

SUGARBAG

A Database System for
Sugarcane Crop Growth, Climate, Soils and Management Data

L A Laredo and D B Prestwidge

CSIRO Sustainable Ecosystems
Brisbane

CRC SUGAR OCCASIONAL PUBLICATION
BRISBANE, JUNE 2003

ISBN: 1 876679 35 2

TABLE OF CONTENTS

Introduction	4
Objectives	4
Minimum Dataset.....	4
Concept	5
Databases	6
Highlights	6
Achievements	6
Weather Stations	7
Training and Communication.....	7
Data Use Protocols and Contact Information.....	7
List of Researchers	23
List of Weather Stations.....	23
Publications	24
Contents of CD	24
SUGARBAG Fixed Information.....	24
SUGARBAG Experiments.....	24
SUGARBAG Data	24

INTRODUCTION

The availability of high quality, complete data from research is the starting point for understanding and improving sugar production systems. R&D in the CRC for Sustainable Sugar Production (CRC Sugar) has brought rigour and order into experimental data collection within its research program, and more broadly, beyond CRC Sugar, thereby increasing research efficiency and effectiveness.

Quality climatic data from an extensive network of automatic weather stations located throughout the Australian sugar production regions is available on CD ready to import to other applications. In addition, the SUGARBAG experimental database contains data, collected in accordance with carefully defined protocols, from over 100 experiments.

Several research activities have drawn extensively on both the CRC Sugar weather database and the SUGARBAG databases particularly for the development and application of simulation models of the sugar production system. These models in turn played a crucial role in other research activities and added value to the entire sugar industry through a variety of approaches.

OBJECTIVES

The collection of experimental data is expensive and time consuming, and this data can be collected and stored by a wide range of researchers from a multitude of research organisations, in a variety of ways. Fragmentation of data storage does not allow easy and efficient comparison of experimental data across production environments and results in poor efficiency in the use of experimental data.

The objective of SUGARBAG is to facilitate more efficient storage of experimental data, as well as greater research efficiency by providing a systematic storage facility for consolidating Sugarcane Experimental data consisting of crop, soil, management, and climate data. SUGARBAG encourages the collection of minimum datasets using standardised procedures (see section below). These procedures have been outlined in the CRC for Sustainable Sugar Production Minimum Dataset Manual (Mazzucchelli *et al.* 1997).

The benefits arising from storing experimental data in SUGARBAG as described by Prestwidge *et al.* (1994) and Robertson *et al.* (1996) are:

1. Comparison of productivity across environments to identify production constraints.
2. Enhanced research efficiency by specification of minimum data to be collected in field experimentation.
3. Provision of minimum datasets to assist sugarcane model development and testing.
4. Facilitation of the use of model analysis in conjunction with historical climate data to identify management, research and policy options that maximise economic return and minimise environmental impact.

An additional benefit of employing such a system is the fostering of collaboration amongst sugarcane researchers to enhance application of data to industry problems, resulting in the maximising of the use of experimental data collected. The database system is being used extensively in CRC Sugar and CSIRO's relevant Divisions.

Minimum Dataset

The ultimate purpose of the overall SUGARBAG research activity was to accumulate complete, quality datasets for use in current and subsequent research on sugarcane production systems. This required consideration of what constituted completeness (or adequacy for the purpose) and what constituted quality. Researchers in this activity, in conjunction with others in CRC Sugar, therefore spent considerable effort developing protocols for the collection of standardised climate, soil, crop, and management data from experiments on sugarcane. These protocols were then published in a 61-page manual that was made available internally to all researchers in the CRC Sugar's Program, and to other interested researchers throughout the world.

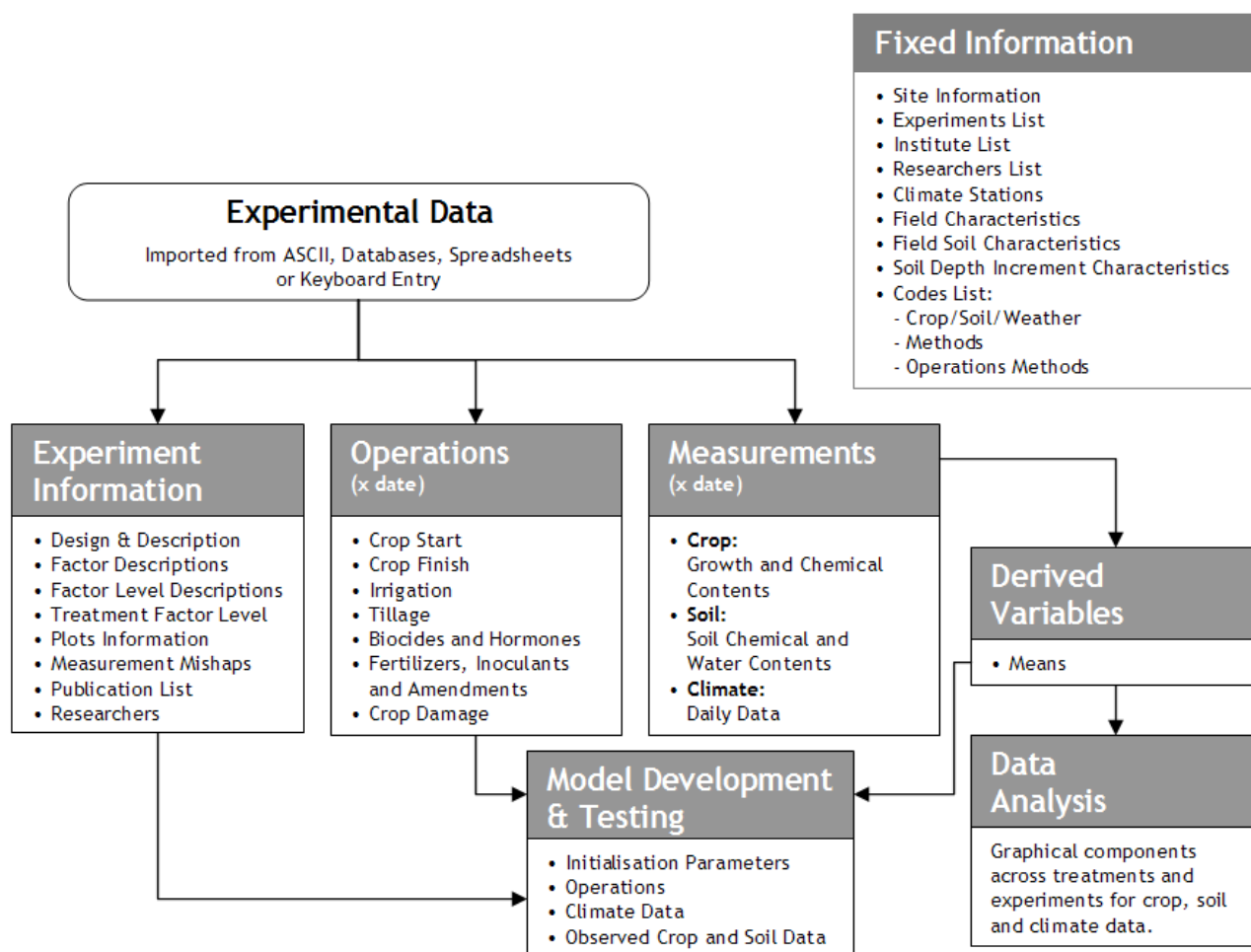


Figure 1 - Structure of the SUGARBAG Database System.

As a result of subsequent deliberations, a new CRC Sugar position was created within the Systems Analysis and Modelling cross-Program, and procedures were established to assist researchers in all Programs in the collection of consistent, quality soils information.

CONCEPT

SUGARBAG consists of data from individual sugarcane experiments where crop growth and/or soil measurements have been made in response to imposed treatments.

The database contains:

- **Fixed Information** on experimental locations (e.g. latitude) and soil types (e.g. land use history, potential maximum rooting depth, soil texture for each soil layer).
- **Experimental Data** comprised of information on the design of the experiment (location, soil type, description of treatments, researchers involved).
- The **Operations** that were carried out on the experiment (planting dates, fertiliser amounts and dates, irrigation, etc.).
- The **Measurements** collected (e.g. cane yield, soil nitrate concentration, sucrose concentration of the stalks, nitrogen accumulation in the leaves).

The SUGARBAG database system consists of three functional components that control the flow of data through the system (see Figure 2 below). The data stored in the database can be accessed in a variety of ways, via the data reporting and retrieval functions. Data can be accessed as either individual plot values or as means of experimental treatments.

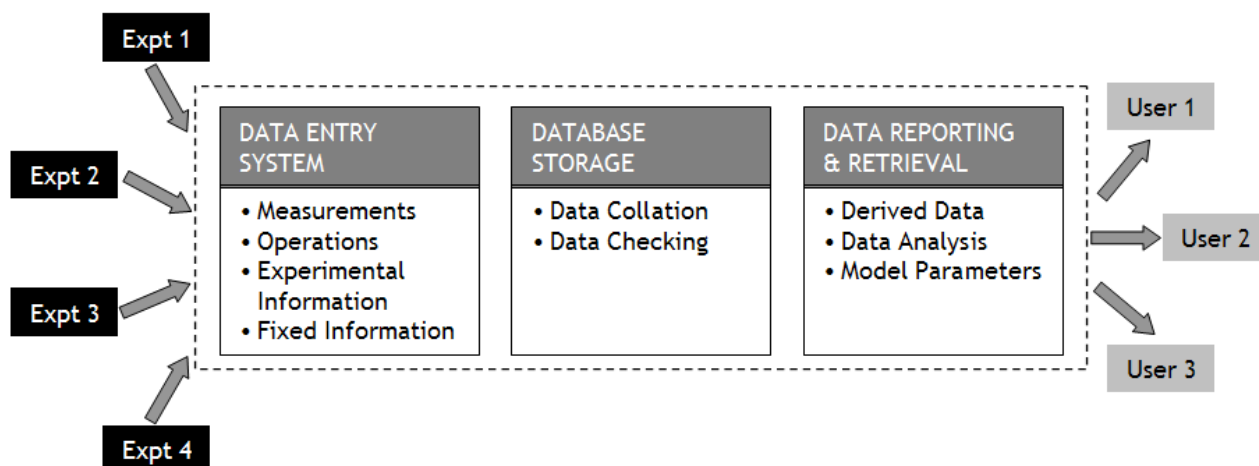


Figure 2 - The flow of data in the database system.

DATABASES

SUGARBAG boasts the following facts and figures:

1. Over 100 experimental sites over its history.
2. Experimental treatments including irrigation, fertilisers, fumigation, cultivars, ratooning, planting and harvest dates, and lodging.
3. A wide geographic distribution of experiments and/or sites (Bundaberg 5, Burdekin 22, Grafton 4, Hawaii 7, Herbert 19, Mackay 28, Mossman 19, Ord 45, Proserpine 2, South Africa 15, Tully 3).
4. Research conducted by 12 different research institutions or companies.
5. Data from the years 1933-35, 1940-47, 1967-69, 1977-82, and 1989-2002.

HIGHLIGHTS

R&D in this activity has progressed through four principal stages:

- Acquisition, installation, and operation of automatic weather stations.
- Development of dataset protocols and publication of an associated instruction manual.
- Quality control on all weather and experimental data collected, and its collation in the weather and SUGARBAG databases.
- Training of users of the databases, and promotion of their value as a major industry resource to other researchers within and beyond CRC Sugar.

ACHIEVEMENTS

This integrative, value-adding activity aimed to derive maximum value from experimental activity, particularly from research conducted within CRC Sugar Program 3. Specific achievements were:

- The collection of quality climate data by providing calibration of weather stations and computer programs for electronic data capture and error checking. A total of 21 weather stations providing daily data ranging from 1991 to 2002. Several of these weather stations will continue to provide the industry with quality up-to-date weather data. The data collection system has been automated to download data via mobile phones then run through upgraded quality checking programs and made available on the Internet.
- The maintenance and updating of the SUGARBAG electronic experimental database with crop, soil, climate and management data which was then used as a tool to maximise the efficiency of field experimentation and enhance the utility of research data on climatic, water and nutrient constraints to sugar production. Data from 138 experiments is stored in the database and available as Microsoft Excel files and flat text to provide a variety of formats for future use. These have been

stored on CDs. A summary metadata set of the experiments has been compiled with directions for obtaining the data.

- The encouragement of the use of standard protocols across CRC Sugar programs and other industry R&D organisations for the collection of crop, soil, climate and management data, and contribution of the resultant data to the SUGARBAG database. This will facilitate future interactions between research organisations.
- To facilitate Internet-based access to climate data and the SUGARBAG database system.
- Production of this brochure and a booklet containing a summarised description of the databases along with a CD with all the data. Available in research organisation libraries.

WEATHER STATIONS

This stage entailed selecting and testing suitable instrumentation, supervising its installation and calibration, and training staff in its maintenance and use. Weather stations are located in an arc from the North-West of Western Australia to Northern New South Wales.

Currently, 21 automatic weather stations adequately represent the diversity of climates experienced by sugarcane in Australia. See 'List of Weather Stations' at the end of this document.

TRAINING AND COMMUNICATION

Each of the stages described above have involved training of research and technical staff involved in the collection of data, either in workshops or in one-on-one sessions on-site. Communication and promotion has also been undertaken through posters and presentations at CRC Sugar meetings, and publication of the 'Minimum Dataset Manual' (Mazzucchelli *et al.* 1997) as well as several publications summarising the SUGARBAG experiments in the database. The quality-checked, daily weather datasets were made available to CRC Sugar researchers on the Internet under the CRC Sugar web page and a link was also established with the SUGARBAG database on a CSIRO web site.

The final lasting products from SUGARBAG include a booklet, containing a summarised description of the databases along with a CD containing all the data. These will be located in research organisation libraries. A brochure and a Web page will also direct researchers to the booklet as well as provide general information about SUGARBAG.

DATA USE PROTOCOLS AND CONTACT INFORMATION

The SUGARBAG database system aims to protect the rights of individual scientists with regard to data ownership and access. The agreed protocol is that each data owner should be consulted (via Di Prestwidge, see below) before a dataset is used for an application.

The software should not be relied on as the sole basis to calculate specifications, data or formulations where an incorrect calculation or result could result in injury to person or property.

The software has been developed to substantially comply with its specifications. However, errors may exist. Therefore, the user has the final responsibility for the integrity of the software usage and its results. It is the user's responsibility to make their own assessment of the suitability of the software and the accompanying material to achieve the user's intended results and for the use of results obtained from the software.

Failure to carefully follow instructions for use of the software set out in the Technical Memorandum will lead to output errors.

Di Prestwidge

Phone: 07 3214 2384 - Fax: 07 3214 2308
Email: Di.Prestwidge@csiro.au

Luis A Laredo

Phone: 07 3214 2252 - Fax: 07 3214 2308
Email: Luis.Laredo@csiro.au

CSIRO Sustainable Ecosystems

Level 3, Queensland Biosciences Precinct
306 Carmody Rd, St Lucia, Qld 4067

EXPERIMENT SUMMARY REPORT

1 Effect of withholding fumigation, on plant crop - Herbert District

Site Name: Macknade Research Station, Ingham Qld 01/07/1991 - 31/08/1992
 Description: (Plant) Non fumigated crop - 2 varieties Researcher(s):
 Design: (Plant) 2 cultivars: Q117, Q138 (Plots 105-108) AWW, RCM
 Weather Station: MK104

2 Effect of withholding fumigation, on plant crop - Burdekin District

Site Name: Ayr, G & R Zanetti's Farm QLD 01/04/1991 - 31/07/1992
 Description: (Plant) under non-fumigated conditions Researcher(s):
 Design: (Plant) Q96 in early plant (Plots 101-104) AWW, RCM
 Weather Station: ZN085

3 Effect of cultivar and crop class under fumigation - Herbert District

Site Name: Macknade Research Station, Ingham Qld 01/07/1992 - 31/10/1993
 Description: 2 cultivars and 2 crop classes under fumigation Researcher(s):
 Design: 2 cultivars: Q117 & Q138; 2 crop classes: Plant & 1st Ratoon, AWW, MJR, RCM
 (Plots 201-208) Weather Station: MK104

4 Effect of Nitrogen rate on plant crop - Herbert District

Site Name: Macknade Research Station, Ingham Qld 01/07/1992 - 31/08/1993
 Description: (Plant) 3 N rates on Q117 crop Researcher(s):
 Design: (Plant) 3 N rates: 56, 107, & 268 kgN/ha (Plots 209 - 214) AWW, MJR, RCM
 Weather Station: MK104

5 Effect of fumigation on growth of fumigated early plant crop

Site Name: Ayr, G & R Zanetti's Farm QLD 01/04/1992 - 31/08/1993
 Description: (Plant) Fumigated Q117 early plant Researcher(s):
 Design: (Plant) Fumigated & Non-fumigated (Plots 201,204,207,208) AWW, MJR, RCM
 Weather Station: ZN085

6 Effect of crop class under non-fumigated conditions - Burdekin

Site Name: Ayr, G & R Zanetti's Farm QLD 01/04/1992 - 30/11/1993
 Description: 4 crop classes effect on yield Researcher(s):
 Design: 4 crop classes: early plant, late plant, 2nd & 4th ratoon AWW, MJR, RCM
 (Plots 204,207,209-214) Weather Station: ZN085

7 Effect of Nitrogen rates on fumigated early plant

Site Name: Ayr, G & R Zanetti's Farm QLD 01/04/1992 - 31/07/1993
 Description: (Plant) 3 N rates on Q117 fumigated early plant crop Researcher(s):
 Design: (Plant) 3 N rates: 35, 257 & 407 kgN/ha; (Plots 202-207) AWW, MJR, RCM
 Weather Station: ZN085

8 Growth Analysis of 2 Varieties - Bundaberg District

Site Name: Bundaberg, BSES, QLD 01/01/1991 - 31/12/1992
 Description: (Plant) 1 planting, x 2 varieties Researcher(s):
 Design: (Plant) 2 Cultivars: Q138 & Q141 - Plant Crop DLL
 Weather Station: BS101

9 Growth Analysis of 2 Varieties - Bundaberg

Site Name: Bundaberg, BSES, QLD 01/01/1991 - 31/12/1992
 Description: (1st Ratoon) 1 planting, x 2 varieties Researcher(s):
 Design: (1st Ratoon) 2 Cultivars: Q138 & Q141 - Ratoon Crop DLL
 Weather Station: BS101

12 Effect of Nitrogen and Water on Cane growth and Soil N Balance - CSC7S

Site Name: Bundaberg, Schulte Farm, QLD 01/09/1992 - 31/08/1993
 Description: (Plant) 4 N rates * 2 Irrigation rates Researcher(s):
 Design: (Plant) 4 Nitrogen rates (0,170,340,450 kg/ha)at 1 water BAK

level and 2 Nitrogen rates (0, 340 kg/ha) at 2nd water level, each rep to be modelled separately

Weather Station: BU102

13 Effect on Plant Crop of Cultivar, Nitrogen & Irrigation - GE1

Site Name: Grafton, NSW

01/09/1994 - 31/08/1995

Description: (Plant) 2 Cultivars x 4 N Rates x 2 Irrigations

Researcher(s):

Design: (Plant) 2 Cultivars (T565-28, Q117) x 4 N Rates (0, 75, 200, 200 + 30 month kg/ha) x 2 Irrigations (rainfed and drip irrigated)

RMH

Weather Station: GR101

14 Effect on Ratoon Crop of Cultivar, Nitrogen & Irrigation - GE2

Site Name: Grafton, NSW

01/10/1995 - 01/10/1997

Description: (1st Ratoon) 2 Cultivar x 4 N rates x 2 Irrigations - To determine effect on Ratoon Crop of Cultivar, Nitrogen & Irrigation

Researcher(s):

RMH

Design: (1st Ratoon) 2 Cultivars (T565-28, Q117) x 4 N Rates (0, 75, 200, 200 + 30 month kg/ha) x 2 irrigations (rainfed and drip irrigated)

Weather Station: GR101

17 Effect of Nitrogen rate and crop class on Q117 under fumigation

Site Name: Macknade Research Station, Ingham Qld

18/08/1993 - 24/08/1994

Description: 3 N rates x 2 crop classes on Q117 under fumigation

Researcher(s):

Design: 3 N rates (0,50 & high kgN/ha) x Crop class(late plant & 1st ratoon) (Plots 301-312)

AWW, MJR, RCM

Weather Station: MK103

18 Effect of fumigation on Q117 in 1st ratoon

Site Name: Ayr, G & R Zanetti's Farm QLD

12/08/1993 - 13/10/1994

Description: (1st Ratoon) Fumigated v nonfumigated

Researcher(s):

Design: (1st Ratoon) Fumigated (plots 304,306) & nonfumigated (Plots 301,308)

AWW, MJR, RCM

Weather Station: ZN085

19 Effect of N rate on Q117 fumigated 1st ratoon

Site Name: Ayr, G & R Zanetti's Farm QLD

12/08/1993 - 13/10/1994

Description: (1st Ratoon) 3 N rates x fumigated Q117

Researcher(s):

Design: (1st Ratoon) 3 N rates (0, standard & high) x fumigated Q117

AWW, MJR, RCM

Weather Station: ZN085

20 Effect of cultivar on non-fumigated 1st ratoon

Site Name: Ayr, G & R Zanetti's Farm QLD

21/06/1993 - 06/09/1994

Description: (1st Ratoon) 2 cultivars - non-fumigated

Researcher(s):

Design: (1st Ratoon) 2 Cultivars (Q96 & Q117) - non-fumigated (Plots 309-312)

MJR, RCM

Weather Station: ZN085

21 Effect of cultivar on fumigated final plant crop yield. - Herbert

Site Name: Macknade Research Station, Ingham Qld

01/06/1991 - 31/07/1992

Description: (Plant) 2 cultivars - fumigated

Researcher(s):

Design: (Plant) 2 Cultivars (Q117 & Q138) - fumigated (Plots 101-104)

AWW, RCM

Weather Station: MK104

22 Effect on Plant crop of Cultivar, Fumigation & Irrigation - HE1

Site Name: Harwood, NSW

01/09/1993 - 31/08/1995

Description: (Plant) 2 Cultivars x Fumigation x 2 Irrigations

Researcher(s):

Design: (Plant) 2 Cultivars (Q117 & TS65-28) x Fumigated & non fumigated x 2 Irrigations (Rainfed, drip irrigated)

RCM, RMH

Weather Station: HW101

23 Effect on Ratoon crop of Cultivar, Fumigation & Irrigation - HE2

Site Name: Harwood, NSW

01/10/1995 - 01/10/1997

Description: (1st Ratoon) 2 Cultivar x Fumigation x 2 Irrigations (Mill Farm) - To determine effect on Ratoon crop of Cultivar, Fumigation & Irrigation

Researcher(s):

RCM, RMH

Design: (1st Ratoon) 2 Cultivars (Q117 & TS65-28) x Fumigated & Non -fumigated x 2 Irrigations (Rainfed, Drip Irrigated) Weather Station: HW101

24 Effect of Crop age and Cultivars on seasonal biomass accumulation

Site Name: Bundaberg, BSES, QLD 01/03/1979 - 19/03/1981
 Description: (Plant) 4 Crop ages x 2 Cultivars Researcher(s):
 Design: (Plant) 2 Cultivars (Q108, Q111) x 4 Initiation Date (Mar, Jun, Sep, + Dec) - Age at Harvest; 6,9,12,+15 months - No irrigation records - Uncertain whether Potential Yield achieved GK
 Weather Station: BS101

25 Effect of Crop age and Cultivars on seasonal biomass accumulation

Site Name: Bundaberg, BSES, QLD 01/09/1979 - 01/09/1981
 Description: (1st Ratoon) 4 Crop ages x 2 Cultivars Researcher(s):
 Design: (1st Ratoon) 2 Cultivars (Q108 , Q111) x 4 Initiation Date (Mar, Jun, Sep, + Dec) - Age at Harvest; 6,9,12,+15 months - No irrigation records - Uncertain whether Potential Yield achieved GK
 Weather Station: BS101

26 Effect of Crop age and Cultivars on seasonal biomass accumulation

Site Name: Bundaberg, BSES, QLD 01/12/1980 - 23/12/1982
 Description: (2nd Ratoon) 4 Crop ages x 2 Cultivars Researcher(s):
 Design: (2nd Ratoon) 2 Cultivars (Q108, Q111) x Initiation Date (Mar, Jun, Sep, + Dec) - Age at Harvest; 6,9,12,+15 months- No irrigation records - Uncertain whether Potential Yield achieved GK
 Weather Station: BS101

27 Growth Analysis of variety grown in the Ord District

Site Name: Kununurra, WA 01/06/1977 - 28/08/1978
 Description: Pilot farm - 1 variety - Trojan Researcher(s):
 Design: Pilot farm - 1 variety - Trojan (Irrigated 23 times @ 16.4 ML/Ha) GK
 Weather Station: KN101

28 Growth Analysis of variety grown in the Ord District

Site Name: Kununurra, WA 02/05/1978 - 23/08/1979
 Description: Pilot farm - 5 Varieties (Total water used - 16.4 ML/Ha) Researcher(s):
 Design: Pilot farm - 5 Varieties (Trojan, Q96, Q95, Q99, Q80) - Total water used - 16.4 ML/Ha GK
 Weather Station: KN101

30 Effect of Nitrogen and Variety on Yield - Ord District

Site Name: Kununurra, WA 26/04/1978 - 12/06/1979
 Description: (Plant) 6 Nitrogen Rates x 4 varieties Researcher(s):
 Design: (Plant) 6 Nitrogen Rates (0, 50, 100, 150, 200, 250 kg/ha) x 4 varieties (Q80, Q96, Q99, Trojan) GK
 Weather Station: KN101

32 Growth Analysis of 3rd Ratoon Grown Under Commercial Practice.

Site Name: Ayr, G & R Zanetti's Farm QLD 21/10/1993 - 02/11/1994
 Description: (3rd Ratoon) Grown under Zanetti standard practice. (block 41) Researcher(s):
 Design: (3rd Ratoon) Grown under Zanetti standard practice. (block 41) Plots 313 and 314 AWW, MJR, RCM
 Weather Station: ZN085

33 Effect of Nitrogen and Variety on Yield - Ord District

Site Name: Kununurra, WA 12/06/1979 - 30/07/1980
 Description: (1st Ratoon) 6 Nitrogen Rates x 4 varieties Researcher(s):
 Design: (1st Ratoon) 6 Nitrogen Rates (0, 50, 100, 150, 200, 250 kg/ha) x 4 varieties (Q80, Q96, Q99, Trojan) GK
 Weather Station: KN101

34 Effect of Nitrogen and Variety on Yield - Ord District

Site Name: Kununurra, WA 30/07/1980 - 28/08/1981
 Description: (2nd Ratoon) 6 Nitrogen Rates x 4 varieties Researcher(s):

Design: (2nd Ratoon) 6 Nitrogen Rates (0, 50, 100, 150, 200, 250 kg/ha) x 4 varieties (Q80, Q96, Q99, Trojan) GK
Weather Station: KN101

35 Effect of Nitrogen and Variety on Yield - Ord District

Site Name: Kununurra, WA 28/08/1981 - 21/10/1982
Description: (3rd Ratoon) 6 Nitrogen Rates x 4 varieties Researcher(s):
Design: (3rd Ratoon) 6 Nitrogen Rates (0, 50, 100, 150, 200, 250 kg/ha) x 4 varieties (Q80, Q96, Q99, Trojan) GK
Weather Station: KN101

36 Schulte2 -

Site Name: Bundaberg, Schulte Farm, QLD 01/10/1993 - 31/07/1994
Description: Effect of Nitrogen and Water on Cane growth and Soil N Balance- CSC7S Researcher(s):
Design: (1st Ratoon) 4 Nitrogen rates (0, 170, 340, 450 kg/ha) at 1 water level and 2 Nitrogen rates (0, 340 kg/ha) at 2nd water level, each rep to be modelled separately BAK
Weather Station: BU102

37 Effect of Nitrogen on Yield of 2 Varieties - Rainfed

Site Name: Macknade Research Station, Ingham Qld 01/10/1993 - 01/11/1994
Description: 2 Varieties x 2 N rates - To determine effect of Nitrogen on Yield of 2 varieties grown under rain fed conditions Researcher(s):
Design: 2 varieties (Q117, Q138) x 2 N rates (0 and 200 kg/ha) under rainfed ratoon conditions AWW, MJR, RCM
Weather Station: MK103

40 Response to Timing and Amount of Irrigation - Herbert

Site Name: Bambaroo, R. Pace Farm, North Qld 01/07/1995 - 30/08/1996
Description: (Plant) 4 Irrigations x Q124 - To measure the yield response to well watered, supplementary irrigated and rainfed conditions of Q124 (Plant crop) in the Bambaroo district. Researcher(s):
Design: (Plant) 4 Irrigations (Full, 2 ML/ha early, 2 ML/ha late, Rainfed) x Q124 AWW, MJR, RCM
Weather Station: HB01

41 Effect of Early and Late Water Stress on Plant Crop - Burdekin

Site Name: Ayr, Kalamia Estate, North QLD 01/04/1995 - 31/07/1996
Description: (Plant) 3 Irrigation rates x Q96 - To determine effect of Early and Late Water Stress on growth of plant crop of Q96 in Burdekin District Researcher(s):
Design: (Plant) 3 Irrigation rates (Early stress (April to August), late stress (August to November) well-watered) x 4 replicates AWW, MJR, RCM
Weather Station: KL239

42 Effect of Drying Off Period Before Harvest - Burdekin

Site Name: Ayr, J. Ybarlucea's farm, North QLD 01/04/1995 - 17/07/1995
Description: (1st Ratoon) 3 Drying off periods x Q117 - To determine effect of drying off period before harvest in 1st ratoon (Q117) Researcher(s):
Design: (1st Ratoon) 3 Drying off periods (5, 8 and 12 weeks) x Q117 x 3 replicates, randomised design AWW, MJR, RCM
Weather Station: ZN085

43 Effect of Drying Off Period Before Harvest - Burdekin

Site Name: Ayr, J. Ybarlucea's farm, North QLD 01/06/1995 - 01/08/1996
Description: (2nd Ratoon) 3 drying-off regimes x Q117 - To determine effect of drying off period before harvest in 2nd ratoon (Q117) Researcher(s):
Design: (2nd Ratoon) 3 drying-off regimes (13, 4 wks and 9 wks with rewatering then drying-off for 4 weeks) x Q117 x 3 replicates MJR
Weather Station: ZN085

44 Effect of Mid Season Water Stress -Varying yield trial

Site Name: Ayr, Kalamia Estate, North QLD 13/04/1995 - 01/08/1996
Description: (Plant) 3 Irrigation Rates x Q117 - To determine effect of Researcher(s):

	Mid Season Water Stress on growth of Q117 plant crop in Burdekin District	MJR
Design:	(Plant) 3 Irrigation Rates (full irrigation, medium, rainfed) x 2 replicates (no randomisation)	Weather Station: KL239
45	Effect of Water Stress in First Ratoon - Q96	
Site Name:	Ayr, Kalamia Estate, North QLD	01/06/1996 - 01/09/1997
Description:	(1st Ratoon) 3 Irrigation Rates x Q96 - To determine effect of Early and Late Water Stress on growth of 1st ratoon crop of Q96	Researcher(s): AWW, GIB, MJR, RCM
Design:	(1st Ratoon) 3 Irrigation Rates (Early stress (July to Nov) , late stress (Nov to Jan) and Well Watered) x 4 replicates	Weather Station: ZN085
201	Overcoming constraints to high yield & CCS in large and lodged Crops	
Site Name:	Ayr, J. Ybarlucea's farm, North QLD	18/04/1998 - 01/09/1999
Description:	SRDC CTA030 - Lodging and Season Effects under Irrigation	Researcher(s): GS, PAJ, SCC
Design:	Randomized Block Design(RBD)	Weather Station: Ay02
202	CRC 3.3 Lodging and Season Effects Under Rainfed	
Site Name:	Borgna, Feluga, Tully, North QLD	01/06/1997 - 06/09/1998
Description:	(Plant) 2 Lodging Treatments x 2 planting dates - To determine what factors cause slow down in biomass and sucrose production in large, lodged crops	Researcher(s): GS, PAJ, SCC
Design:	(Plant) 2 Lodging Treatments (control, Scaffolding) x 2 planting dates (normal, late)	Weather Station: BG01
203	CRC 3.3 Lodging and Season Effects Under Rainfed	
Site Name:	Vecchio, Euramo, Tully, North QLD	29/08/1997 - 02/09/1998
Description:	(Plant) 2 Lodging Treatments x 2 planting dates - To determine what factors cause slow down in biomass and sucrose production in large, lodged crops	Researcher(s): GS, PAJ, SCC
Design:	(Plant) 2 Lodging Treatments (control, Scaffolding) x 2 planting dates (normal, late)	Weather Station: VC01
204	Overcoming Constraints to High Yield and CCS in Large and Lodged Crops	
Site Name:	Borgna, Feluga, Tully, North QLD	25/08/1998 - 01/09/1999
Description:	SRDC CTA030 - Lodging and Season Effects - Rainfed	Researcher(s): GS
Design:	RBD	Weather Station: VC02
301	Growth Analysis on 2 varieties - 01/06/1989 - 1st Ratoon Rainfed LMY88	
Site Name:	La Mercy, Natal, South Africa	01/06/1989 - 31/12/1991
Description:	(1st Ratoon) 2 varieties	Researcher(s): GIB
Design:	(1st Ratoon) 2 varieties (Nco376, N12)	Weather Station: LM20
302	Growth Analysis on 2 varieties - 01/08/1989 - 1st Ratoon Rainfed LMY88	
Site Name:	La Mercy, Natal, South Africa	01/08/1989 - 31/12/1991
Description:	(1st Ratoon) 2 varieties	Researcher(s): GIB
Design:	(1st Ratoon) 2 varieties (Nco376, N12)	Weather Station: LM20
303	Growth Analysis on 2 varieties - 01/10/1989 - 1st Ratoon Rainfed LMY88	
Site Name:	La Mercy, Natal, South Africa	01/10/1989 - 31/12/1991
Description:	(1st Ratoon) 2 varieties	Researcher(s): GIB
Design:	(1st Ratoon) 2 varieties (Nco376, N12)	Weather Station: LM20
304	Growth Analysis on 2 varieties - 01/12/1989 - 1st Ratoon Rainfed LMY88	

Site Name: La Mercy, Natal, South Africa 01/12/1989 - 31/12/1991
 Description: (1st Ratoon) 2 varieties Researcher(s):
 Design: (1st Ratoon) 2 varieties (Nco376, N12) GIB
 Weather Station: LM20

305 Growth Analysis on 2 varieties - 01/02/1990 - 1st Ratoon Rainfed LMY88

Site Name: La Mercy, Natal, South Africa 01/02/1990 - 31/12/1991
 Description: (1st Ratoon) 2 varieties Researcher(s):
 Design: (1st Ratoon) 2 varieties (Nco376, N12) GIB
 Weather Station: LM20

306 Growth Analysis on 2 varieties - 01/04/1990 - 1st Ratoon Rainfed LMY88

Site Name: La Mercy, Natal, South Africa 01/04/1990 - 31/12/1991
 Description: (1st Ratoon) 2 varieties Researcher(s):
 Design: (1st Ratoon) 2 varieties (Nco376, N12) GIB
 Weather Station: LM20

307 Growth Analysis on 2 varieties - 01/06/1990 - 1st Ratoon Rainfed LMY88

Site Name: La Mercy, Natal, South Africa 01/06/1990 - 31/12/1991
 Description: (1st Ratoon) 2 varieties Researcher(s):
 Design: (1st Ratoon) 2 varieties (Nco376, N12) GIB
 Weather Station: LM20

308 Growth Analysis on 2 varieties - 01/08/1990 - 1st Ratoon Rainfed LMY88

Site Name: La Mercy, Natal, South Africa 01/08/1990 - 31/12/1991
 Description: (1st Ratoon) 2 varieties Researcher(s):
 Design: (1st Ratoon) 2 varieties (Nco376, N12) GIB
 Weather Station: LM20

309 Growth Analysis on Irrigated NCo376 - Plant Crop MERR5

Site Name: Pongola, Natal, South Africa 12/11/1967 - 10/10/1968
 Description: (Plant) 1 variety Researcher(s):
 Design: (Plant) 1 variety (Nco376) GIB
 Weather Station: PO006

310 Growth Analysis on Irrigated NCo376 - 1st Ratoon MERR5

Site Name: Pongola, Natal, South Africa 10/10/1968 - 05/11/1969
 Description: (1st Ratoon) 1 variety Researcher(s):
 Design: (1st Ratoon) 1 variety (Nco376) GIB
 Weather Station: PO006

311 Cultivar Growth Analysis Trial - Rainfed - LMY93

Site Name: La Mercy, Natal, South Africa 02/12/1992 - 19/04/1994
 Description: (Plant) 5 Varieties Researcher(s):
 Design: (Plant) 5 varieties (Nc0376, N12,N16, N17, N19) GIB
 Weather Station: LM20

312 Cultivar Growth Analysis - Rainfed LMY93

Site Name: La Mercy, Natal, South Africa 27/01/1993 - 14/06/1994
 Description: (1st Ratoon) 5 Varieties Researcher(s):
 Design: (1st Ratoon) 5 varieties (Nc0376, N12,N16, N17, N19) GIB
 Weather Station: LM20

313 Cultivar Growth Analysis - Rainfed LMY93

Site Name: La Mercy, Natal, South Africa 24/03/1993 - 09/08/1994
 Description: (2nd Ratoon) 5 Varieties Researcher(s):
 Design: (2nd Ratoon) 5 varieties (Nc0376, N12,N16, N17, N19) GIB
 Weather Station: LM20

314 Growth Analysis in Irrigated N14

Site Name: Pongola, Natal, South Africa 12/11/1986 - 12/10/1987

Description: 2 Crop Classes
 Design: 2 Crop Classes (Plant & Ratoon)

Researcher(s):
 GIB
 Weather Station: PO006

316 Growth Analysis of N12 in the Natal Midlands

Site Name: Blamey, Eston, KZN, South Africa
 Description: 3 Ratoon Dates - Growth analysis on commercial rainfed fields ratooned in spring of successive years and grown for at least 15 months to provide comparison of growth rates of young and old crops.
 Design: 3 Ratoon Dates (15/10/92, 14/10/93, 30/6/94) No design, Data reported are means of eight sample units

15/10/1992 - 17/01/1996
 Researcher(s):
 GIB
 Weather Station: ES049

440 To determine effect of Drying Off before harvest

Site Name: Frank Wise Institute, Kununurra WA
 Description: Effect of Drying Off Before Harvest - Plant Crop
 Design: 3 Dry-off treatments (24 days, 47 days, 80 days)

20/04/1997 - 07/07/1998
 Researcher(s):
 AWW, JS, RCM
 Weather Station: KN01

441 Effect of Drying Off Before Harvest

Site Name: Oasis Bananas, Kununurra, WA (H&V Diederichsen)
 Description: 3 Dry-off treatments - 2R
 Design: 3 Dry-off treatments (40 days, 54 days, 68 days)

29/08/1997 - 29/08/1998
 Researcher(s):
 JS
 Weather Station: KN01

442 Effect of Drying Off Before Harvest

Site Name: P & G Pegg, Kununurra, WA
 Description: 3 Dry-off treatments 2R
 Design: 3 Dry-off treatments (20 days, 37 days, 37 days)

18/09/1997 - 18/09/1998
 Researcher(s):
 JS
 Weather Station: KN01

443 Effect of Drying Off Before Harvest

Site Name: Cummings Bros., Kununurra, WA
 Description: Effect of Drying Off Before Harvest-2R
 Design: 3 Dry-off treatments (38 days, 52 days, 66 days)

17/08/1997 - 16/07/1998
 Researcher(s):
 AWW, JS, RCM
 Weather Station: KN01

444 Response to Irrigation based on Class A Evaporation - (Plant)

Site Name: Frank Wise Institute, Kununurra WA
 Description: Irrigation schedules based on class "A" pan evaporation deficits
 Design: 9 plots, 3 treatments by 3 reps.

01/05/1998 - 01/05/1999
 Researcher(s):
 JS
 Weather Station: KN01

445 Irrigation schedules based on soil water deficits (1R)

Site Name: Frank Wise Institute, Kununurra WA
 Description: Irrigation schedules based on soil water deficits (1R)
 Design:

04/08/1999 - 18/09/2000
 Researcher(s):
 AWW, JS, RCM
 Weather Station: KN01

501 Comparison of 2 Hawaiian varieties in winter planting -drip irrigation

Site Name: HSPA Kunia Substation, Hawaii
 Description: (Plant) 2 varieties winter planting
 Design: (Plant) 2 Varieties (H73-6110 & H78-7234), Sampled at 3-6 monthly intervals

22/01/1991 - 26/01/1993
 Researcher(s):
 CIE, RO, SE
 Weather Station: KU101

502 Comparison of 2 Hawaiian varieties in spring planting

Site Name: HSPA Kunia Substation, Hawaii
 Description: (Plant) 2 varieties - spring planting
 Design: (Plant) 2 varieties (H73-6110 & H78-7234) - spring planting,

23/05/1991 - 26/05/1993
 Researcher(s):
 CIE, RO, SE

3 reps - final harvest only		Weather Station:	KU101
503	Nitrogen Nutrition of Sugar Cane		
Site Name:	Makiki Experiment Station, Oahu, Hawaii	21/06/1933 - 30/06/1935	
Description:	3 N rates x Variety H109	Researcher(s):	UKD
Design:	3 N Rates (150 kg/ha N, 300 kg/ha N, 724 kg/ha N) - Sampling at 3 monthly intervals. - Variety H109	Weather Station:	MA101
505	Search for Guidance in the Nitrogen Fertilization - EXP108 ATN		
Site Name:	Waipio Experiment Station, Oahu, Hawaii	26/07/1940 - 15/04/1942	
Description:	(Plant) 4 N rates x 4 application times	Researcher(s):	RJB
Design:	(Plant) 4 N rates (0, 112, 180, 247 kg /ha) with 4 different application times - Sampled 2 monthly intervals - Variety H32-8560 n -. Crop irrigated from planting every 250 oCdays until 21/1/42	Weather Station:	MA101
506	Search for Guidance in the N fertilisation - EXP108 ATN		
Site Name:	Waipio Experiment Station, Oahu, Hawaii	25/05/1942 - 14/02/1943	
Description:	(1st Ratoon) 4 N rates	Researcher(s):	RJB
Design:	(1st Ratoon) 4 N rates (0, 112, 180, 247 kg/ha) with 4 different application times - Sampled at 2 monthly intervals - variety H32-8560	Weather Station:	WA101
508	Effect of Nitrogen on Yield - EXP 20 AxTN		
Site Name:	Makiki Experiment Station, Oahu, Hawaii	11/05/1942 - 27/08/1944	
Description:	4 N Rates	Researcher(s):	RJB
Design:	4 N Rates (0, 112, 180, 247 kg/ha N)- Sampled 3 monthly intervals - Variety H32-8560	Weather Station:	MA101
509	Effect of Nitrogen on Yield - EXPT 22A x TN		
Site Name:	Makiki Experiment Station, Oahu, Hawaii	08/11/1944 - 28/02/1947	
Description:	4 N Rates	Researcher(s):	RJB
Design:	4 N Rates (0, 112, 180, 247 kg/ha N) - Sampled 2 monthly intervals - Variety H32-8560 (X, A1, B1, C1 from paper only used)	Weather Station:	MA101
601	CRC 3.2 Northern Region - Better Crop Scheduling and Yield Forecasting		
Site Name:	Hancock, Mossman, Qld	26/04/1996 - 30/12/1997	
Description:	(Plant) 2 varieties * 3 Harvest Dates Crop Scheduling - To determine effect of harvest date on yield and CCS of 2 varieties	Researcher(s):	AVR, AWF, LMM
Design:	(Plant) 2 Varieties (Q120,Q124) * 3 Harvest Dates (May, June, September) * 2 Replicates	Weather Station:	MS01
602	CRC 3.2 Northern Region - Better Crop Scheduling and Yield Forecasting		
Site Name:	Hancock, Mossman, Qld	30/05/1997 - 30/10/1998	
Description:	(1R) 2 varieties * 3 Crop Start Dates Crop Scheduling - To determine effect of crop start date on yield and CCS of 2 varieties	Researcher(s):	AVR, AWF, LMM
Design:	(1R) 2 Varieties (Q120,Q124) * 3 Crop Start dates (May, June, September) * 2 Reps	Weather Station:	MS01
607	CRC 3.2 Northern Region - Better Crop Scheduling and Yield Forecasting		
Site Name:	Caltabiano, Mossman, Qld	08/08/1996 - 30/12/1997	
Description:	(Plant) 2 varieties * 2 Harvest Times Crop Scheduling - To determine effect of harvest date on yield and CCS of 2 varieties	Researcher(s):	AVR, AWF, LMM
Design:	(Plant) 2 Varieties(Q120, Q152) * 2 Harvest Times (May, June) * 2 Reps	Weather Station:	MS02

608 CRC 3.2 Northern Region - Better Crop Scheduling and Yield Forecasting

Site Name: Caltabiano, Mossman, Qld 20/08/1997 - 30/10/1998
 Description: (1R) 2 varieties * 2 Crop Start Times Crop Scheduling - To determine effect of crop start date on yield and CCS of 2 varieties Researcher(s): AVR, AWF, LMM
 Design: (1R) 2 Varieties(Q120, Q152) * 2 Crop Start Times (June, November) * 2 Reps Weather Station: MS02

613 CRC 3.2 Northern Region - Better Crop Scheduling and Yield Forecasting

Site Name: Adil Farming Co., Mossman, Qld (Biboohra) 01/08/1996 - 30/12/1997
 Description: (1R) 2 Varieties * 2 Crop Start Times - To determine effect of crop start date on yield and CCS of 2 varieties Researcher(s): AVR, AWF, LMM
 Design: (1R) 2 Varieties (Q120, Q124) * 2 Crop StartTimes (July, November) * 2 Reps Weather Station: MS03

619 CRC 3.2 Northern Region - Better Crop Scheduling and Yield Forecasting

Site Name: S Adil, Mossman, Qld (Biboohra) 15/08/1996 - 30/12/1997
 Description: (Plant) 2 Varieties * 3 Harvest Dates Crop Scheduling - To determine effect of harvest date on yield and CCS of 2 varieties Researcher(s): AVR, AWF, LMM
 Design: (Plant) 2 Varieties (Q120, Q124) * 3 Harvest Dates (May, August, September) * 2 Reps Weather Station: MS03

620 CRC 3.2 Northern Region - Better Crop Scheduling and Yield Forecasting

Site Name: S Adil, Mossman, Qld (Biboohra) 28/05/1997 - 30/10/1998
 Description: (1R) 2 Varieties * 3 Crop Start Dates Crop Scheduling - To determine effect of crop start date on yield and CCS of 2 varieties Researcher(s): AVR, AWF, LMM
 Design: (1R) 2 Varieties (Q120, Q124) * 3 Crop Start Dates (May, August, September) * 2 Reps Weather Station: MS03

625 CRC 3.2 Northern Region - Better Crop Scheduling and Yield Forecasting

Site Name: D.Salvetti, Mossman, Qld (Walkamin) 17/06/1996 - 30/12/1997
 Description: (Plant) 2Varieties*2 Harvest Dates Crop Scheduling - To determine effect of harvest date on yield and CCS of 2 varieties Researcher(s): AVR, AWF, LMM
 Design: (Plant) 2 Varieties (Q120,Q124) * 2 Harvest Dates (June, August) *2 Reps Weather Station: MS04

626 CRC 3.2 Northern Region - Better Crop Scheduling and Yield Forecasting

Site Name: D.Salvetti, Mossman, Qld (Walkamin) 19/06/1997 - 31/08/1998
 Description: (1R) 2Varieties * 2 Crop Start Dates Crop Scheduling - To determine effect of crop start date on yield and CCS of 2 varieties Researcher(s): AVR, AWF, LMM
 Design: (1R) 2 Varieties (Q120,Q124) * 2 Crop Start Dates (June, August) * 2 Reps Weather Station: MS04

701 CRC 3.2 Herbert Region - Better Crop Scheduling and Yield Forecasting

Site Name: Macknade Research Station, Ingham Qld 01/04/1996 - 31/12/1997
 Description: (Plant) 4 Harvest Dates * 2 N rates - To determine effect of harvest date and Nitrogen on yield and CCS Researcher(s): AWW, LMM
 Design: (Plant) 4 Harvest dates (May, July, October, December) * 2 Nitrogen rates (30kg/ha, 120kg/ha) * 4 replicates Weather Station: MK104

702 CRC 3.2 Herbert Region - Better Crop Scheduling and Yield Forecasting

Site Name: Macknade Research Station, Ingham Qld 29/05/1997 - 31/12/1998
 Description: (1R) 4 Crop Start Dates * 2 N rates - To determine effect of crop start date and Nitrogen on yield and CCS Researcher(s): AWW, LMM
 Design: (1R) 4 Crop Start dates (May, July, October, December) * 2

Nitrogen rates (30kg/ha, 145kg/ha) * 2 replicates

Weather Station: MK104

706 CRC 3.2 Herbert Region - Better Crop Scheduling and Yield Forecasting

Site Name: Macknade Research Station, Ingham Qld

01/04/1996 - 31/12/1997

Description: (1R) 2 * Harvest Dates - To determine effect of crop start date on yield and CCS

Researcher(s):
AWW, LMM

Design: (1R) 2 Harvest Dates (preseason, November) * 2 reps

Weather Station: MK104

707 CRC 3.2 Herbert Region - Better Crop Scheduling and Yield Forecasting

Site Name: Macknade Research Station, Ingham Qld

29/05/1997 - 30/11/1998

Description: (2R) 2 * Crop Start Dates - To determine effect of crop start date on yield and CCS

Researcher(s):
AWW, LMM

Design: (2R) 2 Crop Start Dates (preseason, November) * 2 reps

Weather Station: MK104

711 CRC 3.2 Crop Scheduling and Yield Forecasting - Herbert

Site Name: K Castorina, Lannercost Extension, Ingham Qld

01/04/1996 - 31/12/1997

Description: (1R) 3 Crop Start Dates - To determine effect of crop start date on yield and CCS

Researcher(s):
AWW, LMM

Design: (1R) 1 Variety x 3 Crop Start Dates (May, July, August) x 2 Reps

Weather Station: CASTO

716 CRC 3.1 Crop Response to Timing & Amount of Irrigation - CSC18S Pace

Site Name: Bambaroo, R. Pace Farm, North Qld

01/07/1996 - 30/06/1997

Description: (1R) 4 Irrigation x Q124 - To measure the yield response to well watered, supplementary irrigated and rainfed conditions of Q124 (1st Ratoon) in the Bambaroo district

Researcher(s):
AWW, GIB, MJR, RCM

Design: (1R) 4 Irrigation treatments (Full, 2 ML/ha early, 2 ML/ha late, Rainfed) by 4 replications

Weather Station: HB01

717 CRC 3.1 Crop Response to Timing & Amount of Irrigation - CSC18S Pace

Site Name: Bambaroo, R. Pace Farm, North Qld

07/09/1997 - 21/10/1998

Description: (2R) 3 Irrigation Treatments - To measure the yield response to well watered, supplementary irrigated and rainfed conditions of Q124 (2nd Ratoon) in the Bambaroo district.

Researcher(s):
AWW, GIB, RCM

Design: (2R) 3 Irrigation treatments (Full, Half, Rainfed) by 4 replications

Weather Station: HB01

730 Water Allocation Scheduling

Site Name: D.Lawson, Bundaberg

01/01/2000 - 31/12/2001

Description: Water Allocation Scheduling

Researcher(s):
Not Available

Weather Station: BB01

731 Water Allocation Scheduling

Site Name: G.Webb, Bundaberg

01/01/2000 - 31/12/2001

Description: Water Allocation Scheduling

Researcher(s):
Not Available

Weather Station: BB02

750 CRC 3.2 Better Crop Scheduling & Yield Forecasting - Kalamia, Ayr

Site Name: Ayr, Kalamia Estate, North Qld

09/02/1998 - 09/12/1999

Description: (Plant) 2 varieties x 2 planting times - To determine effect of crop start date on yield and CCS of 2 varieties

Researcher(s):
GIB, LMM

Design: (Plant) 2 varieties (Q96, Q165) x 2 planting times (February, August)

Weather Station: KL239

751 CRC 3.2 Better Crop Scheduling & Yield Forecasting - Kalamia, Ayr

Site Name: Ayr, Kalamia Estate, North Qld

09/02/1999 - 12/02/2001

Description: (1R) 2 varieties x 2 planting times - To determine effect of crop start date on yield and CCS of 2 varieties
 Design: (1R) 2 varieties (Q96, Q165) x 2 planting times (February, August)
 Researcher(s): GIB, LMM
 Weather Station: KL239

754 CRC 3.2 Better Crop Scheduling & Yield Forecasting - Kalamia Burdekin

Site Name: Ian Haig Farm, Brandon (North of Ayr) North QLD 09/02/1998 - 16/11/2001
 Description: (Plant) Q165 x 2 planting times - To determine effect of crop start date on yield and CCS
 Design: (Plant) Q165 x 2 planting times (March, August)
 Researcher(s): AWW, LMM
 Weather Station: AY01

755 CRC 3.2 Better Crop Scheduling & Yield Forecasting - Kalamia Burdekin

Site Name: Ian Haig Farm, Brandon (North of Ayr) North QLD 09/02/1999 - 16/11/2000
 Description: (1R) Q165 x 2 planting times - To determine effect of crop start date on yield and CCS
 Design: (1R) Q165 x 2 planting times (March, August)
 Researcher(s): AWW, LMM
 Weather Station: AY01

758 Water Balance Study

Site Name: Sexton, Millaroo, Burdekin QLD 01/01/1998 - 01/04/1999
 Description: Water Balance Study
 Researcher(s): GIB
 Weather Station: SX01

760 (1R) - Irrigation Scheduling (Block 56)

Site Name: Ayr, Kalamia Estate, North QLD 01/01/2000 - 31/12/2001
 Description: (1R) - Irrigation Scheduling (Block 56)
 Researcher(s): GIB
 Weather Station: AY03

761 (2R) Irrigation Scheduling (Block 56)

Site Name: Ayr, Kalamia Estate, North QLD 01/01/2001 - 31/12/2002
 Description: (2R) Irrigation Scheduling (Block 56)
 Researcher(s): GIB
 Weather Station: AY03

765 (Plant) Bowen Ration Evap. Study (Block 48)

Site Name: Cornford, Kalamia, Burdekin, Qld 01/01/1999 - 31/12/2000
 Description: (Plant) Bowen Ration Evap. Study (Block 48)
 Researcher(s): GIB
 Weather Station:

766 (1R) Bowen Ration Evap. Study (Block 48)

Site Name: Cornford, Kalamia, Burdekin, Qld 01/01/2000 - 30/12/2001
 Description: (1R) Bowen Ration Evap. Study (Block 48)
 Researcher(s): GIB
 Weather Station: AY03

790 CRC 3.1 Crop Response to Timing and Amount of Irrigation - Burdekin

Site Name: Ayr, Kalamia Estate, North QLD 01/01/1999 - 31/12/2000
 Description: (Block 97) (Early) 2 varieties * 2 water rates - Early season water stress (Plant)
 Design: (Plant) 2 varieties (Q96, Q124) * 2 water rates (stress, control) * 5 replicates
 Researcher(s): GIB
 Weather Station: KL239

791 (Block 97) (Late) 2 varieties * 2 water rates - Late season water stress(Plant)

Site Name: Ayr, Kalamia Estate, North QLD 01/01/1999 - 31/12/2000
 Description: (Block 97) (Late) 2 varieties * 2 water rates - Late season water stress(Plant)
 Researcher(s): GIB
 Weather Station: KL239

807 CRC 3.1 Crop & Yield Response To Timing & Amount Of Irrigation.

Site Name: Powell, Mackay, Qld 01/04/1996 - 20/09/1997
 Description: (Plant) 5 Trickle Irrigation rates - To measure the yield response to well watered, and supplementary irrigated, and rainfed conditions of Q135 (plant crop) in the Mackay district. Researcher(s): DMG, GIB, JJT
 Design: (Plant) 5 Trickle Irrigations (Full, 2ML/ha early, 2ML/ha late, 4 ML/ha, Rainfed) Weather Station: MC01

808 CRC 3.1 Crop & Yield Response To Timing & Amount Of Irrigation

Site Name: Powell, Mackay, Qld 01/09/1997 - 30/09/1998
 Description: (1R) 4 Trickle Irrigation Rates - To measure the yield response to well watered, and supplementary irrigated, and rainfed conditions of Q135 (ratoon crop) in the Mackay district. Researcher(s): DMG, GIB, JJT
 Design: (1R) 4 Trickle Irrigation Rates (Full, 2 ML/ha Early, 2ML/ha Late, Rainfed) Weather Station: MC01

812 CRC 3.2.2 Better Crop Scheduling and Yield forecasting

Site Name: Wallace, Wagoora, Mackay Qld 30/04/1996 - 31/12/1997
 Description: (Plant) 2 varieties * 4 harvest dates - To determine effect of harvest date on yield and CCS of 2 varieties Researcher(s): DMG, JJT, LMM
 Design: (Plant) 2 varieties (Q121, Q124) * 4 harvest dates (April, June, September, November) * 2 replications Weather Station: MC04

813 CRC 3.2.2 Better Crop Scheduling and Yield forecasting

Site Name: Wallace, Wagoora, Mackay Qld 15/04/1997 - 30/11/1998
 Description: (1R) 2 varieties * 4 crop start dates - To determine effect of crop starts date on yield and CCS of 2 varieties Researcher(s): DMG, JT, LMM
 Design: (1R) 2 varieties (Q121, Q124) * 4 crop start dates (April, June, September, November) * 2 replications Weather Station: MC04

825 CRC 3.2 Crop Response to Alternative Harvest Dates - (Apr + Aug)

Site Name: Paul Bohem, Sunnyside Mackay 07/07/1997 - 04/08/1998
 Description: (2R) Crop Yield and CCS Response - To determine effect of harvest date on yield and CCS Researcher(s): DMG, JJH, RCM
 Design: (2R) 2 Harvest Dates (April & August) x 2 Replicates Weather Station: MC04

826 CRC 3.2 Crop Response to Alternative Harvest Dates - (May + Aug)

Site Name: Paul Bohem, Sunnyside Mackay 07/04/1998 - 04/08/1999
 Description: (3R) Crop Yield and CCS Response - To determine effect of harvest date on yield and CCS Researcher(s): DMG, JJH, RCM
 Design: (3R) 2 Harvest Dates (April & August) x 2 Replicates Weather Station: MC04

827 CRC 3.2 Crop Response to Alternative Harvest Dates - (May + Aug)

Site Name: Paul Bohem, Sunnyside Mackay 04/05/1999 - 03/08/2000
 Description: (4R) Crop Yield and CCS Response - To determine effect of harvest date on yield and CCS Researcher(s): DMG, JJH, RCM
 Design: (4R) 2 Harvest Dates (April & August) x 2 Replicates Weather Station: MC04

835 CRC 3.2 Crop Response to Alternative Harvest Dates in Sunnyside

Site Name: Warwick Westcott, Sunnyside Mackay 03/08/1997 - 11/08/1998
 Description: (1R) Crop Yield and CCS Response - To determine effect of harvest date on yield and CCS Researcher(s): DMG, JJH, JJT, LMM
 Design: (1R) 2 Harvest Dates (April & August) x 2 Replicates Weather Station: MC04

836 CRC 3.2 Crop Response to Alternative Harvest Dates in Sunnyside

Site Name: Warwick Westcott, Sunnyside Mackay 07/04/1998 - 09/08/1999
 Description: (2R) Crop Yield and CCS Response - To determine effect of harvest date on yield and CCS Researcher(s): Not Available
 Design: (2R) 2 Harvest Dates (April & August) x 2 Replicates
 Weather Station: MC04

837 CRC 3.2 Crop Response to Alternative Harvest Dates in Sunnyside

Site Name: Warwick Westcott, Sunnyside Mackay 04/05/1999 - 09/08/2000
 Description: (3R) Crop Yield and CCS Response - To determine effect of harvest date on yield and CCS Researcher(s): DMG, JJH, JJT, LMM
 Design: (3R) 2 Harvest Dates (April & August) x 2 Replicates
 Weather Station: MC04

845 CRC 3.2 Crop Response to Alternative Harvest Dates in Dumbleton

Site Name: Andrew Powell, Dumbleton, Mackay 06/09/1997 - 28/10/1998
 Description: (1R) Crop Yield and CCS Response - To determine effect of harvest date on yield and CCS Researcher(s): DMG, JJH, JJT, LMM
 Design: (1R) 2 Harvest Dates x 2 Replicates
 Weather Station: MC01

846 CRC 3.2 Crop Response to Alternative Harvest Dates in Dumbleton

Site Name: Andrew Powell, Dumbleton, Mackay 14/04/1998 - 28/10/1999
 Description: (2R) Crop Yield and CCS Response - To determine effect of harvest date on yield and CCS Researcher(s): Not Available
 Design: (2R) 2 Harvest Dates x 2 Replicates
 Weather Station: MC01

847 CRC 3.2 Crop Response to Alternative Harvest Dates in Dumbleton

Site Name: Andrew Powell, Dumbleton Mackay 04/05/1999 - 28/10/2000
 Description: (3R) Crop Yield and CCS Response - To determine effect of harvest date on yield and CCS Researcher(s): DMG, JJH, JJT, LMM
 Design: (3R) 2 Harvest Dates x 2 Replicates
 Weather Station: MC01

850 CRC 3.1 Optimising the use of limited water

Site Name: Waterson, Proserpine, Qld 01/03/1997 - 31/12/1998
 Description: (1R) Furrow Irrigation Scheduling by Growth Rates - To measure the yield response to irrigation in the Proserpine district Researcher(s): JH, MH
 Design: (1R) 3 Irrigation treatments (50%, 30%, 20% growth rate) * 3 replicates
 Weather Station: PR02

855 CRC 3.1 Optimising the use of limited water

Site Name: Kelsey Creek, Proserpine, Qld 01/04/1997 - 31/12/1998
 Description: (1R) Winch Irrigation Scheduling by Growth Rates - To measure the yield response to irrigation in the Proserpine district Researcher(s): JH, MH
 Design: (1R) 3 Irrigation Treatments (30%, 30% every 2nd irrigation, rainfed)
 Weather Station: PR02

870 CRC 3.2 Crop Response to Alternative Harvest Dates in Walkerston

Site Name: Ian Ritchie, Walkerston, Mackay 06/09/1997 - 06/11/1998
 Description: (1R) Crop Yield and CCS Response Researcher(s): DMG, JJH, JJT, LMM
 Design: (1R) 4 Harvest Dates (April, June, Aug, Nov) x 2 replicates
 Weather Station: MC09

871 CRC 3.2 Crop Response to Alternative Harvest Dates in Walkerston

Site Name: Ian Ritchie, Walkerston, Mackay 13/06/1998 - 08/11/1999
 Description: (2R) Crop Yield and CCS Response Researcher(s):

Design: (2R) 5 Harvest Dates (April, June, Aug, Oct, Nov)) x 2 replicates
 DMG, JJH, LMM, RCM
 Weather Station: MC09

872 CRC 3.2 Crop Response to Alternative Harvest Dates in Walkerston

Site Name: Ian Ritchie, Walkerston, Mackay 19/04/1999 - 08/11/2000
 Description: (3R) Crop Yield and CCS Response Researcher(s):
 Design: (3R) 5 Harvest Dates (April, June, Aug, Oct, Nov)) x 2 DMG, JJH, LMM, RCM
 replicates Weather Station: MC09

875 CRC 3.2 Crop Response to Alternative Harvest Dates in Finch Hatton

Site Name: Charlie Scriha, Finch Hatton, Mackay Qld 01/01/1997 - 31/12/1998
 Description: (1R) Crop Yield and CCS Response - To determine effect of Researcher(s):
 Design: (1R) 2 Harvest Dates (May and October) x 2 replicates DMG, JJH, JJT, LMM
 Weather Station: MC02

876 CRC 3.2 Crop Response to Alternative Harvest Dates in Finch Hatton

Site Name: Charlie Scriha, Finch Hatton, Mackay Qld 01/01/1998 - 31/12/1999
 Description: (2R) Crop Yield and CCS Response - To determine effect of Researcher(s):
 Design: (2R) 2 Harvest Dates (May and October) x 2 replicates DMG, JJH, LMM, RCM
 Weather Station: MC02

877 CRC 3.2 Crop Response to Alternative Harvest Dates in Finch Hatton

Site Name: Charlie Scriha, Finch Hatton, Mackay Qld 01/01/1999 - 31/12/2000
 Description: (3R) Crop Yield and CCS Response - To determine effect of Researcher(s):
 Design: (3R) 2 Harvest Dates (May and October) x 2 replicates DMG, JJH, LMM, RCM
 Weather Station: MC02

885 CRC 3.2 Crop Response to Alternative Harvest Dates in Gargett

Site Name: Nic Voss, Gargett, Qld 03/08/1997 - 27/09/1998
 Description: (1R) Crop Yield and CCS Response - To determine effect of Researcher(s):
 Design: (1R) Harvest Dates (2 - May and September) x Replicates DMG, JJH, JJT
 Weather Station: MC03

886 CRC 3.2 Crop Response to Alternative Harvest Dates in Gargett

Site Name: Nic Voss, Gargett, Qld 28/07/1998 - 21/09/1999
 Description: (2R) Crop Yield and CCS Response - To determine effect of Researcher(s):
 Design: (2R) Harvest Dates (2 - May and September) x Replicates DMG, JJH, RCM
 Weather Station: MC03

887 CRC 3.2 Crop Response to Alternative Harvest Dates in Gargett

Site Name: Nic Voss, Gargett, Qld 17/05/1999 - 21/09/2000
 Description: (3R) Crop Yield and CCS Response - To determine effect of Researcher(s):
 Design: (3R) Harvest Dates (2 - May and September) x Replicates DMG, JJH, JJT
 Weather Station: MC03

901 CRC 3.1 Variety Performance and water use under drip irrigation

Site Name: Fairymead, Bundaberg, Qld 02/02/1997 - 15/09/1998
 Description: (Plant) 6 Drip Irrigation x 2 Varieties - To measure the yield Researcher(s):
 Design: (Plant) 6 Drip Irrigation (Evap * Kc * 1.2, 1.0, 1.0 every 3 CB, ID, MS, RCM
 days, 0.8, 0.8 every 3 days, 0.4) x 2 Varieties (Q124, Q151) Weather Station: FM01

902 CRC 3.1 Variety Performance and water use under drip irrigation

Site Name: Fairymead, Bundaberg, Qld 30/08/1998 - 30/09/1999
 Description: (1R) - 6 Irrigation x 2 Varieties - CRC 3.1 Variety Researcher(s):

Design:	Performance and water use under drip irrigation - (1R) 6 Drip Irrigation (Evap * Kc * 1.2, 1.0, 1.0 every 3 days, 0.8, 0.8 every 3 days, 0.4) x 2 Varieties (Q124, Q151)	CB, ID, MS, RCM Weather Station: FM01
903	(2R) - 6 Irrigation x 2 Varieties - CRC 3.1 Variety Performance and water use under drip	
Site Name:	Fairymead, Bundaberg, Qld	06/09/1999 - 30/09/2000
Description:	(2R) - 6 Irrigation x 2 Varieties - CRC 3.1 Variety Performance and water use under drip irrigation -	Researcher(s): ID
Design:		Weather Station: FM01
905	CRC 3.1 Nitrogen Efficiency of Plant Crop Under Drip Irrigation	
Site Name:	Fairymead, Bundaberg, Qld	01/08/1996 - 01/09/1997
Description:	(Plant) - 6 N Rates - To measure the yield response to Nitrogen under Trickle irrigation	Researcher(s): CB, ID, MS, RCM
Design:	(Plant) 6 N rates (0, 60, 90, 120, 180 and 120 kg/ha N side dress) * 3 replicates	Weather Station: FM01
906	CRC 3.1.2 Nitrogen Efficiency of 1st Ratoon Crop Under Drip Irrigation	
Site Name:	Fairymead, Bundaberg, Qld	03/09/1997 - 31/12/1998
Description:	(1R) - 6 N Rates Under Drip Irrigation - To measure the yield response to Nitrogen under Trickle irrigation	Researcher(s): CB, GIB, ID, MS, RCM
Design:	(1R) 6 N rates (0, 80, 120, 160, 240 and 160 kg/ha N side dress) * 3 replicates	Weather Station: FM01
907	(2R) - 6 N Rates Under Drip Irrigation	
Site Name:	Fairymead, Bundaberg, Qld	30/09/1998 - 31/12/1999
Description:	(2R) - 6 N Rates Under Drip Irrigation	Researcher(s): CB Weather Station: FM01
908	(3R) - 6 N Rates Under Drip Irrigation	
Site Name:	Fairymead, Bundaberg, Qld	03/09/1999 - 30/09/2000
Description:	(3R) - 6 N Rates Under Drip Irrigation	Researcher(s): ID Weather Station: FM01
930	(3R) Water Allocation Scheduling	
Site Name:	D.Lawson, Bundaberg	23/11/2000 - 19/07/2001
Description:	(3R) Water Allocation Scheduling	Researcher(s): GIB Weather Station: BB01
931	(3R) Water allocation Scheduling	
Site Name:	G.Webb, Bundaberg	22/11/2000 - 25/07/2001
Description:	(3R) Water allocation Scheduling	Researcher(s): GIB Weather Station: BB02
932	(4R) Water Allocation Scheduling	
Site Name:	G.Webb, Bundaberg	09/08/2001 - 31/12/2002
Description:	(4R) Water Allocation Scheduling	Researcher(s): GIB Weather Station: BB02
933	(4R) Water Allocation Scheduling	
Site Name:	D.Lawson, Bundaberg	15/07/2001 - 31/12/2002
Description:	(4R) Water Allocation Scheduling	Researcher(s): GIB Weather Station: BB01

LIST OF RESEARCHERS

ID	Researcher Name	Institute	Country
AA	A Ayres	Hawaiian Sugar Planters Association	United States
AVR	Allan Rudd	Sugar North, Mossman	Australia
AWF	Alec Ford	Sugar North, Mossman	Australia
AWW	Andrew Wood	CSR Limited	Australia
BAK	Brian Keating	CSIRO	Australia
CB	Craig Baillie	BBS/CRC - Bundaberg Sugar	Australia
CIE	Carl Evenson	Hawaiian Sugar Planters Association	United States
DH	Dave Horsley	CSR Limited	Australia
DLL	De Li Liu	BSES	Australia
DMG	Drew McGillChrist	Mackay Sugar	Australia
FM	F Meinzer	Hawaiian Sugar Planters Association	United States
GIB	Geoff Inman-Bamber	South African Sugar Association	South Africa
GK	Graham Kingston	BSES	Australia
GS	Gurmit Singh	CSIRO	Australia
ID	Ian Dart	BBS/CRC - Bundaberg Sugar	Australia
JH	James Holden	BSES	Australia
JJH	Jennifer Hollis	CSIRO	Australia
JJT	John Tomlin	Mackay Sugar	Australia
JS	Joe Sherrard	Western Australia Agriculture Dept	Australia
LMM	Lisa McDonald	CSIRO	Australia
LTS	L T Santo	Hawaiian Sugar Planters Association	United States
MH	Marcus Hardie	BSES	Australia
MJR	Micheal Robertson	CSIRO	Australia
MS	Mike Smith	BBS/CRC - Bundaberg Sugar	Australia
PAJ	Phil Jackson	CSIRO	Australia
RCM	Russell Muchow	CSIRO	Australia
RJB	R J Borden	Hawaiian Sugar Planters Association	United States
RMH	Michael Hughes	NSW Agriculture	Australia
RO	R Osgood	Hawaiian Sugar Planters Association	United States
SCC	Scott Chapman	CSIRO	Australia
SE	S El-Swaify	Hawaiian Sugar Planters Association	United States
TM	Tamara Matthews	Canegrowers Qld	Australia
TT	Tim Triglone	Western Australia Agriculture Dept	Australia
UKD	U K Das	Hawaiian Sugar Planters Association	United States

LIST OF WEATHER STATIONS

Adil Farm Co, Bibbohra	Finchhatton, Mackay	Mackay 03
Bogner, Tully	G. Webb	Mackay 04
Bundaberg - Schulte's farm	Grafton	Macknade 103
Bundaberg BSES 101	Harwood Mill Farm - Miser	Macknade 104
Caltabiano, Bamboo	HSPA Kunia Substation, Hawaii	Makiki Experiment Station, Oahu
Cameron, Mackay	Ian Haig, North of Brandon	P. Mizzi, Halifax, Campbell
Castorina, Lannercost, Ingham	Kalamia Estate, Ayr	Paige, Ayr
Cavallo, Herbert	Kimberley Research Station	Pongola Exp Farm
Clarkes, Proserpine	Kununurra Research Station,	Powel, Mackay
Crees and Hancock, Mowbray	Campbell Logger	R. Pace, Bambaroo, Campbell
CSR TFD, Kalamia, Ayr	Kununurra	S Adil
D. Lawson	Kununurra, PaddleSack,	Sextons, Millaroo, Burdekin
DPI, Ayr	Campbell Logger	Vecchio, Tully
Eston, South Africa	La Mercy, Tongaat	Waipio Experiment Station, Oahu
Fairymead Campbell - 60N	Lee's, Kelsey Creek	Zanetti 085

PUBLICATIONS

- ROBERTSON, M.J., MUCHOW, R.C. and PRESTWIDGE, D.B. (1996). The Sugarbag database system: Enhancing the ability of field experimentation to overcome constraints to sugarcane production. In Sugarcane: Research towards efficient and sustainable production, J.R. Wilson, D.M. Hogarth, J.A. Campbell, and A.L. Garside (Eds.), CSIRO Division of Tropical Crops and Pastures, Brisbane. pp19-21.
- MAZZUCHELLI, D.K., SPILLMAN, M.F. and MUCHOW, R.C. (1997). Minimum Dataset Manual for the collection of Crop, Soil and Climate Data in Sugarcane Field Experimentation. Technical Report for CRC Sustainable Sugar Production. March 1997. Internal Report to CRC for Sustainable Sugar Production.
- PRESTWIDGE, D.B. and MAZZUCHELLI, D.K. (1998). SUGARBAG: A Database System for Sugarcane Crop Growth, Climate, Soils and Management Data Version 2. Internal Report to CRC for Sustainable Sugar Production
- PRESTWIDGE, D.B. and MAZZUCHELLI, D.K. (1999). SUGARBAG: A Database System for Sugarcane Crop Growth, Climate, Soils and Management Data Version 3. Internal Report to CRC for Sustainable Sugar Production.
- ROBERTSON, M.J., MUCHOW, R.C. and PRESTWIDGE, D.B. (2000). The SUGARBAG Database system: enhancing the ability of field experimentation to overcome constraints to sugarcane production. Sugar 2000 Poster Abstract.
- FENGDUO HU and PRESTWIDGE, D.B. (2001). SUGARBAG: A Database System for Sugarcane Crop Growth, Climate, Soils and Management Data - Version 4.0. CRC-Sugar Publication.

CONTENTS OF CD

The CD included in this booklet contains three Microsoft® Excel® files, "SUGARBAG Fixed Information", "SUGARBAG Experiments" and "SUGARBAG Data". The CD also contains an Adobe® Reader® file (PDF) with a copy of this booklet.

SUGARBAG Fixed Information

This file contains reference (fixed) data appearing in the database including sites, fields, soil types, soil layer information, list of researchers involved, weather stations, crop/soil/climate variables, fertilisers, methods, factors and explanatory notes.

SUGARBAG Experiments

Design and Treatments of experiments and Management Events (Operations) for all experiments. This includes experiment summaries with associated researchers, experiment design, planting, irrigation, fertilisation, tillage and explanatory notes.

SUGARBAG Data

Measurements taken during sampling of crop, soils and climate. Records include a list of experiments, harvest data (crop measurements), weather data (climate measurements), soil layer data (soil measurements) and explanatory notes.

If unavailable, Microsoft Excel files may be viewed and printed by using the Excel 97/2000 Viewer available for free from the Microsoft web site at:
<http://www.microsoft.com/office/excel/default.asp>

A free copy of Adobe Reader may be downloaded from the Adobe web site at:
<http://www.adobe.com/products/acrobat/readstep2.html>