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**BUREAU OF SUGAR EXPERIMENT STATIONS
QUEENSLAND, AUSTRALIA**

**REPORT ON
EVALUATION OF NUTRIENT ENHANCEMENT
OF BIODUNDER FOR CANE GROWTH**

by
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PREPARED FOR:

**CSR DISTILLERIES OPERATIONS PTY LTD
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and

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Should biodunder be mixed with soluble fertiliser instead of urea?

Will seaweed-based soluble fertiliser be a better alternative with biodunder than normal soluble fertilisers?

Is biodunder an economic alternative to conventional one-shot fertiliser?

Biodunder is a by-product from the distillation of alcohol from molasses. Biodunder from CSR's distillery at Sarina is currently used by 450 cane growers on approximately 40 000 hectares of cane land. Dunder from the Millaquin, Beenleigh and Rocky Point distilleries, which has from half to one-third the nutrient concentrations of biodunder, is used on smaller areas of cane land at Bundaberg and at Rocky Point.

Biodunder is usually spread on the interrow at Mackay and Bundaberg while dunder is usually spread on the cane row at Rocky Point.

The seaweed-based soluble fertiliser use in this trial program was Supagrow 20 (see Appendix 1) formulated by Agrichem Manufacturing Industries.

2.0 METHODS

2.1 Sites

Trial sites were on the properties of M J and Mrs A Simpson, Homebush; W G and Mrs M A Harris, Brightley; and W, Mrs F, M, R, and T W Jenvey, Bucasia. Soils on these sites were respectively: Sandiford, which has a sandy clay loam topsoil, and is acid to neutral, bleached, mottled, yellow duplex, 0.15 me% K; Brightley, which has a clay topsoil, and is alkaline, grey, self-mulching, 0.09 me% K; Andergrove which has a sandy top soil, and is acid, bleached with a yellow B horizon, 0.14 me% K. The sites were selected on the basis that cane should obtain a yield response from potassium fertiliser. The cane crops were Q142 second ratoon with green cane trash on Simpson's, H56-752 second ratoon with conventional cultivation on Harris' and, Q142 first ratoon with green cane trash on Jenvey's.

Cane growth was retarded by dry weather during spring, flood rains (3019 mm) in summer and drought conditions in autumn and winter.

Simpson's trial was irrigated on three occasions, soon after fertilising, in summer and in autumn. Harris' trial was irrigated twice, soon after fertilising and during summer. Jenvey's trial was unirrigated.

SUMMARY

Three yield trials were conducted to evaluate strategies for the use of biodunder as a fertiliser for sugarcane. Cane growth in the trials was adversely affected by the weather, which was dry in summer, followed by exceptionally heavy and prolonged rainfall, and then drought conditions in autumn and winter. Under these abnormal conditions cane yield was lower than normal. The conclusions drawn from the results of these trials must therefore be extrapolated with caution, for they may not apply to more normal growing conditions.

- There were small cane yield responses (3 tonnes ha⁻¹) from biodunder, even though soil tests indicated that a larger yield response could be expected from potassium fertiliser.
- A larger yield response (11 tonnes ha⁻¹) was obtained from nitrogen fertiliser.
- No yield increase was demonstrated by placing biodunder, with or without urea, on the row rather than the interrow. Interpretation of leaf assays supported this observation as the levels of potassium were the same for row and interrow placements.
- The combination of biodunder and urea spread on the surface of the row or interrow gave lower, but not statistically different yields to where urea was buried.
- The mixing of soluble fertilisers such as Supagrow 20, instead of urea, with biodunder did not give any yield benefit.
- Splitting fertiliser applications, instead of one-shot applications, did not give a yield benefit.
- The blending and application of Kelpak, a seaweed extract present in Supagrow 20, with biodunder gave no yield benefit.
- The economics of using biodunder largely depend on how far the farm is from the source of biodunder, for carting and application costs are a large proportion of the total cost of using biodunder. Data on the economics of using biodunder as an alternative to one-shot fertilisers are not presented in this report.

1.0 INTRODUCTION

The aim of this project was to evaluate strategies for the use of biodunder as a fertiliser for sugarcane (Bieske, 1979; Usher and Willington, 1979; Chapman and Webb, 1987). The questions addressed were:

Should biodunder be applied on the row or interrow?

Should urea be buried or applied in the biodunder?

2.2 Treatments

The following treatments were applied soon after ratooning:

1. Control
2. Urea buried in row
3. Biodunder on row
4. Biodunder on interrow
5. Biodunder/urea on row
6. Biodunder/urea on interrow
7. Biodunder/Supagrow 20 on row, urea buried 6 weeks later in row
8. Biodunder/soluble fertiliser on row, urea buried 6 weeks later in row
9. One-shot buried in row

The total quantities of nutrients applied were:

8 kg N ha⁻¹ for treatments 1, 3 and 4

200 kg N ha⁻¹ for treatments 2, 5, 6, 7, 8, 9

8 kg P ha⁻¹ for all treatments

120 kg K ha⁻¹ for treatments 3, 4, 5, 6, 7, 8, 9

29 kg Ca ha⁻¹, 17 kg Mg ha⁻¹ and 10 kg S ha⁻¹ for treatments 3, 4, 5, 6, 7 and 8

The quantities of nutrients were made up from combinations of biodunder, superphosphate, phosphoric acid (for treatment 8), urea and Supagrow 20 (Appendix 1) as indicated in the treatments.

Treatments were replicated four times in each trial and laid out as randomised blocks.

Samples of leaf lamina (200 mm from mid-section) from first exposed dewlap leaves were collected on 11 February 1991 and 5 April 1991, approximately 16 and 24 weeks after fertilising the trials. Each sample consisted of five leaves per plot, which were combined to give one sample per treatment. The samples were dried, ground and analysed for plant nutrients by BSES methods (Chapman *et al.*, 1981).

Cane yield was measured at harvest by weighing billets, cut with a cane harvester, in an automatic weighing truck. Six cane stalk samples were cut from each plot, crushed, and the juice analysed for ccs by the industry method.

3.0 RESULTS AND DISCUSSION

3.1 Yield

Significant differences ($P < 0.05$) in cane and sugar yield were measured for treatments in the three trials (Table 1 and Figure 1). The mean yields for the trials were low, even though two trials had been irrigated. These yields are similar to those for the district this year, which had the lowest yields since 1961. Chapman *et al.* (1992) reported that the intense period of soil waterlogging in December/January affected yield more than the drought period in autumn and winter at the Sugar Experiment Station, and these effects probably apply to the yield of these trials. These low yields result in uncertain interpretation of yield trends from treatments.

There were no significant responses in cane and sugar yield from applied biodunder. On average, the yield from the biodunder treatment (treatment 3) was only three tonnes of cane per hectare heavier than the yield from the control plots (treatment 1). No significant differences in yield were measured as a result of the two biodunder placement methods (treatments 3 and 4).

Urea (treatment 2) and urea in biodunder (treatments 4 and 5) increased cane and sugar yields significantly compared to the control (treatment 1). However, placement of biodunder/urea mixtures on the row (treatment 5) or interrow (treatment 6) gave similar yields. The yield from biodunder/urea mixtures spread on the surface was not as great as yields from urea buried (treatment 2). This could be expected as ammonia gas is produced as urea is hydrolysed. If urea is buried then ammonia is adsorbed on the soil, but if urea is applied on the surface of trash or soil, then ammonia is released into the atmosphere and lost to the soil/plant system. The reduction of ammonia volatilisation depends on urea becoming integrated with the soil as quickly as possible, and this can be achieved by burying the urea, or washing the urea into the soil by irrigation or by heavy rainfall. There was a significant increase in ccs in Harris' trial, in plots where no nitrogen was applied. H56-752, the variety used in this trial, has previously been observed to have depressed ccs levels when high levels of nitrogen were applied (Chapman, unpublished). Supagrow 20 in biodunder (treatment 7) had no yield advantage over equivalent amounts of soluble fertiliser in biodunder (treatment 8). Kelpak, the seaweed extract in Supagrow 20, therefore does not appear to be of any benefit for cane growth.

The 'one-shot' fertiliser application (treatment 9) had yields as high as the split applications (treatments 7 and 8).

3.2 Assays of leaves

Assays of first exposed dewlap leaves can be used to evaluate the nutritional status of the crop as it grows. As the crop matures the levels of some nutrients decline, and this is apparent for the N and K data for all sites, ie the 24-week results are lower than the 16-week results (Tables 2a,b,c). The levels of N were generally above the critical level of

1.80% in all treatments for Simpson's and Jenvey's trials at the 16-week sampling, even those without N fertiliser. By the 24-week sampling most of the low N levels had fallen below the critical level.

In almost all cases, the K levels of leaves at 16 weeks were above the critical level of 1.11%. The data suggest that the K nutrition at these sites was adequate, and there was little benefit in this year from K fertilisers. This is borne out by the small response of three tonnes of cane per hectare from biodunder. With a low yield response from K fertiliser, the benefit in yield from placing the biodunder close to the cane row could not be demonstrated. This lack of yield response to placement is also supported by the leaf assay data, where the mean K leaf assay was 1.12% for all sites when biodunder was placed on the row and 1.14% when biodunder was placed on the interrow.

The leaf assay data for Ca, Mg, S, Cu, Zn, Fe and Mn indicate that no deficiencies of these nutrients were present during the growth of the crop.

4.0 ACKNOWLEDGMENTS

Contribution to the funding for this project was provided by CSR Distilleries Operations Pty Ltd, and Agrichem Manufacturing Industries Pty Ltd.

I am also grateful for technical assistance provided by Mr A J Royal, BSES; analysis of soils and leaves by Mr M B C Haysom, BSES; and assistance with the field work by Mr J Usher, CSR, Mr L Hargreaves and Mr G Clancy, Agrichem.

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Table 1
Cane yield (tonnes ha⁻¹)

Treatment	Simpson	Jenvey	Harris
1	35	46	13
2	57	62	22
3	44	43	14
4	38	45	18
5	52	55	20
6	56	49	21
7	55	50	26
8	55	47	24
9	47	63	28
<i>lsd (P = .05)</i>	15	12	5

CCS

Treatment	Simpson	Jenvey	Harris
1	14.8	15.0	14.6
2	14.7	15.1	12.8
3	14.5	14.6	14.4
4	14.9	14.9	14.5
5	15.2	15.3	13.8
6	14.7	14.9	13.9
7	14.8	14.9	13.0
8	14.4	15.1	12.9
9	15.0	14.8	13.8
<i>lsd (P = .05)</i>	n/s	n/s	0.7

Sugar yield (tonnes ha⁻¹)

Treatment	Simpson	Jenvey	Harris
1	5.1	6.9	1.9
2	8.4	9.3	2.9
3	6.3	6.3	2.0
4	5.7	6.7	2.6
5	7.9	8.5	2.8
6	8.2	7.2	2.9
7	8.0	7.4	3.4
8	8.0	7.0	3.1
9	7.1	9.2	3.8
<i>lsd (P = .05)</i>	2.2	1.6	0.7

Treatments:-

- (1) Control
- (2) Urea buried-row
- (3) Biodunder-row
- (4) Biodunder-interrow
- (5) Biodunder/urea-row
- (6) Biodunder/urea-interrow
- (7) Biodunder/Supergrow 20-row (urea buried 6 weeks later-row)
- (8) Biodunder/soluble fertiliser-row (urea buried 6 weeks later-row)
- (9) N P K one shot buried-row

Table 2(a)

Assays of first exposed dewlap leaves

Simpson

Assay	Week	Treatment								
		1	2	3	4	5	6	7	8	9
%N	16	2.20	2.33	1.94	1.97	2.16	2.19	2.29	2.35	2.31
	24	1.69	1.69	1.58	1.65	1.82	1.65	1.79	1.61	1.56
%P	16	0.27	0.30	0.26	0.28	0.29	0.29	0.29	0.30	0.28
	24	0.21	0.23	0.22	0.22	0.22	0.23	0.23	0.23	0.23
%K	16	1.29	1.31	1.31	1.41	1.44	1.41	1.45	1.41	1.29
	24	0.80	1.01	0.96	0.85	0.86	1.06	1.00	1.07	1.02
%Ca	16	0.25	0.26	0.22	0.20	0.23	0.23	0.26	0.23	0.27
	24	0.37	0.30	0.28	0.37	0.42	0.29	0.32	0.27	0.30
%Mg	16	0.14	0.17	0.14	0.13	0.15	0.16	0.16	0.16	0.17
	24	0.19	0.18	0.17	0.20	0.21	0.18	0.19	0.18	0.18
%S	16	0.15	0.16	0.14	0.15	0.16	0.16	0.17	0.18	0.17
	24	0.15	0.14	0.15	0.17	0.16	0.15	0.16	0.15	0.15
Cu mg/kg	16	5	6	5	5	6	6	6	6	6
	24	5	5	4	5	6	5	5	5	5
Zn mg/kg	16	17	20	16	21	20	20	20	20	20
	24	18	20	17	17	21	22	22	21	19
Fe mg/kg	16	152	182	214	181	134	138	142	135	152
	24	94	93	100	80	100	90	91	107	159
Mn mg/kg	16	99	109	104	103	94	88	100	103	102
	24	120	64	77	149	74	69	103	82	67

Week = Number of weeks since fertilising

Treatments:-

- (1) Control
- (2) Urea buried-row
- (3) Biodunder-row
- (4) Biodunder-interrow
- (5) Biodunder/urea-row
- (6) Biodunder/urea-interrow
- (7) Biodunder/Supergrow 20-row (urea buried 6 weeks later-row)
- (8) Biodunder/soluble fertiliser-row (urea buried 6 weeks later-row)
- (9) N P K one shot buried-row

Table 2(b)

Assays of first exposed dewlap leaves

Jenvey

Assay	Week	Treatment								
		1	2	3	4	5	6	7	8	9
%N	16	2.11	2.29	2.11	2.12	2.12	2.13	2.65	2.52	2.24
	24	1.36	1.58	1.47	1.32	1.39	1.50	1.57	1.67	1.52
%P	16	0.21	0.21	0.24	0.22	0.25	0.24	0.27	0.27	0.25
	24	0.19	0.21	0.19	0.18	0.18	0.20	0.20	0.20	0.20
%K	16	1.10	1.23	1.17	1.15	1.28	1.32	1.34	1.39	1.28
	24	1.03	1.04	1.02	1.02	1.03	1.05	1.14	1.09	1.12
%Ca	16	0.26	0.27	0.26	0.26	0.23	0.25	0.29	0.25	0.26
	24	0.25	0.27	0.23	0.21	0.23	0.25	0.22	0.25	0.21
%Mg	16	0.13	0.14	0.13	0.13	0.12	0.12	0.15	0.13	0.13
	24	0.11	0.11	0.10	0.10	0.11	0.11	0.11	0.12	0.11
%S	16	0.13	0.15	0.14	0.14	0.14	0.14	0.16	0.15	0.14
	24	0.12	0.13	0.12	0.11	0.12	0.13	0.12	0.13	0.12
Cu mg/kg	16	9	8	6	6	6	7	7	8	7
	24	4	5	5	4	5	5	5	6	5
Zn mg/kg	16	33	36	24	19	20	20	22	23	20
	24	19	18	17	19	17	18	17	17	22
Fe mg/kg	16	217	532	304	251	220	222	212	187	166
	24	128	90	96	82	71	115	85	98	100
Mn mg/kg	16	126	135	88	89	72	88	133	107	98
	24	37	49	37	31	33	43	44	47	38

Week = Number of weeks since fertilising

Treatments:-

- (1) Control
- (2) Urea buried-row
- (3) Biodunder-row
- (4) Biodunder-interrow
- (5) Biodunder/urea-row
- (6) Biodunder/urea-interrow
- (7) Biodunder/Supergrow 20-row (urea buried 6 weeks later-row)
- (8) Biodunder/soluble fertiliser-row (urea buried 6 weeks later-row)
- (9) N P K one shot buried-row

Table 2(c)

Assays of first exposed dewlap leaves

Harris

Assay	Week	Treatment								
		1	2	3	4	5	6	7	8	9
%N	16	1.60	2.10	1.66	1.66	1.60	1.86	2.01	1.86	2.20
	24	1.44	1.56	1.48	1.46	1.58	1.57	1.56	1.72	1.55
%P	16	0.25	0.27	0.23	0.23	0.21	0.25	0.24	0.22	0.26
	24	0.25	0.21	0.26	0.26	0.23	0.24	0.23	0.23	0.23
%K	16	1.17	1.15	1.19	1.17	1.18	1.20	1.32	1.18	1.51
	24	0.89	0.73	1.00	1.10	0.90	0.89	0.96	0.98	1.00
%Ca	16	0.22	0.26	0.22	0.19	0.17	0.24	0.24	0.21	0.19
	24	0.30	0.35	0.27	0.26	0.33	0.31	0.31	0.30	0.29
%Mg	16	0.16	0.22	0.14	0.13	0.15	0.18	0.17	0.15	0.15
	24	0.24	0.30	0.22	0.20	0.23	0.24	0.25	0.25	0.21
%S	16	0.13	0.15	0.13	0.12	0.12	0.14	0.15	0.13	0.15
	24	0.16	0.16	0.16	0.16	0.16	0.15	0.16	0.16	0.16
Cu mg/kg	16	5	7	6	6	5	6	7	6	8
	24	6	7	6	6	6	6	6	6	6
Zn mg/kg	16	19	23	18	23	20	19	22	20	22
	24	17	21	19	22	18	18	29	24	20
Fe mg/kg	16	134	290	275	162	177	190	142	123	238
	24	117	95	97	98	85	85	82	85	99
Mn mg/kg	16	114	200	138	123	106	161	176	138	224
	24	142	163	100	124	163	138	155	150	159

Week = Number of weeks since fertilising

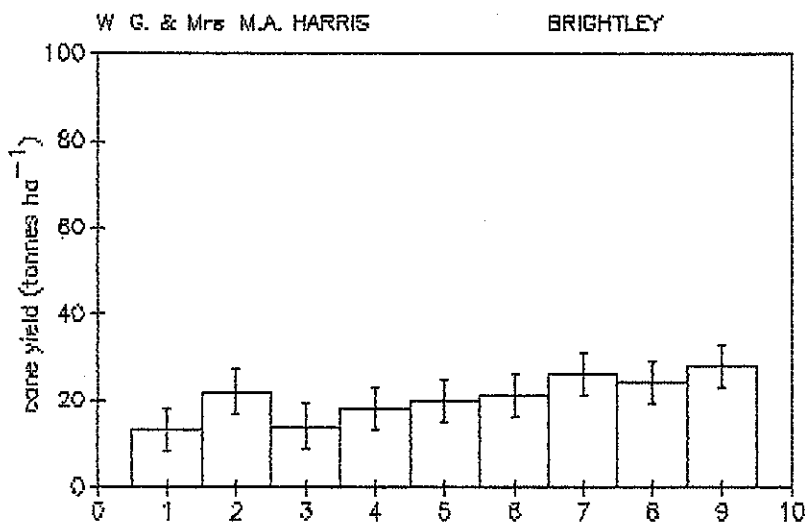
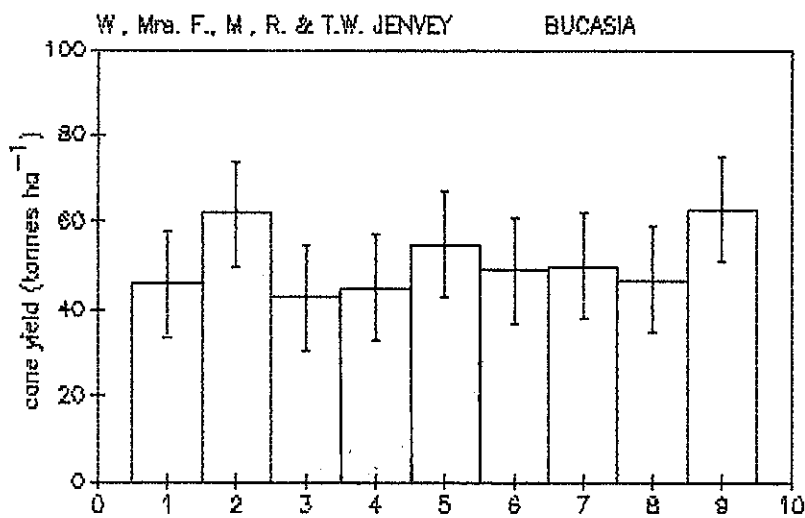
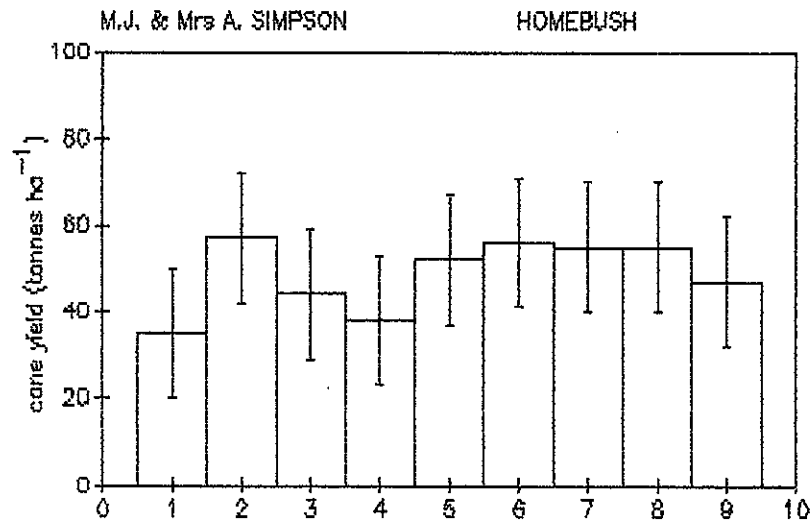
Treatments:-

- (1) Control
- (2) Urea buried-row
- (3) Biodunder-row
- (4) Biodunder-interrow
- (5) Biodunder/urea-row
- (6) Biodunder/urea-interrow
- (7) Biodunder/Supergrow 20-row (urea buried 6 weeks later-row)
- (8) Biodunder/soluble fertiliser-row (urea buried 6 weeks later-row)
- (9) N P K one shot buried-row

FIGURE 1

DUNDER ENRICHMENT TRIALS
TONNES CANE PER HECTARE

MACKAY 1991



bars=lsd(.05%)

- | | | |
|---------------------|-----------------------------|--------------------------------------------------------------|
| (1) control | (4) biolunder-interrow | (7) biolunder/supagrow 20 (urea buried 6 weeks later) |
| (2) urea buried-row | (5) biolunder/urea-row | (8) biolunder/soluble fertiliser (urea buried 8 weeks later) |
| (3) biolunder-row | (6) biolunder/urea-interrow | (9) N P K one shot buried-row |

SUPA GROW 20

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This high NITROGEN and PHOSPHOROUS (SUPER) product with "SUPASTART" cellburst organics added is designed to boost ratoons away to a SUPASTART".

Designed for use instead of D.A.P. this liquid 'High N.P' is applied directly over the stools to give a quicker available source of Nitrogen and Phosphorous plus cellburst 'Kelpak' and Organic Extract.

ADVANTAGES OF SUPAGROW '20' (N20-P10-K0-S2 + 12.5% Kelpak + 5% Organic Extract)

- * 1. EASY TO APPLY - Mix and spread with dunder or your own boom or aqua tank.
- * 2. QUICK TO ACT - The liquid penetrates the stools immediately through the trash weeks faster than dry fertilisers.
- * 3. LESS WASTAGE OF NUTRIENTS - This liquified form is already in a state that is immediately available to the roots of the stool. The liquid soaks into the stools and trash blanket and is not lost to the atmosphere.
- * 4. COST SAVING - apply with DUNDER in one operation and mix with herbicides at the same time. SAVE the whole cost of spreading or drilling D.A.P. or other plant mixes.
- * 5. PRICE -from (\$50/acre - \$125/ha) If usual D.A.P. use is 2 bags/acre then substitute 25L/ac - 62.5L/ha. 'SUPAGROW 20' @ \$2.00/L = \$50/ac or \$125/ha).
- * 6. ONE SHOT SUBSTITUTION - where previously one shot mixes of 5 1/2 bags/ac-12 bags/ha have been used SUSITUTE 40L/ac-100L/ha. Supagrow 20 with dunder or SupaGrow 22 KS (N22.P3. K22S5).Where dunder unavailable after harvest, side dress with min. 2 bags Urea before out of hand. This has shown to produce superior performance when trialled against dry "one shot" blends.

TRIALS IN AUSTRALIA AND OVERSEAS HAVE SHOWN THAT NUTRIENTS IN LIQUID FORM ARE MORE QUICKLY UPTAKEN AND USABLE THAN CONVENTIONAL DRY FERTILISERS INDICATIONS ARE THAT 'SUPAGROW 20' WILL PUT YOUR RATOONS WEEKS AHEAD OF THE REST. FAST ACTING ON EMERGED PLANT CANE TOO!!!

USE 'SUPAGROW 20' THIS SEASON - THE COST EFFECTIVE WAY TO SPEED YOUR RATOONS OR PLANT CANE OFF TO A ****SUPASTART***

IMPORTANT: SUPAGROW '20' is formulated to be a plant or ratoon mix. This preparation does not contain sufficient Nitrogen to be considered as a "one shot" mixture, therefore additional Nitrogen and sufficient Phosphorous and Potassium must be added before "out of hand" stage.

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— ORGANIC SOIL CONDITIONERS

A blend of liquid or granular humic acid and organic catalysts to assist your soil's microbiological activity. Helps unlock elements in heavily cropped or poor ground. Agrolig is an ideal addition to lime, dolomite or fertiliser.

— TRACE ELEMENT LIQUIDS

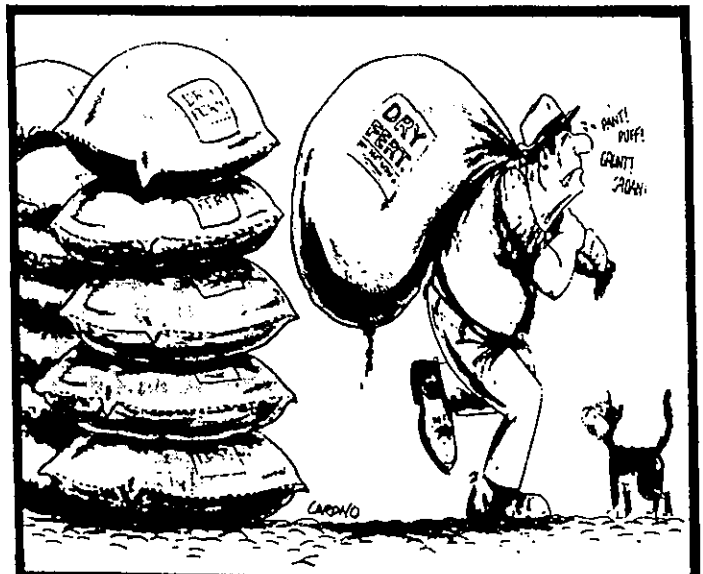
Liquid trace elements most in chelated form, for immediate uptake by the plant to correct deficiencies. High analysis combination trace elements in suspended form for ease of use and fast uptake.

— SUSPENSION FERTILISERS

The latest development in fertilisers. High analysis N.P.K. + T.E. + Kelpak + organics blended to a liquid suspension form which is both easily used and readily available for plant uptake.

— ANIMAL FEED SUPPLEMENT

Vitamin and mineral supplement in a liquid form — for all animals.



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1. *Produce swift decisive results.*
2. *Quick and easy to apply.*
3. *Give greater crop control to growers.*
4. *Promote increased yields.*
5. *Save time, labour and reduce costs.*
6. *Promote healthier more disease resistant crops by increasing root growth in our formulations containing "live" cellburst seaweed extract.*

**SUPA
CROP****HOW DO SUPA CROP FERTILIZERS WORK?**

Using the latest available technology and research, 'Supa Crop' formulations are manufactured using high quality food or technical grade ingredients, extremely suitable for liquid fertilizers, to produce purer nutrients that act quickly by passing into the sap system and rapidly translocated throughout the plant where it is most needed.

The uptake of nutrients is quicker and utilisation better.

No extended delay times are experienced, as occurs with dry fertilizers, for 'Supa Crop' to be uptaken by the plant. In this way applications of sufficient nutrients to promote strong healthy growth throughout the growing cycle of all crops can be controlled by the farmer, horticulturist or orchardist.

As an added bonus most 'Supa Crop' formulations contain a unique seaweed concentrate produced by the "cold process" method. This product is totally organic and non-toxic. Due to it's method of harvest, the seaweed product does not lose any of the spectrum of constituents since the original material does not become denatured by the use of heat, refrigeration or chemicals.

International trials have proved that this product encourages better root growth through increasing the natural micro-organism and Cytokinins therefore encouraging healthier crops with greater resistance to nematodes and disease.

The stimulated activity of 'Supa Crop' fertilizers creates a greater utilisation of accumulated and dormant fertilizers and in this way will assist an early establishment of a balanced soil condition with a corresponding vigorous plant growth.

When using the seaweed blend 'Supa Crop' formulations as a spray, nil filtration between the tank and outlet is recommended so that the natural composition of geletanious particles can be applied to the leaves and stems of the target plants. In this way the greatest benefit is received by the plants without blockage of spray jets.

All products are 100% soluble, easy to mix and apply as a root or foliar feeder, through any spray equipment without damage to flora or fauna, plant and equipment. Best results are obtained when 'Supa Crop' is applied as a foliar spray.

**SUPA
CROP****FOR A BETTER CROP USE****SUPA
CROP**

**SUPA
CROP****PUTS THE GROWER BACK IN CONTROL****SUPA
CROP**

With 'Supa Crops' large range of N.P.K. formulations, from high Nitrogen right through to high Potassium, the grower can control the growth and promote fruiting and colouring of most crops where necessary. Corrections to the nutrient balance can be quickly adjusted by merely varying rates of application or varying the N.P.K. from the 'Supa Crop' product range in most instances.

Better yields are obtained by giving the crop the correct balanced nutrient to suit it's particular phase of development.

Don't spend money applying fertilizer **before you need it** as is the case with all 'dry fertilizers.

For crops and areas suffering from specific "trace" element deficiencies we at 'Supa Crop' can increase the level of the element in question with a minimal amount of fuss and cost to the grower.

Remember - Plants have started to suffer deficiencies long before the symptoms are visible. Regular soil and leaf analysis are recommended to ensure the correction of any such deficiencies before they become a major problem.

'Supa Crop' liquid fertilizers are compatible with most weedicides, insecticides and fungicides. Thus saving on handling and application costs.

'Supa Crop' is not compatible with any petroleum based or alkaline materials such as Bordeaux, White Oil, D.C.Tron, Lime Sulphur and Mancozeb.

The possible "cocktails" that can be mixed through combinations of the hundreds of different products commonly available are endless. Combinations of three or four different preparations should be avoided where possible.

For the protection of your crop - when mixing 'Supa Crop' with chemicals other than water, always mix small quantities of the proposed mixture in a clean container. If the mixture precipitates, (falls out) goes cloudy or to a jelly like state **DO NOT MIX OR APPLY**. Consult your local distributor or the 'Supa Crop' factory.

When using Supa Crop for the first time or with a new or different chemical, always test spray a small area at least 24 hours before full application.

Never apply 'Supa Crop' at temperatures over 38° celsius (For best effect spray early in the morning - avoid spraying during heat of the day.)

**SUPA
CROP****..... MAKES THE DIRT WORK.**

Caution: With the use of Supa Crop with insecticides or weedicides, mix Supa Crop with required amount of water then add the necessary material. Agitate thoroughly and apply.


Always mix Supa Crop for daily application. Do not store mixed with water or other chemicals.

Note: Supa Crop liquids especially those high in "K" potassium have a high freezing point. Because of the high quantity of nutrients in suspensions with cold weather some crystallisation may occur. In winter store Supa Crop in a warm place.

**SUPA
CROP****AGRICHEM**

MANUFACTURING INDUSTRIES PTY LTD

WE HAVE MOVED:

FACTORY

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 Loganholme Q 4129
 P.O. Box 342 Springwood Q. 4127

Manufacturers of Agricultural and Domestic Liquid Fertilizer

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TELEPHONE: (07) 808 2464/808 3134

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FAX: (07) 808 4701

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BUREAU of Experiment Stations agronomy technician Mr Allan Royal applies measured quantities of dunder to a trial site near Homebush.