931 lb per arpent
1 joule	=	1 kg m^2S^{-2}

Table I. Area under sugar cane, 1968 - 1972
(in thousand ha)

Year	Area under cane Island	Area harvested					
		Island	West	North	East	South	Centre
1968	85.67	80.07	5.21	21.34	17.85	25.48	10.19
1969	86.35	79.50	5.26	21.14	17.94	25.19	9.97
1970	86.52	80.38	5.25	21.62	19.76	23.69	10.06
1971	86.39	79.89	5.24	21.14	19.68	23.59	10.24
1972	86.60	80.23	5.31	21.08	19.84	23.89	10.11

Table II. Sugar production, 1968 - 1972
(in thousand tonnes)

Crop year	No. of factories operating	Av. Pol.	Island	West	North	East	South	Centre
1968	23	98.8	596.5	49.5	161.3	117.8	192.1	75.8
1969	22	98.7	668.7	48.7	168.6	155.4	205.5	90.5
1970	21	98.8	576.2	47.0	158.1	125.3	184.8	61.0
1971	21	98.8	621.1	44.3	121.4	155.2	209.8	90.4
1972	21	98.7	686.4	51.1	164.9	164.8	218.2	87.4

Table III. Yield of cane, 1968 - 1972
(in tonnes/ha)

SECTORS	1968	1969	1970	1971	1972
ISLAND					
Miller-Planters	73.9	85.6	74.7	79.9	90.0
Planters*	54.0	59.7	51.4	49.5	65.5
Average	64.5	73.2	63.8	65.9	78.7
WEST					
Miller-Planters	87.7	83.4	84.4	83.0	94.3
Planters*	71.8	61.6	59.7	51.2	66.7
Average	79.9	72.5	73.5	68.7	82.0
NORTH					
Miller-Planters	80.8	85.6	82.7	65.6	91.7
Planters*	57.8	59.5	55.2	39.1	65.6
Average	65.9	69.0	65.2	48.8	75.4
EAST					
Miller-Planters	69.9	96.5	72.8	84.4	94.3
Planters*	46.5	58.8	44.8	51.4	63.0
Average	58.3	77.7	59.0	68.7	79.3
SOUTH					
Miller-Planters	71.8	78.2	74.2	80.1	87.5
Planters*	52.6	58.3	55.2	60.4	67.8
Average	65.6	71.3	68.0	73.9	81.3
CENTRE					
Miller-Planters	71.6	90.3	62.8	87.9	84.8
Planters*	49.8	64.5	42.9	56.9	65.9
Average	62.3	79.4	54.3	75.1	76.7

* *Inclusive of tenant planters*

Table IV. Average sucrose % cane, 1968 - 1972

Crop year	Island	West	North	East	South	Centre
1968	13.10	13.49	13.02	12.81	13.17	13.31
1969	13.01	14.31	13.23	12.63	12.94	12.82
1970	12.86	13.81	12.92	12.45	12.96	12.62
1971	13.41	14.00	13.52	13.06	13.61	13.14
1972	12.33	13.02	12.01	11.91	12.64	12.65

Table V. Yield of sugar, 1968 - 1972

A = Tonnes sucrose/ha

B = Tonnes sugar manufactured 98.5° Pol/ha

Crop year	Island		West		North		East		South		Centre	
	A	B	A	B	A	B	A	B	A	B	A	B
1968	8.45	7.48	10.78	9.53	8.58	7.58	7.47	6.62	8.64	7.62	8.29	7.47
1969	9.52	8.43	10.37	9.28	9.13	7.98	9.81	8.69	9.23	8.17	10.18	9.11
1970	8.20	7.19	10.15	8.97	8.42	7.32	7.35	6.37	8.81	7.80	6.85	6.08
1971	8.84	7.81	9.62	8.48	6.60	5.74	8.97	7.93	10.06	8.91	9.87	8.85
1972	9.70	8.56	10.68	9.58	9.06	7.85	9.44	8.32	10.28	9.15	9.70	8.68

Table VI. Monthly rainfall (mm), 1968 - 1972

(average over whole sugar cane area)

Crop Year	GROWTH PERIOD (deficient months in bold characters)								Nov-June sum(of monthly deficits)	MATURATION PERIOD (excess months in bold characters)				July-Oct. (sum of monthly excesses)
	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE		JULY	AUG.	SEPT.	OCT.	
Normals 1875-1949	96	180	280	281	307	241	176	126	435	117	105	74	71	65
Extremes to date	13 335	44 1138	68 825	66 915	85 990	37 701	41 544	25 419	65 820	41 260	15 318	18 205	9 250	0 359
1968	227	258	**78**	531	406	**87**	**138**	**100**	420	**133**	86	**110**	36	53
1969	**86**	**108**	**76**	**206**	**201**	275	**148**	**71**	551	**183**	**108**	51	9	69
1970	**30**	350	401	**188**	567	**102**	**109**	141	365	**124**	**123**	49	37	25
1971	**47**	**67**	**182**	296	**121**	273	195	**85**	487	112	79	22	42	0
1972	133	**74**	**213**	372	**193**	244	**161**	230	302	**153**	**246**	26	**155**	261

Table VII. Monthly air temperatures (°C), 1968 - 1972

(mean maximum & minimum recorded at Plaisance Airport)

YEAR	NOV.		DEC.		JAN.		FEB.		MAR.		APR.		MAY		JUNE		JULY		AUG.		SEPT.		OCT.	
	M	m	M	m	M	m	M	m	M	m	M	m	M	m	M	m	M	m	M	m	M	m	M	m
Normals 1954-58	27.3	19.5	28.6	21.3	29.0	22.3	29.3	22.5	28.8	22.3	27.8	21.0	26.0	19.3	24.7	17.8	23.8	17.8	23.7	17.2	24.5	17.4	25.6	18.3
1968	26.8	20.1	28.5	21.3	28.0	21.6	28.7	22.7	28.0	22.5	27.7	20.3	25.9	17.2	25.5	17.5	23.9	17.8	23.8	17.1	24.5	17.2	25.6	18.2
1969	27.2	19.4	28.7	21.1	30.1	22.7	29.3	22.3	30.4	22.8	28.6	22.3	27.4	20.9	25.1	18.2	24.1	18.4	23.4	17.4	24.7	18.0	26.8	19.6
1970	29.0	21.2	29.5	22.4	29.9	23.6	30.3	23.8	29.2	23.3	27.8	21.4	26.0	20.1	24.7	18.8	23.9	18.2	23.6	17.5	24.7	18.6	26.4	18.2
1971	27.3	20.3	29.0	21.3	30.3	22.7	28.8	22.7	28.7	21.5	28.0	22.1	26.7	19.7	24.6	18.1	24.0	18.4	23.6	16.8	24.6	17.1	25.4	18.7
1972	27.8	18.7	29.3	20.8	29.9	22.5	28.9	22.2	28.6	22.0	28.1	21.1	26.9	19.9	25.8	17.9	24.9	18.0	24.7	17.7	25.6	17.6	26.1	19.4

Table VIII. Highest sustained wind speed during one hour in km
(average over Mauritius)

Crop Year	1960	1968	1969	1970	1971	1972
November	31	31	27	26	29	27
December	24	31	31	24	34	27
January	**85**	39	29	43	32	29
February	**119**	43	35	**52**	43	**60**
March	24	40	19	**72**	26	45
April	24	23	23	32	26	29
May	27	26	29	31	27	32
June	27	29	27	34	32	37
July	24	32	29	37	41	31
August	26	34	31	34	28	35
September	32	34	32	31	29	34
October	29	29	26	24	34	32

NOTE: Cyclonic winds over 50 km/hr during one hour indicated in bold characters.

Table IX. Highest sustained wind speed during one hour in km, cyclone years

Cyclone Years		West	North	East	South	Centre
Jaunary	1960 *Alix*	97	77	69	97	—
February	1960 *Carol*	134	132	126	119	89
December	1961 *Beryl*	79	72	53	82	64
February	1962 *Jenny*	103	119	79	93	87
January	1964 *Danielle*	77	98	89	130	85
February	1964 *Gisèle*	60	53	42	68	52
January	1966 *Denise*	85	84	56	71	64
January	1967 *Gilberte*	53	61	66	72	60
February	1968 *Ida*	53	48	32	40	45
March	1968 *Monica*	39	27	50	50	32
February	1970 *Jane*	56	56	43	58	48
March	1970 *Louise*	63	74	84	77	61
February	1972 *Eugénie*	61	63	43	80	56

Table X. Cane Varieties, 1965 - 1972

(% area cultivated on estate lands)

	B 37172 (1953)	Ebène 1/37 (1951)	Ebène 50/47 (1962)	M 134/32 (1937)	M 147/44 (1955)	M 31/45 (1955)	M 202/46 (1959)	M 93/48 (1959)	M 253/48 (1961)	M 442/51 (1964)	M 99/48 (1965)	M 409/51 (1966)	M 13/53 (1966)	M 13/56 (1966)	M 377/56 (1966)	M 351/57 (1970)	S 17 (1970)	M 124/59 (1971)
1965	9	11	6	5	29	4	11	12	2	2	—	—	—	—	—	—	—	—
1966	8	9	6	3	26	4	13	16	2	5	—	—	—	—	—	—	—	—
1967	6	6	6	2	23	5	14	17	2	7	1	—	—	—	—	—	—	—
1968	5	4	5	2	19	6	14	19	2	9	1	1	1	3	1	—	—	—
1969	3	2	4	1	15	6	15	21	2	10	1	1	1	6	3	—	—	—
1970	2	1	3	1	12	6	12	21	2	10	1	1	1	8	8	2	4	—
1971	1	1	2	1	7	6	11	20	1	10	1	1	1	11	8	4	10	—
1972	1	—	1	—	3	5	10	18	1	9	1	1	1	15	9	4	16	1

NOTE: Year of approval by Cane Release Committee in brackets

Table XI. Cane varieties on miller-planter's land, 1968 - 1972
(% annual plantation)

Years / Varieties	Island					West					North					East					South					Centre				
	1968	1969	1970	1971	1972	1968	1969	1970	1971	1972	1968	1969	1970	1971	1972	1968	1969	1970	1971	1972	1968	1969	1970	1971	1972	1968	1969	1970	1971	1972
M 147/44 ...	0.1	—	—	—	—	0.3	—	—	—	—	0.4	—	—	—	—	—	—	—	—	—	0.1	—	—	—	—	—	—	—	—	—
M 31/45 ...	7.4	1.9	2.0	2.0	1.6	0.5	0.2	0.3	0.8	—	0.3	0.8	0.5	1.8	—	22.4	4.8	7.2	5.2	5.2	5.0	1.6	0.4	0.8	0.1	2.2	—	0.3	0.4	2.0
M 202/46 ...	7.7	1.3	0.9	0.7	0.1	22.2	0.2	—	—	—	1.7	0.1	—	—	—	4.8	0.2	0.2	—	—	12.8	3.2	2.1	1.8	0.3	0.8	—	—	—	—
M 93/48 ...	23.7	13.3	12.3	9.9	8.8	—	—	—	—	—	0.7	1.7	—	—	—	26.0	5.3	3.9	2.7	1.6	17.4	9.9	13.2	11.5	7.5	70.3	51.4	41.4	40.7	36.1
M 99/48 ...	0.1	—	—	—	—	1.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
M 409/51 ...	0.9	—	—	—	—	—	—	—	—	—	0.3	—	—	—	—	—	—	—	—	—	0.9	—	—	—	—	3.4	—	—	—	—
M 442/51 ...	11.7	4.1	0.4	0.5	0.4	15.9	1.6	—	—	—	36.8	6.5	0.4	1.0	0.9	9.2	7.1	0.4	0.5	—	5.4	3.1	0.8	0.5	0.6	1.6	—	0.1	—	—
M 13/53 ...	3.0	0.4	0.2	—	—	3.7	—	—	—	—	9.9	0.8	1.0	—	—	3.5	—	—	—	—	0.7	—	—	—	—	0.1	1.3	0.1	—	—
M 13/56 ...	22.9	24.8	16.6	25.8	25.1	8.3	21.2	13.4	19.1	17.5	41.4	58.7	30.5	56.9	63.3	16.9	21.5	17.0	19.1	13.7	24.7	18.7	16.1	24.6	25.6	10.2	7.2	3.8	—	1.1
M 377/56 ...	9.8	32.6	20.7	—	3.0	38.1	35.2	8.1	—	18.0	6.4	25.2	39.2	—	2.7	9.7	38.2	17.0	—	5.4	10.0	34.3	19.1	—	—	4.5	27.4	15.9	—	—
M 351/57 ...	—	9.9	6.4	8.7	3.4	—	4.3	4.8	2.0	7.8	—	—	1.4	2.2	1.2	—	13.1	2.5	6.2	0.6	—	15.8	10.3	10.3	3.8	—	4.3	8.2	23.3	6.9
Ebène 1/37 ...	0.1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.3	—	—	—	—	—	—	—	—	—
N Co 376 ...	1.9	0.9	0.4	0.1	0.2	0.3	1.2	—	—	—	0.1	—	—	—	—	0.1	—	—	—	—	4.3	1.2	0.9	0.3	0.5	0.8	2.6	—	—	—
S 17 ...	—	8.3	37.3	48.2	47.0	—	27.6	69.8	67.1	50.8	—	3.5	25.2	37.2	26.9	—	7.8	49.5	61.7	54.6	—	9.9	33.9	47.0	54.9	—	3.9	27.0	29.8	38.6
M 124/59 ...	—	—	—	1.7	5.4	—	—	—	2.7	—	—	—	—	—	—	—	—	—	1.0	9.5	—	—	—	1.9	4.5	—	—	—	0.4	10.0
M 438/59 ...	—	—	—	—	2.7	—	—	—	—	—	—	—	—	—	2.4	—	—	—	—	7.7	—	—	—	—	0.4	—	—	—	—	2.6
Other varieties	10.7	2.5	2.8	2.4	2.3	9.6	8.5	3.6	8.3	5.9	2.0	2.7	1.8	0.9	2.6	7.4	2.0	2.3	3.6	1.7	18.4	2.3	3.2	1.3	1.8	6.1	1.9	3.2	5.4	2.7
Total area planted (ha)	5,480	5,901	6,018	6,317	6,139	270	311	374	521	458	970	1,047	965	1,143	1,070	1,204	1,423	1,399	1,445	1,369	2,179	2,199	2,385	2,466	2,279	858	922	895	742	963

Table XII Area harvested and yields, 1972 crop

A = area, ha

B = yields, tonnes/ha

	Island		West		North		East		South		Centre	
	A	B	A	B	A	B	A	B	A	B	A	B
1. Miller-Planters												
(a) Virgin canes												
(i) Grande Saison*	3768	110.7	310	114.7	965	103.3	832	104.8	1256	120.4	405	103.2
(ii) Petite Saison*	1811	91.0	81	90.5	104	90.3	518	99.1	912	88.9	196	80.6
(b) Ratoons												
1st ratoon	5995	92.0	387	97.9	984	99.8	1416	96.9	2375	86.0	833	88.4
2nd ,,	5958	94.0	345	97.6	1098	97.2	1469	100.3	2245	91.2	801	85.3
3rd ,,	5656	88.4	294	89.8	1073	89.3	1300	94.8	2165	85.3	824	85.1
4th ,,	4655	86.0	277	88.9	1050	86.3	1159	92.2	1598	81.8	571	84.1
5th ,,	4260	82.7	250	87.7	895	84.4	1012	89.8	1579	78.7	524	75.8
6th ,,	4089	83.2	329	91.7	696	87.2	979	89.8	1580	78.2	505	75.8
Older ratoons	7191	82.9	672	89.5	1047	84.7	1646	86.6	2709	79.9	1117	76.2
I. Total Miller-Planters	43383	90.0	2945	94.3	7912	91.7	10331	94.3	16419	87.5	5776	84.8
II. Total Owner-Planters	33907	66.3	2298	66.8	13162	65.5	8283	65 0	5936	69.7	4228	66.2
III. Total Tenant-Planters	2942	55.3	69	64.0	10	48.8	1231	49.2	1532	60.0	100	52.7
Grand total	80232	78.7	5312	82.0	21084	75.4	19845	79.3	23887	81.3	10104	76.7

* *Planted from January to June*

** *Planted from July to December*

Table XIII. Evolution of cane quality, 1972 crop
(*sucrose % cane*)

Week ending	Island	West	North	East	South	Centre
15th July	11.70	12.81	11.64	11.63	11.64	11.50
22nd ,,	11.90	12.75	11.85	11.60	12.10	11.62
29th ,,	11.89	12.58	11.64	11.88	12.08	11.71
5th August	12.04	12.99	11.78	11.92	12.21	11.82
12th ,,	11.97	12.86	11.59	11.92	12.19	11.87
19th ,,	11.95	12.58	11.52	11.78	12.19	12.15
26th ,,	12.06	12.43	11.58	11.82	12.36	12.37
2nd September	12.22	12.42	11.73	11.96	12.62	12.57
9th ,,	12.33	12.64	11.75	12.05	12.71	12.82
16th ,,	12.55	12.93	11.93	12.26	12.95	12.98
23rd ,,	12.70	13.01	12.10	12.40	13.10	13.15
30th ,,	12.94	13.55	12.31	12.58	13.46	13.26
7th October	13.18	13.54	12.64	12.93	13.66	13.33
14th ,,	13.08	13.52	12.64	12.93	13.70	13.58
21st ,,	13.32	13.47	12.82	13.08	13.80	13.60
28th ,,	13.10	13.60	12.54	12.71	13.55	13.46
4th November	13.02	13.38	12.48	12.79	13.48	13.26
11th ,,	12.94	13.63	12.45	12.54	13.34	13.22
18th ,,	12.65	13.53	12.30	12.17	12.98	13.02
25th ,,	12.34	13.42	12.26	11.64	12.61	12.70
2nd December	11.97	12.99	11.80	11.27	12.17	12.60
9th ,,	11.54	12.59	11.43	10.95	11.99	11.61
16th ,,	11.16	11.41	11.34	10.54	11.68	—
23rd ,,	10.12	—	—	9.92	10.49	—
30th ,,	9.50	—	—	9.50	—	—
6th January	9.03	—	—	9.03	—	—

Table XIV. Comparative mid-harvest dates, 1968 - 1972

A mid-harvest date weighted by weekly tonnages of canes crushed

B : Interval between mid-harvest dates (days)

Crop Year	Island		West		North		East		South		Centre	
	A	B	A	B	A	B	A	B	A	B	A	B
1968	2/9	340	7/9	346	15/9	345	31/8	337	7/9	346	2/9	346
1969	19/9	382	25/9	383	19/9	369	14/9	379	17/9	375	23/9	386
1970	13/9	359	20/9	360	19/9	365	9/9	360	16/9	364	28/8	370
1971	20/9	374	29/9	374	28/9	374	14/9	370	25/9	374	19/9	356
1972	23/9	366	23/9	359	26/9	363	26/9	377	21/9	361	16/9	362

Table XV. Summary of chemical control data 1972

(i) CANE CRUSHED AND SUGAR PRODUCED

		Médine	Solitude	Beau Plan	The Mount	Belle Vue	St. Antoine	Mon Loisir	Constance	Union Flacq	Beau Champ	Riche en Eau
CRUSHING PERIOD	From	8/7	7/7	19/7	14/7	1/7	7/7	14/7	14/7	23/6	3/7	3/7
	To	11/12	20/12	15/12	20/12	20/12	20/12	9/12	28/12	22/12	11/1	8/12
	No. of crushing days	126	133	119	128	137	131	119	135	149	154	129
	Net crushing hours per day	21.33	21.79	21.50	19.94	19.32	20.72	18.85	19.73	21.27	20.94	18.42
	Hours stoppages per day	0.52	0.65	0.63	0.30	0.45	1.28	0.45	0.52	0.33	0.55	0.25
	Overall Time Efficiency	88.9	90.8	89.6	83.1	80.5	86.3	78.5	82.2	88.6	87.3	76.8
	Mechanical Efficiency	97.6	97.1	97.2	98.5	97.7	94.2	97.7	97.4	98.5	97.4	98.7
CANE CRUSHED (Tonnes)	Factory	278,209	65,812	75,432	158,633	132,618	117,279	177,206	158,712	489,485	330,167	236,918
	Planters	157,725	188,047	149,062	65,726	181,675	168,283	109,367	133,815	303,720	157,364	37,094
	Total	435,934	253,229	224,494	224,359	314,293	285,562	286,573	292,527	793,205	487,531	274,012
	Factory % Total	63.8	25.7	33.6	70.7	42.2	41.1	61.8	54.3	61.7	67.7	86.5
	Per day	3,460	1,904	1,887	1,753	2,294	2,180	2,408	2,167	5,324	3,166	2,124
	Per hour actual crushing	162.2	87 4	87.9	87.9	118.7	105.2	127.7	109.8	250.5	151.2	115.3
PERCENTAGE VARIETIES CRUSHED (Factory)	M 93/48	0.4	0.8	1.4	14.3	1.1	4.3	3.5	1.8	25.2	10.8	4.1
	S 17	23.7	11.4	12.6	8.3	12.9	9.6	5.2	18.8	17.3	15.3	15.9
	M 13/56	8.8	24.2	21.3	29.6	24.9	32.9	31.5	18.7	6.6	12.3	15.9
	M 377/56	11.0	18.8	15.0	11.1	14.8	10.3	6.4	16.6	12.0	6.4	9.5
	M 442/51	9.0	10.9	17.1	16.2	19.4	20.9	34.6	14.6	9.3	6.8	10.7
	M 202/46	19.1	17.5	10.9	9.6	7.6	4.5	2.2	5.8	3.1	15.0	8.8
	M 31/45	0.2	—	2.7	1.5	0.1	2.5	3.5	8.2	11.6	18.0	5.0
	M 351/57	2.5	1.7	0.1	1.7	—	0.4	—	0.4	5.0	2.2	14.0
	M 147/44	9.7	4.4	8.9	2.0	11.5	11.0	8.7	9.5	—	4.6	0.5
	M 13/53	1.4	3.6	7.3	4.5	2.7	0.8	1.9	0.8	—	2.4	0.7
	M 253/48	5.7	1.6	0.2	—	1.3	0.2	—	1.3	—	2.2	0.9
	Eb 74/56	—	0.2	—	0.5	—	0.2	—	—	1.6	0.2	0.8
	Other varieties	8.5	4.9	2.5	0.7	3.7	2.4	2.5	3.5	8.3	3.8	13.2
SUGAR PRODUCED (Tonnes)	Raw Sugar	51,029	25,578	24,074	23,559	23,402	15,587	30,180	30,484	69,300	37,055	30,298
	White Sugar	—	—	—	—	10,017	12,507	—	—	16,410	11,679	—
	Total Sugar	51,029	25,578	24,074	23,559	33,419	28,094	30,180	30,484	85,710	48,734	30,298
	Total Sugar at 96° Pol	52,244	26,203	24,732	24,255	34,455	29,045	30,971	31,360	88,077	50,225	31,220

		Mon Trésor	Savannah	Rose Belle	Britannia	Union St. Aubin	St. Félix	Bel Ombre	Réunion	Highlands	Mon Désert Alma	Totals & Averages
CRUSHING PERIOD	From	3/7	30/6	7/7	29/6	8/7	3/7	10/7	12/7	8/7	10/7	—
	To	16/12	21/12	2/12	18/12	29/12	25/11	29/12	29/11	14/11	9/12	—
	No. of crushing days	135	142	120	140	140	118	139	114	105	121	132
	Net crushing hours per day	18.37	20.38	20.91	20.41	19.26	21.75	19.82	19.70	19.79	21.07	20.28
	Hours stoppages per day	0.33	0.33	0.81	0.38	0.64	0.68	1.38	0.35	0.25	0.64	0.56
	Overall Time Efficiency	76.5	84.9	87.1	85.0	80.2	90.6	82.6	82.1	82.5	87.8	84.5
	Mechanical Efficiency	98.2	98.4	96.3	98.2	96.8	97.0	93.5	98.3	98.8	97.1	97.3
CANE CRUSHED (Tonnes)	Factory	209,138	224,735	164,875	159,424	291,927	58,317	101,052	143,176	124,521	221,873	3,918,879
	Planters	43,078	90,597	66,336	68,155	7,178	90,394	93,880	80,076	79,088	125,129	2,395,789
	Total	252,216	315,332	231,211	227,579	299,105	148,711	194,932	223,252	203,609	347,002	6,314,668
	Factory % Total	82.9	71.3	71.3	70.1	97.6	39.2	51.8	64.1	61.2	63.9	62.1
	Per day	1,868	2,221	1,927	1,626	2,136	1,260	1,402	1,958	1,939	2,868	2,280
	Per hour actual crushing	101.7	108.9	92.2	79.7	110.9	57.9	70.8	99.5	98.0	136.1	112.4
PERCENTAGE VARIETIES CRUSHED (Factory)	M 93/48	6.5	12.5	35.3	39.2	19.9	9.7	0.3	39.1	49.0	69.3	18.1
	S 17	9.3	16.2	5.8	8.5	17.3	14.2	36.9	8.3	12.5	8.6	14.2
	M 13/56	25.9	20.7	1.8	2.6	13.1	15.2	15.7	5.6	3.1	1.4	14.2
	M 377/56	13.3	10.5	8.4	8.1	10.1	9.8	10.4	7.2	10.4	8.1	10.4
	M 442/51	9.6	6.1	0.4	0.9	7.3	8.5	10.4	3.4	—	—	9.6
	M 202/46	12.0	16.1	32.8	9.7	7.7	1.3	6.2	7.3	0.4	—	9.5
	M 31/45	4.0	4.0	2.9	5.8	5.8	10.8	2.3	4.6	—	—	5.6
	M 351/57	2.4	3.4	7.3	7.7	4.1	8.9	0.5	7.4	0.6	6.8	4.0
	M 147/44	3.7	0.8	—	—	3.2	3.1	8.1	1.7	—	—	3.7
	M 13/53	0.3	0.5	—	—	0.1	0.2	3.0	0.9	0.4	—	1.1
	M 253/48	1.1	1.3	0.2	—	0.7	1.7	0.1	2.1	—	—	1.1
	Eb 74/56	—	0.4	—	—	0.5	—	0.6	0.1	12.8	3.0	1.0
	Other varieties	11.9	7.5	5.1	17.5	10.2	16.6	5.5	12.3	10.8	2.8	7.5
SUGAR PRODUCED (Tonnes)	Raw Sugar	29,349	37,779	26,228	25,817	32,406	15,921	16,056	24,364	23,973	39,012	631,451
	White Sugar	—	—	—	—	—	—	4,379	—	—	—	54,992
	Total Sugar	29,349	37,779	26,228	25,817	32,406	15,921	20,435	24,364	23,973	39,012	686,443
	Total Sugar at 96° Pol	30,176	38,859	26,927	26,553	33,364	16,316	21,039	25,014	24,688	40,120	705,843

Table XV. Summary of chemical control data 1972

(ii) CANE, BAGASSE AND JUICES

		Médine	Solitude	Beau Plan	The Mount	Belle Vue	St Antoine	Mon Loisir	Constance	Union Flacq	Beau Champ	Riche en Eau
CANE/SUGAR RATIO	Tonnes cane per tonne sugar made	8.54	9.90	9.33	9.52	9.40	10.16	9.50	9.60	9.25	10.00	9.04
	Tonnes cane per tonne sugar made @ 96° Pol.	8.34	9.66	9.08	9.25	9.12	9.83	9.25	9.33	9.01	9.71	8.78
	Sucrose per cent	13.02	11.65	11.91	11.74	12.34	12.15	12.09	11.88	12.12	11.58	12.45
	Fibre per cent	12.46	14.69	13.76	13.40	13.83	16.79	12.74	14.14	12.70	12.70	12.50
BAGASSE	Pol per cent	1.78	1.96	1.42	1.43	1.99	2.01	1.94	1.76	2.13	1.79	1.80
	Moisture per cent	49.3	48.0	47.6	46.0	46.9	52.4	49.2	46.6	50.7	47.1	49.0
	Fibre per cent	48.2	49.3	50.4	52.1	50.5	45.1	48.0	50.9	46.5	50.5	48.6
	Weight per cent cane	25.85	29.80	27.32	25.73	27.42	37.24	26.55	27 77	27.34	25.14	25.73
FIRST EXPRESSED JUICE	Brix (B_1)*	18.14	17.67	17.54	16.74	18.06	17.88	17.49	17.16	17.09	16.82	17.43
	Gravity purity	87.7	86.4	86.5	87.8	88.5	87.4	87.8	87.1	88.8	87.1	88.0
	Reducing sugars/sucrose ratio	4.0	4.7	5.5	4.6	3.4	5.1	4.4	5.8	4.7	5.6	4.4
LAST EXPRESSED JUICE	Brix*	1.67	3.34	2.48	2.57	4.36	3.09	2.25	2.40	4.72	2.58	2.41
	Apparent purity	71.4	71.6	72.3	72.8	77.1	79.6	69.7	69.9	76.5	74.4	75.9
MIXED JUICE	Weight per cent on cane	100.0	91.8	103.5	99.9	97.8	98.8	104.8	103.1	90.2	98.9	112.0
	Brix*	14.52	14.25	13.08	13.29	14.01	13.38	12.85	12.97	14.65	13.26	12.43
	Gravity purity	86.6	84.7	85.1	85.6	86.0	86.2	86.0	85.2	87.3	84.8	86.2
	Reducing sugars/sucrose ratio	4.4	5.1	6.3	5.7	4.3	5.5	5.6	6.8	5.7	6.5	5.2
	Gty. Pty. drop from first expressed juice	1.1	1.7	1.4	2.2	2.5	1.2	1.8	1.9	1.5	2.3	1.8
ABSOLUTE JUICE	Brix (B_A)	17.30	16.28	16.31	15.91	16.73	17.03	16.27	16.39	16.02	15.72	16.61
	B_A/B_1	0.95	0.92	0.93	0.95	0.93	0.95	0.93	0.96	0.94	0.93	0.95
	Gravity purity	86.0	83.9	84.7	85.2	85.6	85.7	85.2	84.4	86.6	84.4	85 7
CLARIFIED JUICE	Brix*	14.35	14.98	12.79	12.95	13.77	12.29	12.66	13.18	15.13	13.06	12.65
	Gravity purity	—	84.7	8.57	86.3	87.0	87.9	—	85.1	87.5	85.5	87.0
	Reducing sugars/sucrose ratio	4.6	5.0	6.2	5.5	4.0	5.5	—	6.6	5.4	6.2	4.6

		Mon Trésor	Savannah	Rose Belle	Britannia	Union St. Aubin	St. Félix	Bel Ombre	Réunion	Highlands	Mon Désert Alma	Totals & Averages
CANE/SUGAR RATIO	Tonnes cane per tonne sugar made	8.59	8.35	8.82	8.81	9.23	9.34	9.54	9.16	8.49	8.89	9.20
	Tonnes cane per tonne sugar made @ 96° Pol.	8.36	8.11	8.59	8.57	8.96	9.11	9.27	8.93	8.25	8.65	8.95
	Sucrose per cent	13.12	13.25	12.80	12.62	12.22	12.30	12.09	12.46	12.95	12.59	12.33
	Fibre per cent	12 41	12.22	12.31	10.89	11.19	12.32	13.51	12.87	11.20	11.66	12.86
BAGASSE	Pol per cent	2.26	2.07	2.31	2.19	2.30	2.18	2.07	2.05	1.34	1.79	1.94
	Moisture per cent	49.7	47.2	49.5	48.3	47.7	48.1	50.2	51.8	49.9	49.7	49.0
	Fibre per cent	47.4	50.1	47.5	48.9	49.2	48.9	47.1	45.5	48.3	47.9	48.4
	Weight per cent cane	26.17	24.40	25.90	22.26	22.76	25.19	28.69	28.32	23.20	24.37	26.56
FIRST EXPRESSED JUICE	Brix (B_1)*	18.21	18.02	17.31	17.26	16.93	16.78	17.33	17.30	17.33	17.03	17.41
	Gravity purity	89.6	89.7	90.1	90.8	88.5	86.5	88.2	89.5	90.3	89.9	88.4
	Reducing sugars/sucrose ratio	3.1	3.2	4.0	4.5	4.3	3.7	4.3	3.1	3.1	3.5	4.2
LAST EXPRESSED JUICE	Brix*	2.26	2.69	3.33	2.80	2.64	2.94	3.18	2.14	1.67	2.05	2.74
	Apparent purity	78.7	74.7	77 7	77.5	73.5	74.1	77.5	73.7	72.5	74.0	74.5
MIXED JUICE	Weight per cent on cane	104.7	107.9	104.1	101.7	103.3	103.4	99.0	102.3	103.7	103.2	100.6
	Brix*	13.66	13.41	13.16	13.40	13.02	13.28	13.49	13.20	13.72	13.31	13.54
	Gravity purity	87.6	88.1	89.0	89.0	87.0	85.6	86.1	88.0	88.8	88.5	86.7
	Reducing sugars/sucrose ratio	3.7	4.0	4.4	5.0	4.6	4.4	4.9	3.4	3.5	4.0	5.0
	Gty. Pty. drop from first expressed juice	2.0	1.6	1 1	1.8	1.5	1.0	2.1	1.5	1.5	1.4	1 7
ABSOLUTE JUICE	Brix (B_A)	17.19	17.26	16.51	16.00	15.95	16.50	16.32	16.40	16.51	16.22	16.42
	B_A/B_1	0.94	0.96	0.95	0.93	0.94	0.98	0.94	0.95	0.95	0.95	0.94
	Gravity purity	87.1	87.5	88 4	88.5	84.3	85.0	85.7	87.2	88.3	87.9	86.2
CLARIFIED JUICE	Brix*	13.50	12.68	12.60	12.97	13.06	13.26	13.54	13.48	12.78	13.23	13.28
	Gravity purity	87.9	88.9	—	89.6	—	85.8	86.3	88.1	88.8	88.7	87.1
	Reducing sugars/sucrose ratio	3.3	4.0	4.1	4.9	—	4.4	4.6	3.3	3.4	3.9	4.7

* *Refractometric Brix*

Table XV. Summary of chemical control data 1972

(iii) FILTER CAKE, SYRUP, pH, FINAL MOLASSES, SUGAR

		Médine	Solitude	Beau Plan	The Mount	Belle Vue	St. Antoine	Mon Loisir	Constance	Union Flacq	Beau Champ	Riche en Eau	Mon Trésor	Savannah	Rose Belle	Britannia	Union St. Aubin	St Félix	Bel Ombre	Réunion	Highlands	Mon Désert Alma	Totals & Averages
FILTER CAKE	Pol per cent	1.31	0.71	1.11	1.66	0.72	0.62	0.77	0.71	0.51	1.34	0.46	2.22	0.56	1.71	2.25	1.31	7.72	4.30	8.16	2.18	2.66	1.60
	Weight per cent cane	4.43	2.67	3.98	3.72	3.40	2.12	2.76	2.58	2.82	3.13	3.77	3.42	2.16	2.20	4.03	2.78	1.57	3.01	2.08	2.61	4.68	3.10
SYRUP	Brix*	59.3	57.3	58.0	62.1	57.3	61.9	61.1	60.1	57.9	54.9	65.6	61.2	59.7	60.6	64.5	55.4	54.8	52.7	60.8	59.0	62.7	59.4
	Gravity purity	—	84.7	85.0	86.4	87.4	87.1	—	85.4	86.9	85.5	87.0	88.2	88.8	—	89.3	—	85.9	86.5	88.2	88.8	88.5	87.0
	Reducing sugars/sucrose ratio	4.9	5.5	5.9	5.6	4.1	5.5	–	6.8	5.0	6.1	4.5	3.6	3.9	4.2	4.9		4.2	4.7	3.7	3.4	4.0	4.7
pH VALUES	Limed juice	7.8	8.1	8.5	7.7	8.3	—	—	7.9	8.3	—	7.9	—	8.1	7.7	8.1	—	–	7.5	8.2	8.0	7.7	8.0
	Clarified juice	7.0	7.1	7.1	7.0	7.3	7.0	7.0	7.3	7.3	7.1	7.4	7.4	7.5	7.1	7.2	7.1	6.9	6.7	7.3	7.4	7.2	7.2
	Filter press juice	—	—	9.2	—	6.8	—	7.2	7.0	8.8	6.7	7.5	7.7	7.3	7.1	—	6.3	—	—	6.9	7.3	7.4	7.4
	Syrup	6.5	6.6	7.0	6.5	6.4	6.5	6.7	6.5	6.8	7.3	6.7	6.8	7.0	6.6	7.1	6.4	—	6.7	7.2	7.0	7.1	6.8
FINAL MOLASSES	Brix**	86.0	84.2	88.6	85.0	83.6	88.4	87.4	85.1	85.6	84.0	87.3	86.2	89.9	88.7	87.1	88.5	87.5	84.2	85.4	88.1	83.1	86.1
	Sucrose per cent	30.98	30.48	28.65	28.09	30.72	34.38	30.38	29.56	29.90	30.80	31.87	32.03	33.50	31.38	33.10	31.88	32.30	30.58	32.73	33.22	30.34	31.08
	Reducing sugars per cent	17.84	15.45	20.55	17.00	14.40	17.11	21.62	21.73	20.50	20.70	14.34	16.15	15.70	20.26	19.30	19.26	18.20	16.52	14.74	14.49	16.60	18.09
	Total sugars per cent	48.82	45.93	49.20	45.09	45.12	51.49	52.00	51.29	50.40	51.50	46.21	48.18	49.20	51.64	52.40	51.14	50.50	47.10	47.47	47.71	46.94	49.17
	Gravity purity	36.0	36.2	32.3	33.0	36.7	38.9	34.8	34.7	34.9	36.6	36.5	37.2	37.3	35.4	38.0	36.0	37.0	36.3	38.3	37.7	36.5	36.1
	Reducing sugars/sucrose ratio	57.6	50.7	71.7	60.5	46.9	49.8	71.2	73.5	68.6	67.2	45.0	50.4	46.9	64.6	58.3	60.4	56.3	54.0	45.0	43.6	54.7	58.2
	Weight per cent cane @ 85° Brix	2.85	3.36	3.06	2.96	3.09	3.65	3.09	3.14	2.69	3.02	2.83	2.71	2.80	2.30	2.48	2.54	2.89	2.87	2.38	2.47	2.43	2.84
SUGAR MADE	White sugar recovered per cent cane	—	—	—	—	3.19	4.38	—	—	2.07	2.40	—	—	—	—	—	—	—	2.25	—	—	—	0.87
	Raw ,, ,, ,, ,, ,,	11.71	10.10	10.72	10.50	7.44	5.46	10.53	10.42	8.74	7.60	11.06	11.64	11.98	11.34	11.34	10.83	10.71	8.23	10.91	11.77	11.24	10.00
	Total ,, ,, ,, ,, ,,	11.71	10.10	10.72	10.50	10.63	9.84	10.53	10.42	10.81	10.00	11.06	11.64	11.98	11.34	11.34	10.83	10.71	10.48	10.91	11.77	11.24	10.87
	Average Pol of sugars	98.29	98.35	98.62	98.84	98.98	99.25	98.52	98.76	98.65	98.94	98.92	98.70	98.75	98.56	98.74	98.84	98.38	98.84	98.57	98.86	98.73	98.71
	Total sucrose recovered per cent cane	11.50	9.93	10.58	10.38	10.52	9.76	10.38	10.29	10.66	9.89	10.94	11.49	11.83	11.18	11.20	10.71	10.53	10.36	10.76	11.64	11.10	10.73
	Moisture per cent raw sugar	0.44	0.40	0.36	0.34	0.46	0.41	0.35	0.35	0.43	0.38	0.29	0.35	0.38	0.46	0.36	0.34	0.50	0.28	0.41	0.29	0.32	0.38
	Dilution indicator of raw sugar	34.5	31.6	35.7	41.7	51.1	55.4	30.7	39.2	35.3	39.3	36.3	37.1	43.1	47.0	39.0	40.7	45.2	26.0	39.3	33.5	33.5	37.5

* *Refractometric Brix 1 : 5 w/w*

** *Refractometric Brix 1 . 6 w/w*

Table XV. Summary of chemical control data 1972

(iv) MASSECUITES

		Médine	Solitude	Beau Plan	The Mount	Belle Vue	St. Antoine	Mon Loisir	Constance	Union Flacq	Beau Champ
MAGMA	Apparent purity	84.8	81.9	89.0	85.0	85.2	82.7	81.7	84.8	85.4	82.5
A-MASSECUITE	Brix**	92.0	91.8	91.0	92.5	89.9	89.8	92.7	92.6	93.3	91.7
	Apparent purity	82.8	81.8	84.7	84.0	87.2	84.7	81.8	79.4	80.0	80.6
	Apparent purity of A-molasses	63.1	56.8	66.4	59.6	70.4	69.4	54.8	54.0	56.8	57.4
	Drop in purity	19.7	25.0	18.3	24.4	16.8	15.3	27.0	25.4	23.2	23.2
	Crystal per cent Brix in massecuite	53.4	57.9	54.5	60.4	56.8	50.0	59.8	55.2	53.7	54.5
	Litres per tonne Brix in mixed juice	846	961	738	915	744	1,123	1,284	930	1,074	1,296
	A-Massecuite per cent total massecuite	62.7	75.0	54.6	77.4	48.5	58.1	73.1	76.5	82.6	80.0
B-MASSECUITE	Brix**	92.0	—	91.0	—	91.1	91.0	91.5	—	—	—
	Apparent purity	72.5	—	74.3	—	78.6	74.9	72.9	—	—	—
	Apparent purity of B-molasses	51.8	—	49.1	—	59.3	55.9	51.1	—	—	—
	Drop in purity	20.7	—	25.2	—	19.3	19.0	21.8	—	—	—
	Crystal per cent Brix in massecuite	42.9	—	49.5	—	47.4	43.1	44.6	—	—	—
	Litres per tonne Brix in mixed juice	302	—	354	—	535	477	141	—	—	—
	B-Massecuite per cent total massecuite	22.4	—	26.1	—	34.8	24.7	8.1	—	—	—
	Kg. sugar per cubic metre of A & B massecuite	703	804	726	865	606	465	549	838	761	588
C-MASSECUITE	Brix**	94.9	94.8	93.6	95.2	95.8	94.9	94.1	95.5	94.4	94.6
	Apparent purity	56.5	57.8	57.5	59.7	60.1	60.3	58.7	57.0	57.8	57.8
	Apparent purity of final molasses	31.2	33.0	26.0	30.1	36.1	37.1	33.0	29.3	30.1	32.8
	Drop in purity	25.3	24.8	31.5	29.6	24.0	23.2	25.7	27.7	27.7	25.0
	Crystal per cent Brix in massecuite	36.8	37.0	42.6	42.3	37.6	36.9	38.4	38.3	39.6	37.2
	Litres per tonne Brix in mixed juice	201	321	261	267	256	332	331	248	226	325
	C-Massecuite per cent total massecuite	14.9	25.0	19.3	22.6	16.7	17.2	18.8	23.5	17.4	20.0
TOTAL MASSECUITE	Litres per tonne Brix in mixed juice	1,350	1,282	1,353	1,182	1,536	1,932	1,757	1,178	1,300	1,621
	Litres per tonne sugar made	1,672	1,659	1,707	1,493	1,980	2,597	2,245	1,512	1,591	2,129

		Riche en Eau	Mon Trésor	Savannah	Rose Belle	Britannia	Union St. Aubin	St. Félix	Bel Ombre	Réunion	Highlands	Mon Désert Alma	Totals & Averages
MAGMA	Apparent purity	81.6	86.8	87.8	84.9	83.1	85.8	82.6	87.2	85.1	81.7	83.8	84.4
A-MASSECUITE	Brix**	91.3	91.8	91.4	92.8	92.9	93.0	91.5	90.6	91.9	92.3	91.6	92.0
	Apparent purity	86.1	87.8	84.3	84.5	83.9	80.0	81.8	84.8	84.1	82.8	81.5	82.0
	Apparent purity of A-molasses	64.0	66.6	66.9	57.1	57.5	54.4	57.9	67.9	63.0	57.3	61.4	60.2
	Drop in purity	22.1	21.2	17.4	27.4	26.4	25.6	23.9	16.9	21.1	25.5	20.1	21.8
	Crystal per cent Brix in massecuite	61.4	63.5	76.5	63.9	62.1	56.1	56.7	52.6	57.0	59.7	52.1	54.8
	Litres per tonne Brix in mixed juice	688	641	968	1,014	1,091	1,208	1,055	839	721	1,129	1,228	995
	A-Massecuite per cent total massecuite	52.4	49.5	59.8	81.2	82.1	80.7	76.1	55.8	61.2	82.5	76.9	69.7
B-MASSECUITE	Brix**	93.4	92.8	92.7	—	—	—	—	91.9	92.0	—	91.8	91.9
	Apparent purity	74.2	76.3	75.0	—	—	—	—	76.1	74.3	—	70.7	75.0
	Apparent purity of B-molasses	52.2	49.9	55.3	—	—	—	—	57.6	53.2	—	52.3	54.0
	Drop in purity	22.0	26.4	19.7	—	—	—	—	18.5	21.1	—	18.4	21.0
	Crystal per cent Brix in massecuite	46.0	52.7	62.6	—	—	—	—	43.6	4.51	—	38.6	45.7
	Litres per tonne Brix in mixed juice	355	402	406	—	—	—	—	341	259	—	165	172
	B-Massecuite per cent total massecuite	27.0	31.1	25.1	—	—	—	—	22.6	22.0	—	10.3	12.0
	Kg. sugar per cubic metre of A & B massecuite	762	780	603	816	763	667	739	665	824	733	644	687
C-MASSECUITE	Brix**	95.7	95.0	96.6	93.3	94.4	93.9	93.5	93.6	94.5	94.4	96.1	94.7
	Apparent purity	60.2	60.0	58.1	61.6	61.7	60.1	62.3	61.3	57.7	60.9	57.5	58.4
	Apparent purity of final molasses	31.8	32.3	33.2	29.2	31.8	30.1	31.6	33.4	33.3	33.5	32.1	32.0
	Drop in purity	28.4	27.7	24.9	32.4	29.9	30.0	30.7	27.9	24.4	27.4	25.4	26.4
	Crystal per cent Brix in massecuite	41.6	40.9	37.1	45.8	43.8	42.9	44.8	41.9	36.6	41.2	37.4	38.8
	Litres per tonne Brix in mixed juice	270	250	244	234	237	289	332	324	199	239	205	261
	C-Massecuite per cent total massecuite	20.6	19.4	15.1	18.8	17.9	19.3	23.9	21.6	16.8	17.5	12.8	18.3
TOTAL MASSECUITE	Litres per tonne Brix in mixed juice	1,313	1,293	1,618	1,248	1,328	1,496	1,387	1,504	1,179	1,368	1,598	1,428
	Litres per tonne sugar made	1,652	1,590	1,954	1,508	1,596	1,858	1,778	1,916	1,459	1,653	1,953	1,788

** *Refractometric Brix 1 : 6 w/w*

Table XV. Summary of chemical control data 1972

(v) MILLING WORK, SUCROSE LOSSES AND BALANCE, RECOVERIES

		Médine	Solitude	Beau Plan	The Mount	Belle Vue	St. Antoine	Mon Loisir	Constance	Union Flacq	Beau Champ	Riche en Eau	Mon Trésor	Savannah	Rose Belle	Britannia	Union St. Aubin	St. Félix	Bel Ombre	Réunion	Highlands	Mon Désert Alma	Totals & Averages
MILLING WORK	Imbibition water % cane	25.7	21.6	30.8	25.6	25.2	36.1	31.3	30.9	17.6	24.1	37.7	30.9	32.3	30.0	24.0	26.1	28.5	27.7	30.6	26.9	27.6	27.1
	Imbibition water % fibre	206	147	224	191	182	215	246	218	139	189	302	249	264	244	220	233	231	205	238	240	237	211
	Extraction ratio	28.4	34.1	23.7	23.4	31.8	36.6	33.4	29.1	37.8	30.6	29.5	36.3	31.1	37.9	35.5	38.3	36.2	36.3	36.2	21.5	29.7	32.7
	Mill extraction	96.5	95.0	96.7	96.9	95.6	93.9	95.7	95.9	95.2	96.1	96.3	95.5	96.2	95.3	96.1	95.7	95.5	95.1	95.3	97.6	96.5	95.8
	Reduced mill extraction	96.5	95.9	97 1	97.1	96.1	95.7	95.8	96.4	95.3	96.2	96.3	95.5	96.1	95.3	95.5	95.2	95.5	95.5	95.5	97.3	96.3	95.9
SUCROSE LOSSES	Sucrose lost in bagasse % cane	0.46	0.58	0.39	0.37	0.55	0.75	0.52	0.49	0.58	0.45	0.46	0.59	0.51	0.60	0.49	0.52	0.55	0.59	0.58	0.31	0.44	0.52
	,, ,, in filter cake % cane	0.06	0.02	0.04	0.06	0.02	0.01	0.02	0.02	0.01	0.04	0.02	0.08	0.01	0.04	0.09	0.04	0.12	0.13	0.17	0.06	0.12	0.05
	,, ,, in molasses % cane	0.87	1.03	0.84	0.83	0.97	1.21	0.91	0.93	0.80	0.94	0.88	0.86	0.89	0.69	0.80	0.78	0.91	0.89	0.78	0.79	0.76	0.87
	Undertermined losses % cane	0.13	0.09	0.06	0.10	0.28	0.42	0.27	0.15	0.07	0.26	0.15	0.10	0.01	0.29	0.04	0.17	0.19	0.12	0.17	0.15	0.17	0.16
	Industrial losses % cane	1.06	1.14	0.94	0.99	1.27	1.64	1.20	1.10	0.88	1.24	1.05	1.04	0.91	1.02	0.93	0.99	1.22	1.14	1.12	1.00	1.05	1.08
	Total losses % cane	1.52	1 72	1.33	1.36	1.82	2.39	1.72	1.59	1.46	1.69	1.51	1.63	1.42	1.62	1.42	1.51	1.77	1.73	1.70	1.31	1 49	1.60
SUCROSE BALANCE	Sucrose in bagasse % sucrose in cane	3.54	5.01	3.26	3.14	4.42	6.15	4.26	4.12	4.79	3.88	3.71	4.51	3.82	4.67	3.87	4.28	4.47	4.92	4.66	2.41	3.46	4.19
	,, ,, filter cake % sucrose in cane	0.45	0.16	0.37	0.53	0.20	0.11	0.18	0.16	0.12	0.36	0.14	0.58	0.09	0.29	0.72	0.30	0.99	1.07	1.36	0.44	0.99	0.40
	,, ,, molasses % sucrose in cane	6.67	8.88	7.07	7.08	7.83	9.94	7.54	7.81	6.58	8.07	7.05	6.52	67.0	5.39	6.34	6.37	7.42	7.34	6.23	6.11	6.00	7.07
	Undetermined losses % sucrose in cane	1.01	0.71	0.49	0.82	2.25	3.44	2.21	1.29	0.56	2.31	1.28	0.83	0.11	2.30	0.29	1.43	1.49	1.01	1.43	1.12	1.37	1.29
	Industrial losses % sucrose in cane	8.13	9.75	7.93	8.43	10.28	13.49	9.93	9.26	7.26	10.74	8.47	7.93	6.90	7.98	7.35	8.10	9.90	9.41	9.02	7.67	8.36	8.76
	Total losses % sucrose in cane	11.67	14 76	11.19	11.57	14.70	19.64	14.19	13.38	12.05	14.62	12.18	12.44	10.72	12.65	11.22	12.38	14.37	14.33	13.68	10.08	11.82	12.95
RECOVERIES	Boiling house recovery	91.6	89.7	91.8	91.3	89.3	85.6	89.6	90.4	92.4	88.8	91.2	91.7	92.8	91.6	92.4	91.5	89.6	90.1	90.5	92.1	91.3	90.9
	Reduced boiling house recovery (Pty. M.J.85°)	90.4	90.0	91.7	90.9	88.4	84.2	88.8	90.2	90.8	89.0	90.3	89.7	90.6	88.1	89.1	89.9	89.1	89.2	87.8	89.0	88.3	89.5
	Overall recovery	88.3	85.2	88.8	88.4	85.3	80.4	85.8	86.6	88.0	85.4	87.8	87.6	89.3	87.4	88.8	87.6	85.6	85.7	86.3	89.9	88.2	87.1
	Reduced overall recovery (Pty. M.J.85°, F % C 12.5)	87.2	86.2	89.1	88.2	84.9	80.5	85.1	87.0	86.5	85.6	87.0	85.6	87.1	83.9	85.1	85.6	85.1	85.2	83.9	86.6	85.0	85.8
	Boiling house efficiency	99.5	99.3	99.7	99.1	98.2	95.0	97.5	99.1	99.7	98.6	100.0	99.5	100.3	97.8	99.4	99.5	98.9	98.7	98.3	99.2	98.2	98.9

APPENDIX

THE MAURITIUS HERBARIUM

Flora of the Mascarene Islands

The editors of the Flora of the Mascarene Islands were appointed. They are Mr. J. Bosser (Editor-in-Chief) of the *Museum National d'Histoire Naturelle*, Paris, Mr. W. Marais of the Royal Botanic Gardens, Kew, and Dr. R. Julien of the Mauritius Herbarium. Dr. R.E. Vaughan, former Curator of the Herbarium was appointed Adviser.

Mr. M.J.E. Coode was appointed Taxonomist in November and will work on the Flora at the Royal Botanic Gardens Kew.

Agreement was reached upon the modality of publication. It was also decided to have an introductory volume, which will include a foreword, a description of the serial method of publication that is to be adopted, maps, and information on climates, soils and topographies. A glossary of botanical terms is to appear concurrently with the introductory volume.

The families Agavaceae, Amaryllidaceae, Iridaceae, Liliaceae, Juncaceae, Hypoxidaceae and Smilacaceae are being studied by Messrs. Marais and Coode at Kew. At the Mauritius Herbarium, Messrs. Guého and Lorence are studying the Rhamnaceae and Elaphoglossaceae, respectively. Check lists of the flowering plants of the Mascarenes are being prepared in Mauritius with the aid of botanists in Réunion Island, while Dr. R.E. Vaughan is writing an historial account of Botany in the Mascarenes.

Scientific Missions

Mr. J. Bosser, of the *Museum National d'Histoire Naturelle*, Paris, and Dr. R. Julien, Curator of the Mauritius Herbarium, made a survey of the vegetation of Rodriguez in December. The Herbarium Assistant, Mr. J. Guého, accompanied Prof. Moore Jr. during his travels to Réunion, Rodriguez and the Seychelles to assist in field work on palms and the opportunity was taken to collect material of flowering plants and ferns for the Herbarium.

Accessions

During the year under review 641 specimens were added to the herbarium's collection as follows :

From Mauritius ...	463
From Réunion	98
From Rodriguez ...	34
From Seychelles ...	46
TOTAL	641

For the kind donations of duplicate sets of material to the Herbarium we wish to thank in particular : Prof. H.E. Moore Jr. of the L.H. Bailey Hortorium, Cornell University, New York, U.S.A., for valuable specimens of native palms from the Mascarenes and the Seychelles, collected during his visit in October-November; Sir Colville Barclay Bt., for a number of flowering plants, ferns and bryophytes from Mauritius; Mr. D. Tirvengadum for material of indigenous species belonging mainly to the families Erythoxylaceae and Rubiaceae, which he obtained during his visits to Réunion and Mauritius.

Field work

Field work was carried out to obtain duplicates of specimens in the herbarium for distribution to the institutions and specialists involved with the Flora Project. In addition, further field data on various native species is being gathered for incorporation in the Flora.

Of special interest was the recent finding of *Adiantum hisutum* Bory, a fern which has not been collected in Mauritius since the end of the last century. The plant was found by Sir Colville Barclay Bt., in December, and subsequently other specimens were located in dry forest at Yemen and on the Corps de Garde Mountain.

Visitors

The staff of the Herbarium had the pleasure of welcoming the following visitors from overseas :

Dr. D.F. Gaff, of Monash University, Clayton, Australia, who had been engaged on research on tolerance of plants to dessication at the Botanical Research Institute Pretoria, stayed a few days and visited sites of interest in connection with his research subject.

Mr. D. Tirvengadum, from the *Museum National d'Histoire Naturelle*, Paris, visited both Mauritius and Réunion. He studied species of Erythoxylaceae and Linaceae at the Herbarium and in the field.

Professor A. Borel, Director of the *Institut Supérieur d'Agriculture*, Lille, France visited the Nature Reserves and other forested sites. He collected material of some indigenous ferns and bryophytes.

Dr. J.J. Gaudet of Makarere University, Kampala, Uganda, gathered data on the sedge *Cyperus papyrus*.

Mr. Marshall R. Crosby, Curator of Cryptogams at the Missouri Botanical Gardens, U.S.A., made collections of bryophytes.

Nature Reserves

Following the recommendation made by the Ancient Monuments and Nature Reserves Board, the Petrin Nature Reserve was enlarged by the inclusion of 48 hectares of heaths and *Sideroxylon* thickets.

Flat Island, north-north-west of Mauritius, was proclaimed a Nature Reserve. It is hoped that Gabriel Island, in its immediate vicinity, will also be proclaimed a Nature Reserve in the near future.

The eradiction of exotic shrubs and weeds, which interfere with the regeneration of native species, was continued at Perrier Nature Reserve in cooperation with the Forest Department. Plans for the upkeep of this reserve are being formulated.

Further specimens of an undescribed, endemic palm were found at Crown Land Declerc in the uplands. It is hoped that a Nature Reserve will be set up in the area to preserve the marshy habitat of the species and thus ensure its survival.

Distribution of specimens to overseas institutions

Nearly two hundred specimens of flowering plants and ferns were sent to the Royal Botanic Gardens, Kew, the *Museum National d'Histoire Naturelle*, Paris, and the Herbarium of the *Centre Universitaire*, St. Denis, Réunion. Duplicates were retained in the Herbarium for reference purposes.

Acknowledgments

Grateful acknowledgment is made to : Drs. R.E. Holttum and F.M. Jarrett of the Royal Botanic Gardens, Kew, for identifying fern specimens from the Mascarenes, Mr. E.W. Jones of the Commonwealth Forestry Institute, Oxford, for identifying hepatics gathered by Sir Colville Barclay in Réunion and Mauritius, Dr. H. Sleumer, of the Rijksherbarium, Leiden, Netherlands, for examining and naming specimens of indigenous Flacourtiaceae in the Herbarium collections.

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