

**BUREAU OF SUGAR EXPERIMENT STATIONS
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**EVALUATION OF AN EXTENSION PROGRAM :
IMPROVING WATER PENETRATION
IN THE BURDEKIN**

by

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EVALUATION OF AN EXTENSION PROGRAM :

IMPROVING WATER PENETRATION IN THE BURDEKIN

INTRODUCTION

Poor water penetration represents the greatest source of preventable yield loss in the Burdekin district. The problem occurs in all four mill areas in the district with about 18 000 ha affected to some degree. Cane yield losses for the 1987 season were estimated conservatively at 250 000 t. Crop yields in 1989, following good rains, indicate that actual losses may be closer to 500 000 t of cane in dry years.

The promotion of remedial measures aimed at reducing the problem has been an important extension theme in the Burdekin district for many years. In March 1988, extension staff commenced an extension program focussing on the use of the 'dissolvenator' as the preferred means of overcoming the problem.

THE PROGRAM

The program consisted of:

- Shed meetings - 400 people attended 15 shed meetings held throughout the district. Mr Ham assisted with these meetings;
- Field Day - dissolvenator display by Mr Ham;
- Water quality booklet - mailed to all growers with a newsletter;
- Gypsum demonstration plots - 11 plots put out in conjunction with the Productivity Committee;
- Bus tour;
- BSES video - featuring the dissolvenator. The video was available from late 1989 and was available on loan from Mill Suppliers' offices and through cane inspectors as well as BSES. The video was promoted in a newsletter;
- BSES Bulletin - three articles since October, 1986;
- Newsletters - poor water penetration was covered in two newsletters;
- Other - the dissolvenator was featured in several newspaper articles, on radio and discussed during personal contacts.

EVALUATION

An evaluation of the program was included in the initial proposal. A telephone survey of a representative sample (n = 30) of growers was used to test:

1. The perception by growers of the serious nature of the water penetration problem;
2. How well the problem was understood by growers;
3. Grower awareness of BSES recommended ways of overcoming the problem;
4. Grower awareness of the dissolvenator and to identify where they first heard of it.

METHODOLOGY

Thirty growers, from all four Burdekin district mill areas, were selected at random for surveying by telephone.

They were surveyed by DPI Extension Agronomist, Peter Elliott, over a four day period. The use of someone other than a BSES staff member to carry out the survey was designed to ensure that growers would be more frank and not simply give the replies that they thought BSES expected. The survey form appears as Appendix 1.

RESULTS

Perception of the problem (Q's 1 and 2)

- (i) 60% of growers thought they had a water penetration problem.
- (ii) An assessment by extension staff closely coincided with this view. In 83% of cases the grower and Extension Officer agreed whether a problem existed or not.
- (iii) 70% of growers thought water penetration was a problem in the Burdekin district; 47% thought it was a serious or major problem.

Cause of the problem (Q3)

- (i) Only 33% of growers mentioned low salinity water (the major cause of the problem).
- (ii) 60% mentioned either low salinity water or free alkali in the water.
- (iii) Only 7% mentioned surface slope of cane blocks.
- (iv) 63% thought the problem was soil related and mentioned either compaction, soil type or soil structure as a cause.

Solutions to the problem (Q4)

- (i) Not one grower surveyed mentioned the dissolvenator as a solution to the problem.
- (ii) 73% mentioned a BSES recommendation as a solution.
- (iii) 23% thought applying earth lime was the best solution.
- (iv) 30% thought applying burnt or pulverised lime or gypsum was best.
- (v) Irrigation technique (ie water slowly, reduce slope, smaller hills) was mentioned by 13%.
- (vi) 30% mentioned deep ripping and 17% thought it was the best way of solving the problem.

Dissolvenator awareness (Q5)

- (i) 90% of growers knew of the dissolvenator.

Source of information (Q6)

- (i) 33% of growers first heard of the dissolvenator at the Burdekin Sugar Experiment Station Field Day.
- (ii) 23% heard of it through personal contact with BSES staff, almost half of these growers (10%) cited Mr Ham as the first source of information.
- (iii) Newspaper articles, radio or newsletters were only cited by 3%.

Would a dissolvenator improve production? (Q7)

- (i) Of the 27 growers who had heard of the dissolvenator, 13 did not know whether it would improve their production.
- (ii) Of the eight growers who believed they had a serious or major water penetration problem only one thought a dissolvenator would help.
- (iii) 17% thought it would help production, 33% thought it wouldn't.

Dissolvenator video (Q8 and Q9)

- (i) 40% of growers surveyed knew of the video.
- (ii) Only two growers (7%) had seen the video.

DISCUSSION

1. Perceptions of the problem

Most growers (83%) were able to identify correctly whether or not a problem existed on their own farm. When compared to the rating of the problem by an Extension Officer there was a tendency for growers to underestimate the problem. Only two growers (7%) failed to recognise what an Extension Officer thought was a serious or major problem.

Water penetration is perceived by 70% of growers to be a problem in the Burdekin district.

2. Causes of the problem

Most growers did not understand that the primary cause of the problem is low salinity water. The popular belief is that free alkali is the main cause.

Almost half (47%) of the growers believed that soil compaction or deteriorating soil structure was a major cause of the problem.

3. Solution to the problem

The majority of growers offered workable solutions to the problem. Seven growers (23%) believed earth lime was the best solution. Although not generally recommended by BSES, application of earth lime often gives a yield response. Earth lime should not therefore be counted as an 'incorrect' answer. Thus 80% of growers proposed workable (but not necessarily the most economic) solutions.

Of 19 growers rated by BSES Extension Officers as having a problem, 15 (79%) offered a BSES recommendation as the best solution. Of 18 growers who believed they had a water penetration problem, 12 thought a BSES recommended solution was the best solution. Another five mentioned a BSES recommendation.

Interestingly, five growers (17%) thought they could beat the soil into submission. These growers proposed deep ripping as the best solution. Nine growers mentioned deep ripping as a solution.

Not one grower cited the dissolvenator as a means of overcoming the problem. Although most (90%) have heard of the dissolvenator growers are yet to be convinced of its effectiveness. Information on its cost advantages has been widely disseminated.

Until the 10 dissolvenators now in place produce good results most growers will remain unconvinced.

4. Dissolvenator awareness

We have been successful in achieving widespread (90%) awareness of the dissolvenator but as stated above, growers do not yet see it as a solution to the water penetration problem.

Whilst being trialed at the Burdekin Sugar Experiment Station, the dissolvenator was featured at several Field Days where it was a popular display. It was again featured during the promotion campaign. One third of growers surveyed said they first heard of the dissolvenator at Field Day. Field Day then appears to be a good vehicle for introducing new technology.

While awareness of the dissolvenator is at a high level, growers do not yet see it as a viable solution. Of the eight growers who believed they had a serious or major water penetration problem, only one thought the dissolvenator would improve their production.

Although 18 growers thought water penetration was a problem on their farm only four believed a dissolvenator would help.

Seven growers cited a personal contact with BSES as the first source of information. Three of these contacts were with Mr Ham. Research staff often do considerable extension on projects in which they are involved. Such contributions should be recognised.

5. The video

Only 40% of growers were aware of the dissolvenator video. This is despite its promotion in a newsletter mailed to all growers.

More disappointing is the fact that only two growers (7%) surveyed had seen the video. A special effort was made to make this video available from cane inspectors, Mill Suppliers' offices and the Canegrowers Executive as well as through BSES. Ready access to a video does not appear to ensure wide viewing.

6. Farm computers

With the survey the opportunity was taken to determine how many growers had a computer on the farm and whether they were using it in relation to the farm.

Eight growers surveyed (27%) have computers on the farm. Half of these growers are using them as a farm management aid.

RECOMMENDATIONS

1. Growers need to be further educated to understand that the problem is mainly a water quality problem rather than a soil property problem.
2. Awareness of the dissolvenator has been achieved. As results produced by the dissolvenators presently in use become available, they should be disseminated to growers. There are presently 10 dissolvenators in use throughout the area. Four more are under construction or on order.
3. The dissolvenator video will be featured at the 1990 Field Day.

ACKNOWLEDGMENT

I wish to thank Mr Peter Elliott, Extension-Agronomist with the QDPI, for conducting the survey which formed the basis for this paper to be written.

**COMPARISON OF ACTUAL RESPONSES WITH
FORECASTS BY EXTENSION STAFF**

Before the survey was conducted each extension officer gave a forecast of what grower's replies would be. Extension staff are often called on to estimate grower perceptions and to 'guesstimate' such things as adoption rates and the popularity of given agronomic practices. Comparing our forecasts to the actual data shows the reliability of such forecasts.

Results:

	ACTUAL RESPONSE%	FORECAST Peter	RESPONSE Gavin	% Ian
1. How serious a problem do you think poor water penetration is on your farm				
.....no problem	40	20	---	80
.....minor	33	25	---	5
.....serious	17	30	---	5
.....major	10	10	---	10
.....don't know	---	15	---	---
2. How serious a problem do you think poor water penetration is in the Burdekin as a whole?				
.....no problem	10	20	10	10
.....minor	23	25	40	10
.....serious	43	30	25	80
.....major	3	10	25	---
.....don't know	20	15	---	---
3. In your opinion what causes the problem?				
.....low salinity water	20	---	5	3*
.....free alkali	17	50	40	1
.....soil type	23	25	40	4
.....soil compaction	13	25	---	5
.....soil slope	7	---	5	2
.....soil structure	10	---	---	6
4. What do you think is the best way of overcoming the problem?				
.....earth lime	23	40	30	2*
.....pulv. lime	7	10	25	3
.....burnt lime	7	10	15	8
.....gypsum	17	---	8	1
.....dissolvenator	0	---	2	10
.....mix water	13	---	---	5
.....water slowly	3	---	10	4
.....reduce slope	7	10	10	6
.....smaller hills	3	---	---	7
.....incorp.trash/tops	---	---	---	9

Results (continued):

	ACTUAL RESPONSE%	FORECAST Peter	RESPONSE % Gavin	% Ian
5. Have you heard of the dissolvenator?yes	90	80	75	90
6. Where did you first hear about it?..another farmer	7	---	---	4*
.....newspaper	3	---	10	2
.....Field Day	33	50	40	1
.....radio	0	---	---	6
.....shed meeting	10	10	30	3
.....newsletter	0	---	10	2
.....BSES staff member	23	30	5	5
7. Do you think a dissolvenator would improve your production?yes	17	33	60	20
8. Are you aware there is a video about the dissolvenator available?yes	40	70	20	50
9. Have you seen the video?yes	7	20	20	1
10. Do you have a computer at home (includes children's computer)?.....yes	27	30	20	5
11. Do you use it in relation to the farm?.....yes	13	10	10	0

* ranked

APPENDIX 1

THE SURVEY FORM

WATER PENETRATION SURVEY

Q1. How serious a problem do you think poor water penetration is on your farm?

Circle: 1 2 3 4 5
Not a Minor Serious Major Don't
problem problem problem problem know

Q2. How serious a problem do you think poor water penetration is in the Burdekin as a whole?

Circle: 1 2 3 4 5
Not a Minor Serious Major Don't
problem problem problem problem know

Q3. In your opinion what causes the problem?

Number in order
Mentioned

_____ low salinity water
_____ free alkali
_____ soil type
_____ soil compaction
_____ soil slope
_____ soil structure
Specify _____ Other

Q4. What do you think is the best way of overcoming the problem?

- apply (earth) lime
- apply pulverised lime
- apply burnt lime
- apply gypsum
- dissolvenator
- mix water (with saline water)
- water slowly
- reduce slope
- smaller hills
- put trash/tops into soil
- other

Write '1' as first measure mentioned and tick any others

Do you know of any other ways of overcoming the problem?
TICK AS ABOVE

Q5. Have you heard of the dissolvenator?

- Yes
- No

Q6. Where did you first hear about it?

- Tick
- another farmer
 - newspaper
 - BSES Field Day
 - radio
 - shed meeting
 - newsletter
 - BSES staff member
 - Note Who
 - other

Q7. Do you think a dissolvenator would improve your production?

_____ Yes

_____ No

_____ Don't know

Q8. Are you aware there is a video about the dissolvenator available?

_____ Yes

_____ No

Q9. Have you seen the video?

_____ Yes

_____ No

Q10. Do you have a computer at home (includes children's computer)?

_____ Yes

_____ No

Q11. Do you use it in relation to the farm ?

_____ Yes

_____ No

APPENDIX 2

RESULTS SUMMARY

WATER PENETRATION SURVEY

Q1. How serious a problem do you think poor water penetration is on your farm?

Circle:	1	2	3	4	5
	Not a problem	Minor problem	Serious problem	Major problem	Don't know

Farmer :	12	10	5	3	0
Ext.Off:	11	5	8	6	0

Q2. How serious a problem do you think poor water penetration is in the Burdekin as a whole?

Circle:	1	2	3	4	5
	Not a problem	Minor problem	Serious problem	Major problem	Don't know

	3	7	13	1	6
--	---	---	----	---	---

Q3. In your opinion what causes the problem? 1st 2nd 3rd

mentioned :	10	low salinity water	6	4	0
	10	free alkali	5	4	1
	11	soil type	7	3	1
Number in order Mentioned	7	soil compaction	4	3	0
	2	soil slope	1	1	0
	7	soil structure	3	3	1
Specify	___	Other			
	___	Sediment	2		
	___	no rain	1		
	___	less cultivation	1		

Four farmers claimed problem had been solved with lime/gypsum (2 major, 1 minor, 1 serious).

Q4. What do you think is the best way of overcoming the problem?

	7	apply (earth) lime
	2	apply pulverised lime
	2	apply burnt lime
	5	apply gypsum
Write '1' as first measure mentioned and tick any others	0	dissolvenator
	4	mix water (with saline water)
	1	water slowly
	2	reduce slope
	1	smaller hills
	1	put trash/tops into soil
	5	other(deep rip).....

Do you know of any other ways of overcoming the problem?
TICK AS ABOVE

Q5. Have you heard of the dissolvenator?

	27	Yes
	3	No

Q6. Where did you first hear about it?

Tick	2	another farmer
	1	newspaper
	10	BSES Field Day
	0	radio
	3	shed meeting
	0	newsletter
EO	4	BSES staff member
GJH	3	Note Who
	1	other (Pest Board)
	2	Bulletin
	1	don't remember

Q7. Do you think a dissolvenator would improve your production?

27 have heard of 5 Yes
 10 No 12 Don't know

Q8. Are you aware there is a video about the dissolvenator available?

12 Yes
18 No

Q9. Have you seen the video?

2 Yes
28 No

Q10. Do you have a computer at home (includes children's computer)?

8 Yes
_____ No

Q11. Do you use it in relation to the farm ?

4 Yes
_____ No