MSIRI

21st ANNUAL REPORT 1973

MAURITIUS SUGAR INDUSTRY

RESEARCH INSTITUTE

ANNUAL REPORT 1973

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CORRIGENDA

Table XIV. Annual Report 1972

In Island,	1971	column A,	read	22/9	instead of	20/9
,,	1972	column B,	,,	367	,,	366
West	1972	,,	,,	360	,,	359
North	1972	,,	,,	364	,,	363
East	1972	,,	,,	378	,,	377
South	1972	,,	,,	362	,,	361
Centre	1970	,,	,,	339	,,	370
Centre	1971	,,	,,	387	,,	356
Centre	1972	,,	,,	363	,,	362

CORRIGENDA

Annual Report for 1973

p. 51, line 16. Delete "using invertase" after "A.O.A.C. chemical method."

p. 52, Table 21. Read "correction" for "connection" throughout.

CONTENTS

STATISTICAL TABLES

APPENDIX : The Mauritius Herbarium

MEMBERS EXECUTIVE BOARD

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

Mr. B.D. Roy, *representing the Ministry of Agriculture and Natural Resources*

Mr. K. Venkatachellum, *representing the Ministry of Finance*

Mr. M. Baguant, *representing the Ministry of Economic Planning and Development*

Mr. E. Sériès, C.B.E.
Mr. S.D. de R. de St. Antoine
Mr. G. Langlois
} *representing factory owners*

Mr. C. Rouillard, *representing large planters*

Mr. G. Beeharry
Mr. R. Seeruttun
} *representing small planters*

MEMBERS RESEARCH ADVISORY BOARD

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
Mr. J. Leclézio
} *representing the Société de Technologie Agricole et Sucrière*

and the senior staff of the Research Institute.

STAFF

(As at 31.12.73)

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)
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	S. Dhayan
	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.)
Scientific Assistant	A. Bastide

Weed Agronomy

Weed Agronomist	G. McIntyre, BSc. (Lond.), Dip. Agr. (Maur.)
Scientific Assistants	J.C. Autrey
	J. Pitchen

Sugar Cane Agronomy

Chief Agriculturist ...	... G. Rouillard, Dip. Agr. (Maur.)
Senior Field Officer ...	... L. Thatcher, Dip. Agr. (Maur.)
Field Officers	... A.P.F. Chan Wan Fong, Dip. Agr. (Maur.)
	J.R. Moutia, Dip. Agr. (Maur.)

Food Crop Agronomy

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

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 Chemist	... 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 ...	... C. Cavalot
	Mrs. J. Gauthier
	I. Jhoty
	H. Maurice

Sugar Technology

Sugar Technologist ...	... J.T. d'Espagnet, 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 Technologist	... J.F.R. Rivalland, B.E. (Chem.) (Queensland)
Scientific Assistants ...	... M. Abel
	L. Le Guen
	R. Wan Sai Chong, Dip. Agr. (Maur.)

Agricultural Engineering

Agricultural Engineer ...	... L. Li Pi Shan, B.E. (Agr.) (Sask.), Dip. Agr. (Maur.), M. I. Agr. E., M.I. Mech. E., C. Eng.
Associate Agriculturist	... M. Hardy, Dip. Agr. (Maur.)
Technical Officer ...	... G. Mazery, Dip. Agr. (Maur.),
Senior Assistant (Soil Physics)	... P.Y. Chan, B.Sc., M.Sc. (Lond.), A.R.I.C.
Scientific Assistants ...	... D. Ah Koon
	L. d'Espagnac

Library

Librarian	... Madeleine Ly-Tio-Fane, B.A., Ph.D. (Lond.)

Draughtsmanship & Photography

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

Public Relations

Liaison Officer ... ... R. Ng Ying Sheung, Dip. Agr. (Maur.)

Administration

Secretary-Accountant ... ... P.G. du Mée
Asst. Secretary-Accountant ... P. Rivet
Clerks ... ... Mrs. P. Bégué
Mrs. J. Cavalot
Miss E. Cox
Mrs. M. Montocchio
Miss A. North-Coombes
Mrs. M.T. Rae
Telephonist ... ... Miss G. Morin

Also 22 Junior Technicians attached to various divisions.

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, and financed mainly by means of a cess on sugar borne by all cane growers. 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, Agricultural Engineering, and Sugar Technology. In addition there are three experimental stations in other climatic zones of the island.

In 1972, 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 composition of which became :

(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 at first borne uniformly by all sugar producers; it was subsequently increased for Miller-Planters and 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 13,985 volumes and the periodicals and reports that are received total 515 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.

In 1960, the library acquired a collection of rare literature on the flora of the Mascarenes consequent to the transfer of the Mauritius Herbarium to the Institute.

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.

The Mauritius Herbarium

The origin of the Mauritius Herbarium goes back to the early 19th Century. The first herbarium was housed in the Royal College, Port Louis, and 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 former 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 only change in the composition of the Executive Board for the year under review was the replacement of Mr. G.H. Wiehe by Mr. C. Rouillard as the representative of large planters.

Establishment

Resignations during the year were those of Mr. L.P. Noel, Liaison Officer, Mr. J. Desjardins, Assistant Secretary-Accountant, Mr. R. Kwok Tak Hing, Assistant Sugar Technologist, and Mrs. A. Williams, Clerk-Typist.

New appointments were those of Mr. L. Li Pi Shan as Head of the new Agricultural Engineering Division, Mr. P. Rivet as Assistant Secretary-Accountant, and Miss. E. Cox as Clerk-Typist.

Promotions were those of Mr. R. Ng Ying Sheung as Liaison Officer, Mr. A.P.F. Chan Wan Fong as field officer in charge of Union Park Experiment Station, Mr. S. Dhayan as Scientific Assistant, Plant Pathology Division, and Mrs. J. Cavalot as Clerk-Typist.

The creation of an Agricultural Engineering Division involved some reorganization of staff and the following officers were transferred to the new Division : Messrs. P.Y. Chan, D. Ah Koon and L. d'Espagnac from the Division of Soils and Plant Nutrition, and Messrs. M. Hardy and G. Mazery from the Division of Sugar Cane Agronomy. Mr. Hardy, however, continued to remain in charge of the Réduit Experiment Station.

Miss. M. Ly-Tio-Fane and Mr. A.R. Pillay were awarded the degree of Ph.D. by the Universities of London and Sydney, respectively. Mr. G. McIntyre was awarded the B.Sc. of London University.

Finance

The rate of cess, which had been uniform for all planters, had, in June 1972, been increased for miller-planters and to a lesser extent for large planters (producers of more than 5,000 tons of cane annually), and slightly reduced for small planters. As the decision could not have, legally, a retroactive effect on the 1971 crop, miller-planters and large planters had contributed voluntarily, in 1972, a large share of the additional funds. In 1973, Government provided the balance as a loan.

In December, the cess was again increased for miller-planters and large planters, the contribution for small planters remaining unchanged.

Technical Assistance

Messrs. D. Delanoe and G. Delavouet, the two agronomists whose services had been provided under the Franco-Mauritian Cultural and Technical Assistance Scheme, left the Institute in May and were replaced by Messrs. D. Jamin and B. Lévêque, who arrived in September. Both are graduates of the *Ecole Nationale Supérieure des Industries Agricoles et Alimentaires* and are attached to the Pathology Division. Mr. J.F. Klein, electronic engineer, who arrived in April and whose services are also provided by the Scheme, is attached to the Sugar Technology Division.

Mr. David Lorence, a U.S. Peace Corps Volunteer, who joined the Institute in 1969 is still attached to the Botany Division and Herbarium.

Building Programme

The building intended to house the Sections of Land Resources Survey and Draughtsmanship-Photography was started in July and was still under construction at the end of the year.

In July 1972, Mr. Jean Espitalier Noel, C.B.E., who had been Chairman of the Executive Board from 1966 to 1969, contributed Rs. 20,000 towards the construction of a building to house a permanent exhibition of the sugar industry of Mauritius. This building, which was started in May and completed in November, cost some Rs. 84,000, the balance being financed by the M.S.P.A., the Chamber of Agriculture and the Mauritius Sugar Syndicate, each contributing Rs. 13,333, and the M.S.I.R.I., which contributed Rs. 24,000.

Director's Missions

In August ,the Director visited Swaziland, Eastern Transvaal and Natal to obtain first-hand information on mechanization of loading and harvesting operations of sugar cane. He went on a similar mission to Réunion in September. He was accompanied on both occasions by Messrs Li Pi Shan and Mazery.

As Head of the Mauritian delegation, he attended the meeting of the *Comité de Collaboration Agricole, Maurice-Réunion-Madagascar*. He also attended the Congress organized by the *Association Réunionnaise pour le Développement de la Technologie Agricole et Sucrière*, both functions being held in Réunion Island in October.

In December, he went on a mission to the Seychelles Islands to advise on the prospects of sugar cane cultivation for fodder production.

Staff Movements

The following officers went on overseas leave during the year : Dr. R. Julien, Mr. P. Noel, Mr. L. Thatcher, Mr. M. Randabel, Mr. L.C.Y. Lim Shin Cheong, Mr. M.A. Rajabalee, Mr. S. Félix and Miss. M. Ly-Tio-Fane. All spent some of their time visiting research establishments, etc., and meeting specialists in their own fields of work.

Dr. Julien visited the Royal Botanical Garden, Kew, the *Museum National d'Histoire Naturelle*, Paris, and the *Conservatoire et Jardin Botanique*, Geneva; Mr. Randabel visited the Milling Research Institute, Durban, and the Schmidt & Haensch saccharimeter manufacturers, Germany; Mr. Fèlix visited the *Institut Français de la Pomme de Terre*, the Scottish Horticultural Research Institute, Dundee, Rothamsted Experimental Station, Harpenden, England, and other European agricultural research organizations; Mr. Rajabalee visited the Rodent Control Department of the U.K. Ministry of Agriculture, Fisheries and Food and Rentokil Ltd., England (a pest control firm); Mr. Thatcher visited the Bureau of Sugar Experiment Stations, Brisbane; Mr. Lim Shin Chong was granted an extended leave of one year to read for the M.Sc. at Reading University with the aid of a scholarship from the British Council; Miss. M. Ly-Tio-Fane visited the libraries of a number of research institutions in Europe, including those of the Philip Lyle Memorial Research Laboratory at Reading and of the *Museum National d'Histoire Naturelle*, Paris.

Mr. J.T. d'Espagnet and Mr. M. Randabel attended the 1st Congress of the *Association Réunionnaise pour le Développement de la Technologie Agricole et Sucrière* (ARTAS) held in Réunion in August.

Dr. C. Ricaud visited Madagascar in connection with cane disease problems, while Dr. J.R. Williams and Mr. H. Dove visited Réunion on entomological work.

Comité de Collaboration Agricole

The annual meeting of the *Comité* was held in Réunion in October to coincide with the 1st Congress of the *Association Réunionnaise pour le Développement de la Technologie Agricole et Sucrière* (ARTAS). The representatives from Mauritius at the meeting were Mr. R. Antoine, Director MSIRI, Mr. E. Sériès, President of the Mauritius Chamber of Agriculture, Mr. A. Wiehe, President of the *Société de Technologie Agricole et Sucrière de l'Ile Maurice*, Mr. T. Maigrot, President of the *Comité Central des Administrateurs*, Dr. S. Moutia, Ministry of Agriculture and Natural Resources, and Mr. P.G. du Mée, Secretary-Treasurer of the *Comité*.

Mr. R. Antoine, Regional Vice-Chairman of the *Comité* for Mauritius, was elected President of the *Comité* for 1974 and it was decided that the next meeting would be held in Mauritius in October of that year. It was also decided to admit the Comores Islands to participate in the *Comité*'s activities as a full member.

Dr. C. Ricaud visited Madagascar in April for a meeting of the Plant Pathology sub-committee.

Dr. J.R. Williams and Mr. H. Dove spent a week in Réunion in December, under the auspices of the *Comité*, to collect endemic insects of the group Fulgoroidea.

Personalia

The following visitors were welcomed at the MSIRI during 1973 : M. S.M. Abdullah, *Commissaire au Plan et au Développement*, Comores; Messrs. J. Bruijn and J. Murray, S.M.R.I.S., Africa; Dr. J.B. Butterworth, Vice-Chancellor, University of Warwick, England; M. H. Carsalade, *Directeur de l'Agriculture*, Comores; M. M. Chatel, *IRAT*, Madagascar; Messrs. C.F. Cooke and P. Hawkins, British Parliamentary Delegates; Mr. P.J.C. Dart, British Council, Mauritius; Messrs. B. Egan and B. Hitchcock, Bureau of Sugar Experiment Stations, Brisbane, Australia; Mr. R. Espinosa, *Institute de Cienca Agricola*, Cuba; Messrs. G. Evans and P. Mortloc, with young farmers from the U.K.; M. R. Grégoire, *Fonds Européen de Développement;* Messrs. R.C. Griffiths and J.M. Theakstone, Inter-University Council; Messrs. A.G. Hammond, J.L. du Toit and J. Wilson, S.A.S.A. Experiment Station, Mount Edgecombe, South Africa; Mr. A.W.E. Isherwood, Monsanto S.A., South Africa; Mr. R. Key, World Bank, Washington, D.C., U.S.A.; Mr. S.E. Kunz, FAO, Ministry of Agriculture and Natural Resources, Mauritius; Mr. H.D. Liliani, Shahada Sugar Factory, India; Mr. G.A. Muirhead, Ministry of Economic Planning and Development of Mauritius; Mr. J.P. O'Brien, British Council, London; Mr. R. Puri, Saraswati Sugar Mills, India; Mr. E.H. Roberts, University of Reading, England; M. & Mme. R. Rouxel, *Institut de Recherches sur le caoutchouc en Afrique*, Abidjan, Ivory Coast; M. J. Ruffier, *Sucrerie Bernard*, Réunion; M. H. Saragoni, *IRAT*, Réunion; Mr. Y. Simon, *Sucrerie de Namakia*, Madagascar; Mr. R.R. Smit, Royal Netherlands Embassy, Nairobi; M. O. Ramo, *Ministère du Développement Rural*, Comores; M. R. Vaubercie, *IRAT*, Paris; also twenty-one members of the Chamber of Agriculture and of the Extension Service of Réunion Island, sixteen delegates from the Sugar Technologists' Association of India, and delegates to the 2nd meeting of the Standing Conference of African University Libraries (Eastern Africa) accompanied by the Library Staff of the University of Mauritius.

Research Visitors and Study Groups

The following visitors spent some time working at the Institute or else called at the Institute on a few occasions while on mission to Mauritius during the year : Messrs. R. Bond, R. Harding and K. Nuss, Plant Breeding Division, S.A.S.A. Expt. Station, Mt. Edgecombe, South Africa; Messrs. S.K. Saied and I.A. Ashawi, Field Managers of Egyptian Sugar Estates; M. Yves Laissus, *Bibliothèque Centrale du Museum National d'Histoire Naturelle*, Paris ; Mr. J.E. Woolston, Director, Information

Sciences, International Development Research Centre, Canada; Messrs. M. Maphy and N. Kwame, *Sodosucre*, Côte d'Ivoire.

Aimé de Sornay Scholarship

The Scholarship was awarded in 1973 to a girl for the third consecutive year, namely to Miss Chandrani Jomadar, who came out fourth, with 68.5% 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 and Dr. Ricaud on the Senate, of the University of Mauritius.

Membership of various Committees and Boards of the University was as follows : Messrs. D. de R. de St. Antoine and d'Espagnet on the Sugar Technology Advisory Committee; Messrs. D. de R. de St. Antoine, d'Espagnet, Vignes and Rivalland on the Board of Examiners, School of Agriculture; Messrs. d'Espagnet and Rivalland on the Board of Examiners, School of Industrial Technology.

Lectures were delivered at the University by various members of the staff.

Representation on Boards and Committees by Members of Staff

Ancient Monuments and Nature Reserves Board
    Dr. Julien, Mr. Rouillard.

Board of Agriculture, Fisheries and Natural Resources
    Director.

Board of Directors, Mauritius Institute
    Director (Chairman), Messrs. D. de R. de St. Antoine and G. Rouillard.

Board of Examiners for the Registration of Agricultural Chemists
    Messrs. D. de R. de St. Antoine and Vignes.

Cane Release Committee
    Director (Chairman), Mr. Lalouette, Dr. Ricaud.

Comité, Société de Technologie Agricole et Sucrière de Maurice
    Director, Messrs. D. de R. de St. Antoine and Randabel.

Committee for the International Hydrological Decade
    Mr. Li Pi Shan.

Committee on the Manufacture of Concentrates based on bagasse and molasses
    Dr. Wong and Mr. d'Espagnet.

Conseil d'Administration, La Revue Agricole et Sucrière de l'Ile Maurice
    Director, Messrs. D. de R. de St. Antoine (President), Rivalland, Randabel.

Council, Royal Society of Arts & Sciences of Mauritius
    Director, Messrs. D. de R. de St. Antoine, Rouillard, Mamet, Ricaud, Dr. Ly-Tio-Fane.

Food Crops Insurance Committee
    Mr. Mamet.

Irrigation Committee
    Mr. Mazery.

Livestock Committee, Chamber of Agriculture
    Dr. Wong.

Mauritius National Commission for UNESCO
    Dr. Julien (Science Sub-Committee), Dr. Ricaud (Man and the Biosphere Sub-Committee).

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

Messrs. D. de R. de St. Antoine (Chairman) and Vignes.

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

Director (Chairman) and Dr. Julien.

Plant Introduction and Quarantine Standing Committee

Drs. Williams and Ricaud.

Permanent Advisory Committee for the Royal Botanical Gardens, Pamplemousses

Dr. Julien.

Pesticides Control Board

Dr. Williams.

The Director remained as Regional Vice-Chairman of the International Society of Sugar Cane Technologists.

Television Talks

Television talks for small planters, delivered by the staff of the MSIRI, were started in 1971 with eleven weekly programmes each lasting about 15 minutes. Owing to the interest they aroused, they have become a regular annual feature and in 1973 twelve were devoted to various aspects of sugar cane cultivation and 6 to the growing of food crops. Many viewers subsequently wrote for further information. A booklet embodying the substance of these talks is in preparation for distribution to small planters.

Lectures and Meetings at Head Office

11th January — G. STRIDE (Project Manager, U.N. South Pacific Commission Rhinoceros Beetle Research Project). The activities of the Coconut Rhinoceros Beetle Project in Western Samoa and recent developments in the control of the beetle. [2]

10th May — HENRI CORNU. *Histoire des Dames de Bourbon.* [1]

12th June — R. ANTOINE. *Revue des travaux du MSIRI en 1972.*

19th June — J.T. d'ESPAGNET. *Revue des travaux de la Division de Technologie sucrière en 1972.*

17th July — C. RICAUD, S. FELIX. *La production de semences saines de Pommes de Terre à Maurice.*

21st August — J.A. LALOUETTE. *Multiplication de cannes en prè-homologation.*

18th September — Y. WONG YOU CHEONG. *La fertilisation de la canne à sucre.*

9th October — R. ANTOINE. *Bilan des travaux accomplis au MSIRI sur la diversification agricole en terres de canne à sucre ces cinq dernières années.*

10th October — E.M. HINE. (President of the National Planning and Construction Corporation, Florida). The storage of thick cane juice. [3]

8th November — Committee for cane mechanisation. Mechanical cane loading.

20th November — J.R. WILLIAMS. Efforts to control the sugar cane scale insect biologically.

5th December — N. BROUARD. *Les forêts du Gabon.* [1]

18th December — R. ANTOINE. *Les variétés de canne à sucre.*

(1) Meeting under the auspices of the Royal Society of Arts and Sciences

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

(3) Meeting under the auspices of the *Société de Technologie Agricole et Sucrière de l'Ile Maurice.*

Library Affairs

His Excellency, M. R. L. Touze, French Ambassador, presented to the library a collection of books on horticulture and on crops other than sugar cane.

Mr. L.H. Garthwaite also kindly donated a collection of books and periodicals on the sugar industry.

Progress was made with the cataloguing of sugar publications, which is a joint venture with the *Institut fur Zuckerindustrie*, Berlin. Other libraries, including that of the Philip Lyle Memorial Research Laboratory, Reading, have agreed to participate. The 1st number of the *Current Awareness List* (July-September 1973) was issued.

The library was visited during the year by delegates to the 2nd Meeting of the Standing Conference of African University Libraries (Eastern Africa).

Publications

ANTOINE, R. (1973). Diversification agricole en terres de cannes à sucre. Bilan des travaux, 1968-1973. *Tech. Circ. Maurit. Sug. Ind. Res. Inst.* **39** : 50 + VI pp. (mimeo).

The research conducted during the period 1968-1973 on crop diversification on sugar cane lands is described in full. The objective of the research is defined as the maximum utilization of cane lands by the growing of various crop plants in cane interrows and on cane land between cane cycles without reducing yield of sugar per unit area. The crop plants considered are potato, groundnut, maize, ginger, soya and other legumes, and tomato.

ANTOINE, R., COUACAUD, C., LI PI SHAN, L., MAZERY, G. and PILOT, L. (1973). Report on a mission to Natal, Eastern Transvaal, Swaziland and Réunion Island to study the mechanical operations connected with the harvesting, loading and transport of the sugar cane crop. *Priv. Circ. Rep. Maurit. Sug. Ind. Res. Inst.* **27** : 30 pp. (mimeo).

FELIX, S. (1973). Une méthode de lutte contre le flétrissement bactérien et les anguillules de la tomate. *Revue agric. sucr. Ile Maurice* **52** (1) : 12-14.

Two major diseases of tomato in Mauritius are bacterial wilt (*Pseudomonas solanacearum*) and root-knot (*Meloidogyne* spp.). Both can be controlled by grafting suitable tomato scions on *Solanum torvum*, a highly resistant rootstock, using the tongued graft method. Grafted plants also show tolerance to conditions of high humidity.

JULIEN, M.H.R. (1973). Physiology of flowering *Saccharum*. 1. Daylength control of floral initiation and development in *S. spontaneum* L. *J. exp. Bot.* **24** : 449-557.

Flowering in two clones of *Saccharum spontaneum* L. is controlled by photoperiod. The earliest stages of development, 'induction' and 'initiation of the inflorescence axis primordium' (IAP), were optimally promoted under intermediate days of 12h30 min, while the subsequent stage 'initiation of inflorescence branch primordia' (IBP) was inhibited by days longer than 13h. The following stage 'initiation of spikelet primordia' (ISP) showed a quantitatively intermediate response with an optimum photoperiod of 9 h to 11 h. The elongation of the differentiated inflorescence was found to be only slightly sensitive to photoperiods of 13 h or longer in one of the clones. Unfavourable photoperiods at stages following induction resulted in the arrest or delay of inflorescence development and when these were given during the IAP and IBP stages, reversion to the vegetative condition commonly occurred.

PILLAY, A.R. & MAMET, J.R. (1973). Adaptability of commercially grown potato varieties tested in different locations and seasons (1969 and 1970). *Revue agric. sucr. Ile Maurice* **52** (2) : 78-83.

Statistical methods were used to assess yield performance of commercially grown potato varieties. *Up-to-Date* was found to be the most desirable variety with general adaptability. Results obtained were also compared with data from commercial plantations in 73 locations.

TURSAN D'ESPAGNET, J. (1973). Review of performance of sugar factories in 1971 and 1972. *Revue agric. sucr. Ile Maurice* **51** (2) : 53-58.

The performance of sugar factories in 1971 and 1972 is discussed in relation to equipment installed.

TURSAN D'ESPAGNET, J. (1973). Modification of Rietz varigrator to reduce maintenance costs. *Revue agric. sucr. Ile Maurice* **52** (3) : 118-119.

A simple modification to the Rietz varigrator enabling replacement of original bearings by cheaper ones and embodying effective protection and lubrication of bearings is described.

VAUGHAN, R.E. & AUTREY, J.C. *Weeds of Mauritius*. Leaflet **12**; 17 — *Ageratum conyzoides* Linn. (Herbe bouc, goat weed), 18 — *Ageratum houstonianum* Mill. May 1973, 5 pp., 1 pl. Leaflet **13**; 19 — *Paederia tomentosa* Blume var. *glabra* Kurz. (Liane lingue), May 1973, 5 pp., 1 pl. Leaflet **14**; 20 — *Laurentia longiflora* (L.) Endl. (Lastron blanc). May 1973, 4 pp., 1 pl.

WILLIAMS, J.R. & DOVE, H. (1973). Aphid vectors of potato viruses in Mauritius. *Revue agric. sucr. Ile Maurice* **52** (3) : 104-111.

Aphids in Mauritius seldom cause direct injury of any importance to potato crops but as potential vectors of virus diseases they are significant factors in the context of the recently implemented scheme for local production of seed potatoes. A survey revealed four species occurring on potatoes, namely *Myzus persicae*, *Macrosiphum euphorbiae*, *Aulacorthum* sp. prob. *solani*, and *Aphis gossypii*. The known abilities of these species as disease vectors elsewhere, and a local experiment to obtain data on their incidence in different climatic areas, indicated that the potentially important species are *M. persicae* and *M. euphorbiae*. Both species are apparently least numerous on potatoes in upland localities, particularly early in the crop season.

WILLIAMS, J.R. & GREATHEAD, D.J. (1973). The sugar cane scale insect *Aulacaspis tegalensis* (Zhnt.) and its biological control in Mauritius and East Africa. *Pest Artic. & News Summ.* (PANS) **19** (3) : 353-367.

The importance of *A. tegalensis* as a pest of sugar cane is described with particular reference to Mauritius and East Africa, where severe infestations have occurred in recent years. The factors that influence the insect's dispersal, distribution, and populations, are discussed. Cultural methods of control, including the use of resistant varieties, are of value but are not entirely effective or not always practicable. Work on biological control has involved studies of parasites and predators in the Mascarenes, Madagascar, East Africa, Indonesia and Australia and the known species and their distribution are tabulated. The introductions of parasites and predators that have been made in Mauritius and East Africa, and the results of these introductions as far as they can yet be assessed, are described.

WONG YOU CHEONG, Y. and CHAN, P.Y. (1973). Incorporation of P^{32} in phosphate esters of the sugar cane plant and the effect of Si and Al on the distribution of these esters. *Pl. Soil* **38** : 113-123.

Good separation of phosphate esters labelled with P^{32} was obtained on paper-chromatography using the ascending technique in two dimensions at right angles.

The pattern of phosphate esters in chromatographic resolution was similar for both the roots and leaves of sugar cane but there were differences in the relative proportions of the individual esters. Significant amounts of some esters, of which G-6-P constituted the bulk, were labelled and identified after brief incubation of excised roots in the radioactive phosphate solution.

Although Al pre-treatment at the level of 0.5 M $Al_2(SO_4)_3$ stimulated labelled phosphate uptake, there was no effect on the extent of phosphorylation. With Si pre-treatment, however, a significant increase in the degree of phosphorylation was noted although no effect was obtained on labelled phosphate uptake.

WONG YOU CHEONG, Y., HEITZ, A. and DEVILLE, J. (1973). The effect of silicon on sugar cane growth in pure nutrient solution. *J. Sci. Fd Agric.* **24** : 113-115.

Si, supplied as silicic acid, significantly increased cane yields of two sugar cane varieties growing in pure nutrient solution and the sucrose yield of one variety. "Leaf freckling" symptoms only developed on those plants not receiving Si.

Acknowledgements

It is a pleasure to acknowledge the active assistance of Sugar Estate personnel without which much of the experimentation described in this report would not have been possible. The Estate Agronomists have, in particular, greatly aided the conduct of field trials and their collaboration was otherwise of much practical value. The cooperation of the Permanent Secretary, Ministry of Agriculture and Natural Resources, and of the Chief Agricultural Officer and staff of the Agricultural Services has also been invaluable. Finally, the advice and support of the Chairman and Members of the Executive Board and the loyalty and efficiency of the staff is acknowledged with gratitude.

Director

Technical Report

GENERAL

Plate 1. Soil erosion in cane plantation on steep slopes.

TECHNICAL REPORT

GENERAL

Land use recommendations

At the request of the Ministry of Agriculture and Natural Resources, the requirements for derocking and the appropriate frequency and intensity of irrigation of lands within the Northern Plain Irrigation Scheme were assessed.

Discussions on land suitability and land use were held with consultants of the Sugar Mechanical Pool and Sores Incorporated Montreal under the auspices of the Commonwealth Fund for Technical Aid. Data on these subjects were also provided.

On behalf of Savannah S.E., a study of land characteristics, and of cultural practices that should be adapted to land characteristics, was started at Joli Bois with the object of improving yields of sugar cane in that region.

An assessment was also made of the suitability of the area known as Beau Thé at Mon Désert Alma S.E. for the growing of tea. This study was carried out with the help of the Estate Agronomist.

A study of the area occupied on cane lands by rounded rock piles and rock walls was made during the year using aerial photographs. Measurements from the photographs were checked by field work. It was found that, according to the degree of rockiness, a gain of 3-14% in cultivable land would result from changing rock walls into rounded rock piles owing to the height of the latter and the greater volume of rock they accommodate per unit area.

Data on cane yield were obtained from the field trials that had been laid down on the different landforms at Chamarel. As expected, the average yields of cane and sugar were greater on the lower slopes than on the upper, steeper slopes and on the summital tops but there was no significant difference in the productivity of the two last. A highly significant response to silicon was obtained at all sites.

Following a request from Constance S.E., the distribution of the various lava flows in the Eastern Coastal Region was defined by interpretation of aerial photographs and the results were checked by ground observations.

Mapping services were provided to the World Bank Mission in Mauritius for the preparation of land utilization maps.

Soil moisture characteristics

The compilation of the moisture characteristics of Mauritian soils, started in 1972, was completed for the following soil groups : Low Humic Latosols, Humic Latosols, Humic Ferruginous Latosols, Latosolic Reddish Prairie, Latosolic Brown Forest, Dark Magnesium Clays, Grey Hydromorphic and Regosols.

Soil water retention capacities were determined for two more sugar estates in connection with development of irrigation.

SUGAR CANE

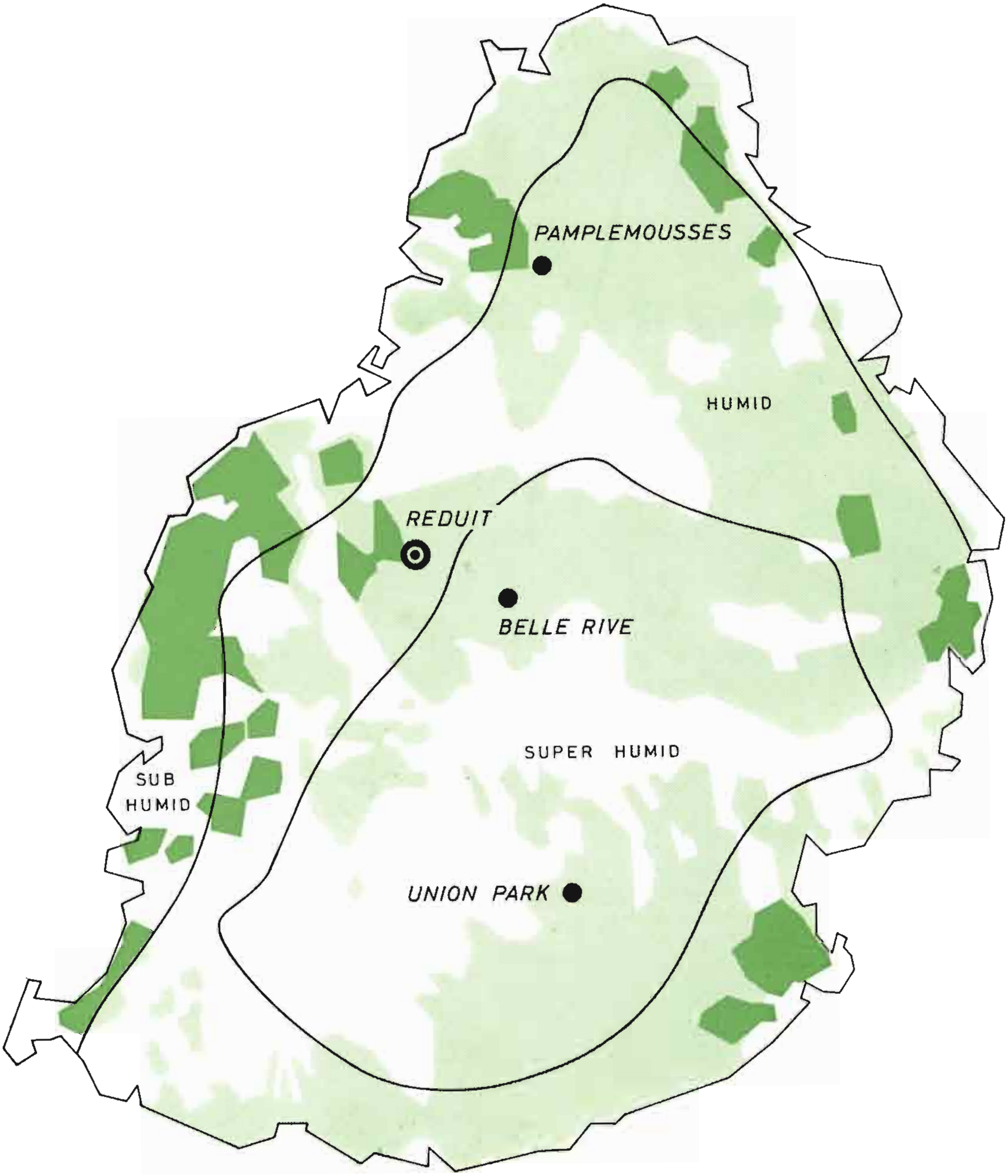


Fig 1. The three main climatic zones, the sugar cane areas (light green, non-irrigated ; dark green, irrigated), and the location of Sugar Experiment Stations.

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°
	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	1408	1601	880	1230	487
	occasional	—	437	540	320	—
Surface	intensive	3269	490	287	996	568
	occasional	390	1160	184	160	320
Area (1000 ha)	Total	24	38	30	68	27
	Under cane	6	23	22	26	10
Cane production, 1973 (1000 tonnes)		464	1591	1478	1947	763
Sugar production, 1973 (1000 tonnes)		58	180	166	226	90

SUGAR CANE

The 1973 crop

Weather during the 1973 crop was exceptionally good in the growing period and favourable 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, March and June, close to normal in January and below normal during the other months, particularly in April. Total rainfall for the period was 1740 mm. Temperatures were above normal from December to May, and close to normal in November and June.

Intense tropical cyclone *Ariane* passed at 80 km North East of Mauritius on the 30th November 1972, causing heavy rains. Sustained winds of up to 64 km/hr were experienced but caused no damage to the young crop.

During the maturation period from July to October, rainfall was below normal except in August when it was above normal. Total rainfall for the period was 338 mm. Mean minimum temperatures were slightly above normal except in September when they were slightly below normal.

On the whole, climatological conditions were therefore very favourable during the crop year and led to a record crop.

Details of the 1973 crop, of weather during the crop year, and of the varieties cultivated, are given in Table 1 and Figs. 2-6.

Table 1. The 1973 crop

	1973		*1972*	
Area cultivated, hectares*	87,366	(207,029)	86,600	(205,242)
Area harvested, hectares* :				
Miller-Planters	43,660	(103,459)	43,383	(102,818)
Planters	37,289	(88,363)	36,849	(87,332)
Total	80,949	(191,822)	80,232	(190,150)
Weight of canes, tonnes	6,242,631		6,314,667	
Tonnes cane per hectare* :				
Miller-Planters	88.4	(37.3)	90.1	(38.0)
Planters	64.0	(27.0)	65.2	(27.5)
Average, Island	77.0	(32.5)	78.7	(33.2)
Commercial sugar recovered % cane	11.51**		10.87***	
Tonnes sugar per hectare				
Miller-Planters	10.17	(4.29)	9.79	(4.13)
Planters	7.37	(3.11)	7.09	(2.99)
Island	8.89	(3.75)	8.55	(3.61)
Total duration of harvest (days, Sundays and public holidays excluded)	163		164	
Sucrose % cane	13.05		12.33	
Fibre % cane	13.27		12.87	
Tonnes sugar 98.5° pol	719,928		687,885	

* Equivalent figures for arpents are given in brackets

** Equivalent to 8.7 tonnes of cane per tonne of sugar

*** Equivalent to 9.2 tonnes of cane per tonne of sugar

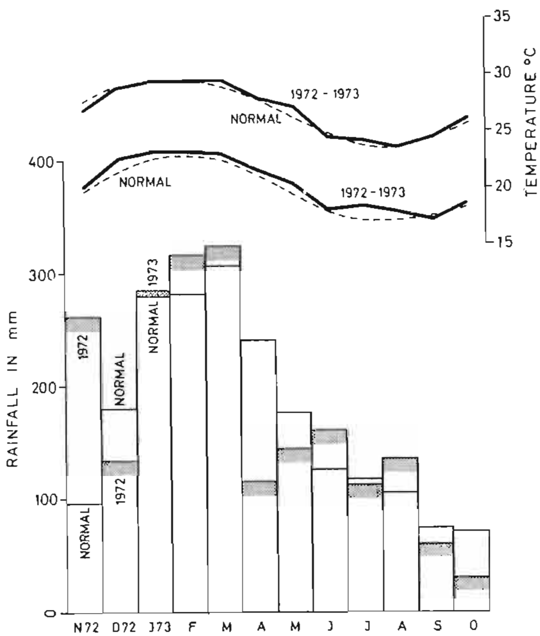


Fig. 2. Average rainfall, and maximum and minimum temperatures, over the cane area in 1973 compared to normal.

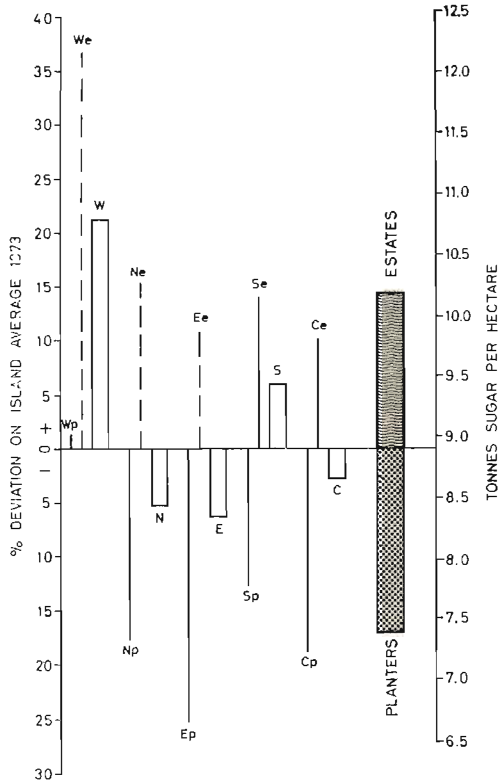


Fig. 3. Relative yields of sugar/ha in different sectors. Average island yield 8.89 tonnes of 98.7° pol sugar/ha (3.75 tonnes/arp.). Plain lines, planters; broken lines, estates; columns, sector averages.

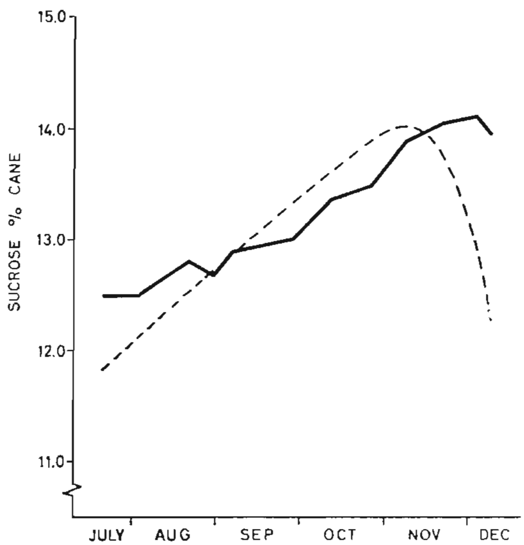


Fig. 4. Variation in sucrose % cane during the harvest season of 1973 (plain line) compared to the 1968-1972 average (broken line).

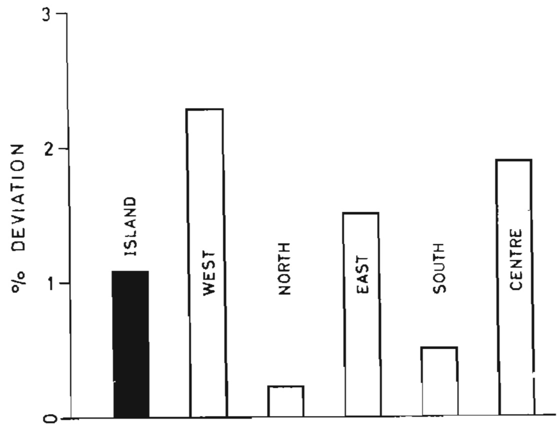


Fig. 5. Sugar manufactured % cane in 1973 for the various sectors expressed as % deviation from the 1968-1972 average.

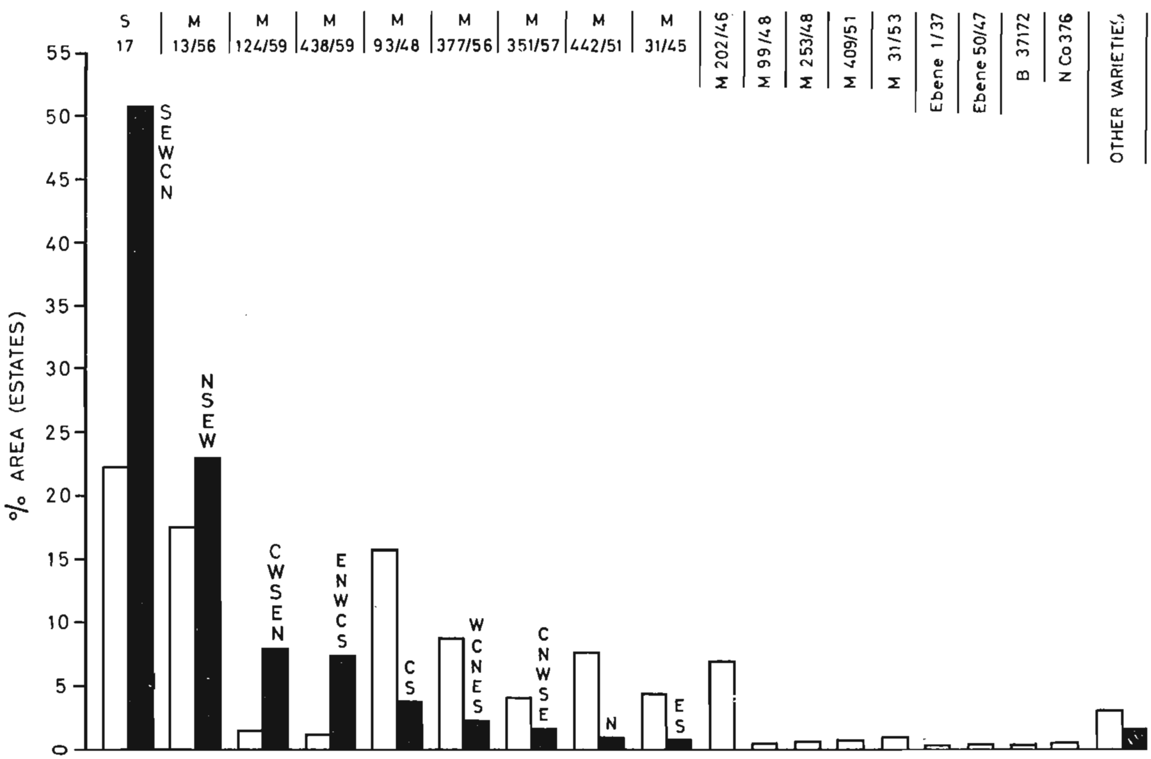


Fig. 6. Varietal trend in 1973 as illustrated by area under cultivation (plain columns) and area planted during the year (black columns). Letters denote sectors arranged in descending order of magnitude of plantations.

BREEDING AND VARIETIES

Crossing

The crossing period lasted from May 11th to July 24th. The number of crosses made was 1355 and they involved 1122 combinations and 201 parents, the latter comprising 60 clones as male, 111 as female, and 30 as both male and female. The nobilization programme accounted for 150 crosses involving 132 combinations. As in previous years, the number of seedlings produced exceeded requirements and an initial random discard was accordingly made from every combination that yielded more than about 500 seedlings, the remainder being transplanted as 2 bunches of 3 per location. Fuzz from repeated crosses and from crosses expected to produce many seedlings was divided into two, half being sown and half stored or used for re-sowing if germination was poor.

Selection

A summary of the preliminary phases of variety testing in 1973 is given in Table 2.

Table 2. Summary of variety testing in 1973. Preliminary phases

	Stage	*Series*	*Crop Cycle*	*Different varieties*	*Total locations*
		(i) Stages measured & selected			
1.	Seedling	M/71	Plant cane	39,493	19,787
2.	Bunch Selection Plot	M/70	Plant cane	15,591	15,591
3.	Propagation Plot	M/68	1st ratoon	2,130	3,710
4.	First Selection Trial	M/64	2nd ratoon	164	182
		Total measured & selected		*57,378*	*39,270*
		(ii) Stages measured			
3.	Propagation Plot	M/69	Plant cane	2,145	3,449
4.	1st Selection Trial	M/67	Plant cane	81	86
	,, ,,	M/66	Plant cane	83	88
	,, ,,	Foreign	Plant cane	27	54
		Total		*191*	*228*
	1st Selection Trial	M/66	1st ratoon	167	184
		Foreign	1st ratoon	18	36
		Total		*185*	*220*
		Total measured		*2,521*	*3,897*
		(iii) Stages planted			
1.	Seedling	M/71		55,393	20,470
2.	Bunch Selection Plot	M/71		17,441	17,441
3.	Propagation Plot	M/70		2,298	3,609
4.	1st Selection Trial	M/68		113	120
	,, ,,	Foreign & named		1	1
		Total		*114*	*121*
5.	1st Multiplication : MI	M/64		28	28
		Total planted		*75,274*	*41,669*
		Grand Total		*135,173*	*84,836*

About 2 ha (5.0 arp) of multiplication plots containing 54 varieties and 7 standards were established at Médine. Four varieties were also planted in the first nurseries (M3) and occupied about 1.5 ha (3.5 arp). All planting material used for M 1 and M 2 received a short hot water treatment (52°C/20 min), while material for M 3 was given the long treatment (50°C/2 hr). The whole of the M 3 nursery was planted in June, the setts being obtained from M 1 and M 2.

Eight sites were selected for M 4 and M 5 nurseries. The total area planted to each variety at each site was proportional to the area under cane in the factory zones which a given site represents. This will facilitate delivery of planting material by accommodating regional requirements. The areas planted to each variety at the M 4 and M 5 stages at the various sites are shown in Table 3.

Table 3. Areas (ha) of M 4 & M 5 Nurseries established on Estates in 1973

Nursery Site	*M 5*		*M 4*				*Total*
	M 1453/59	M 555/60	M 537/57	M 738/59	M 702/60	Triton	
Beau Champ	1.75	1.73	0.16	0.18	0.16	0.16	4.14
Belle Vue	3.17	4.03	0.11	0.35	0.43	0.32	8.41
Benares	1.43	0.93	0.06	0.10	0.15	0.17	2.84
F.U.E.L.	1.69	1.10	0.11	0.14	0.14	0.21	3.39
Médine	1.10	0.68	0.10	0.11	0.11	0.10	2.20
Mon Désert	1.24	1.75	0.30	0.12	0.18	0.22	3.81
Mon Trésor	2.36	1.69	—	0.14	0.18	0.06	4.43
Riche en Eau	1.31	1.18	0.09	0.13	0.26	0.26	3.23
TOTAL	14.05	13.09	0.93	1.27	1.61	1.50	32.45

1st Testing : T1

Two series of 4 trials each were planted in 1973. In one series, the trials were laid out as 5 × 5 lattice squares with 3 replications and included 19 varieties, in the other, the trials were 4 × 4 triple lattices and included 11 varieties. Table 4 gives details of varieties undergoing testing at stage T1.

Table 4. Varieties planted in 1st test : T1

Varieties	**1970**	**1971**	**1972**	**1973**	*Total*
M 59	1	—	—	—	1
M 60	1	—	—	—	1
M 61	9	1	—	—	10
M 62	4	25	—	—	29
M 63	—	—	14	13	27
M 64	—	—	—	9	9
Sub total	*15*	*26*	*14*	*22*	*77*
Foreign	6	2	4	8	20
Total	*21*	*28*	*18*	*30*	*97*
No. of series	1	2	1	2	6
No. of trials	4	8	4	8	24

2nd Testing : T2

One series of 4 trials was planted, the trials being laid out as 4 × 4 balanced lattices with 5 replicates and including 10 varieties. Table 5 gives details of varieties undergoing testing at stage T2.

Table 5. Varieties planted in 2nd test : T2

Varieties	1970	1971	1972	1973	*Total*
M 54	—	1	—	—	1
M 55	3	2	—	—	5
M 56	6	—	—	—	6
M 57	3	3	—	—	6
M 58	1	2	—	—	3
M 59	—	6	—	—	6
M 60	—	6	2	—	8
M 61	—	1*	4	1	6
M 62	—	—	1	8	9
Sub Total	*13*	*21*	*7*	*9*	*50*
Foreign	1	1	2	1	5
Total	*14*	*22*	*9*	*10*	*55*
No. of series	1	2	1	1	5
No. of trials	4	8	4	4	20

* Variety M 907/61 was planted in 1969 in 2nd test F. & in 1971 in 2nd test E.

3rd Testing : T3

Ten paired trials were planted. As usual, one trial of each pair will be for harvest in the first half of the crop period and the other for harvest in the 2nd half of the crop period. These trials were laid out as randomised blocks of 12 treatments with 3 replicates and they include 5 varieties. Table 6 gives details of varieties undergoing testing at stage T3 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	1973	*Total*
M 53	1	—	1	—	2
M 54	—	—	1	—	1
M 56	1	—	—	—	1
M 57	1*	—	2	—	3
M 59	2**	—	1	2	5
M 60	—	—	—	2	2
M 61	1†	—	—	†	1
Sub Total	*6*	—	*5*	*4*	*15*
Foreign	2***	—	—	—	2
Total	*8*	—	*5*	*4*	*17*
No. of series	2	—	2	2	6
No. of trials	30	—	18	20	68

* M 351/57 released 18.9.70
** M 124/59, M 438/59, released 29.12.71
*** S 17 included here, was released on 28.8.70
† M 907/61 planted at this stage in 1970 was replanted in 1973

Table 7. Varieties in the final phase of testing

Varieties	1963—1969	1970	1971	1972	1973	*Total*
Planted T1	—	21	28	18	30	97
Under testing at later stages	51	—	—	—	—	51
Total	*51*	*21*	*28*	*18*	*30*	*148*
Released	4	—	—	—	—	4
Discarded	9	5	1	7	—	22
Net Selectionable	38	16	27	11	30	122

Trials planted in 1969 at the T1 and T2 stages were harvested in 3rd ratoons. A summary of results is presented in Table 8.

Table 8. Varieties planted in 1969 at stage T1 and harvested in 3rd ratoon

Varieties planted 1969	55
Varieties released	4
Varieties previously discarded	1
Varieties discarded	36
Varieties that can be considered for selection	14

Varieties that can be considered for selection

Varieties	*Parent*			*Gumming Disease Rating**	*Further testing* T2	T3	*Multiplication* M 4	M 5
M 356/53	E 1/37	x	Co 290	O	—	70	—	—
M 361/53	E 1/37	x	Co 290	P	—	72	—	—
M 357/54	E 1/37	x	Co 419	P	—	72	—	—
M 144/56	M 241/40	x	M 147/44	O	—	70	—	—
M 260/59	NCo 376	x	M 213/40	P	—	72	—	—
M 496/59	NCo 310	x	M 213/40	O	—	73	—	—
M 1453/59	NCo 310	x	M 147/44	O	71	73	72	73
M 555/60	M 241/40	x	M 213/40	O	71	73	72	73
M 571/60	M 146/56	x	NCo 310	O	72	—	—	—
M 702/60	NCo 376	x	M 147/44	P	71	—	73	—
M 861/60	NCo 376	x	M 442/41	P	71	73	72	—
M 907/61	M 202/46	x	47R2777	O	71	70,73	72	—
M 1078/61	NCo 376	x	M 147/44	P	72	—	—	—
M 1189/61	PR 1000	x	47R2777	P	72	—	—	—

* O = Signs of susceptibility observed, reaction of variety needs confirmation
P = No signs of susceptibility observed yet

Varieties discarded

B 49119	M 384/59	M 350/60	M 857/60
M 305/51	M 624/59	M 391/60	M 870/60
M 428/51	M 646/59	M 467/60	M 941/60
M 359/53	M 856/59	M 527/60	M 958/60
M 346/54	M 1006/59	M 554/60	M 962/60
M 16/57	M 1016/59	M 574/60	M 963/60
M 361/57	M 1415/59	M 582/60	M 283/61
M 62/58	M 1419/59	M 584/60	M 1230/61
M 65/59	M 1436/59	M 635/60	M 1239/61

Approved cane varieties

The cane varieties officially proclaimed for commercial cultivation as at 16th April, 1974, are given below :

Varieties	*Proclamation*	*Cane Release Advisory Committee Meeting*
B 37161	12 (*1953*)	26. 3.53
B 37172	12 (*1953*)	26. 3.53
E 1/37	5 (*1951*)	3. 4.51
E 50/47	18 (*1962*)	29.12.61
M 134/32	10 (*1946*)	1937
M 134/32 striped	5 (*1956*)	16.12.55
M 134/32 white	5 (*1956*)	16.12.55
M 31/45	5 (*1956*)	13.12.55
M 202/46	13 (*1960*)	8.12.59
M 93/48	13 (*1960*)	8.12.59
M 99/48	20 (*1966*)	12. 2.65
M 253/48	18 (*1962*)	29.12.61
M 409/51	20 (*1966*)	24. 5.66
M 442/51	20 (*1966*)	18. 2.64
M 13/53	20 (*1966*)	24. 5.66
M 13/56	20 (*1966*)	24. 5.66
M 377/56*	3 (*1967*)	15.12.66
,,	8 (*1972*)	—
,,	4 (*1974*)	18. 1.74
M 351/57	8 (*1972*)	18. 9.70
M 124/59	8 (*1972*)	29.12.71
M 438/59	8 (*1972*)	29.12.71
NCo 376	20 (*1966*)	24. 5.66
S 17	8 (*1972*)	28. 8.70

* Approved for commercial cultivation in 1967, withdrawn in 1972, approved again in 1974.

Characteristics of major varieties

The broad characteristics of the major commercial varieties are as follows :

Variety	*Sugar content (general level)*	*Optimum harvest period for sugar/unit area*
M 31/45	Low	Late
M 93/48	Low	Late
M 13/56	Low	None
M 377/56	Average	Late
M 351/57	Very Low	Late
M 124/59	Average	Late
M 438/59	Average	None
S 17	Very high	None

The general suitability of the major commercial varieties for different regions is shown below, the regions being defined by soil type rather than by rainfall as in former years. The varieties for each region are given in the apparent optimum order of harvest for maximum sugar yield.

Low Humic Latosols, irrigated	S 17, M 13/56, M 377/56, M 124/59
,, ,, ,, low altitudes	M 438/59, S 17, M 13/56, M 377/56
,, ,, ,, high altitudes	M 438/59, S 17, M 377/56, M 124/59, M 93/48
Humic Latosols	M 438/59, M 13/56, M 377/56, S 17, M 124/59
Humic Ferruginous Latosols	S 17, M 438/59, M 377/56, M 124/59
Latosolic Brown Forest	S 17, M 93/48, M 438/59, M 124/59
Latosolic Red Prairie	M 438/59, S 17, M 377/56, M 13/56

Quarantine and export of varieties

The 29 varieties imported in 1972 remained in quarantine throughout the year. Their quarantine period is due to end in 1974.

Cane varieties were exported to the following countries : Brazil (8), Madagascar (8), Malawi (8), Malaysia (15), Mozambique (5), Central African Republic (10), Taïwan (10), U.S.A. (5).

Miscellaneous

The variety collection at Réduit was replanted and all planting material received the long hot water treatment (50°C/2 hr).

AGRONOMY AND PLANT PHYSIOLOGY

Plant nutrition

Nitrogen and potassium

To study the nutrient requirements of newly-released varieties, fertilizer-maturation trials were laid down with 3 levels of nitrogen (60, 120, 180 kg N/ha) and 3 levels of potassium (60, 180, 300 kg K_2O/ha). Two, with 3 dates of planting and harvesting, respectively, were laid down on Low Humic Latosols and three, with only 2 dates of planting and harvesting, were laid down on both Humic Ferruginous Latosols and Latosolic Brown Forest Soils.

The field trials laid down in 1968 to compare sulphate of ammonia with calcium ammonium nitrate were continued.

The yield responses to potassium obtained in plant cane were also obtained in 1st ratoon in the 1971 series of trials. Soil sampling and analysis showed that even the lowest level of potassium applied (70 kg/ha) caused an increase in the level of extractable potassium in the more potassium-deficient soils.

Silicon

Soil samples were again taken in the 1967 calcium silicate trials which were, in 1973, in the final year of their first cycle. Correlations worked out between silicon content of soil and of leaves enabled the establishment of a soil threshold of 182 kg Si/ha as the level below which a net return can be expected following application of calcium silicate. Figures for soil Si and pH, as means of all sites for the 3 separate samplings made during the first cycle are given in Table 9.

Table 9. Soil Si and pH values obtained from 1967 calcium silicate trials

	1968		1970		1973	
Treatment	kg Si/ha	pH	Kg Si/ha	pH	kg Si/ha	pH
None	145	5.0	119	5.0	123	4.9
7.1 T. $CaSiO_3$/ha	931	6.0	249	5.5	225	5.4
14.2 T. $CaSiO_3$/ha	1936	6.5	455	5.9	346	5.7
9.5 T. Sand/ha	228	6.0	178	5.7	175	5.5

Soil analysis

Laboratory facilities were provided to estate chemists for the determination of phosphorus (1142 samples), silicon (597 samples), pH (576 samples) and potassium (521 samples) in soils.

Foliar diagnosis

Weather at the beginning of the year was ideal for leaf sampling and samples were received from all sugar estates, many of them carrying out 2 or 3 samplings on each sampling unit. The total number of samples received was 674,611 from sugar estates and 63 from large planters. The percentage deficiencies were N 35.1‰, P 6.1‰, K 45.9‰ and Si 11.6‰.

An analysis of potassium deficiencies and soil type showed that over half the samples from Low Humic Latosols and Latosolic Reddish Prairie had leaf values below 1.20‰ K, whereas the opposite held for Humic Latosols, Latosolic Brown Forest soils and Humic Ferruginous Latosols. However, the threshold of 1.20‰ K has not been established conclusively and the picture is further complicated by periods of water stress in the first two of these soil groups. Trials with different levels of potassium (0-180 kg K_2O/ha) were placed throughout the island in 1971 and will enable the optimum leaf levels for each soil type to be established.

Age corrections in foliar diagnosis

Leaf samples were taken from 10 trials of the Agro. 68 Final Variety Series at 3 dates, in late January, February and March, and from plots that had been harvested early, mid-way and late in the previous crop season. Samples from 4 varieties (S 17, NCo 376, M 93/48, M 442/51) were combined before analysis. The results were considered together with those obtained in 1972.

Nitrogen, phosphorus, manganese and sulphur levels in the leaf decreased with increasing age of the cane. Potassium, calcium and magnesium levels did not vary. Silicon and chlorine levels decreased with the date of leaf sampling but did not vary with harvest date.

In routine analysis of samples from permanent sampling units, no age correction is necessary for K. The age corrections for nitrogen and phosphorus are :

Age (months)	2 1/2	*3*	*4*	*5*	*6*	*7*	*8*	*9*
N	—0.26	—0.17	—0.05	0	+ 0.02	+0.08	+ 0.04	+ 0.05
P	—0.015	—0.011	—0.005	0	0.002	+ 0.005	+ 0.007	+ 0.008

Irrigation

Overhead irrigation

The 4 experiments laid down in 1972 to determine the water regime giving the most profitable return and the effect of moisture stress on sucrose content were harvested. The differences in cane yields that were expected were not evident, probably as a result of the favourable distribution of rainfall during the growing season. Two of the experiments are being continued : that at Guibies on Dark Magnesium Clay, where drainage created problems, was abandoned while the experiment at Tamarin was replaced by one that includes different levels of N fertilisation.

Drip irrigation

The drip system of irrigation consists of a fixed network of plastic tubes fitted with drippers at ground level (Plate II). It allows irrigation with small, uniform amounts of water at frequent intervals. Advantages claimed for the system include economy in water, saving in manpower, and increased yield.

A trial with drip irrigation was laid down at Palmyre, Médine S.E., to determine cane yields with different spacings of cane rows and dripper lines.

Flowering

The juvenile stage

In an experiment with *S. spontaneum* var. 51 NG 2 to study the relation between morphology and growth during (a) induction and (b) inflorescence initiation and development, percentage flowering was highest in canes 12-16 weeks old at the time of induction and lowest in canes of 8 and 24 weeks old. Number of leaves was similar in canes of different ages but number of internodes varied. It appears that there is an optimum number of internodes for floral induction and that senility may be as important a factor as juvenility in the control of floral induction.

Effect of Mon 045* *on flowering*

Preliminary studies on the effect of Mon 045 on floral induction and development in varieties S 17 and M 13/56 were started in 1973. Mon 045 at 0 to 4 kg a.i./ha was applied at four stages of floral development in S 17 and at three stages of development in M 13/56. The effect of the chemical on floral induction depended on dosage rate as well as time of application. When applied to S 17 at early stages of initiation of inflorescence axis primordium, the chemical reduced flowering, particullarly at the highest rate of 3.2 kg/ha. At the subsequent stage of development (initiation of inflorescence branch primordia), the chemical at rates of up to 1.7 kg/ha. increased flowering while the higher rates decreased it. At the latest stage of development (elongation of the inflorescence), the chemical again reduced flowering, particularly at the high rates. These results were confirmed in the experiment on variety M 13/56; a stronger promotive effect of the chemical on flowering when applied at 1.7 kg/ha at the initiation of inflorescence branch primordia stage was observed and the highest rate of 3.4 kg/ha also promoted flowering (Table 10). Further experiments are necessary to confirm the promotive effect of Mon 045 at rates of about 1 to 2 kg/ha on floral initiation at certain stages of floral development.

* N, N, bis (phosphonomethyl) glycine.

Table 10. Effect of Mon 045 on percentage flowering (arc sine transformed) in variety M 13/56 when applied at 3 stages of development

Stage of Development		*Concentration (kg/ha)* 0	1.7	3.4
Initiation of inflorescence	axis	2.5	7.5	1.4
,, ,, ,,	branch primordia	3.9	16.1	9.8
,, ,, ,,	spikelet primordia	5.0	7.9	7.9

Effect of flowering on yield

Two experiments were laid down in 1973 to investigate the effects of flowering on growth and yield of varieties S 17 (early maturer) and M 351/57 (late maturer). The treatments were in a factorial structure and included :

(1) Control plots in which the stalks were allowed to flower naturally and treated plots in which flowering was inhibited by applying night-breaks for 10 weeks as from early February.

(2) Sequential harvesting from flower emergence (May 15) to late November, with six harvests for S 17 and five for M 351/57.

The growth parameters for leaf emergence, leaf senescence, leaf area and stem elongation were followed in all plots. At each date of harvest, similar portions of flowered and vegetative stalks were analysed for Brix, sucrose content, fibre and reducing sugars. Fresh-weight yields were also recorded.

In variety S 17, fresh- and dry-weight yields and sucrose increased significantly in both vegetative and flowering stalks from flower emergence to October. In November, yields were generally lower, particularly in vegetative stalks, which had significantly lower dry weights and sucrose. The pattern was generally similar in variety M 351/57 except that yields were not lower in November.

The fresh weight, dry weight and sucrose yields were higher in flowering than in vegetative stalks of variety S 17 at flower emergence and anthesis; at later sampling dates no significant differences could be detected between flowering and vegetative stalks. In variety M 351/57, yields were also higher in flowering stalks and the difference was maintained throughout the experimental period (Fig. 7). Higher fresh weight yields in flowering stalks result from a greater number of internodes and by longer topmost internodes. Growth in vegetative stalks from June onwards was slow, only 3 to 4 internodes being differentiated up to November. This explains why vegetative stalks did not outyield flowering stalks late in the season.

It may be concluded that flowering generally had a beneficial effect on yield, particularly early in the season, and had no adverse effects even late in the season.

Maturity trials

Maturity trials 1971

Two series of five trials were laid down in 1971 to study the effects of plant age, climate and season on yield in plant cane. The first series included varieties S 17, M 351/57 and M 13/56 and the second series varieties M 377/56, M 93/48 and M 442/51. In each series one trial was laid down in each of the following zones : sub-humid, sub-humid irrigated, humid, super-humid low altitude and super-humid high altitude. The treatments included 3 plant ages at harvest (60, 64, and 68 weeks) fully factorized with 3 dates of harvest (July, September and November). Hence, in 1972, the yields of cane ranging from 60 to 68 weeks old were compared on each of the three harvest dates (July, September and November). These plots were allowed to regrow and harvested in 1973 at a fixed age of 52 weeks.

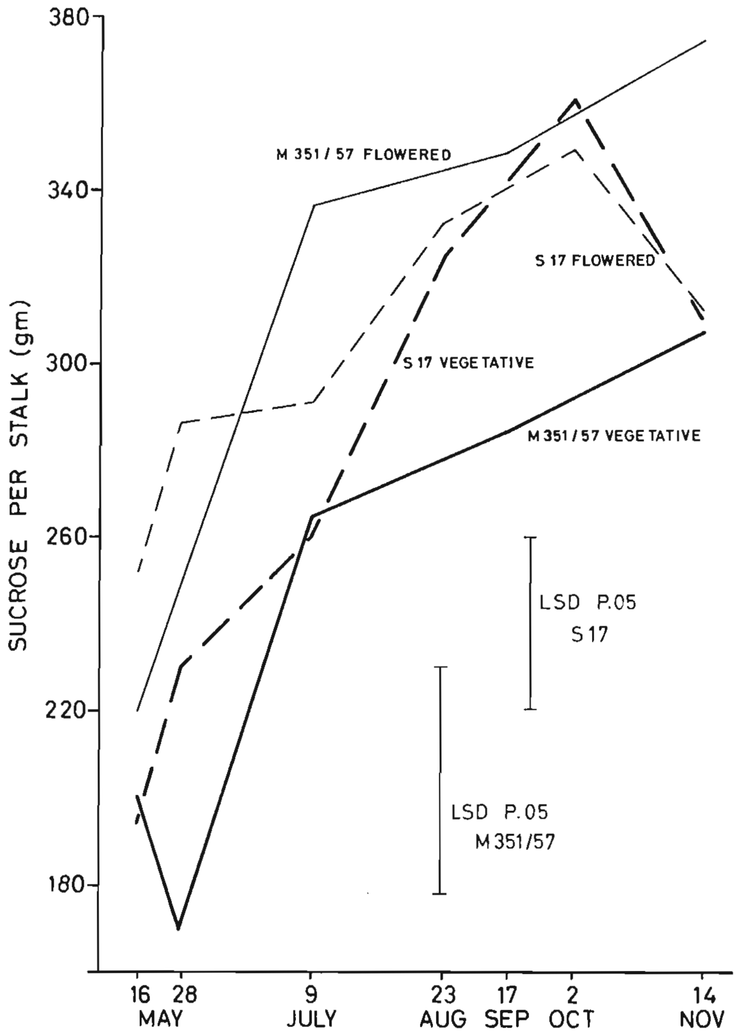


Fig. 7. Evolution of total sucrose in vegetative and flowering stalks of varieties S 17 and M 351/57.

Plant cane results

In most of the trials, date of harvest was the major factor influencing sugar yield. In the first series, containing varieties S 17, M 351/57 and M 13/56, the later the date of harvest the less were sugar yields, with the exception of the sub-humid zone where sugar yield increased from July to November in S 17 and M 351/57 (Fig. 8). Of the two components of sugar yield, cane yield was predominant as increases in sugar content late in the season could not offset the reduction in cane yield caused by late planting. Age of crop had little influence on sucrose content, and affected cane yield mainly in November. Yields were generally very low for canes of 60 weeks and this was probably related to very late planting (September).

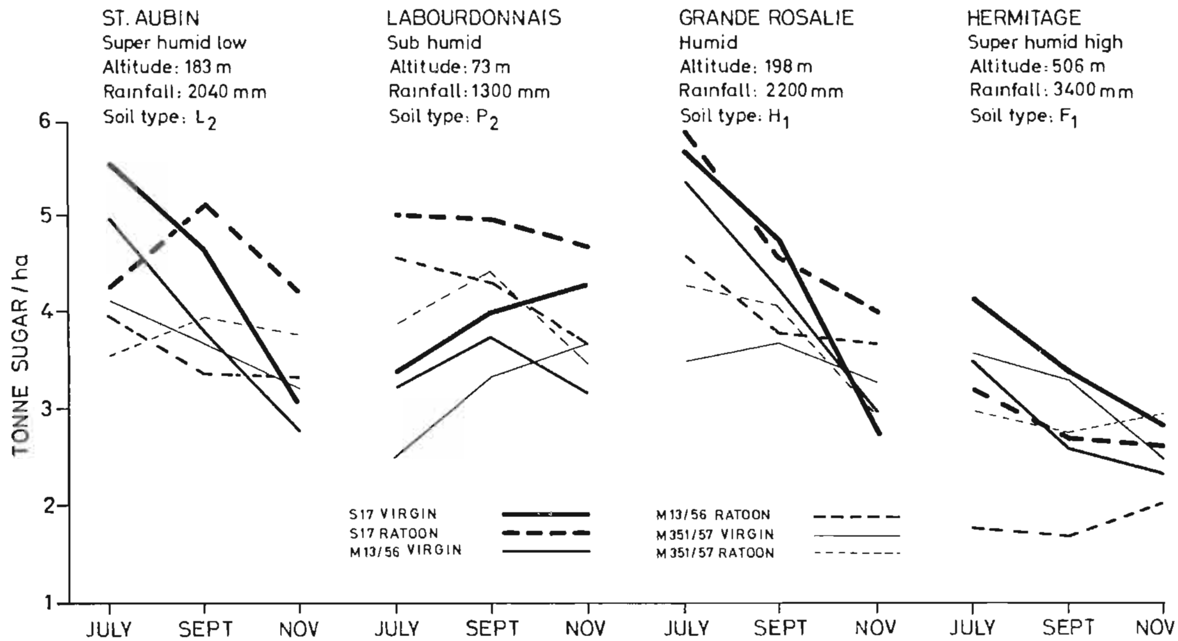


Fig. 8. Effect of date of harvest on sugar yield in varieties S 17, M 351/57 and M 13/56 grown in 4 contrasting environments.

The results of the second series of experiments, containing varieties M 377/56, M 442/51 and M 93/48 were generally similar to the first series except that cane yields were lower in November for variety M 377/56 in the sub-humid zone, while in the super humid zone the increase of sucrose content offset the reduction in cane yield with the result that sugar yield was generally stable.

Ratoon results

The effects of date of harvest were less marked in ratoon canes in both series of experiments. Cane yields were generally lower the later the date of harvest, particularly in November. However, the increase of sucrose content from July to November offset the reduction in cane yield and consequently sugar yield was generally stable. The plots harvested at 60 weeks in November 1972, which had given very low yields, showed a spectacular recovery in most trials and their yield in 1973 was similar to the other higher yielding plots in virgin.

Maturity trials 1972

These trials were laid down to investigate the effect of time of planting and harvest on varieties M 438/59, M 496/59, M 124/59, M 31/45, M 377/56 and S 17 grown in seven contrasting environments. Each trial had four harvest treatments as detailed in Table 11, all plots being harvested at an age of 65 weeks.

Table 11. Planting and harvest dates for Maturity trials, 1972 series

Planting	*Harvest*
27 March '72	16 July '73
8 May '72	27 August '73
19 June '72	8 October '73
31 July '72	19 November '73

Fresh-weight yield declined significantly with later planting and harvest in all trials except at Hermitage. The pattern of yield decline depended mainly on the locality, although varietal interactions were detected in some localities. Varieties showed strong adaptability to the different environments, the performance being similar at all harvest dates; thus the interaction variety × time of harvest in any particular locality was generally low. Sucrose content increased with later harvest in most varieties; this compensated to some extent for the lower fresh weight yields late in the season. The resultant effects on sugar yields are presented in Fig. 9 for three of the environments which exhibit three different types of response. These responses are :

(1) Stable yields for all varieties throughout the harvest (Hermitage)
(2) Sharp yield decline in some varieties from early to late, e.g. M 124/59, and stable yields for other varieties, e.g. M 377/56 (Mon Desert Mon Tresor).
(3) Stable yields in most varieties up to October and marked decline in November (Belle Vue).

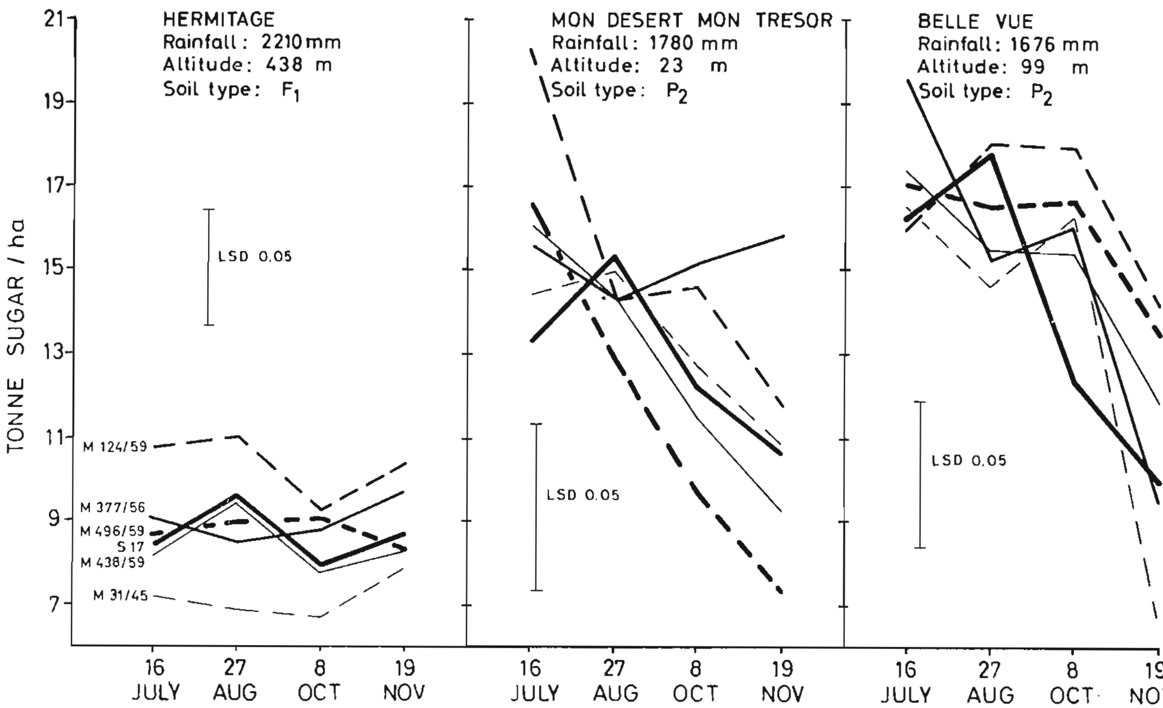


Fig. 9. Effect of date of harvest on sugar yield in varieties M 124/59, M 496/59, M 438/59, M 377/56, M 31/45 and S 17 grown in 3 environments.

The performances of the varieties for the *virgin crop* have been assessed on profitability. The varieties that gave the highest profitable sugar yield for each date of harvest and environment are given in Table 12.

Table 12. Performance of varieties M 496/59, M 124/59, M 438/59, M 31/45, M 377/56 and S 17 for virgin crop showing those giving the highest profitable sugar yield in diffrent environments at different harvest dates.

Date of Harvest	*Locality*	*Hermitage*	*Rose Belle*	*F.U.E.L.*	*Ferney*	*M. Desert M. Tresor*	*Beau Plan*	*Belle Vue*
	Rainfall (mm)	2210	3100	2362	2286	1780	1600	1676
	Altitude(m)	438	219	146	15	23	91	99
	Soil type	*F* 1	*B* 1	*L* 4	*H* 2	*P* 2	*L* 2	*P* 2
July 16		M 124/59	M 496/59 S 17	S 17 M 377/56	M 438/59 M 124/59 S 17	M 124/59	M 377/56 M 496/59	M 377/56 M 438/59
August 27		M 124/59 S 17	M 31/45 S 17	All vties*	M 438/59 S 17	S 17 M 438/59 M 31/45	All vties. except M 31/45 &M 124/59	S 17 M 124/59
October 8		M 124/59 M 496/59	M 31/45 M 124/59	S 17	M 438/59	M 377/56 M 124/59	M 377/56	M 124/59
November 19		M 124/59 M 377/56	M 31/45 M 377/56	All vties*	M 438/59 M 377/56	M 377/56	M 377/56 S 17	M 124/59 M 496/59

* Except M 496/59 & M 438/59

Methods of assessing maturity

Further trials were laid down to evaluate methods of maturity testing, including sampling techniques. The results confirmed earlier reports (Ann. Rep. 1971, page 82) that high correlations between Brix and Pol % Cane exist. The highest correlation cœfficients were obtained between Pol %Cane and laboratory Brix throughout the harvest season and while those between Pol % Cane and field Brix were significant throughout the harvest season for M 93/48, they were significant only for the early and middle parts of the season for varieties M 13/56, S 17 and M 351/57 (Table 13). Correlation between field Brix ratios and Pol % Cane were not significant.

Table 13. Correlation cœfficients between field Brix taken at 5/6th stalk height and Pol % Cane in varieties M 13/56, S 17, M 351/57 and M 93/48

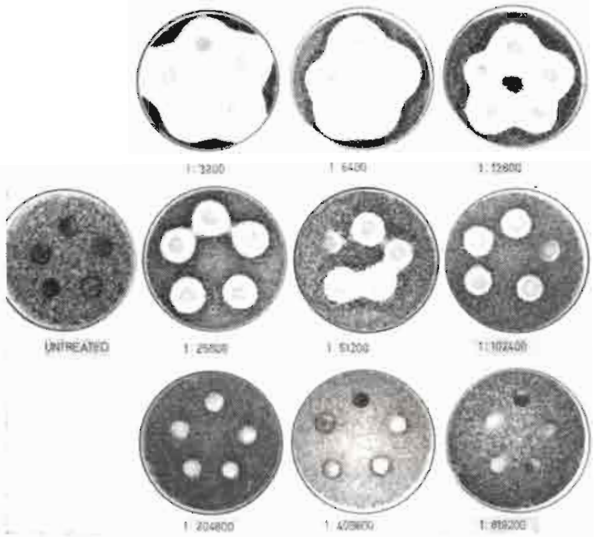
Variety	*July*	*August*	*September*	*October*	*November*	*December*
M 13/56	0.843***	0.738**	0.828***	0.619*	0.237	0.010
M 351/57		0.787**	0.685**	0.648*	0.384	
S 17	0.680**	0.680**	0.635*	0.635*	0.240	
M 93/48	0.600*	0.560*	0.572*	0.643*	0.851***	

* significant at $P < 0.05$

** significant at $P < 0.01$

*** significant at $P < 0.001$

Plate II. Drip irrigation experiment. *Top*, Filtration system using sand filters (A) and mesh screen (B).
Bottom, Dripper line in interrow, drippers (arrowed) 1 m apart.


1:3200
1:6400
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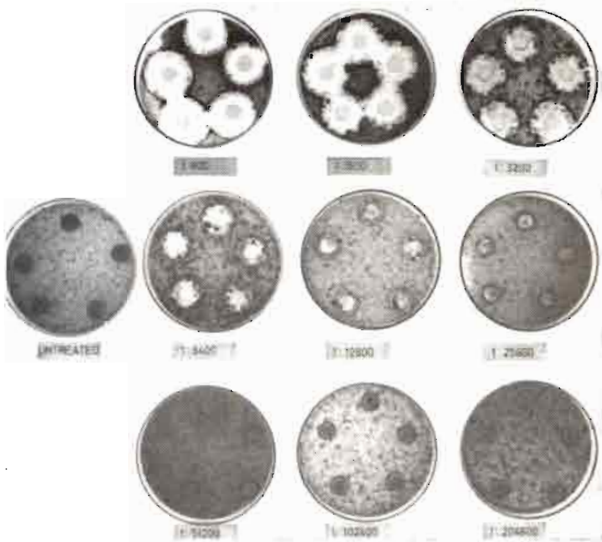
UNTREATED
1:25600
1:51200
1:102400
1:204800
1:409600
1:819200


1:3200
UNTREATED
1:6400
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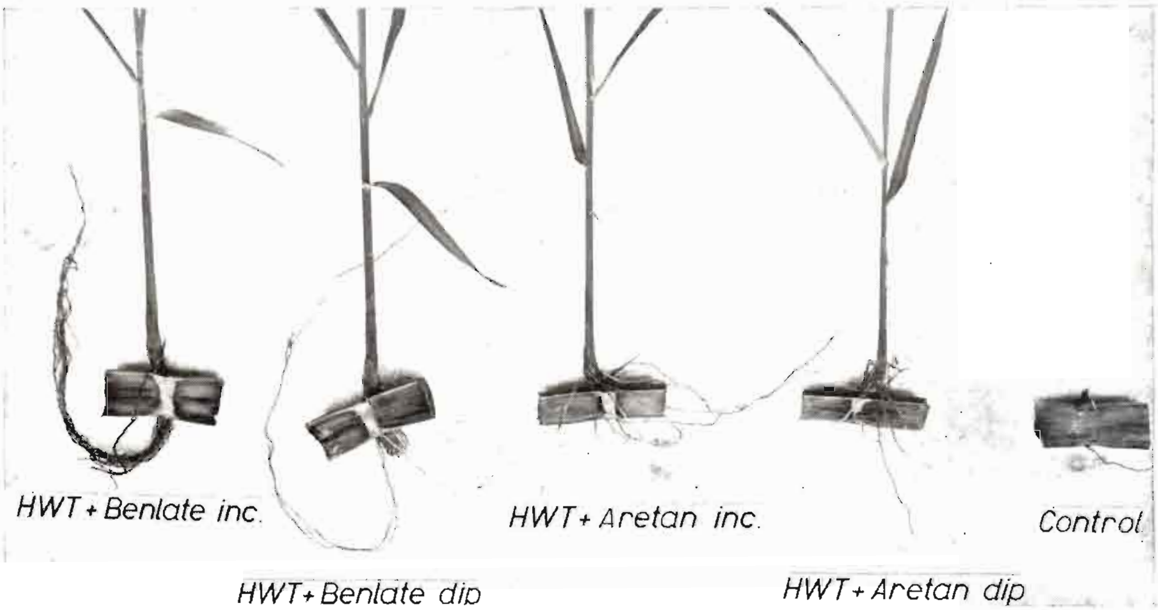
HWT + Benlate inc.
HWT + Aretan inc.
Control
HWT + Benlate dip
HWT + Aretan dip

Field sampling techniques were studied for field and laboratory Brix. In a three stage sampling, a field of about 2 ha was divided into four blocks within which sites were selected and at each site three readings (top, mid and bottom) of field and laboratory Brix were recorded. Block effects were generally not significant. The number of sites per block varied with variety, environment and character measured. The optimum number of readings per site was found to be two. Rates of increase of Brix were generally highest in the top section and lowest in the bottom section. For example, in variety M 13/56 it was necessary to detect differences of 0.7 in the top section as compared to 0.3 in the mid section for Laboratory Brix. The standard errors required to detect these differences are 0.4 and 0.2 respectively and the number of samples required to obtain these standard errors were 25 and 5 respectively. It may therefore be concluded that field Brix and laboratory Brix of the top section required the least number of samples. As the cost involved in performing a determination of laboratory Brix is about six times that of field Brix, the latter is recommended.

Sugar cane ripeners

Ethrel and Racuza

The two ripeners Ethrel and Racuza were applied in March and April on young canes (36-40 weeks old) of varieties M 13/56, M 93/48 and S 17. The dosage rates used were 0, 1, 2 and 4 kg/ha and the plots were harvested at 2, 4, 6 and 8 weeks after application. The chemicals had no significant effects on growth, sucrose content or yield in any of the experiments.

Mon 045

Studies on the mode of action of ripener Mon 045, started in 1972, were continued. Particular attention was paid to the distribution of dry matter and sucrose in the cane stalk following treatment with the chemical. It was shown that total dry matter in the stem of variety M 13/56 increased after application at rates of 4-6 kg/ha, optimum response occurring 9-12 weeks later. The increase in dry matter was due to an increase in sucrose, since the chemical had no effect on fibre and decreased reducing sugars. The site of action appears to be 16 top internodes and the mode of action is complex. There is an inhibition of growth and differentiation, which could result in higher rates of translocation of sucrose from leaves and a diversion of more photosynthates to storage organs, while there also appears to be interference with the enzyme system invertase, which plays a role in sucrose accumulation. The chemical does not appear to act through desiccation.

DISEASES

Gumming (*Xanthomonas vasculorum*)

The reduction in the amount of gumming disease in the island in recent years may be attributed to weather unfavourable for its spread, the gradual removal of susceptible varieties, especially M 147/44, and the ban (lifted on 16.4.74, see p. 30) on extending the areas planted to the susceptible and comparatively new variety M 377/56.

Observations over the 9 years since the last epidemic have led to the conclusion that present-day hybrid canes are tolerant even when highly susceptible, unlike the noble canes formerly grown. It would seem, therefore, that susceptible but tolerant varieties having a high yield potential can at

Plate III. Control of pineapple disease with Benlate. *Top, In vitro* tests comparing efficacy of Benlate (left) and Aretan (right) at various dilutions against *C. paradoxa*. *Middle and Bottom*, Germination test in greenhouse comparing the fungicides as dip treatments and when incorporated in hot bath.

times be profitably exploited without great risk provided certain precautions are taken to minimize disease inoculum. In accordance with this view, it was recommended that the ban on the planting of M 377/56 be lifted, with the following provisions :

i) planting material should not be taken from severely infected fields;
ii) the variety should not be planted in areas where the disease has been common in recent years nor in the immediate vicinity of fields still planted to M 147/44;
iii) the variety should not occupy more than 25% of any factory area;
iv) old ratoon fields of the variety that show a high degree of infection should be uprooted.

Lifting the ban on the planting of M 377/56 is likely to increase the amount of disease inoculum in the cane areas. In view of this, and concomitant with the attitude towards susceptible but tolerant varieties expressed above, selection for resistance to gumming in the cane breeding programme will remain rigorous in the early stages of selection but will be for tolerance rather than resistance in the later stages.

Investigations with the object of developing a therapeutic treatment for setts with systemic infection were continued. The thermal death point of the bacterium *in vitro* was determined by exposing bacterial suspensions to hot water treatment at different time-temperature combinations. Temperatures below 50°C at exposure times of 15-120 min were not lethal to the bacterium and some survival occurred even at higher temperatures. Experiments were begun on treatment of infected setts with hot water containing penicillin and with hot water followed by penicillin treatment.

Wilt complex and ratoon failure

Wilt or root disease complex was widespread during the year owing to very wet conditions at the beginning of the crop season. The varieties most affected were M 438/59, in particular, and S 17.

Ratoon failure in M 93/48 occurred in some superhumid areas early in the season and was attributed to a complex of factors including excessive soil moisture, root disease and insect attack.

Ratoon stunting disease

A hundred and fifty tonnes of cuttings were treated against RSD with the long hot water treatment at the MSIRI, and 300 tonnes were treated on sugar estates, to establish 38 ha of A Nurseries on estates and 3 ha at the Central Cane Nursery. A total of 400 ha of B Nurseries were planted.

Chlorotic streak

A trial was laid down to compare the rate of infection by chlorotic streak of cane grown on land previously cropped with a susceptible and a resistant variety, respectively. A susceptible variety was used as test plant and the setts were given the short HWT to ensure that they were free from the disease at planting.

To investigate the possible dual infection of cane with chlorotic streak and ratoon stunting diseases, and to elucidate the importance of the latter in the island, plots of M 147/44 and M 442/51 had been established in both a dry and a wet area in 1972 with setts that had received the following treatments : long HWT for 2 generations, long HWT once, short HWT, no treatment. Two trials were laid down in 1973, using untreated planting material from the plots established in 1972, to assess differences of cane growth that could be attributed to infection with one or both diseases.

Pineapple disease (*Ceratocystis paradoxa*)

The efficacy of Benomyl (Benlate) in wettable powder formulation for treatment of setts against pineapple disease was assessed (Plate III). When the Benomyl was used in a large tank as a cold dip, the rate at which the particles settled was excessive, as determined by spectrophotometric analysis. This factor was, however, less important when the fungicide was incorporated in a hot water bath in a small laboratory tank and also in a commercial tank, both with forced circulation and in which serial batches of cuttings were treated. The drop in the concentration of active ingredient in the hot bath in the laboratory test was less than that observed in the past with standard organomercurial under similar treatment conditions (Fig. 10). Germination tests with setts treated in the commercial tank, in the field and in the greenhouse with heavy soil inoculum, showed that the Benomyl remained active in the bath for at least 10 days and germination was comparable with that of setts treated successively with hot water and a standard organomercurial dip (Table 14). A combined hot water and fungicide treatment would be economical and is likely to be adopted in commercial practice if further tests confirm the results so far obtained.

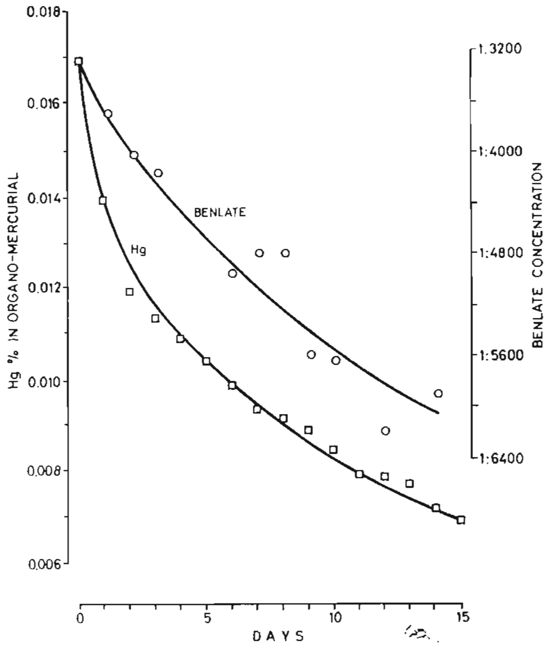

Fig. 10. Comparison between deterioration of Benomyl (Benlate) and organomercurial (Aretan) during hot water treatment of cuttings.

Table 14. Percent germination from setts after treatment with hot Benlate suspension (50°C/30 min) and with hot water followed by organo mercurial dip.

	GREENHOUSE (One-bud setts)			*FIELD (Three-bud setts)*		
Age of Benlate Solution (days)	*Benlate*	*Standard organo mercurial*	*Untreated*	*Benlate*	*Standard organo mercurial*	*Untreated*
0	90.0	60.0	0	16.5	13.0	14.0
2	85.0	58.3	0	9.5	12.3	10.3
5	71.7	36.7	1.7	12.3	15.3	8.5
7	45.0	46.6	5.0	9.5	8.5	4.3
10	86.7	63.3	1.7	16.0	11.5	8.3

Yellow spot

Investigations on yellow spot were terminated. It has been confirmed that rainfall and relative humidity are the predominant factors influencing the epidemiology of the disease. Heavy rains in December-January cause early infection and the disease always subsides in July-June. There is virtually no yellow spot between August and December. Although the disease may reduce both cane yield and sugar content, the decrease of disease coincides with the start of the crop season so that the greatest effect is on the former. Total loss is estimated at 10-15% in a highly susceptible variety.

Disease-resistance testing

The scheme followed for testing the reaction to disease of new varieties at various stages of the selection programme is illustrated in Fig. 11. In addition to orthodox resistance trials and disease observation plots, inspections are carried out in variety trials at harvest and in young ratoons. Thirty-one out of a total of 98 trials were thus inspected during the year, emphasis being laid on those trials with varieties approaching release.

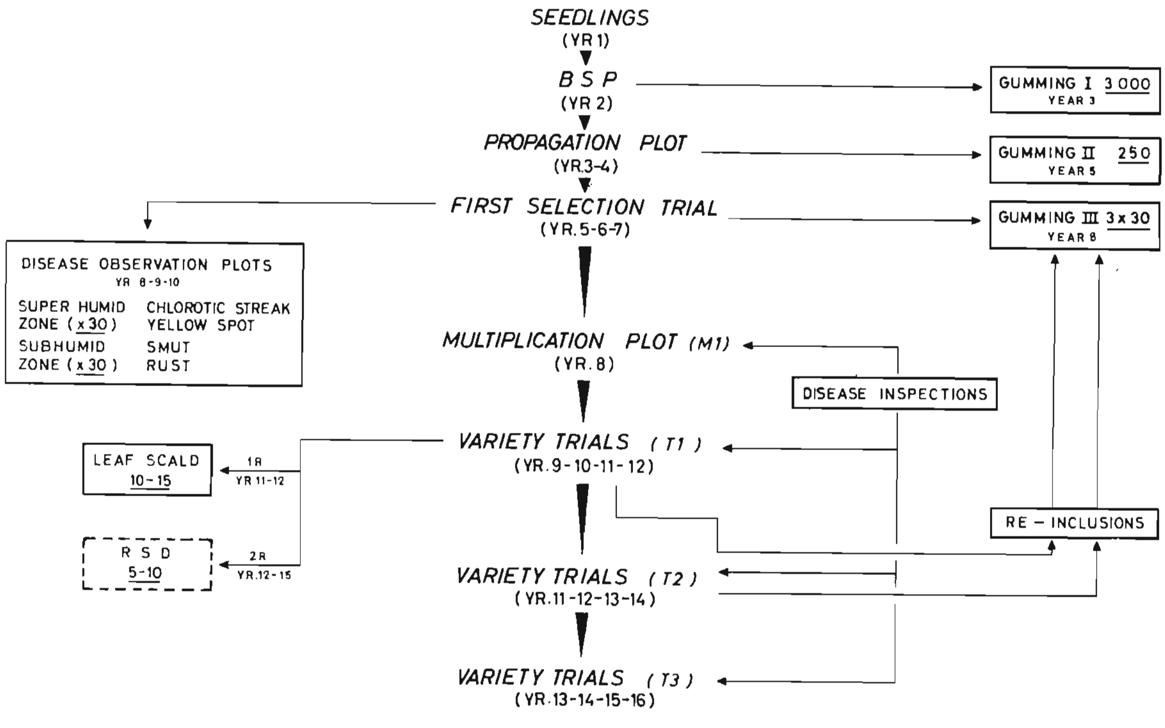

Fig. 11. Scheme for testing resistance of cane varieties to diseases at various stages of selection.

The reaction to disease of some of the most important varieties under cultivation is given in Table 15.

Table 15. Reaction of the most important varieties grown in Mauritius to diseases of primary importance locally†

Variety	*Chlorotic Steak*	*Gumming*	*Leaf Scald*	*Smut*††	*Wilt complex*	*Yellow spot*
M 31/45	S* (7)**	R(2/3)	R(2/3)	R(2/3)	R(2/3)	R(2/3)
M 93/48	R (2/3)	SS(5)	R(2/3)	R(2/3)	S(7)	R(2/3)
M 442/51	HS(8/9)	SS(5)	R(2/3)	R(2/3)	SS(5)	SS(5)
M 13/56	SS(5)	R(2/3)	R(2/3)	R(2/3)	R(2/3)	R(2/3)
M 377/56	S (7)	HS(8/9)	SS(5)	S(7)	S(7)	S(7)
M 351/57	HS (8/9)	SS(5)	R(2/3)	R(2/3)	SS(5)	R(2/3)
M 124/59	S (7)	R(2/3)	SS(5)	R(2/3)	R(2/3)	R(2/3)
M 438/59	SS (5)	R(2/3)	R(2/3)	R(2/3)	HS(8/9)	SS(5)
S 17	S (7)	R(2/3)	S(7)	SS(5)	S(7)	R(2/3)

† No precise rating for Ratoon Stunting disease available.
†† Under very low inoculum pressure nowadays.
* R = Resistant to highly resistant; SS = Slightly susceptible; S = Susceptible; HS = Highly susceptible
** ISSCT international disease rating system.

Gumming

The results of gumming resistance trials in 1973 are summarized in Table 16. The number of varieties discarded for susceptibility at the 1st stage testing continues to be low compared to that discarded at later stages; if the reason for this cannot be determined and the test cannot as a consequence be improved, 1st stage testing will have to be abandoned as it is failing in its purpose and is also time-consuming and requires much labour.

About 100 varieties were tested for resistance by the newly-developed detached leaf technique for correlation of results so obtained with those from field trials. Correlation was poor in some instances and further improvements for the method are being sought.

Table 16. Results of gumming resistance trial in 1973

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††	2145	0.8	3.6	76.9	+	18.9
II	1st Selection Trial††	195	5.7	28.7	64.6	+	1.0
III	1st Multiplication†††	31	9.7	25.8	64.5		

† Dead or poor growth
†† One trial
††† Three trials in different localities

Leaf scald

The plant canes in the leaf scald trial laid down in 1972 were inoculated and 8 of the 24 varieties in the trial appeared nearly as susceptible as the highly susceptible standard, M 202/46. Final assessment of susceptibility will be made after re-inoculation in 1974.

Smut

Two out of 31 varieties in the disease observation plot, which is situated in a dry locality, showed some susceptibility to smut. Disease inoculum was low.

Yellow spot

In the disease observation plot in the superhumid zone, 11 varieties showed resistance to yellow spot, 6 were susceptible to highly susceptible and 15 were intermediate.

Fiji disease testing in Madagascar

There has been no progress in the programme for testing in Madagascar the resistance of Mauritian varieties to Fiji disease since the erection 3 years ago of a greenhouse in Tananarive with funds provided by the *Comité de Collaboration Agricole Maurice-Réunion-Madagascar*. The future of this co-operative project is very uncertain and the possibility of testing local varieties in Australia has accordingly been under consideration. However, the different reaction of certain varieties in Australia and Madagascar indicate that different strains of the virus may occur in those countries : if this is so, tests conducted in Australia would be of dubious value, for it is the presence of the disease in Madagascar that poses a threat to the Mauritian cane industry.

PESTS

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

Work on biological control of the scale insect by importation of exotic parasites was continued. A general account of its progress, and also of parallel work by the Commonwealth Institute of Biological Control in East Africa, where the insect is also a cane pest, was published during the year (see p. 17).

Release of imported parasites

Three species of imported Aphelinid parasites were reared in large numbers and released during the year. These were *Metaphycus* sp. from Tanzania, *Physcus* sp. nr. *nigriclavus* from Queensland, and *Aphytis* sp. also from Queensland. The collection of these parasites in their respective countries, their importation, and the initiation of laboratory cultures were described in the Report for 1972.

Metaphycus was reared from March 1972 until May 1973, *Physcus* from October 1972 until May 1973, while the *Aphytis* culture, also started in October 1972, was maintained throughout the year.

Many thousands of these parasites were released in various regions where scale insect is periodically abundant and the volume of work involved in breeding the three species simultaneously was considerable, particularly as the rearing of a continuous supply of healthy host insects was a necessary accompaniment to breeding the parasites.

Accurate records of numbers reared and released were not kept owing to the very small size of the parasites and the numbers involved. However, about 110,000 *Physcus* were reared and the majority released, while the numbers of *Metaphycus* reared and released exceeded those of *Physcus*.

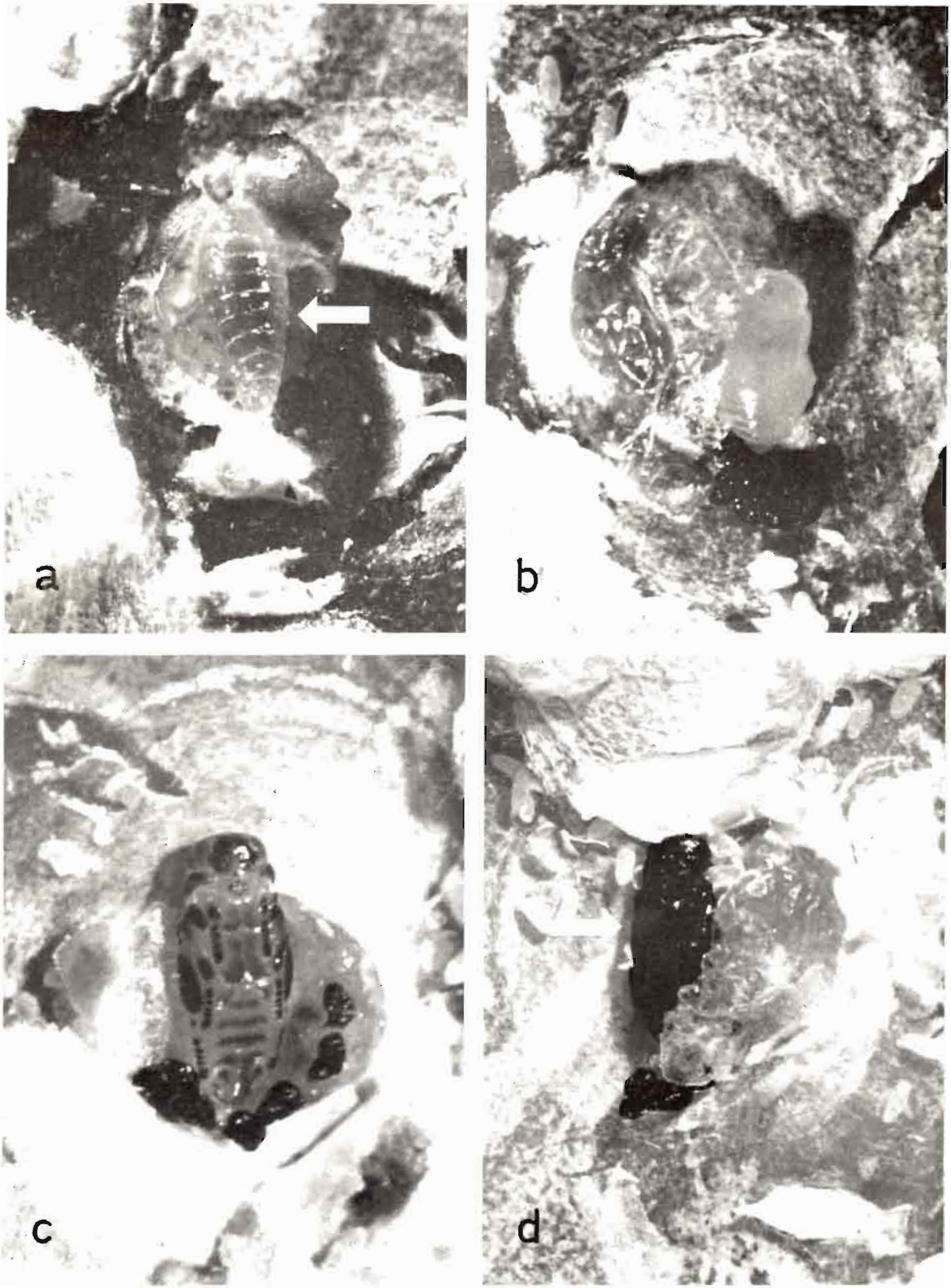

Plate IV. Stages in the development of the parasite *Aphytis* sp. on its host, the sugar cane scale insect (*Aulacaspis tegalensis*). (a) larva (arrowed) on a female scale insect, (b-c) transformation into the pupal stage, (d) pupa (arrowed, partly covered by the dead, crumpled body of the host. The black pellets of excreta passed by the parasite larva before pupation are visible in b - d.

Plate V. Demonstration of SIMSON loader.

The greatest effort was made with *Aphytis* (Plate IV) because the most important gap in the natural enemy spectrum of *Aulacaspis* at present is an effective external parasite. Moreover, this species appears immune to the hyperparasitic *Tetrastichus* that attacks all the internal parasites and hinders their beneficial action. The monthly production and releases of *Aphytis* in 1973 are shown in Fig. 12 : the total number released approximated 170,000 and the increased rate of production and release in the second half of the year was possible because it was the only species then being reared˙ Production of *Aphytis* at the maximum rate facilities allow will be continued during the early months of 1974 to ensure the establishment of the parasite if it is at all suited to local conditions.

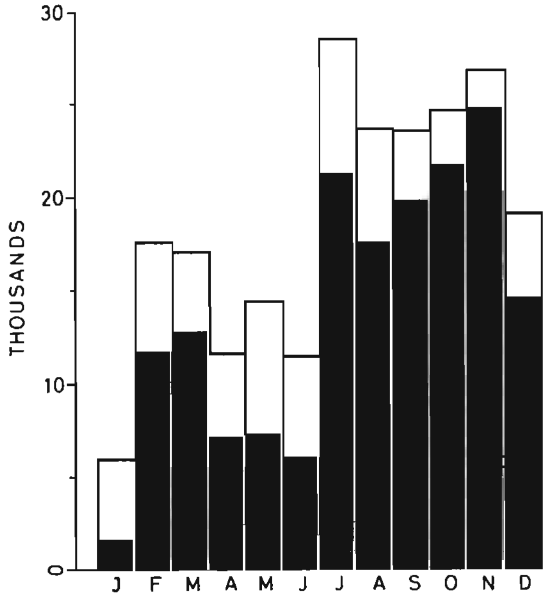

Fig. 12. Approximate numbers of *Aphytis* sp. reared (plain columns) and released (shaded columns) in 1973.

Relative incidence of scale insect parasites

Data on the relative incidence of the recorded parasites and hyperparasites of the scale insect, including the recently established *Physcus seminotus* from Uganda (Ann. Rep. 1972) were sought by repeated sampling at a few selected sites. Investigations prior to the introduction of *P. seminotus* (*Bull. ent. Res.* **60**: 61-95) had shown that the only common primary parasite was *Adelencyrtus myiarai* and that this was much attacked by the secondary *Tetrastichus* sp. The sampling made during the 1972-73 crop season confirmed earlier indications that *P. seminotus* is now often the dominant parasite, outnumbering all others together. Fig. 13 shows the results of sampling in a block of fields at Benares S.E., where it is seen that *P. seminotus* was the commonest parasite at all times of the season and was the only parasite that could be recovered from samples taken after harvest in September-November when scale insect populations were minimal.

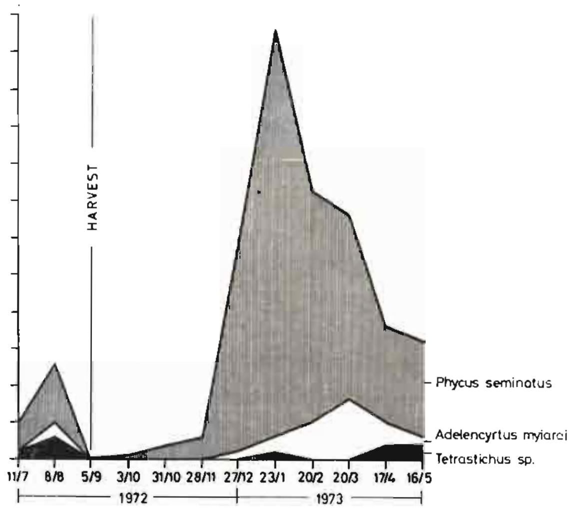

Fig. 13. Relative incidence of major parasites of *Aulacaspis* at Benarés, 1972-1973. Each unit on the vertical axis equals 30 individuals obtained from samples.

Cane moth-borers

Study of moth-borer populations and their relation to crop growth and season was continued at two sites, Labourdonnais in the northern coastal plain and La Flora in the superhumid uplands.

At the first of these sites the spotted borer (*Chilo sacchariphagus*) is the important species and monthly sampling in long season plant cane showed larval populations to increase sharply and to decrease equally sharply during the grand period of growth. It was evident that the damage to canes in the fields studied, which exceeded 60% of canes bored, occurred almost exclusively during a limited and comparatively short period of crop growth, a fact of considerable interest and of possible practical importance if it can be shown to be of general occurrence.

At the second site, environmental conditions are quite different and, from past experience, so is the borer problem. Both white borer (*Argyroploce schistaceana*) and spotted borer are at times abundant in the locality and the incidence of both species is being followed by regular sampling.

WEEDS

Logarithmic trial with new herbicides

Using the Chesterford logarithmic spraying machine, three herbicides, namely MON 2139, DPX 2851 and RU 12709, were compared to DCMU in the superhumid zone at Belle Rive S.E.S. Dosage rates ranged from 5.38-1.34 kg a.i./ha.

DPX 2851 showed very good herbicidal properties, being as good as DCMU. RU 12709, although giving slightly inferior results, was also promising. Both chemicals need further testing to evaluate their real potentialities. MON 2139 gave poor results and unlike the other two products reduced cane growth and germination. However, in subsequent trials it gave spectacular results against various weed species when used as post-emergence sprays.

The experiment lasted 14 weeks and the rainfall recorded was 1160 mm. A summary of the weed assessment is given in Table 17.

Table 17. Weed assessment data 98 days after spraying

(Frequency abundance method expressed as % of control)

Herbicides	*Dosage rates of herbicides (kg a.i./ha)* 5.38 — 4.09 (5.00 — 3.80)	4.09 — 3.06 (3.80 — 2.85)	3.06 — 2.31 (2.85 — 2.15)	2.31 — 1.77 (2.15 — 1.65)	1.77 — 1.34 (1.65 — 1.25)*
DCMU	31.7	30.4	34.3	40.1	44.9
MON 2139	53.3	56.0	48.8	48.8	49.5
RU 12709	44.0	39.0	37.7	43.2	50.3
DPX 2851	28.6	30.1	41.0	41.0	45.5

* Figures in brackets represent lb a.i. per arpent

Special weed problems

1. *Paspalidium geminatum* (Herbe sifflette)

Complete control of this troublesome graminaceous weed was obtained with MON 2139 (Roundup), at dosage rates of 4.30, 6.45, 8.60 and 10.75 kg a.e./ha. At 2.15 kg 70 to 80% control was obtained, necessitating a "spot spraying" five months later, with the same dose, for complete eradication of the weed. These results were confirmed in three other trials. Unsatisfactory control of *P. geminatum* was obtained with Aminotriazole at 21.5 kg a.i. and a mixture of Hyvar X + Gramoxone at 21.5 kg a.i. + 1 kg a.e. per hectare.

2. *Cyperus rotundus* (Herbe à oignons)

The efficacy of several herbicidal compositions on *C. rotundus* was investigated in the sub-humid, humid and super-humid zones. However, results were obtained only from the super-humid (Belle Rive) and sub-humid (Pamplemousses) zones. The experiment in the humid zone was spoilt when the field was ploughed by error.

Eleven herbicidal treatments were compared to an untreated control and all the experimental plots were completely covered by *C. rotundus* at the start of the experiments. The treatments and dosage rates per hectare were as follows : MON 2139 at 0.54, 1.08, 1.61, 2.15, 2.69 and 3.23 kg a.e., Actril-D at 1.7 kg a.e., 2,4-D amine salt at 2.15 and 3.23 kg a.e., Gesapax H at 2.15 and 3.23 kg a.e.

Although all treatments destroyed the leafy parts of the sedge, a real reduction in the *C. rotundus* population was obtained only with MON 2139, irrespective of dosage rates. Both experiments lasted nine months. During this period three sprayings were necessary at Belle Rive and two at Pamplemousses, showing that rainfall is definitely an important factor. At the conclusion of the experiments the percentage regrowth of *C. rotundus* was very low in all MON 2139 treated plots, amounting to about 2% (Fig. 14).

3. *Paspalum paniculatum* (Herbe duvet), *P. urvillei* (Herbe cheval) and *P. conjugatum* (Herbe créole)

Complete kill of these three grasses, at all stages of growth, was obtained with MON 2139 at 0.54, 1.08, 2.15 and 3.23 kg a.e./ha. Asulox at 3.23 and 4.30 kg a.e., alone and in mixture with 1.3 kg a.e. of Actril-D, gave a complete control of *P. paniculatum* and *P. urvillei* but the control of *P. conjugatum* was unsatisfactory.

In another experiment 100% control of *P. conjugatum* was obtained with Aminotriazole at 1.08 kg a.e./ha followed, one hour later, by Gramoxone at 1 kg a.i. A 3789, and mixture of Hyvar X + Gramoxone, were not efficacious on this weed.

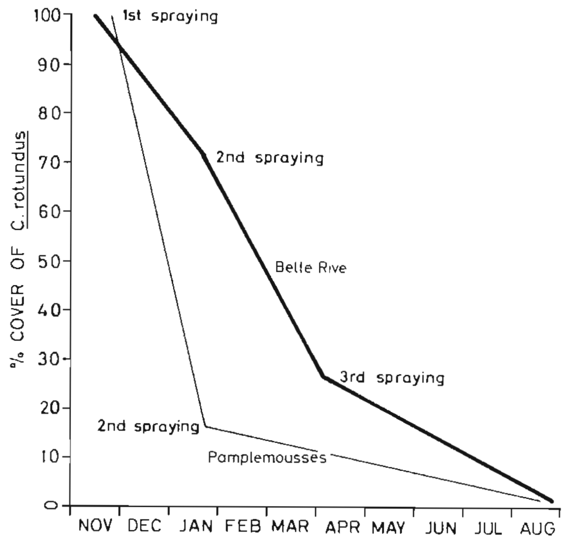

Fig. 14. Effect of MON 2139 (Roundup) at 0.54 kg a.e./ha (0.5 lb a.e./arp) on *Cyperus rotundus*.

4. *Kyllinga monecephala* (Petit mota)

Two experiments laid down in the super-humid zone emphasized the above-mentioned outstanding herbicidal properties of MON 2139 when applied as post-emergent sprays. Complete control of *K. monocephala* was noted with this herbicide at 0.54, 1.08, 1.61, 2.15, 2.69 and 3.23 kg a.e./ha. At rates lower than those mentioned, a maximum of 50% control resulted. Other treatments were also tested, but results were unsatisfactory.

5. *Cynodon dactylon* (Chiendent)

Results obtained with MON 2139 on *C. dactylon* were inconsistent. On the "Constance biotype" nearly 100% control of the grass resulted at dosage rates of 4.30 and 5.40 kg a.e./ha and regrowth, six months after spraying, was slight. However, on the "Bel Ombre biotype", regrowth was complete. The "Constance biotype" was growing on very rocky soil and this may account for the good results obtained. On the other hand, the two biotypes may differ in their resistance to the chemical, a possibility that is indicated by previous studies (Rochecouste, 1961). Further trials are necessary.

6. *Colocasia antiquorum* (Songe)

In a trial laid down on non-crop land in the super-humid zone, the efficacy of the following herbicidal treatments on *C. antiquorum* was compared : MON 2139, at 1.08, 2.15, 3.23, 4.30 and 5.38 kg a.e., Actril-D at 1.3 kg a.e., MCPA at 1.91 kg a.e./ha. All treatments gave a total kill of the leafy parts. Twelve weeks after spraying, the regrowth in the plots treated with MON 2139 ranged from 12 to 23%, corresponding with the highest and lowest dosage rates respectively. In the plots treated with Actril-D and MCPA, 48 and 55% regrowth, respectively, occurred.

Treatments were then repeated and 13 weeks later there was no regrowth of *C. antiquorum* in the plots treated with MON 2139, irrespective of dosage rates. In the plots treated with Actril-D and MCPA, there was 10% regrowth and there were also many young plants emerging. Unfortunately, no further surveys could be carried out because of weeding done in the trial by the estate.

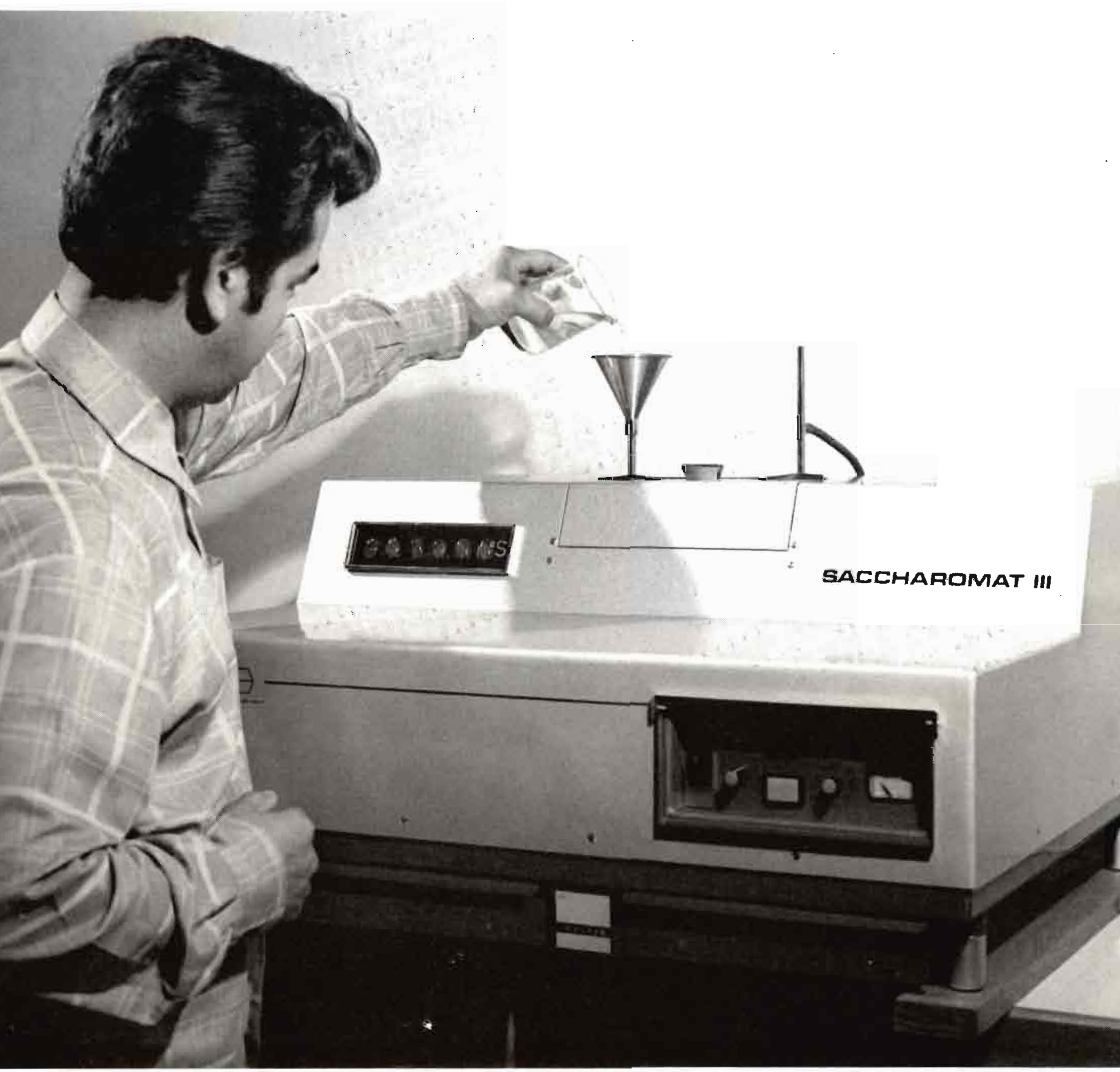

Plate VI. The Schmidt and Haensch Auomatic Polarimeter.

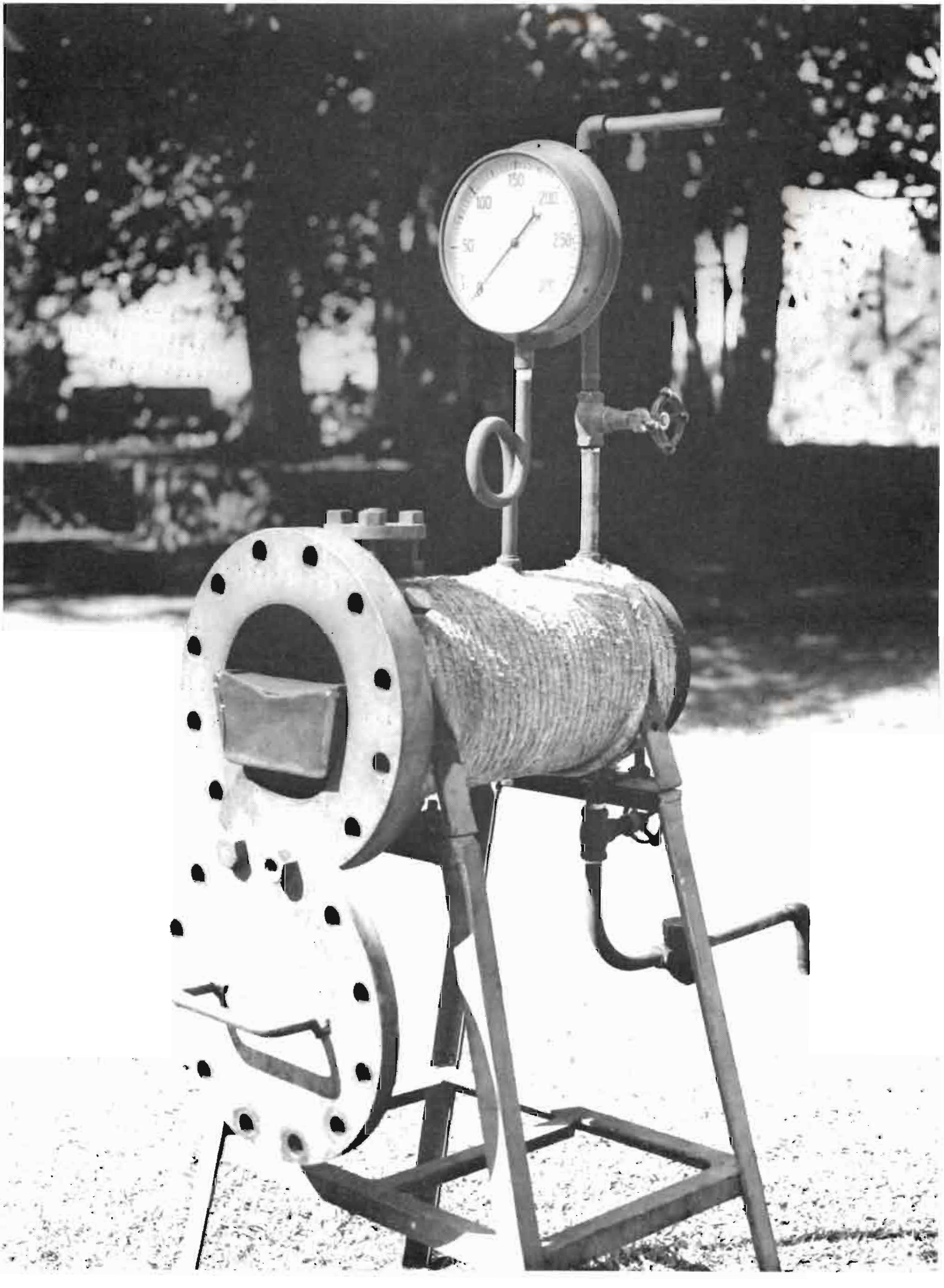

Plate VII. Digester used for steam treatment of bagasse (courtesy of Britannia S.E.)

In the course of the above experiments, it was observed that other weeds were also well controlled by MON 2139. These were *Leersia hexandra, Digitaria horizontalis, Setaria barbata, Coix lachryma-jobi.*

FIELD MECHANIZATION

The shortage of labour during the 1972 sugar cane harvest showed the need for the mechanization of harvesting operations. Investigations were therefore started on various types of machines that would be suitable for loading sugar cane under local conditions.

Demonstrations of the tractor-mounted SIMSON push-piler loader (Plate V) and the self-propelled tricycle type FUNKEY BELL grab loader were held near the end of the 1973 crop. Field tests with these and other loaders are to be made in the 1974 crop season.

Research is also to be undertaken to determine the modifications necessary to existing field layouts and cultural practices to enable machines used for harvesting operations to perform efficiently and economically.

SUGAR MANUFACTURE

Direct weighing of final bagasse and diffusion juice at St. Antoine factory

It was mentioned in Annual Reports for 1971 and 1972 that fibre % cane at St. Antoine factory appeared to be suspiciously high following the installation of the "Saturne diffuser."

Throughout most of the 1973 season, the mass of final bagasse was determined by direct weighing using an OHMART Gamma Ray weighscale. Regular short term (± 5 minutes) calibration checks indicated that the weighing precision of this equipment was within ± 2% F.S.D. Comparison between calculated and directly determined mass of bagasse showed the former to be greater by 21% on average when the diffuser was in operation. The difference became 10% when extraction was carried out with mills only for a two week period.

Diffusion juice going to process was also weighed directly using a Maxwell Boulogne scale.

Average 1st mill and overall extractions based on directly determined mass of juice and bagasse over the period extending from the beginning of the season to November 3rd were 68.5 and 94.9 respectively at a fibre content of 14.11 % cane.

During the period indicated above, extraction was practised by combined milling diffusion. Weighing of bagasse was not carried out during that part of the season remaining after November 3rd.

Table 18. Analysis of primary and secondary juices

	Belle-Vue % average *increase* from primary juice to secondary juice	*St. Antoine* % average *decrease* from primary juice to secondary juice
Suspended solids % Brix	58.5	27.7
Precipitated muds % Brix	45.4	34.1
Starch % Brix	66.6	38.9

Clarification, filtration and starch elimination effects in the Saturne diffuser at St. Antoine factory

The effect of diffusion on precipitable muds, suspended solids and starch elimination in juice was studied. Representative samples of primary and secondary juices were collected at St. Antoine and Belle Vue, the latter being a straight milling factory situated near St. Antoine, and compared. From the results given in Table 18, it appears that filtration, clarification and starch elimination effects are associated with the operation of the diffuser.

Possible sucrose inversion during diffusion process

A study was carried out in the laboratory to determine if inversion is likely to occur during the diffusion process.

Equal subsamples of first mill bagasse were subjected to the following treatments :

Treatment A : Cold extraction in a wet "disintegrator" immediately after sampling.

Treatment B : Cold extraction in a wet "disintegrator" after being subjected during 40 minutes to physical conditions (pH, temperature, solid-liquid ratio) normally obtained in the Saturne diffuser.

The average amounts of Brix, pol and reducing sugars found in the liquid extract after "disintegration" are given in Table 19 and the data show that hot maceration improves extraction of Brix, pol and reducing sugars to such an extent that inversion losses, if any, are not apparent.

Table 19. Effects of physical conditions on extraction process

	Amounts in Extract % Original Bagasse Sample			*Purity of Extract*
	Brix	*Pol*	*R.S.*	
Treatment A (Cold extraction)	9.06	6.84	0.26	75.5
Treatment B (Cold extraction) after hot maceration	9.62	7.01	0.28	72.7

Industrial crystallization by evaporation

In 1973 inadequate purity drops in high grade strikes were at times experienced at Mon Loisir factory and an investigation was carried out, following a request by the estate management, to determine the cause. This involved measurements to establish the evolution of the main parameters during a number of strikes. Typical results are graphically represented in Fig. 15.

The evolution of the parameters leads to the conclusion that too high a feed rate of diluted runnings and/or circulation water was generally resorted to towards the end of the strike, just prior to tightening up stage, with the result that the descending trend in the purity of the mother liquor was impeded.

Performance of continuous crystallizers for high grade massecuites

Continuous crystallizers of unconventional design were in use on high grade massecuite at Mon Désert Alma and at Mon Loisir factories in 1973. An attempt was made to evaluate the performance of these new crystallizers.

Cooling rates were found to be satisfactory with the two installations but owing to water leakages from the cooling elements into the massecuite (Mon Désert Alma) and lubrication of the massecuite with diluted A runnings (Mon Loisir) it was not possible to draw conclusions concerning exhaustion of mother liquor.

Sucrose losses during white sugar manufacture by phospho defecation process

The evaluation of sucrose losses during manufacture of white sugar by the phospho defecation process was started towards the end of the 1973 season at F.U.E.L. factory and is expected to be completed during the next season. All products entering and leaving the back end "refinery" are weighed in batches with a view to establishing Brix, sucrose and reducing sugars balances.

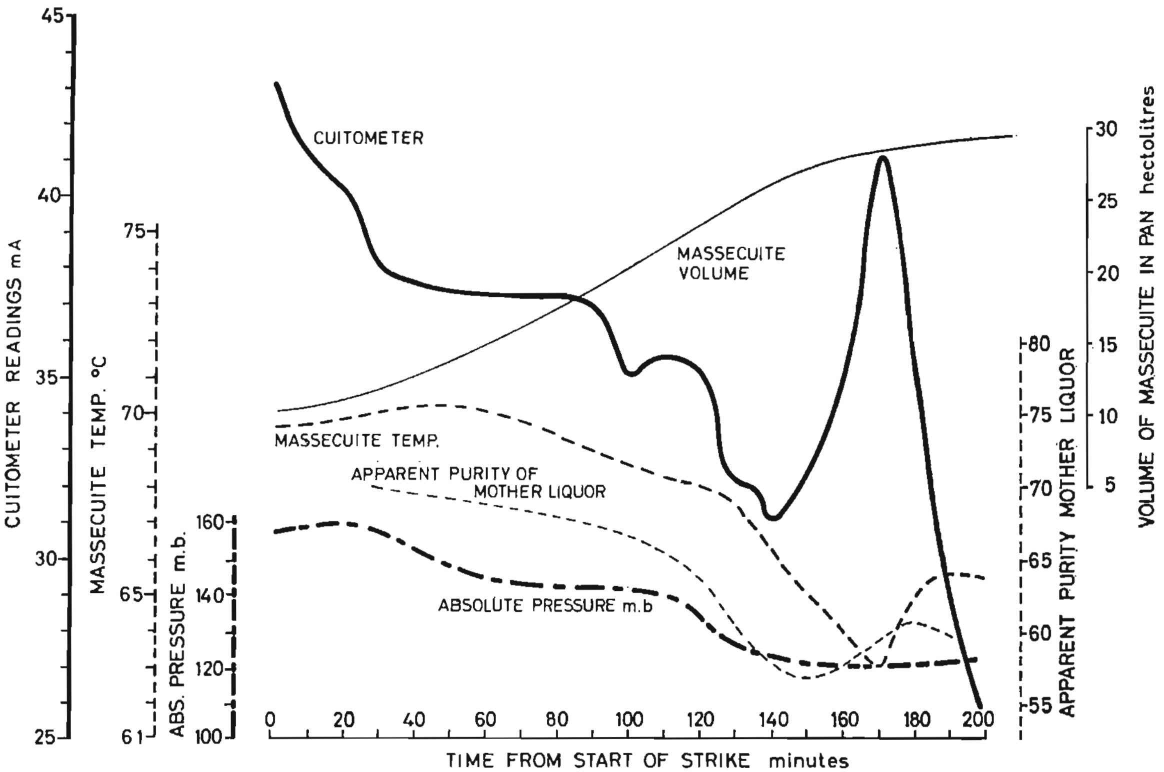

Fig. 15. Evolution of main parameters during a high grade strike.

Exhaustibility of final molasses

Progress on the project to develop a precise formula for predicting exhaustibility of final molasses was slow due to staff changes. However, a reproducible "boiling technique" has been established.

Boiling-test data are being accumulated to assess the relationship between the various constituent impurities and sucrose losses in molasses.

Case studies on boiling house chemical control techniques

In the past, boiling house performance factors at some factories had been noted to vary erratically from week to week. In 1973 a close examination of the situation revealed a lack of uniformity in the sucrose accounting systems used by factory chemists and a standard procedure for allocating sucrose in stock to weekly mass of canes crushed was proposed. To test this procedure a Fortran computer programme has been written to process the 1973 crop figures.

Determination of sucrose in final molasses

Work on assessing the relative merits of methods for determining sucrose in final molasses, originally started in 1971, was continued. A sample of final molasses was analysed using four different methods, namely, the double polarisation method, the A.O.A.C. chemical method using invertase, the Sugar Research Institute (Mackay) acid inversion method, and the Canadian National Committee method using invertase. The results are summarised in Table 20.

Table 20. Determination of sucrose in final molasses

Method of determination	*Sucrose %*	*S.D.*	*Recovery %*
Double polarisation	33.30	± 0.11	100.7
A.O.A.C. Chemical	33.03	± 0.11	99.1
Canadian National Committee	32.78	± 0.20	—
Sugar Research Institute (Makay)	33.71	± 0.24	95.3

Under local conditions, the A.O.A.C. and Canadian National Committee methods are not considered to be appropriate for routine analysis at sugar factories. Although the S.R.I. (Mackay) method is very simple compared to the Double Polarisation method, its adoption for routine analysis is not envisaged on account of the relatively high S.D. and low recovery associated with it.

Conductivity ash measurements

A comparative study of conductivity of sugar solutions at certain specific concentrations and at several levels of purity was undertaken following a request by I.C.U.M.S.A. The aim was to determine the optimum concentration at which conductivity measurements are to be made to assess sulphated ash through multiplication of the conductivity figure by a so-called C factor.

The products examined were : Raw sugar, Syrup and Final Molasses, and results are given in Table 21.

Table 21. Conductivity Ash of Raw Sugar, Syrups and Final Molasses

(a) Raw Sugar

POL SUGAR	SULPHATED ASH	CONDUCTIVITY (u MHOS)		
		on 28 Bx solution *with* water connexion	on 5g % cm³ soln. *with* water connexion	on 1 g % cm³ soln. *without* water connexion
98.65	0.303	459.4 (Corr.Cœff.0.8642)	182.2 (Corr.Cœff.0.8574)	44.6 (Corr.Cœff.0.8419)

(b) Syrups

PURITY (Clerget)	SULPHATED ASH	CONDUCTIVITY (u MHOS)			
		on 28 Bx soln. *with* water connexion	on 5 g % cm³ soln. *with* water connexion	on 5 g (0.5 g syrup) + 4.5 g sucrose) % cm³ soln. *with* water connexion	on 1 g % cm³ soln. *without* water connexion
87.3	2.02	4125 (Corr.Cœff.0.7841)	1061 (Corr.Cœff.0.9011)	127.3 (Corr.Cœff.0.8973)	271.3 (Corr.Cœff.0.9314)

(c) Final Molasses

PURITY (Clerget)	SULPHATED ASH	CONDUCTIVITY (u MOHS)		
		on 5 g % cm³ soln. *with* water connexion	on 5 g (0.5 g molasses + 4.5 g sucrose) % cm³ *with* water connexion	on 1 g % cm³ soln. *without* water connexion
36.7	14.71	5285 (Corr.Cœff.0.9455)	755 (Corr.Cœff.0.9576)	1407 (Corr.Cœff.0.9584)

Miscellaneous

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

Issues of weekly chemical control figures for sugar factories were published throughout the season.

A total of 12,961 samples of cane were analysed for the various Divisions of the Institute and for Estate Agronomists.

BY-PRODUCTS

The effects of steam on bagasse

Work started in 1972 on the increased digestibility to cattle of bagasse after treatment with steam under pressure was continued. Several combinations of steam condition and treatment times were tried. Highest pressures utilised were around 18 bars.

At pressures between 14 and 18 bars (saturated or wet steam) best conversion of insoluble matter into water-soluble material resulted after steaming times of 5-10 minutes. Longer steaming times resulted in a reduction of soluble matter content. At pressures of around 10 bars solubility increased with treatment time, the rate of increase becoming negligible at 30 minutes. The level of solubility after that time did not, however, reach that obtained at the higher pressures tested.

Derinded cane as cattle feed

Following the results obtained in Barbados on derinding of sugar cane, a yield analysis of sugar cane components (tops, rind and derinded cane) was undertaken using different varieties at two different sites. It would seem that 9-10 months old sugar cane planted under proper conditions could be utilized for cattle feeding (Table 22).

Talbe 22. Dry matter yield of sugar cane at different ages (tonnes/ha)

Location :	Henrietta						St. André					
Variety :	S 17			M 93/48			S 17			M 377/56		
Age (months) :	5	7	10	5	7	10	5	7	10	5	7	10
Whole stalks	19.0	18.5	29.3	14.7	18.5	28.0	19.9	31.5	34.1	16.8	35.3	42.2
Derinded stalks	11.9	11.4	18.7	8.8	10.9	15.6	11.6	20.9	22.5	9.5	20.9	27.0
Tops	4.3	4.5	4.7	2.8	3.8	4.3	5.9	6.9	6.9	7.3	8.1	8.5
Derinded cane + tops	16.1	15.9	23.4	11.6	14.7	19.9	17.5	27.8	29.4	16.8	29.0	35.5

MAIZE

Plate VIII. Vegetative development and height of a French maize hybrid (left; well developed ears and tassels) compared to the local variety (right; ears and tassels not yet developed) sown at the same date. Note also the different number and size of the leaves.

MAIZE

Agronomy and Plant Breeding

Owing to the limited acreage of free and suitable land, increased cultivation of maize necessitates the use of sugar cane interrows and land fallow between cane cycles. The type of maize now predominantly cultivated, called the "local" variety, has characters that preclude its use on sugar cane lands. These are its great vegetative heterogeneity, its height, the profusion of broad leaves, a marked tendency to lodge, a growing period of more than 140 days, and a low yielding capacity.

Work is currently in progress on (1) the evaluation of yielding capacities of introduced shortcycle hybrids suitable for cultivation in the interrows of ratoon cane and in full stand between cane cycles, and on (2) the breeding of local hybrids.

Yield trials with hybrid maize

Yield trials with hybrids from France (kindly supplied by the Universal Development Corporation (Pty.) Ltd., Port Louis) in 1971 and 1972 showed that certain of them, e.g. *Anjou 360*, *Anjou 510*, *United 32A*, outyielded the "local" variety, from which they differ by their shorter height, by possessing fewer and more slender leaves, by having ears lower on the stems, and by maturing earlier (Plate VIII). All the varieties were planted at the same density in the trials but it is possible to plant certain of them at higher densities owing to their short height. Accordingly, in trials conducted in 1973, the hybrids were grouped according to age at maturity, which is directly related to vegetative development, and planted at different densities. The groups were : I, very early; II, early; III, medium late; IV, late; V, very late. The hybrids of each group were compared to a control hybrid of known performance and having the same age at maturity as the group to which it was assigned. For groups I, II, III and IV, the control hybrids were *Inra 258*, *Anjou 360*, *Anjou 500* and *MA 1178*, respectively, while the "local" variety was control in group V, which included hybrids from South Africa.

Table 23 shows the mean yields of the best yielders in each maturity group at two locations, Réduit and Pamplemousses, and two planting periods, March and September. It may be noted, however, that the highest individual yields recorded were 8.0 tonnes/ha with the medium late *United 530* and 8.23 tonnes/ha with the very late *SSM 20* both planted in September at Rèduit.

From yield results and other characters evaluated, such as plant height, height of ear insertion, days to 50% silking, shelling%, number of leaves, resistance to rust, insect and fungal attacks, and lodging, the hybrids *United 530* and *Anjou 360* can be recommended for planting in cane interrows and *SSM 20* for replacing the "local" variety in full stand cultivation.

Effect of plant density on yield of hybrid maize

The hybrid *Anjou 500* was grown at 6 population levels in March to compare yields at different plant densities. There were 3 replications and plot size was 10 m by 4 rows. Weeds were controlled with herbicide (Atrazine) and fertilizers were applied at 280 kg N, 142 kg P_2O_5, and 237 kg K_2O/ha. Yield data was obtained from the two centre rows of each plot.

Grain yield increased with plant density up to 56,900 plants/ha, then decreased (Fig. 16).

Hybrid maize in interrows of ratoon cane

In 1972, preliminary trials with the hybrid *Anjou 500* planted in the interrows of ratoon cane (every 2nd interrow planted to maize) showed no decrease of cane yield if fertilizers were applied in adequate quantities. In September 1973, trials were laid down to determine the appropriate maize

Table 23. Mean yields of maize in March and September from 2 locations and some characters of the high yielding introduced maize hybrids.

VARIETY	*Yield kg/ha at 12% m.c* March	*Yield kg/ha at 12% m.c* Sept.	*50% silking days* March	*50% silking days* Sept.	*Plant Height (cm) Reduit* March	*Plant Height (cm) Reduit* Sept.	*Ear Placement (cm) Reduit* March	*Ear Placement (cm) Reduit* Sept.
GROUP I (65,000 plants/ha)								
CR 206	2,337	6,292	32	41	166.3	200.3	64.3	81.5
DEK 216	3,098	5,880	34	42	161.4	185.4	56.7	69.6
INRA 240	3,207	6,136	34	42	193.8	188.7	77.0	73.0
INRA 258	3,320	5,807	34	41	177.2	194.0	72.3	81.7
INRA 260	2,880	5,816	34	42	172.3	190.8	59.6	70.9
L. G. 7	3,036	6,901	33	41	180.1	194.4	66.1	77.0
GROUP II (57,000 plants/ha)								
ANJOU 360	4,200	6,051	37	46	153.7	189.4	53.9	70.0
INRA 400	4,027	6,994	37	47	169.4	192.6	46.8	66.4
U 352	4,017	6,036	38	46	164.0	201.1	57.5	72.1
GROUP III (50,500 plants/ha)								
ANJOU 500	3,801	6,842	41	48	169.2	209.1	63.8	83.3
ANJOU 510	4,081	7,055	42	48	182.4	202.6	59.8	73.9
C 555	2,910	5,953	42	47	166.2	198.0	53.4	70.1
DEK XL 24	3,655	7,430	42	49	168.1	205.0	61.3	85.9
U 530	5,998	8,001	42	49	189.4	218.7	57.0	69.2
U 550	3,389	6,451	43	49	171.5	198.9	57.7	65.8
GROUP IV (41,500 plants/ha)								
CR 608	3,652	5,259	41	52	170.4	193.6	54.6	68.6
DEK 12	3,870	5,927	43	55	190.0	213.5	69.4	82.9
P. R. 610	3,787	5,013	43	54	176.5	205.6	65.8	87.5
U 32A	3,517	5,498	43	55	176.0	198.9	63.7	75.0
GROUP V (38,000 plants/ha)								
SSM 20	5,351	8,233	48	65	210.0	208.9	96.2	97.1
SSM 40	4,882	8,065	48	64	206.3	223.4	97.6	112.4
SSM 44	4,491	8,070	48	64	194.9	195.7	98.4	93.4
SSM 56	4,920	8,304	48	63	197.2	220.6	98.1	108.9
LOCAL	3,659	6,219	66	79	244.1	256.2	137.8	174.9

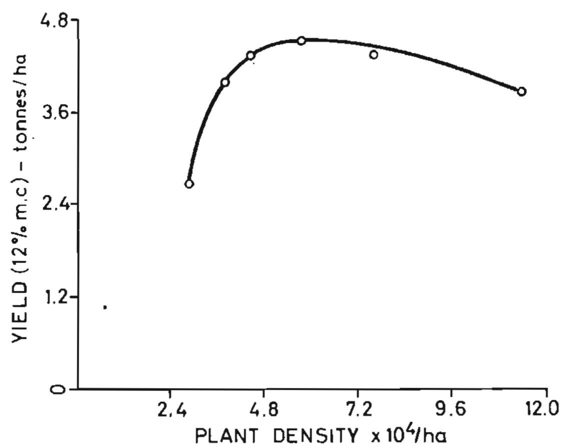

Fig. 16. Effect of plant density on yield of the maize hybrid *Anjou 500.*

density and fertilizer combination for highest productivity and profitability without affecting sugar cane yield. Table 24 summarises the data obtained at Beau Plan, Rose Belle, Savannah and St. Antoine. Analysis of the data from each of these localities showed that the main effects for density and fertilizer levels were highly significant ($P < 0.01$), but the interaction density × fertilizer was not.

It appeared that the density-fertilizer combination F_2D_2 in Table 24 would be the best for production of maize but cane yields cannot be assessed until 1974, when final conclusions may be drawn on the profitability of planting maize in ratoon-cane interrows.

Table 24. Mean yield of maize (12% m.c.) in kg/ha, when planted in every second interrow of ratoon cane, with 12 treatments in 4 locations.

Treatments	*Beau Plan M 13/56 2nd Ratoon*	*Rose Belle S 17 1st Ratoon*	*Savannah M 13/56 1st Ratoon*	*St. Antoine M 13/56 2nd Ratoon*
F_0D_1	881	108	372	253
F^0D_2	1486	139	369	503
F_0D_3	1309	176	321	845
F_1D_1	1352	783	661	598
F_1D_2	2639	899	691	970
F_1D_3	2163	837	927	1207
F_2D_1	1453	783	731	724
F_2D_2	2109	1288	1138	1114
F_2D_3	2542	1057	1138	1224
F_3D_1	1554	1006	725	862
F_3D_2	2253	1200	1434	1108
F_3D_3	2730	1049	1310	1065
C. V. %	19.5	23.9	25.3	26.5

F_0 = No addition of fertilizer
F_1 = 190 kg Amm. sulphate; 95 kg single super phosphate; 52 kg Potassium chloride/ha
F_2 = 380 kg ,, ,, 190 kg ,, ,, ,, 104 kg ,, ,,
F_3 = 570 kg ,, ,, 285 kg ,, ,, ,, 156 kg ,, ,,

D_1 = 9,500 plants/ha interrows
D_2 = 19,000 plants/ha interrows
D_3 = 28,500 plants/ha interrows

Breeding and selection

The following stages were completed in the breeding programme for the production of local maize hybrids :

(a) 5th generation selfing of the basic material from Savanne and Flacq;
(b) 4th generation selfing of the stock from Le Morne, Pailles, Nouvelle Découverte, Richelieu and Solitude;
(c) 3rd generation selfing of the material from Rodriguez.

Observations have shown that only 4 selfings are necessary to stabilise the growth characters. The height then becomes uniform, a criterion generally accepted for homozygoty. Three selected lines from the 4th generation selfing of material from Savanne and Flacq were therefore used in September to produce single-cross hybrids. They were also used in crosses with the hybrids *LG 11*, *Anjou 360* and *United 530* and the seeds obtained will be tested in 1974.

Synthetic varieties

The programme to produce local synthetic varieties was continued. Ears selected from each group of lines planted in 1972 were compared in a trial at Réduit. A randomised complete block design with 3 replicates was used and the planting rate was 38,000 plants/ha. Synthetics 2, 3 and 4 yielded 4619, 5392 and 5114 kg/ha, respectively, of maize at 12% moisture content.

Seeds from the selected ears were also planted to produce a second generation of plants, from which further selection, based on such characters as age at maturity, uniformity of plant height, level of ear insertion, and yield, will be carried out.

A number of varieties adapted to tropical and subtropical climates have been introduced for incorporation in the breeding programme.

Top crosses

Crosses were made at Réduit using the South African *SSM 20* as male parent and the single-cross French varieties *LG 11*, *Anjou 360* and *United 530* as female parents. The crosses so obtained will be compared with the parent lines and with the local variety in 1974.

Pests and diseases

Cob and stem borers

The insects that have emerged as the most troublesome pests of maize plantations are cob borers and early-shoot borers. The former include *Heliothis armigera* and *Cryptophlebia leucotreta* but the relative importance of the species involved is not yet clear. The only shoot-boring species that has been prominent is *Angustalius malacellus*, which is generally referred to as the "webworm", for the larva bores into shoots below soil level and when not feeding retires into a silken tunnel which it constructs outside and attached to the shoot. It may be noted that the borer *Sesamia calamistis*, formerly frequent on maize, has given no trouble and appears to be very well controlled by imported parasites.

No satisfactory insecticidal methods of control for cob and stem borers can yet be recommended.

Streak disease (*virus*)

Study of *Cicadulina mbila*, the leafhopper vector of streak disease, was continued. Sugar cane is one of the reported host-plants of the insect but search for it on this plant was unsuccessful, although it laid eggs freely and developed to the adult stage on young sugar cane plants in the laboratory. However, when caged with both young sugar cane and young maize, oviposition occurred almost exclusively on the latter.

Stripe disease (*virus*)

All the 44 varieties grown in a field trial at Case Noyale became infected to between 40% and 100% with a disease diagnosed as stripe.

Transmission of stripe from maize to maize and from *Sorghum album* to maize, using the maize hybrids *U 600* and *Ona 36*, as well as the local variety, was obtained under greenhouse conditions with *Peregrinus maidis*.

Reaction of newly-introduced hybrids to diseases

Forty seven newly introduced hybrids were tested for resistance to maize rust (*Puccinia polysora*) and blight (*Tetrametaspheria turcica*). Eleven had the same reaction to rust as the local variety, i.e. were moderately susceptible, and the others were more susceptible. Fourteen varieties were more susceptible to blight than the local variety.

The susceptibility of 26 hybrids to the local strain of maize mosaic was assessed by mechanical inoculation : 11 were found to be very susceptible, 11 moderately susceptible, and 4 were immune.

POTATO

POTATO

Varieties

The following varieties were introduced during the year : *Cardinal, Mirka, Ulster, Sceptre, Amigo, Asta, Baraka, Eba, Element, Marijka, Prevalent, Rector; Spunta, Wilja* from Holland and *Ilam Hardy* from New Zealand. The cooperation of the *Instituut voor Rassenonderzœk van Landbourrogewassen*, Wageningen, of Messrs. Wolf & Wolf, Amsterdam, and of Messrs. Alex Mc Donald Ltd., Christchurch, New Zealand, in supplying certified seed is gratefully acknowledged

The above-named varieties were compared with *Up-to-Date* in the humid and subhumid zones. *Cardinal* seemed to have a better yield potential as well as a higher tolerance to bacterial wilt than *Up-to-Date* but the performance of the Dutch varieties was affected by the poor state of the seeds on receipt and no definite conclusions could be drawn as to their yielding capacities under local conditions. The tubers harvested were stored at the Agricultural Marketing Board and will be used as seeds for further tests in 1974.

Of varieties re-tested in 1973, *Mariline*, *Désirée*, *Greta* and *Regale* yielded better than *Up-to-Date* at both Réduit and Pamplemousses. Moreover, *Mariline* again proved to be highly tolerant to bacterial wilt and fairly tolerant to late blight.

Propagation of the variety *Mariline* for seed was continued at Réduit. In 1972, 4.3 tonnes of seed had been produced and these, planted in 1973, yielded 23.5 tonnes of tubers which were placed in storage at 2-3°C for further propagation in 1974.

Local production of seed for commercial plantations

The 55 tonnes of seed potatoes produced locally in 1972, comprising 37 tonnes 2nd generation *Up-to-Date*, 1 tonne 2nd generation *Delaware*, and 17 tonnes 3rd generation *Up-to-Date* were used in commercial plantations on 12 estates (1-3 tonnes per estate). The incidence of leaf roll in the seeds had been earlier determined by sample plantings and was satisfactorily low, as shown below :

Origin of seed	*% leaf roll*
Beau Plan	3.5
Tamarin	7.0
Anna	1.2
Rose Belle	1.9
Terre Rouge	6.9
Beau Champ	2.5

Eight randomised block trials were carried out in different climatic zones, with early, optimum and late planting dates, and with planting in full stand and in cane interrows, to compare 1st (i.e. imported), 2nd and 3rd generation seed. The results (Fig. 17) showed that locally-produced seed gave yields comparable to those obtained with imported seed and that virus disease was not more prevalent in 3rd generation than in 2nd generation seed.

Plate IX. Seed potatoes produced in Mauritius in 1973 being graded and bagged at the Agricultural Marketing Board (Photograph by courtesy of the AMB).

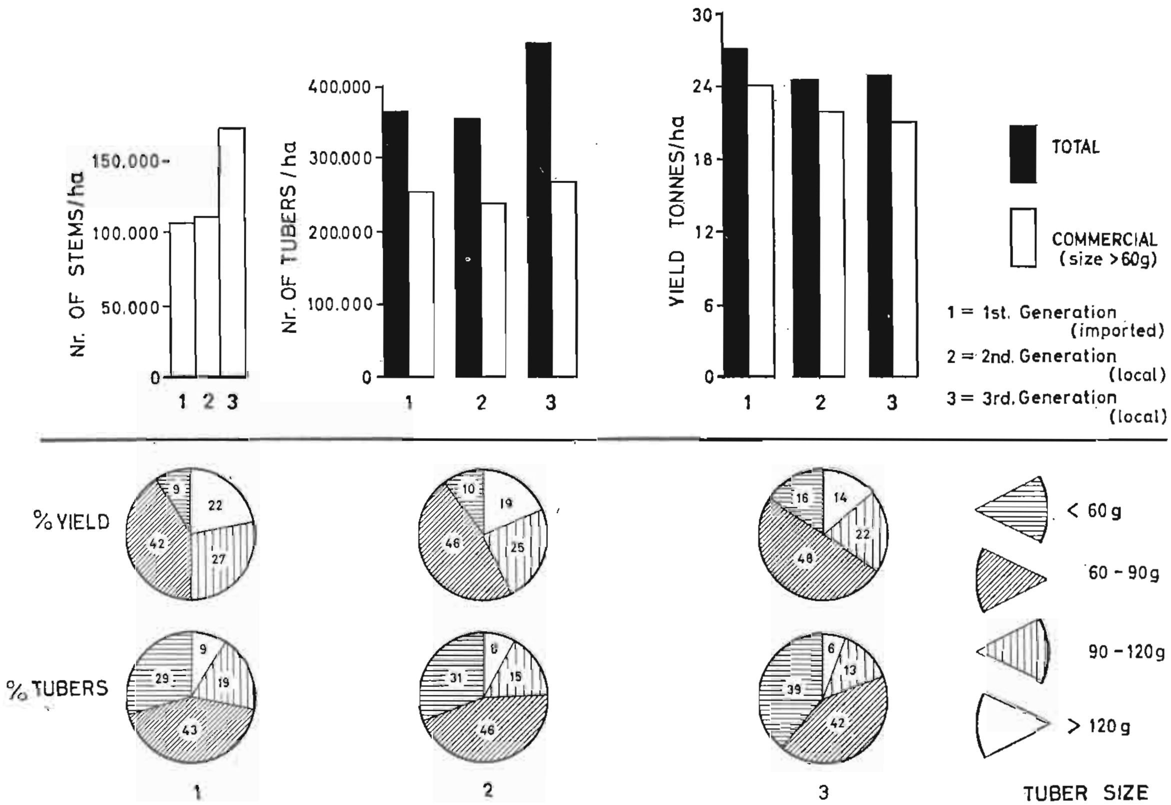

Fig. 17. Yields from seed potatoes of 1st, 2nd and 3rd generations.

The production of 2nd generation seed of *Up-to-Date* from imported Grade A certified South African seed was increased to 472 tonnes. The imported seed was of very good quality with only 0.8% leaf roll infection. About 6 tonnes of 3rd and 4th generation seed were also produced for experimentation in 1974.

Using Grade AA certified seed from South Africa, 4 tonnes of superior grade seed of *Up-to-Date* were produced for further multiplication in 1974.

Cultural methods

Use of cut seed

Five trials, using locally produced-seed, were carried out during both the cool and hot seasons to compare cut and whole seeds and to assess the effect of treatment of such seeds with the fungicides Captan and Benomyl (Benlate).

Previously-obtained data indicating that the cutting of seed in good condition has no adverse effect on yield were confirmed. Higher yields resulted from treatment of seed with either fungicide during the hot season but the results of fungicidal treatment in cool season plantations were erratic and inconclusive.

Fungicidal treatment of seed, particularly of cut seed, is considered to be beneficial in hot season plantations and a desirable insurance in cool season plantations if (i) dry conditions are likely to retard sprouting or if seeds have (ii) just broken dormancy and have few sprouts, (iii) are old and flabby, or (iv) are contaminated with *Fusarium* sp.

Fertilisers

Fertiliser trials in 1971, 1972 and 1973 have led to the conclusion that about 175 kg N/ha should be applied to plantations of *Up-to-Date*.

A highly significant response to phosphate was obtained in trials at Union Park and Belle Rive in 1973 (Table 25) although soil analyses before planting had shown the phosphate status of the experimental sites to be good. It would seem that the rate of release of phosphate from the soil is inadequate to satisfy the sudden needs of a potato crop.

Table 25. Potato yield (tonnes/ha) and phosphate fertilization

Phosphate levels ($kg\ P_2O_5/ha$)	*K fertiliser used*	0	75	150	225
Belle Rive	Muriate	17.6	21.4*	22.8**	22.8**
	Sulphate	19.5	23.7**	25.0**	23.3**
Union Park	Muriate	13.5	19.7*	22.3**	22.0**
	Sulphate	13.8	15.9	19.5	21.4**

* Sig. increase at P = 0.05
** Sig. increase at P = 0.01

Basic fertilization : Ammonium sulphate at 150 kg N/ha
Muriate or sulphate of potash at 200 kg K_2O/ha

A yield response to application of potassium was obtained at Belle Rive but not at Union Park (Table 26). As expected, type of fertiliser had no effect on yield but the effect of type of potassium fertiliser on keeping quality is still under investigation.

It is concluded from observations made in recent seasons that application of fertilisers at planting is essential in order to provide readily-available nutrients for quick growth. The release of nutrients bound in the soil is generally too slow for a short-cycle crop such as potatoes.

Table 26. Potato yield (tonnes/ha) and potassium fertilization

Potassium levels ($kg\ K_2O/ha$)	*K fertilizers*	0	95	190	285
Belle Rive	Muriate	18.7	23.3*	25.0*	23.0*
	Sulphate	18.7	22.1*	22.2*	23.6*
Union Park	Muriate	16.3	18.7	22.3*	20.3
	Sulphate	17.9	19.5	19.3	21.8

* Sig. increase at P = 0.05

Basic fertilization : Ammonium Sulphate at 150 kg N/ha
Triple Superphosphate at 150 kg P_2O_5/ha

Pests and diseases

Late Blight (Phytophthora infestans)

Late blight was on the whole less severe in 1973 than in recent years, although it was prevalent in some areas in July. Plantations in the north and south were almost free from infection and late plantations were everywhere unaffected.

Field tests of newly-introduced varieties for resistance to blight, and some fungicide trials, were compromised by conditions unfavourable for the disease and will need repeating in 1974.

A trial to test the efficacy in fungicidal sprays of the wetters Triton B 1956, Citowett and Nu-film was carried out at Belle Rive in July. The wetters were added to Dithane M/45 sprays which were applied at 5-day and 7-day intervals. The three gave equally good results. In plots sprayed at 7-day intervals yields were higher with addition of wetters but this was not evident with sprays at 5-day intervals (Table 27).

Table 27. Efficacy of wetters in fungicidal sprays for the control of potato blight

	Treatment		*% Blight at harvest*	*Mean yield (kg/plot)*
1.	Dithane M 45 + Citowett	every 5 days	66.8	18.8
2.	Dithane M 45 + Citowett	every 7 days	75.0	24.5
3.	Dithane M 45 + Triton	every 5 days	62.5	23.1
4.	Dithane M 45 + Triton	every 7 days	70.4	23.2
5.	Dithane M 45 + Nu-film 17	every 5 days	56.2	19.6
6.	Dithane M 45 + Nu-film 17	every 7 days	69.6	23.7
7.	Dithane M 45 only	every 5 days	76.7	24.7
8.	Dithane M 45 only	every 7 days	80.0	17.2
9.	Control		100.0	15.7

Bacterial wilt (Pseudomonas solanacearum)

An experiment at Pamplemousses in February, in a field where bacterial wilt had caused complete failure of a potato crop in 1972, showed that planting on ridges, as opposed to planting in furrows, did not reduce disease incidence although the rate at which plants became infected was slower.

Sixteen potato varieties were tested for resistance to wilt. The tolerance of *Mariline* was confirmed and the newly-introduced *Cardinal*, *Ilam Hardy* and *Spunta* also showed some tolerance.

Potato virus Y

The newly-introduced variety *Spartaan*, which has the asset of being highly resistant to blight, was found in several plantations to be severely affected by Potato Virus Y.

Transmission of leaf roll by aphids

Aphids and their ability to transmit virus diseases, in particular leaf roll, have an obvious connection with local production of seed potatoes. An experiment to assess the incidence of aphids in potato crops was carried out in 1972 and briefly described in the previous report. The results of this experiment have now been published separately in more detail (see p. 17). The experiment involved 3 plantings in an upland and a lowland locality, respectively, the 1st planting being in April. It was concluded that *Myzus persicae* and *Macrosiphum euphorbiae*, the two species most likely to be vectors of leaf roll, were least numerous in the 1st (April) planting, particularly in the upland locality (Belle Rive).

Inspection of the two April 1972 plantings had revealed less than 1% leaf roll originating from the certified seed used. At harvest, and excluding the few plants showing seed-borne infection, tuber samples were taken for use as seed in 1973, to determine the extent of any aphid-borne infection that had occurred. The samples were taken, one from each planting, by heaping the yield of every 5 adjacent plants and removing one medium-sized tuber from each heap. In effect, one tuber was taken from 20% of all plants. Samples were kept in cold storage and planted in April 1973 at Belle Rive. They gave rise to plants showing no symptoms of leaf roll.

Thus, transmission of leaf roll by aphids was apparently absent in a planting of potatoes made in April, 1972, in an upland locality (Belle Rive) and a lowland locality (Pamplemousses), where no insecticidal treatments had been applied for control of aphids.

To pursue this subject further, two plots, each of 0.084 ha (1/5 arp) were planted in May, July and September, respectively, at 3 sites, namely Belle Rive, Union Park and Pamplemousses. One plot of each pair was regularly sprayed with systemic insecticides and the other left untreated. At harvest, one medium-sized tuber was taken from each plant and the tubers so obtained placed in cold storage until 1974 when they will be planted and the extent of seed-borne infection assessed. The results should enable comparison of aphid-borne infection at different times and places with and without insecticidal treatment for aphid control.

Trapping of aphids with "Broadbent" cylindrical sticky traps was attempted at various sites from January to October with the intention of obtaining information on the abundance of flying potato aphids. However, very few alate aphids were caught by the traps and it is uncertain if any significance can be attached to the fact that catches were very small.

GROUNDNUT

TOMATO

FRENCH BEAN

Plate X. *Top*. Preforan at 2.15 kg a.i./ha sprayed in pre-emergence of groundnuts and weeds.
Middle. Effect of weeds on groundnuts in an untreated control plot.
Bottom. Deleterious effects on germination and growth of groundnuts resulting from pre-emergence application of Sencor at 1 kg a.i./ha.

GROUNDNUT

Varieties

Trials to assess the yield potential of imported varieties were carried out at Pamplemousses and Réduit with the following : *Cabri, GH 119-20, Manipintas, Mwitunde, Nan Kai 76, NC 2, NC 5, Nung Yu 922, Nung Yu 991, S.A. 156, S.A. 291, 55-437, 61-24, Shulamit, Tainan Selection No. 9, Tai Nung No. 3, U.F. 71-316, VA 56R*, and *Virginia Bunch Improved.* In both localities *Shulamit* outyielded all others. Among varieties of the Spanish type, *Nung Yu 991* and *Tai Nung No. 3* yielded more than the local *Cabri.* Further trials with Spanish type varieties will be carried out before recommendations concerning them are made.

Varieties *Nung Yu 1137, AC 15714, AC 15753, AC 15754* and *AC 15755*, which had been propagated in 1972, were planted in trials in October-November at Réduit and Pamplemousses.

Cultural methods

Trials to determine optimum planting period were carried out from end October 1971 to November 1972 at Pamplemousses (sub humid), with and without irrigation and at Union Park (super humid), without irrigation. The varieties used were *Shulamit* and *Cabri*, and sowings were made at monthly intervals. Treatments were in a randomised complete block design with 4 replications for each variety and plot size was 10 m by 4 rows. Yields were recorded at 8% moisture content.

Data obtained from each location were analysed separately and showed the marked effect of planting date on yield. October to January sowings gave the highest yields with early November being the best period for planting both varieties. It may be noted that January sowings entail certain risks because of the possibility of cyclones in February and March. Rainfall was identified as an important factor affecting yield and the results suggest that rainfall 60-90 days after germination is the predominant factor in sub humid areas. Flowering and pod development are evidently greatly reduced by moisture stress.

Weeds

Trials laid down in 1972 to study the economics of herbicide use compared to manual weeding were harvested in 1973. Yield differences were not significant. However, in most experiments herbicides proved to be more economical than hand-weeding.

New herbicides tested were not promising and Preforan, at 2.15 kg a.i./ha (2 lb/arp) remains the best herbicide in groundnuts. Sencor, although showing good herbicidal properties, affected germination and growth of groundnuts (Plate X).

Diseases

The new systemic fungicide Bavistin was found to be as efficacious as Benomyl (Benlate) for the control of *Cercospora* leaf spot. A combination of these fungicides with Dithane M 45 gave better control than each alone (Table 28).

Table 28. Comparison of Bavistin and Benlate fungicides for the control of *Cercospora* leaf spot

Treatment	*% Cercospora at harvest*	*Pod yield (as % of control)*
1. Bavistin (0.6 kg/ha) (1/2 lb/arp.)	17.2	113
2. Benlate (0.6 kg/ha)	18.0	123
3. Bavistin + Dithane M 45 (0.3 kg + 1.2 kg/ha) (1/4 lb + 1 lb/arp.)	6.9	163
4. Benlate + Dithane M 45 (0.3 kg + 1.2 kg/ha)	13.2	163
5. Control	52.4	100

TOMATO

The following varieties were planted at Réduit in 1972 and 1973 to determine their yield potential and their susceptibility to bacterial wilt (*Pseudomonas solanacearum*).

Stake type : *Ballon Rouge*, *Saint Pierre*, *70529*, *70266* or *Moneymaker*, *Venus* and *Saturn*

Dwarf type : *Roma*, *70123*, *70285*, *70215* or *Scoresby*, *VFN 8*.

Ballon Rouge, *Saint Pierre* and *Roma* had been obtained from Tézier Frères, France; *Venus* and *Saturn* from North Carolina Foundation Seed Producers Ltd., U.S.A., and the numbered varieties from D.S.I.R., New Zealand (through Dr. E.Z. Arlidge).

Also included in the trials was the locally-produced *Marglobe*.

The yields in the trials were very erratic, mainly due to bacterial wilt. In all the trials, however, *Venus* and *Saturn* proved to be highly resistant to the disease. This was confirmed when the varieties were planted in a "wilt garden" at Réduit in September 1972 where they evidenced immunity, while other varieties failed completely. Observations in 1973 have also shown the resistance of *Venus* and *Saturn* to bacterial wilt.

FRENCH BEAN

A variety trial was planted at Réduit in September to compare the yield of green beans of 7 dwarf varieties with that of the *Local Red* variety. The beans were harvested when average pod length was not greater than 9 mm. Four harvests were carried out at about every 4 days over 15 days. Results are shown in Table 29.

Table 29. Pod characteristics and yield of varieties of French Beans

	Pod characteristics					
Varieties	*Type*	*Colour*	*Cross Section*	*Shape*	*Average length*	*Yield kg/ha.*
Contender	stringless	green	round	slightly curved	15.5	8,558
Golden wax	stringless	yellow	round	twisted	11.6	5,292
Top Crop	stringless	green	round	slightly curved	13.3	7,999
Long John	stringless	green	round	twisted	13.3	4,991
Long Tom	stringy	green	flat oval	straight	17.2	8,662
Local Red	stringy	green	flat	straight	13.4	6,484
Pioneer	stringy	green	flat oval	straight	15.4	6,880
Victory	stringy	green	flat oval	straight	15.3	7,231

Compared to *Local Red*, varieties *Contender*, *Top Crop* and *Long Tom* gave significantly ($P < 0.05$) higher yields. It was observed that varieties *Long John* and *Long Tom* were more susceptible to mosaic than the others.

Statistical Tables

CONVERSION FACTORS

Length

1 cm	=	0.3937 (1/2.5400) inch
1 m	=	3.2808 (1/0.3048) ft
	=	1.0936 (1/0.9144) yd
	=	3.0784 (1/0.3248) Pied de Roi*
	=	0.3078 (1/3.2484) gaulette*
1 km	=	0.6214 (1/1.6093) mile

Area

1 m^2	=	10.7639 (1/0.0929) ft^2
	=	1.1960 (1/0.8361) yd^2
1 ha	=	10 000 (1/0.0001) m^2
	=	2.4711 (1/0.4047) acre
	=	2.3692 (1/0.4221) arpent*
	=	236.9211 (1/0.0042) perch*

Volume

1 l	=	0.2200 (1/4.5460) gall (Imp.)
	=	1.7598 (1/0.5682) pint (Imp.)
	=	0.0353 (1/28.3168) ft^3
	=	0.0010 (1/1000) m^3
1 m^3	=	35.3148 (1/0.0283) ft^3

Weight

1 kg	=	2.20462 (1/0.4536) lb (avoirdupois)
	=	0.00098 (1/1016) ton (avoirdupois)
	=	0.00110 (1/907.2) short ton (avoirdupois)
	=	0.00100 (1/1000) tonne or metric ton

Energy

1 J	=	0.000948 (1/1055) BTU

Power

1 kW	=	1.341 (1/0.7457) HP

* = local measures

Table I. Area under sugar cane, 1969-1973
(in thousand ha)

Year	Area under cane Island	Area harvested					
		Island	West	North	East	South	Centre
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	70.89	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
1973	87.37	80.95	5.37	21.41	19.95	23.90	10.32

Table II. Sugar production, 1969 - 1973
(in thousand tonnes)

Crop Year	No. of factories operating	Av. Pol.	Island	West	North	East	South	Centre
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
1973	21	98.7	718.5	57.8	179.8	165.8	225.5	89.6

Table III. Yield of cane, 1969 - 1973
(tonnes/ha)

SECTORS	1969	1970	1971	1972	1973
ISLAND					
Miller-Planters	85.6	74.7	79.9	90.0	88.4
Planters*	59.7	51.4	49.5	65.5	64.0
Average	73.2	63.8	65.9	78.7	77.0
WEST					
Miller-Planters	83.4	84.4	83.0	94.3	97.6
Planters*	61.6	59.7	51.2	66.7	72.5
Average	72.5	73.5	68.7	82.0	86.5
NORTH					
Miller-Planters	85.6	82.7	65.6	91.7	90.8
Planters*	59.5	55.2	39.1	65.6	64.7
Average	69.0	65.2	48.8	75.4	74.4
EAST					
Miller-Planters	96.5	72.8	84.4	94.3	87.9
Planters*	58.8	44.8	51.4	63.0	59.5
Average	77.7	59.0	68.7	79.3	74.2
SOUTH					
Miller-Planters	78.2	74.2	80.1	87.5	87.5
Planters*	58.3	55.2	60.4	67.8	67.3
Average	71.3	68.0	73.9	81.3	81.3
CENTRE					
Miller-Planters	90.3	62.8	87.9	84.8	83.4
Planters*	64.5	42.9	56.9	65.9	61.6
Average	79.4	54.3	75.1	76.7	73.9

* *Inclusive of tenant planters*

Table IV. Average sucrose % cane, 1969 - 1973

Crop year	Island	West	North	East	South	Centre
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
1973	13.06	13.84	13.00	12.73	13.12	13.19

Table V. Yield of sugar, 1969 - 1973
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
1969	8.31	8.43	9.14	9.28	7.87	7.98	8.55	8.69	8.06	8.17	8.96	9.11
1970	7.07	7.19	8.82	8.97	7.21	7.32	6.26	6.37	7.70	7.80	5.99	6.08
1971	7.67	7.81	8.35	8.48	5.67	5.74	7.78	7.93	8.77	8.91	8.72	8.85
1972	8.45	8.56	9.44	9.58	7.73	7.85	8.21	8.32	9.02	9.15	8.53	8.68
1973	8.76	8.89	10.59	10.75	8.29	8.42	8.21	8.34	9.31	9.46	8.56	8.69

Table VI. Monthly rainfall (mm), 1969 - 1973

(average over whole sugar cane area)

Crop Year	GROWTH PERIOD (deficient months in bold characters)								MATURATION PERIOD (excess months in bold characters)			
	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.
Normals 1875 - 1949	96	180	280	281	307	241	176	126	117	105	74	71
Extremes to date	13 335	44 1138	68 825	66 915	85 990	37 701	41 544	25 419	41 260	15 318	18 205	9 250
1969	**86**	**108**	**76**	206	**201**	275	**148**	**71**	**183**	**108**	51	9
1970	**30**	350	401	**188**	567	**102**	**109**	141	**124**	**123**	49	37
1971	**47**	**67**	**182**	296	**121**	273	195	**85**	112	79	22	42
1972	133	**74**	**213**	372	**193**	244	**161**	230	**153**	**246**	26	**155**
1973	261	**134**	283	318	324	**116**	**141**	160	113	**135**	59	30

Table VII. Monthly air temperatures (°c), 1969 - 1973

(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 1950 - 73	275.	19.6	28.8	21.4	29.3	22.5	29.3	22.6	28.9	22.4	27.9	21.1	26.3	19.5	24.8	17.9	23.9	17.6	23.7	17.2	24.6	17.5	25.7	18.3
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
1973	26.8	20.2	28.8	22.7	29.4	23.3	29.4	23.3	29.5	23.1	28.0	21.7	27.2	20.4	24.5	18.1	24.2	18.3	23.5	17.8	24.5	17.2	26.1	18.6

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

Crop Year	1960	1961	1970	1971	1972	1973
November	31	27	26	29	27	**56**
December	24	31	24	34	27	31
January	**85**	29	43	32	29	36
February	**119**	35	**52**	43	**60**	30
March	24	19	**72**	26	45	34
April	24	23	32	26	29	28
May	27	29	31	27	32	22

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
January 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
November 1972 *Ariane*	48	64	63	54	48

Table X. Cane Varieties, 1966 - 1973

(% area cultivated on estate lands)

	B 37172 (1953)	Ebène 1/37 (1951)	Ebène 50/47 (1961)	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)	S17 (1970)	M 124/59 (1971)	M 438/59 (1971)
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	—
1973	—	—	—	—	1	5	7	16	1	8	1	1	1	18	9	4	23	2	1

NOTE : Year of approval by Cane Release Committee in brackets

Table XI. Cane varieties on miller-planters' land 1969 - 1973

(% annual plantation)

Years / Varieties	Island					West					North					East					South					Centre				
	1969	1970	1971	1972	1973	1969	1970	1971	1972	1973	1969	1970	1971	1972	1973	1969	1970	1971	1972	1973	1969	1970	1971	1972	1973	1969	1970	1971	1972	1973
M 31/45 ...	1.9	2.0	2.0	1.6	0.7	0.2	0.3	0.8	—	—	0.8	0.5	1.8	—	—	4.8	7.2	5.2	5.2	2.8	1.6	0.4	0.8	0.1	0.4	—	0.3	0.4	2.0	—
M 202/46 ...	1.3	0.9	0.7	0.1	—	0.2	—	—	—	—	0.1	—	—	—	—	0.2	0.2	—	—	—	3.2	2.1	1.8	0.3	—	—	—	—	—	—
M 93/48 ...	13.3	12.3	9.9	8.8	3.9	—	—	—	—	—	1.7	—	—	—	—	5.3	3.9	2.7	1.6	—	9.9	13.2	11.5	7.5	3.0	51.4	41.4	40.7	36.1	19.9
M 442/51 ...	4.1	0.4	0.5	0.4	0.9	1.6	—	—	—	—	6.5	0.4	1.0	0.9	0.8	7.1	0.4	0.5	—	—	3.1	0.8	0.5	0.6	—	—	0.1	—	—	—
M 13/53 ...	0.4	0.2	—	—	—	—	—	—	—	—	0.8	1.0	—	—	—	—	—	—	—	—	—	—	—	—	—	1.3	0.1	—	—	—
M 13/56 ...	24.8	16.6	25.8	25.1	23.3	21.2	13.4	19.1	17.5	14.6	58.7	30.5	56.9	63.3	44.9	21.5	17.0	19.1	13.7	21.4	18.7	16.1	24.6	25.6	22.9	7.2	3.8	—	1.1	—
M 377/56 ...	32.6	20.7	—	3.0	2.0	35.2	8.1	—	18.0	10.0	25.2	39.2	—	2.7	2.0	38.2	17.0	—	5.4	1.5	34.3	19.1	—	—	0.5	27.4	15.9	—	—	2.9
M 351/57 ...	9.9	6.4	8.7	3.4	1.7	4.3	4.8	2.0	7.8	2.2	—	1.4	2.2	1.2	2.7	13.1	2.5	6.2	0.6	0.2	15.8	10.3	10.3	3.8	1.2	4.3	8.2	23.3	6.9	3.3
N Co 376 ...	0.9	0.4	0.1	0.2	—	1.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.2	0.9	0.3	0.5	—	2.6	—	—	—	—
S 17 ...	8.3	37.3	48.2	47.0	50.1	27.6	69.8	67.1	50.8	49.9	3.5	25.2	37.2	26.9	37.3	7.8	49.5	61.7	54.6	54.3	9.9	33.9	47.0	54.9	58.1	3.9	27.0	29.8	38.6	44.8
M 124/59 ...	—	—	1.7	5.4	8.2	—	—	2.7	—	9.5	—	—	—	—	0.6	—	—	1.0	9.5	3.8	—	—	1.9	4.5	9.5	—	—	0.4	10.0	22.4
M 438/59 ...	—	—	—	2.7	7.6	—	—	—	—	9.6	—	—	—	2.4	10.5	—	—	—	7.7	15.2	—	—	—	0.4	2.6	—	—	—	2.6	5.5
Other varieties	2.5	2.8	2.4	2.3	1.6	8.5	3.6	8.3	5.9	4.2	2.7	1.8	0.9	2.6	1.2	2.0	2.3	3.6	1.7	0.8	2.3	3.2	1.3	1.8	1.8	1.9	3.2	5.4	2.7	1.2
Total area planted (ha)	5,901	6,018	6,317	6,139	5,678	311	374	521	458	435	1,047	965	1,143	1,070	1,214	1,423	1,399	1,445	1,369	1,121	2,199	2,385	2,466	2,279	2,095	922	895	742	963	813

Table XII. Area harvested and yields, 1973 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*	3803	116.1	316	133.0	930	120.2	816	105.9	1133	123.2	608	102.1
(ii) Petite saison**	1799	85.6	76	94.6	156	84.8	432	87.2	927	83.9	209	84.1
(b) Ratoons												
1st ratoon	6252	94.8	430	104.5	1148	101.2	1471	93.1	2468	94.8	735	83.9
2nd ,,	6114	93.1	384	100.7	992	94.6	1443	96.2	2385	88.2	908	86.0
3rd ,,	6022	87.7	342	93.1	1087	92.0	1470	88.4	2236	87.0	886	81.8
4th ,,	5602	83.9	282	87.2	1079	82.5	1293	85.6	2131	84.1	817	80.8
5th ,,	4256	78.4	243	87.9	984	76.8	1015	78.9	1495	77.5	519	78.7
6th ,,	3669	74.9	236	87.0	733	74.7	864	78.0	1410	71.8	425	72.3
Older ratoons	6143	81.7	672	89.8	801	79.6	1569	79.2	2368	81.5	736	82.0
I. Total Miller-Planters	43660	88.4	2981	97.6	7910	90.8	10373	87.9	16553	87.5	5843	83.4
II. Total Owner-Planters	34573	64.9	2388	72.5	13491	64.7	8364	61.4	5956	69.4	4374	61.9
III. Total Tenant-Planters	2716	53.3	—	—	10	42.2	1211	46.9	1387	59.0	108	48.8
Grand Total	80949	77.0	5369	86.5	21411	74.4	19948	74.2	23896	81.3	10325	73.9

* Planted from January to June

** Planted from July to December

Table XIII. Evolution of cane quality, 1973 crop
(sucrose % cane)

Week ending	Island	West	North	East	South	Centre
7th July	12.12	13.10	12.27	11.79	12.00	12.77
14th ,,	12.32	12.91	12.53	12.01	12.27	12.52
21st ,,	12.47	13.35	12.44	12.20	12.45	12.52
28th ,,	12.40	13.22	12.24	12.18	12.41	12.55
4th August	12.48	13.28	12.33	12.24	12.54	12.56
11th ,,	12.68	13.68	12.37	12.59	12.71	12.78
18th ,,	12.77	13.71	12.50	12.62	12.83	12.84
25th ,,	12.84	13.87	12.59	12.68	12.93	12.86
1st September	12.68	13.62	12.44	12.39	12.77	12.80
8th ,,	12.90	13.92	12.70	12.60	12.97	13.12
15th ,,	12.98	14.07	12.82	12.69	13.04	13.14
22nd ,,	13.03	13.83	12.98	12.70	13.09	13.14
29th ,,	13.02	13.97	12.93	12.65	12.92	13.35
6th October	13.26	14.23	13.16	12.93	13.24	13.53
13th ,,	13.38	14.20	13.31	13.01	13.36	13.71
20th ,,	13.47	14.22	13.36	13.06	13.62	13.60
27th ,,	13.50	14.19	13.57	13.00	13.57	13.56
3rd November	13.68	14.21	13.69	13.29	13.72	13.83
10th ,,	13.90	14.49	13.90	13.51	13.93	14.14
17th ,,	13.95	14.38	13.91	13.57	13.99	14.24
24th ,,	14.07	14.42	13.96	13.73	14.13	14.50
1st December	14.10	14.47	13.92	13.97	14.24	14.49
8th ,,	14.24	—	13.96	14.12	14.52	—
15th ,,	13.81	—	13.20	13.90	13.96	—

Table XIV. Comparative mid-harvest dates, 1969 - 1973

A : mid-harvest date weighted by weekly tonnages of cane 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
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	339
1971	22/9	374	29/9	374	28/9	374	14/9	370	25/9	374	19/9	387
1972	23/9	367	23/9	360	26/9	364	26/9	378	21/9	362	16/9	363
1973	15/9	357	13/9	355	19/9	358	11/9	350	15/9	359	12/9	351

Table XV. Summary of chemical control data 1973

(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	29/6	5/7	13/7	4/7	25/6	12/7	10/7	22/6	11/6	2/7	2/7
	To	1/2	5/12	4/12	14/12	8/12	13/12	6/12	26/11	12/12	11/12	15/12
	No. of crushing days	125	122	116	127	134	124	120	126	149	131	134
	Net crushing hours per day	21,47	22,80	22,54	21,00	19,84	21,00	19.03	19.49	20.42	20.95	19.54
	Hours stoppages per day	0,82	0,34	0,67	0.90	1,03	1 83	0.82	0.37	0.93	0.63	0.27
	Overall Time Efficiency	89,5	95,0	93,9	87,5	82,7	87,5	79.3	81.2	85.1	87.3	81.4
	Mechanical Efficiency	96,4	98,5	97,1	95,9	95,1	92.0	95.9	98.1	95.6	97 1	98.6
CANE CRUSHED (Tonnes)	Factory	291,329	51,392	72,832	157,246	147,768	119,189	177,129	149,635	466,125	297,170	255,301
	Planters	172,557	182,153	154,198	74,456	185,323	157,062	112,465	133,146	289,363	142,129	39,818
	Total	463,886	233,545	227,030	231,702	333,091	276,251	289,594	282,781	755,488	439,299	295,119
	Factory % Total	62.8	22.0	30.8	67.8	40.3	43.1	61.2	52.9	61.5	67.6	86.5
	Per day	3,711	1,914	2,024	1,824	2,486	2,228	2,413	2,244	5,070	3,353	2,202
	Per hour actual crushing	172,8	84,0	86,8	86,9	125,3	106,1	126.8	115.1	248.3	160.1	112.7
PERCENTAGE VARIETIES CRUSHED (Factory)	S 17	31.6	17.7	18.8	10.9	25.4	15.6	6.2	31.0	26.8	26.4	26.7
	M 13/56	12.1	31.4	31.6	42.1	35.1	41.8	47.1	24.5	7.9	13.9	20.6
	M 93/48	0.1	0.3	0.6	9.2	1.0	3.2	3.2	1.1	19.8	8.1	1.4
	M 377/56	13.1	16.9	13.8	11.3	13.4	8.2	8.4	15.4	13.0	5.5	8.9
	M 202/46	16.0	13.0	6.0	7.5	5.1	3.2	1.6	2.1	0.7	12.7	5.2
	M 442/51	7.6	6.9	13.6	10.9	14.2	17.7	26.0	10.4	4.8	5.4	7.0
	M 31/45	0.3	—	2.2	1.0	0.1	1.8	2.0	7.2	12.1	16.2	4.1
	M 351/57	3.5	2.6	0.1	1.7	—	0.4	—	0.2	4.5	2 1	13.0
	M 147/44	3.0	2.7	3.6	—	0.4	74.6	1.5	4.1	—	1.3	—
	Other varieties	12.7	8.5	9.7	5 4	5.3	3.5	4.0	4.0	10.4	8.4	13 1
SUGAR PRODUCED (Tonnes)	Raw sugar	57,746	25,997	26,976	26,504	21,199	17,419	32,650	31,676	70,616	36,493	34,228
	White sugar	—	—	—	—	16,551	12,508	—	—	14,937	12,005	—
	Total sugar	57,746	25,997	26,976	26,504	37,750	29,927	32,650	31,676	85,553	48,498	34,228
	Total sugar at 96° Pol	59,216	26,565	27,696	27,269	39,003	30,883	33,469	32,591	88,126	49,973	35,254

		Mon Trésor	Savannah	Rose Belle	Britannia	Union St. Aubin	St. Félix	Bel Ombre	Réunion	Highlands	Mon Désert Alma	Totals & Averages
CRUSHING PERIOD	From	23/6	29/6	29/6	22/6	28/6	25/6	18/6	29/6	7/7	9/7	—
	To	19/12	20/12	15/11	29/11	18/12	12/12	4/12	29/11	28/11	29/11	—
	No. of crushing days	144	140	107	128	134	136	135	122	114	115	129
	Net crushing hours per day	17.91	21.03	20.54	19.83	19.99	21.84	19.51	19.01	19.53	19.60	20.32
	Hours stoppages per day	0.16	0.52	1.11	0.38	1.24	0.94	0.72	0.18	0.37	0.56	0.70
	Overall Time Efficiency	74.6	87.6	85.6	82.6	83.3	91.0	81.3	79.2	81.4	81.7	84.7
	Mechanical Efficiency	99.1	98 5	94 9	98.1	94.2	95.8	96 4	99.0	98.2	97.2	96.7
CANE CRUSHED (Tonnes)	Factory	228,426	230,400	148,196	138,985	290,382	67,275	97,990	147,391	133,865	205,709	3,873,735
	Planters	46,727	94,572	56,091	60,909	4,032	101,366	86,145	82,601	81,428	112,029	2,368,570
	Total	275,153	324,972	204,287	199,894	294,414	168,641	184,135	229,992	215,293	317,738	6,242,305
	Factory % Total	83.0	70.9	72.5	69.5	98.6	39.8	53.2	61.4	62.2	64.7	62.1
	Per day	1,911	2,321	1,909	1,562	2,197	1,240	1,364	1,885	1,888	2,763	2,310
	Per hour actual crushing	106.7	110 4	92.9	78.8	109.9	56.7	69.9	99.1	96.7	140.9	113.7
PERCENTAGE VARIETIES CRUSHED (Factory)	S 17	13.9	22.7	10.7	16.6	32.2	22.2	51.8	17.0	25.9	12.7	22.8
	M 13/56	35.7	28.0	1.6	2.6	15.9	25.1	19.2	6.8	3.5	1.4	19.2
	M 93/48	7.3	11.5	35.1	35.7	15.1	8.1	—	35.8	42.4	67.8	15.3
	M 377/56	12.1	8.6	7.3	7 7	8.4	7.8	8.1	6.1	8.7	7.6	9.9
	M 202/46	8.7	11.8	27.9	8.0	6.6	1.1	3.8	5.1	0.3	—	7.0
	M 442/51	7.5	4.4	0.1	0.2	5.4	5.7	6.9	2.4	—	—	7.0
	M 31/45	1.2	3.6	3.2	5.5	4.8	9.4	1.5	5.2	—	—	4.9
	M 351/57	2.0	3.3	8.7	7 9	3.5	7.4	0.5	8.0	2.3	6.6	4.0
	M 147/44	0.9	—	—	—	0.3	1.0	3.2	0.1	—	—	1.0
	Other varieties	10.7	6.1	5 4	15.8	7.8	12.2	5.0	13.5	16.9	3.9	8.9
SUGAR PRODUCED (Tonnes)	Raw sugar	32,783	40,068	23,284	22,821	33,352	18,008	21,005	25,731	26,047	37,758	662,361
	White sugar	—	—	—	—	—	—	—	—	—	—	56.001
	Total sugar	32,783	40,068	23,284	22,821	33,352	18,008	21,005	25,731	26,047	37,758	718,362
	Total sugar at 96° Pol	33,727	41,120	23,917	23,456	34,334	18,501	21,545	26,428	26,804	38,799	738,676

Table XV. Summary of chemical control data 1973

(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	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	8.03	8.98	8.42	8.74	8.82	9.23	9.01	8.93	8.83	9.06	8.62	8.39	8.11	8.77	8.76	8.83	9.36	8.77	8.94	8.27	8.42	8.69
	Tonnes cane per tonne sugar made @ 96° Pol.	7.83	8.79	8.20	8.50	8.54	8.95	8.65	8.68	8.57	8.79	8.37	8.16	7.90	8.54	8.52	8.58	9.11	8.55	8.70	8.03	8.19	8.45
	Sucrose per cent	13.84	12.91	13.21	12.67	13.05	13.28	12.83	12.69	12.69	12.82	13.04	13.47	13.66	13.06	12.65	12.77	12.76	13.04	12.87	13.40	13.29	13.05
	Fibre per cent	12.58	14.72	13.84	14.19	14.03	17.19	13.06	14.06	13.67	13.14	12.33	13.08	12.77	12.57	11.69	11.84	12.71	12.85	13.06	12 04	12.41	13.27
BAGASSE	Pol per cent	1.92	1.96	1.57	1.32	1.96	2.14	1.96	1.77	1.96	2.11	1.82	2.10	2.08	2.46	2.18	1.87	3.17	2.04	1.98	1.41	1.81	1.97
	Moisture per cent	49.8	47.9	48.8	45.5	47.0	51.4	49.6	47.0	50.5	47.9	49.4	49.2	47.4	49.9	48.6	47.8	49.0	50.3	51.7	49.8	48.8	49.0
	Fibre per cent	47.4	49.4	49.0	52.7	50.4	45.8	47.6	50.5	47.0	49.2	48.2	48.2	49.8	47.0	48.7	49.6	46.7	47.0	45.6	48.3	48.8	48.3
	Weight per cent cane	26.53	29.83	28.22	26.96	27.81	37.56	27.46	27.86	29.12	26.69	25.61	27.14	25.67	26.73	24.03	23.89	27.21	27.35	28.67	24.94	25.42	27.46
FIRST EXPRESSED JUICE	Brix (B1)*	19.30	19.42	19.34	18.14	19.06	19.64	18.62	18.26	18.07	18.48	18.43	18.89	18.95	17.66	17.49	17.91	17.83	18.34	17.87	18.20	18.06	18.47
	Gravity purity	87.7	85.8	87.3	88.6	88.5	86.7	87.7	87.7	89.3	88.2	88.6	89.7	89.5	90.5	91.2	88.9	86.6	89.4	89.9	90.5	90.6	88.7
	Reducing sugars/sucrose ratio	4.0	4.9	5.0	3.9	3.1	5.2	4.0	5.0	4.1	4.2	4.2	3.3	3.3	3.3	3.8	4.1	3.8	3.7	2.9	2.9	3.2	3.9
LAST EXPRESSED JUICE	Brix*	2.06	3.43	2.62	2.17	4.41	3.12	2.51	2.36	3.30	2.63	2.58	2.26	2.80	3.37	2.84	1.99	5.02	2.67	2.17	1.89	2.20	2.78
	Apparent purity	67.9	70.8	73.0	71.4	76.3	75.6	67.9	70.1	77.0	74.2	73.3	78.9	73.9	79.5	78.5	70.4	75.1	76.4	73.7	73.3	75.5	73.9
MIXED JUICE	Weight per cent on cane	100.2	94.1	103.4	102.4	99.1	101.0	10.43	103.9	94.9	99.4	110.6	103.6	104.4	103.0	104.0	105.9	101.3	100.4	100.7	103.2	102.8	101.4
	Brix*	15.35	15.61	14.36	13.92	14.69	14.45	13.68	13.71	14.54	14.31	13.18	14.19	14.39	13.43	13.05	13.36	13.77	14.30	13.90	14.19	13.95	14.18
	Gravity purity	86.6	83.9	86.0	86.4	85.9	85.5	86.2	85.6	87.8	86.1	86.2	87.8	87.4	89.7	89.4	87.1	85.3	87.0	88.0	89.1	89.4	87.0
	Reducing sugars/sucrose ratio	4.2	5.8	5.9	4.5	3.8	6.0	5.2	5.7	5.0	5.0	5.3	3.9	4.1	3.7	4.3	4.8	4.4	4 1	3.2	3.3	3.2	4.6
	Gty. Pty. drop from first expressed juice	1.1	1.9	1.3	2.2	2.6	1.2	1.5	2.1	1.5	2.1	2.4	1.9	2.1	0.8	1.8	1.8	1.3	2.4	1.9	1.4	1.2	1.7
ABSOLUTE JUICE	Brix (Ba)	18.45	18.18	17.93	17.20	17.77	18.90	17.32	17.39	16.85	17.26	17.35	17.75	18.06	16.76	16.11	16.77	17.29	17.30	16.98	17.19	17.07	17.43
	Ba/B1	0.96	0.94	0.93	0.95	0.93	0.96	0.93	0.95	0.93	0.93	0.94	0.94	0.95	0.95	0.92	0.94	0.97	0.94	0.95	0.94	0.95	0.94
	Gravity Purity	85.8	83.2	85.5	85.8	85.4	84.9	85.2	84.9	87.3	85.5	85.7	87.3	86.8	89 1	88.9	86 4	84.6	86.5	87.2	88.6	88.9	86.3
CLARIFIED JUICE	Brix*	15.22	15.75	14.01	13.67	14.44	13.53	13.62	13.58	14.89	14.02	13.29	13.87	13.68	12.96	12.72	13.39	13.68	14.30	14.06	13.31	14.08	13.91
	Gravity purity	—	84.3	86.5	86.7	86.9	86.8	—	85.9	88.0	86.7	87.0	88.0	88.3	—	89.7	—	85.5	87.3	88.4	89.2	89.5	87.3
	Reducing sugars/ sucrose ratio	4.6	5.6	5.5	4.5	3.7	5.6	—	5.6	5.0	4.5	4.7	3.3	4.1	3 4	4.2	—	4.4	4.0	3.1	3.2	3.2	4.3

* Refractometric Brix

Table XV. Summary of chemical control data 1973

(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	Rose Belle	Britannia	Union St. Aubin	St. Félix	Bel Ombre	Réunion	Highlands	Mon Désert Alma	Totals & Averages
FILTER CAKE	Pol per cent	1.22	0.75	1.19	1.83	0.60	0.48	1.02	0.68	0.55	1.61	0.58	2.28	0.72	1.81	1.81	1.77	1 10	6.61	3.89	8.94	2.46	3.00	1.63
	Weight per cent cane	4.52	2.94	4.37	3.02	3.06	2.42	2.86	3.02	2.95	3.26	3.99	3.32	2 48	2.62	2.62	3.64	2.74	1.35	3.13	2.25	2.89	5.05	3.21
SYRUP	Brix*	62.1	61.9	61.7	63.9	59.4	66.5	63.4	63.9	62.9	59.2	64.5	64.6	59.1	60.7	60.7	64.3	55.7	57.1	54.6	61.5	59.2	61.4	61.3
	Gravity purity	—	84.9	85.7	86.9	87.2	86.0	—	86.1	87.9	86.8	87.2	88.5	88.3	—	—	89.8	—	86.5	86.8	88.1	89.1	89.4	87.4
	Reducing sugars/sucrose ratio	4.8	4.2	5.5	4.7	4.2	5.8	—	5.6	4.8	4.6	4.6	3 4	4.3	3.5	3.5	4.2	—	4.2	4.1	3.5	3.1	3.5	4.3
pH VALUES	Limed juice	8.0	8.1	8.5	7.6	8.4	—	—	7.7	8.2	—	7.9	—	7.7	7.9	7.9	8.0	—	—	7.8	8.6	8.0	8.1	8.0
	Clarified juice	7.1	7.1	7.2	7.1	7.4	7.1	6.9	7.2	7.4	—	7.3	7.6	7.0	7.1	7.1	7.2	7.1	6.9	7.0	7.7	7.2	7.1	7.2
	Filter press juice	—	—	9.3	—	6.9	—	7.2	7.2	8.8	—	7.9	7.5	7.3	7.3	7.3	—	6.3	—	—	7.0	6.7	7.6	7.5
	Syrup	6.4	6.3	7.0	6.6	6.8	6.4	6.6	6.6	6.9	—	6.6	7.0	6.7	6.6	6.6	7.1	6.5	—	6.6	7.3	6.9	7.2	6.7
FINAL MOLASSES	Brix**	87.4	83.2	87.5	82.6	82.3	83.5	83.8	82.9	85.5	82.6	83.3	85.5	84.3	89.1	89.1	85.5	88.1	86.0	83.4	85.1	88.6	85.0	84.8
	Sucrose per cent	30.89	31.04	29.49	28.54	28.89	32.72	30.87	29.17	30.50	31.60	29.95	32.85	31.00	34.05	34.05	33.16	33.14	32.00	30.62	33.88	34.60	32.66	31.24
	Reducing sugars per cent	18.70	14.75	19.27	16.61	14.25	16.47	20.97	19.74	19.60	16.80	14.32	15.11	15.95	16.90	16.90	16.50	17.87	19.50	15.54	13.56	14.13	14.47	17.02
	Total sugars per cent	49.59	45.79	48.76	45.15	43.14	49.19	51.84	48.91	50.10	48.40	44.27	47.96	46.95	50.95	50.95	49.66	51.01	51.50	46.16	47.44	48.73	47.13	48.26
	Gravity purity	35.4	37.3	33.7	34.6	35.1	39.2	36.8	35.2	35.7	38.3	36.0	38.4	36.8	38.2	38.2	38.8	37.6	37.2	36.7	39.8	39.1	38.4	36.8
	Reducing sugars/sucrose ratio	60.5	47.5	65.3	58.2	49.3	50.4	67.9	67.7	64.3	53.0	47.8	46.0	51.5	49.6	49.6	49.8	53.9	60.9	50.8	40.0	40.9	44.3	54.5
	Weight per cent cane @ 85° Brix	2.92	3.65	3.36	3.02	3.24	3.89	3.34	3.17	2.86	3.12	2.96	2.81	2.87	2.33	2.33	2.40	2.72	3.13	2.85	2.59	2.56	2.35	2.97
SUGAR MADE	White sugar recovered per cent cane	—	—	—	—	4.97	4.53	—	—	1.98	2.73	—	—	—	—	—	—	—	—	—	—	—	—	0.90
	Raw ,, ,, ,, ,, ,,	12.45	11.13	11.88	11.44	6.36	6.30	11.27	11.20	9.35	8.31	11.60	11.91	12.33	11.40	11.40	11.42	11.33	10.68	11.41	11.19	12.10	11.88	10.61
	Total ,, ,, ,, ,, ,,	12.45	11.13	11.88	11.44	11.33	10.83	11.27	11.20	11.32	11.04	11.60	11.91	12.33	11.40	11.40	11.42	11.33	10.68	11.41	11.19	12.10	11.88	11.51
	Average Pol of sugars	98.44	98.10	98.56	98.77	99.19	99.07	98.41	98.77	98.89	98.92	98.88	98.76	98.52	98.61	98.61	98.67	98.83	98.63	98.47	98.60	98.79	98.65	98.71
	Total sucrose recovered per cent cane	12.25	10.92	11.71	11.30	11.24	10.73	11.09	11.06	11.19	10.92	11.47	11.77	12.15	11.24	11.24	11.26	11.20	10.53	11.23	11.03	11.95	11.72	11.36
	Moisture per cent rax w sugar	0.42	0.46	0.38	0.36	0.40	0.53	0.41	0.33	0.32	0.40	0.31	0.28	0.38	0.52	0.52	0.34	0.32	0.42	0.34	0.41	0.26	0.34	0.37
	Dilution indicator of raw sugar	36.9	31.6	36.4	41.0	43.0	57.7	35.1	37.2	32.5	41.8	37.5	28.9	34.9	60.3	60.3	34.3	37.6	43.9	28.0	41.0	27.6	33.5	36.9

* Refractometric Brix 1 : 5 *w/w*

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

Table XV. Summary of chemical control data 1973

(iv) MASSECUITES

		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
MAGMA	Apparent purity	84.4	77.1	88.2	85.2	86.3	85.7	80.9	83.9	85.1	84.1	83.0	84.4	87.2	84.1	84.0	85.8	84.3	87.2	83.7	81.3	82.8	84.2
A-MASSECUITE	Brix**	92.3	91.7	90.6	92.2	90.1	89.5	92.8	92.9	93.1	91.9	91.6	92.1	92.2	93.1	92.9	92.9	91.5	90.7	92.0	92.1	91.7	92.0
	Apparent purity	82.8	81.4	84.7	84.2	87.5	84.4	80.8	79.5	80.5	81.4	86.2	81.1	79.3	84.6	83.7	80.2	81.9	84.9	83.9	82.7	81.3	82.2
	Apparent purity of A-molasses	63.0	57.0	65.8	61.2	73.0	72.0	56.4	53.9	56.3	59.1	64.5	56.4	57.4	56.5	56.8	55.7	56.5	66.3	63.3	58.8	63.2	60.0
	Drop in purity	19.8	24.4	18.9	23.0	14.5	12.4	24.4	25.6	24.2	22.3	21.7	24.7	21.9	28.1	26.9	24.5	25.4	18.6	20.6	23.9	18.1	22.2
	Crystal per cent Brix in massecuite	53.5	56.7	55.3	59.3	53.7	44.3	56.0	55.5	55.4	54.5	61.1	56.7	51.4	64.6	62.3	55.2	58.4	55.2	56.1	58.0	49.2	55.5
	Litres per tonne Brix in mixed juice	862	975	805	950	742	1,057	997	918	1,096	1,326	655	1,030	1,254	964	1,122	1,240	1,003	811	716	1,155	1,086	1,004
	A-Massecuite per cent total massecuite	64.1	72.8	58.3	76.3	49.6	56.8	76.1	78.1	82.3	82.0	50.9	73.6	82.2	79.5	80.9	80.7	76.0	59.4	60.8	82.4	75.0	71.8
B-MASSECUITE	Brix**	92.5	—	90.6	—	91.3	91.1	92.2	—	—	—	93.5	92.2	92.7	—	—	—	—	92.1	92.0	—	92.1	91.9
	Apparent purity	72.2	—	74.7	—	78.6	76.2	72.8	—	—	—	75.5	76.1	70.8	—	—	—	—	75.1	74.4	—	72.7	75.3
	Apparent purity of B-molasses	51.7	—	51.6	—	59.1	57.6	57.5	—	—	—	52.2	50.3	50.6	—	—	—	—	52.7	52.0	—	54.4	54.4
	Drop in purity	20.5	—	23.1	—	19.5	18.6	15.3	—	—	—	23.3	25.8	20.2	—	—	—	—	22.4	22.4	—	18.3	20.9
	Crystal per cent Brix in massecuite	42.4	—	47.7	—	47.7	43.9	36.0	—	—	—	48.7	51.9	40.9	—	—	—	—	47.4	46.7	—	40.1	45.8
	Litres per tonne Brix in mixed juice	287	—	313	—	492	489	22	—	—	—	378	91	36	—	—	—	—	282	264	—	163	134
	B-Massecuite per cent total massecuite	21.3	—	22.7	—	32.9	26.4	1.7	—	—	—	29.3	6.5	2.3	—	—	—	—	20.7	22.4	—	11.3	9.6
	Kg. sugar per cubic metre of A&B massecuite	704	778	716	844	630	480	776	857	749	585	771	723	636	855	751	646	763	727	817	715	663	703
C-MASSECUITE	Brix**	95.3	95.6	93.3	95.4	96.1	94.9	94.8	95.1	93.8	94.5	96.0	94.7	97.0	93.1	94.8	93.6	94.1	94.2	94.4	94.4	96.3	94.8
	Apparent purity	56.2	58.3	58.7	61.5	59.6	60.5	59.6	56.9	58.2	59.3	59.9	60.6	57.7	61.7	61.5	60.8	61.1	59.1	56.9	61.6	59.3	59.3
	Apparent purity of final molasses	30.7	34.0	27.6	32.5	35.7	36.8	36.4	29.8	30.3	38.3	31.0	32.0	32.7	33.2	33.9	31.8	29.7	32.9	37.5	35.7	34.1	33.2
	Drop in purity	25.5	24.3	31.1	29.0	23.9	23.7	23.2	27.1	27.9	21.0	28.9	28.6	25.0	28.5	27.6	29.0	31.4	26.2	19.4	25.9	25.2	26.1
	Crystal per cent Brix in massecuite	36.8	33.0	43.0	43.0	37.2	37.5	36.4	38.6	40.0	37.3	41.9	42.1	37.1	42.7	41.7	42.5	44.6	39.0	31.0	40.3	38.2	39.1
	Litres per tonne Brix in mixed juice	197	373	263	295	262	313	291	255	236	292	255	278	236	248	265	296	317	272	197	247	202	261
	C-Massecuite per cent total massecuite	14.6	27.2	19.0	23.7	17.5	16.8	22.2	21.9	17.7	18.0	19.8	19.9	15.5	20.5	19.1	19.3	24.0	19.9	16.8	17.6	13.7	18.6
TOTAL MASSECUITE	Litres per tonne Brix in mixed juice	1,346	1,348	1,381	1,245	1,496	1,859	1,310	1,173	1,332	1,618	1,288	1,399	1,526	1,212	1,387	1,535	1,320	1,365	1,176	1,402	1,451	1,399
	Litres per tonne sugar made	1,663	1,777	1,725	1,553	1,921	2,505	1,658	1,491	1,623	2,085	1,619	1,726	1,933	1,471	1,648	1,918	1,726	1,718	1,471	1,697	1,752	1,749

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

Table XV. Summary of chemical control data 1973

(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
MILLING WORK	Imbibition water % cane	26.8	23.9	31.6	29.4	26.9	38.6	31.8	31.8	24.1	26.1	36.2
	Imbibition water % fibre	213	162	229	207	192	224	243	226	176	199	293
	Extraction ratio	29.3	30.8	24.2	19.9	29.7	35.1	32.1	27.6	32.9	33.5	29.2
	Mill extraction	96.3	95.5	96.7	97.2	95.8	94.0	95.8	96.1	95.5	95.6	96.4
	Reduced mill extraction	96.4	96.3	97.0	97.6	96.4	95.8	96.0	96.6	96.0	95.9	96.4
SUCROSE LOSSES	Sucrose lost in bagasse % cane	0.51	0.59	0.44	0.36	0.54	0.80	0.54	0.49	0.57	0.56	0.47
	,, ,, in filter cake % cane	0.05	0.02	0.05	0.05	0.02	0.01	0.03	0.02	0.02	0.05	0.02
	,, ,, in molasses % cane	0.88	1.16	0.96	0.89	0.97	1.30	1.05	0.95	0.87	1.01	0.91
	Undetermined losses % cane	0.15	0.22	0.05	0.07	0.28	0.44	0.12	0.17	0.04	0.28	0.17
	Industrial losses % cane	1.08	1.40	1.06	1.01	1.27	1.75	1.20	1.14	0.93	1.34	1.10
	Total losses % cane	1.59	1.99	1.50	1.37	1.81	2.55	1.74	1.63	1.50	1.90	1.57
SUCROSE BALANCE	Sucrose in bagasse % sucrose in cane	3.68	4.54	3.35	2.82	4.17	6.04	4.19	3.89	4.50	4.39	3.58
	,, ,, filter cake % sucrose in cane	0.40	0.17	0.39	0.43	0.14	0.09	0.23	0.16	0.13	0.41	0.18
	,, ,, molasses % sucrose in cane	6.34	8.97	7.29	7.01	7.42	9.76	8.16	7.47	6.83	7.96	6.93
	Undetermined losses % sucrose in cane	1.02	1.72	0.32	0.54	2.15	3.31	0.95	1.29	0.32	2.06	1.32
	Industrial losses % sucrose in cane	7.76	10.96	8.00	7.98	9.71	13.16	9.34	8.92	7.28	10.43	8.43
	Total losses % sucrose in cane	11.44	15.40	11.35	10.80	13.88	19.20	13.53	12.81	11.78	14.82	12.01
RECOVERIES	Boiling house recovery	91.9	88.6	91.7	91.8	89.9	86.0	90.3	90.7	92.4	89.1	91.3
	Reduced boiling houserecovery (Pty. M.J.85°)	90.8	89.5	91.0	90.8	89.1	85.4	89.3	90.3	90.3	88.0	90.4
	Overall recovery	88.6	84.6	88.7	89.2	86.1	80.8	86.5	87.2	88.2	85.2	88.0
	Reduced overall recovery (Pty. M.J. 85°, F% C 12.5)	87.5	86.2	88.3	88.6	85.9	81.9	85.7	87.2	86.7	84.4	87.1
	Boiling house efficiency	99.9	99.2	99.4	99.6	98.3	96.2	98.8	99.1	99.7	98.5	99.7

		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	30.8	30.1	29.7	28.0	29.8	28.4	27.7	29.3	28.1	28.3	28.9
	Imbibition water % fibre	235	236	236	239	252	224	216	225	234	228	218
	Extraction ratio	32.3	30.5	40.0	35.5	29.6	53.2	33.3	33.8	21.8	28.0	31.2
	Mill extraction	95.8	96.1	94.5	95.9	96.5	93.2	95.7	95.6	97.4	96.5	95.9
	Reduced mill extraction	96.0	96.2	95.0	95.5	96.3	93.4	95.9	95.8	97.3	96.5	96.1
SUCROSE LOSSES	Sucrose lost in bagasse % cane	0.57	0.53	0.66	0.52	0.45	0.86	0.56	0.57	0.35	0.46	0.54
	,, ,, in filter cake % cane	0.08	0.02	0.05	0.06	0.03	0.09	0.12	0.20	0.07	0.15	0.05
	,, ,, in molasses % cane	0.92	0.90	0.76	0.79	0.87	0.99	0.89	0.88	0.85	0.77	0.93
	Undetermined losses % cane	0.13	0.06	0.35	0.02	0.22	0.29	0.24	0.19	0.18	0.19	0.17
	Industrial losses % cane	0.13	0.98	1.16	0.87	1.12	1.37	1.25	1.27	1.10	1.11	1.15
	Total losses % cane	1 70	1.51	1.82	1.39	1.57	2.23	1.81	1.84	1.45	1.57	1.69
SUCROSE BALANCE	Sucrose in bagasse % sucrose in cane	4.23	3.90	5.03	4.15	3.50	6.76	4.28	4.41	2.63	3.47	4.14
	,, ,, filter cake % sucrose in cane	0.56	0.13	0.36	0.51	0.24	0.70	0.94	1.56	0.53	1.14	0.40
	,, ,, molasses % sucrose in cane	6.81	6.55	5.80	6.27	6.83	7.78	6.81	6.81	6.34	5.78	7.11
	Undetermined losses % sucrose in cane	1.06	0.52	2.77	0.04	1.76	2.27	1.82	1.54	1.31	1.39	1.32
	Industrial losses % sucrose in cane	8.43	7.20	8.93	6.82	8.83	10.75	9.57	9.91	8.18	8.31	8.83
	Total losses % sucrose in cane	12.66	11.10	13.96	10.97	12.33	17.51	13.85	14.32	10.81	11.78	12.97
RECOVERIES	Boiling house recovery	91.2	92.5	90.6	92.9	90.9	88.4	90.0	89.6	91.6	91.4	90.8
	Reduced boiling houserecovery (Pty. M.J.85°)	88.8	90.8	85.6	89.4	89.0	88.1	88.2	86.3	87.9	87.1	89.1
	Overall recovery	87.3	88.9	86.0	89.0	87.7	82.5	86.1	85.7	89.2	88.2	87.0
	Reduced overall recovery (Pty. M.J. 85°, F% C 12.5)	85.2	87.3	81.3	85.4	85.7	82.3	84.5	82.7	85.5	84.1	85.7
	Boiling house efficiency	99.3	100.3	97.0	99.8	99.2	97.9	97.9	97.9	98.8	98.0	98.9

APPENDIX

THE MAURITIUS HERBARIUM

Flora of the Mascarene Islands

Fifteen families were studied at the Herbarium in connection with this project and checklists of species, ecological data, etc., were compiled. The parts dealing with the monocot families Liliaceae, Amaryllidaceae, Iridaceae, Agavaceae and Hypoxidaceae were nearly completed by Messrs. W. Marais and M. J.E. Coode at the Royal Botanic Gardens, Kew, and will shortly be submitted to the editorial board.

The families Eriocaulaceae, Juncaceae and Smilacaceae were in the course of preparation by Messrs. Coode and Marais, the Flacourtiaceae by Dr. Sleumer, at the *Rijksherbatium*, Leiden, and the Campanulaceae and Lobeliaceae by M. F. Badré at the *Museum National d'Histoire Naturelle*, Paris. Work was also done on the introductory volume, which will include a glossary. It is anticipated that the first fascicle of *The Flora of the Mascarene Islands* will appear by the end of 1974.

Scientific Missions

The Curator, during a mission to Paris in May, participated in discussions with the Directors and Editors of the *Flora* on various aspects concerning its publication. He also took the opportunity of studying the fern genera *Adiantum* and *Asplenium* at the Kew and British Museum herbaria.

Mr. D. Lorence spent a week in Réunion in March to study the genus *Elaphoglossum* in the field and to make collections for the herbarium. Messrs. J. Guého and Lorence accompanied Mr. M.E. Coode, of the Royal Botanic Gardens, Kew, and M. F. Badré of the *Museum National d'Histoire Naturelle*, Paris, during a week's stay in Rodrigues in December.

Accessions

During the year 620 specimens were added to the Herbarium's collections, as follows :

From Mauritius ...	268
From Rodrigues... ...	46
From Réunion	142
From Seychelles ...	119
From Agalega	30
From Amirantes ...	15
TOTAL	620

We wish to convey our thanks to Mr. J. Procter, Conservation Adviser, Department of Agriculture, Seychelles, for his presentation of valuable material from the Seychelles, Agalega and Amirantes islands. Sir Colville Barclay also kindly presented to the herbarium duplicate specimens of mosses from his collections. Amongst other notable accessions was *Crinum mauritianum* Lodd., a colony of which was found by the herbarium staff at Midlands : this is a rare endemic species hitherto known exclusively from an illustration in Loddiges' Botanical Cabinet, t. 650.

Field Work

A field study of species belonging to the Araliaceae was undertaken by Dr. L. Bernardi of the *Conservatoire et Jardin Botanique*, Geneva, Switzerland, during a short visit to Mauritius in January. Mr. M. Coode, taxonomist at the Royal Botanic Gardens, Kew, visited Mauritius in November-December and made extensive field studies and obtained material which will be shared with his institution as well as other herbaria. He also visited Réunion and Rodrigues with a similar aim. M. F. Badré of the *Museum National d'Histoire Naturelle*, Paris, while visiting Mauritius and Rodrigues studied pteridophytes in the field, especially the Selaginellaceae.

Visitors

In March, Mr. H. Baijnath, presently working at the University of Durban, Natal, on a M.Sc. thesis : "The Biology of *Cyperus prolifer*", visited the herbarium and studied dried material and also made observations in the field.

Mr. N.B. Patel made collections of agar-producing marine algae in Mauritius and studied various species at the herbarium.

Dr. Stanley Temple of the Smithsonion Institution, working for the World Wild Life Fund in an effort to preserve the indigenous "Mauritius Kestrel", and other bird species menaced by extinct ion, used our collections with reference to bird feeding habits and ecology. Mr. A. Cheake of Cambridge University, member of the British Ornithological Union, who was engaged in ornithological studies in the Mascarenes, used our collections with the same objective.

Distribution and Loan of Specimens

About 600 herbarium specimens from our collections were despatched on loan to specialists working with overseas institutions on the *Flora of the Mascarenes.* These included Oxalidaceae to Dr. P. Lourteig, *Museum National d'Histoire Naturelle*, Paris, and the fern genera *Hymenophyllum* and *Trichomanes* to Mme. Tardieu Blot of the same institution. Specimens of Goodeniaceae, Aselepiadeceae and Ericaceae were also sent to the Paris Museum. Amaranthaceae, Chenopodiaceae and Thelypteridaceae were despatched to the Royal Botanic Gardens, Kew.

Seeds of the rarer indigenous palms in the genus *Hyophorbe* as well as of an undescribed palm species known locally as "Palmiste Bouclé" were forwarded to Mr. De Armand Hull, Florida, U.S.A.

Green leaves and twigs of *Litsea glutinosa* were sent to Pretoria for feeding tests to assess the toxicity of the plant to livestock.

Accessions to the Herbarium Library

AUBREVILLE, A. 1973. Les *Sapotacées* de l'Ile Maurice. *Adansonia*, sèr. 2, **13**(2) : 135-148.