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Bureau of Sugar Experiment Stations

Division of Soils and Agriculture

FARM BULLETIN No. 7.

Farm Fertility Trials

and

Review of the Work of Experiment Stations

Results for the 1932 Season.

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REVIEW OF THE WORK OF EXPERIMENT STATIONS.

RESULTS FOR THE 1932 SEASON.

In presenting the results of the Farm Fertility Trials harvested during 1932, advantage is taken of the opportunity to review also the work of the past year on the Northern, Central, and Southern Experiment Stations. The results of plot experiments harvested on these Stations have already been recorded in the Annual Report of the Director, but as certain of them are of special interest, a detailed discussion of their more valuable features is again presented. Attention is directed particularly to those trials which aimed at determining the manurial value of molasses, and the possibilities of irrigation in those areas which are at present dependent on natural rainfall.

EXPERIMENT STATION RESULTS.

THE work of the Stations during the past year has provided us with some valuable and interesting results. This is particularly true of the trials harvested at South Johnstone.

Fertilizer Trials.

At that Station the recent results confirm our previous conclusions regarding the differential response to the three plant foods applied—Nitrogen (N), phosphoric acid (P), and potash (K), and have also provided further information regarding the amount of fertilizer per acre which may be applied profitably. We may summarise these results as follows:—

Plant crops show consistently good response to superphosphate applied in the drill with the cane plants. The response to potash on this soil is very slight, although a small amount added with the superphosphate does appear to have a definite influence on the c.c.s. of the cane. At the present juncture it appears that potash is instrumental in hastening maturity, even on soils of this nature which are fairly well supplied with this plant food in an available condition. This is an important point, which should be clearly appreciated by those growers who are in the habit of using "straight" superphosphate and dispensing with potash for both plant and ratoon crops, and it is of special significance in the case of cane crops which will be harvested early in the season.

As regards nitrogen, it has been demonstrated repeatedly that little increase in crop yield is experienced by the use of sulphate of ammonia on plant cane, provided a heavy leguminous crop has been ploughed under prior to planting. Where the land has been bare-fallowed this does not hold, and it is imperative that nitrogenous fertilizer be applied for maximum returns under these conditions.

For ratoons, the situation is rather similar to that observed with plant cane. The pronounced response to superphosphate is again recorded, while potash is also important only in its influence on maturity of the crop. With respect to nitrogen, the position demands special attention, for the response to this plant food is particularly marked. Even where green manuring has been practised, the influence of the bean crop has practically disappeared by ratooning time, and the use of sulphate of ammonia is essential for heavy crops. With second and subsequent ratoons the need for sulphate of ammonia becomes even more acute, and any deficiency in the supply of this material is accompanied by a serious reduction in crop yield.

With respect to the maximum economic application of fertilizer under these conditions, our data are as yet incomplete. The heaviest application of superphosphate at South Johnstone during the past season was 900 lb. per acre, and the fact that this dressing showed an increased yield of 3¾ tons of cane over that following a 600 lb. application, indicates that the heavier dressing may be given to advantage. So far we have failed to obtain any marked improvement from applications in excess of 100 lb. per acre of muriate of potash, even where heavy treatments with nitrogen and phosphates were applied. To date, the heaviest application of sulphate of ammonia has been 400 lb. per acre, and this dressing indicated clearly that increased applications of this material might well be applied to ratoons.

Bearing in mind that we are dealing *exclusively* with the acid alluvial loams of the Babinda-Innisfail-Tully areas, the following may be taken tentatively, as general fertilizer recommendations for soils of this type:—

Plant Cane.

(1) Drill Application.—500 lb. superphosphate and 100 lb. potash per acre.

(2) Top Dressing.—Following a heavy green manure crop, no further nitrogen need be applied. Where bare-fallowing is practised, 200 to 300 lb. per acre of sulphate of ammonia should be given; with a poor green manure crop 150 to 200 lb. per acre will show a profitable return.

Ratoon Cane.

(1) Ratooning Mixture.—100 lb. sulphate of ammonia, 500 lb. superphosphate, and 100 lb. potash per acre, applied in a furrow alongside the row of stools at ratooning time.

(2) Top Dressing.—On all blocks, from 400 to 600 lb. per acre of sulphate of ammonia should be applied. This should be given in two or three dressings, at three to four-week intervals.

Liming.

The profitable and marked increase in crop yield following the use of lime on these soils, suggests that 1 ton of burnt lime or 2 tons of crushed limestone (or earth lime) should be applied per acre, every time the land is in fallow. If in doubt regarding the need for lime, a soil sample should be forwarded to the Brisbane or South Johnstone laboratory, when definite advice will be given.

Value of Irrigation.

A small scale trial was carried out at South Johnstone to determine the maximum crop yield under conditions as nearly as possible ideal for cane growth. The results of this experiment were recorded in the January (1933) number of the "Queensland Agricultural Journal," to which growers should refer for full details. It should be clearly understood that the phenomenal crop yield obtained in this trial—144 tons of cane per acre—could not be realised under farm conditions; but there are many valuable deductions to be drawn from the investigation. The most important point is, that under the growing conditions normally experienced in our wettest districts, the crop suffers very appreciably from the dry conditions which occur between rainy spells; and the judicious application of irrigation water to maintain continuous growth is responsible for a very pronounced increase in cane yield. It appeared that December, with its long, hot days, was the month during which cane was produced at its maximum rate, but of course the crop could only take advantage of these conditions if it had reached its peak of leaf development and had commenced to make cane.

The marked superiority of April-planted cane over that planted in August was outstanding, and the reduction in crop yield due to the later planting leaves no doubt as to the advantages presented by the former practice. An interesting sidelight, which should appeal to growers in those localities where Top Rot incidence is acute, is the experience that the autumn-planted cane was not attacked, while the adjacent spring-plant was seriously injured. This is in complete confirmation of the advice of our Pathologists that, where possible, autumn planting offers one of the best means of control for this disease.

The whole of the evidence which this small trial presents is strongly in favour of the development of irrigation wherever facilities exist; and this is true for both the humid tropical areas and for the drier Central and Southern districts of uncertain rainfall. In these times of reduced crop values, the exploration of every avenue whereby costs of production may be reduced must be carefully considered, and it is felt that means for improving the supply of soil moisture offer the best prospects in this respect.

Varietal Trial.

The first competitive trial of Badila against P.O.J. 2878 ("Wonder Cane") was harvested during the past season. Present indications are that, though this variety may have a definite value on the poorer soils of the North, it possesses certain features which suggest that on first-class land, Badila is the superior cane. One objection which should be emphasised is the decided susceptibility of P.O.J. 2878 to Top Rot disease. In the trial blocks under discussion, the cane was seriously infected with this disease, and a heavy percentage of dead shoots was

recorded. The Badila was also moderately damaged. The cane out-yielded Badila, however, but the sugar content was decidedly inferior. The following is a summary of the returns:—

Variety.	Tons Cane Per Acre.	C.C.S. Per Cent.	Tons C.C.S. Per Acre.
Badila	34·2	15·85	5·44
P.O.J. 2878	39·9	14·0	5·60

A further trial with these varieties was planted during 1932, and the supplies of this cane which will be available in all areas this year, will afford an early opportunity of gauging the true worth of the "Wonder Cane" under the wide range of Queensland conditions.

Molasses as a Fertilizer.

Two years ago we presented the results obtained from the Bundaberg Station, following an application of molasses at the rate of 10 tons per acre on the red volcanic soil. The crop returns were as follows:—

Treatment.	Tons Cane Per Acre.	
	Plant Crop.	1st Ratoon Crop.
No treatment	22·7	15·7
10 tons molasses per acre	37·1	33·2

The total increase for the two crops was practically 32 tons of cane per acre, which demonstrates very clearly the definite manurial value of this by-product.

It is well known that the red volcanic soils of this State respond freely to heavy applications of potash-rich fertilizer; and as the chief manurial constituent of molasses is potash, it was thought that our alluvial soils might not show such flattering returns. An attempt was made to verify these suggestions during the past year. Trials were set out both at South Johnstone and at Mackay, and in each case molasses was applied at the rate of 10 tons per acre. A further comparative treatment was introduced by applying the same quantity of plant food in the form of common fertilizer constituents—sulphate of ammonia, superphosphate, and sulphate of potash. The object of this treatment was to determine whether molasses possessed any further virtues which contributed to the increased crop yields. The following are the results for the plant crops:—

Station.	No Treatment.	10 Tons Molasses per Acre.	Plant Food Equivalent to 10 Tons Molasses.
	Tons.	Tons.	Tons.
Mackay	17·7	23·7	25·6
South Johnstone	28·4	41·3	38·3

The results demonstrate conclusively that molasses is of value as a manure on a wide range of soils. On the South Johnstone alluvial, an increased yield of 13 tons per acre was recorded, and with an indifferent season at Mackay the yield was improved to the extent of 6 tons of cane per acre. The comparison with the fertilizer treatment is indefinite, and the ratoon crop results will be looked for with interest.

There can be no question that the application of molasses to the soil is the best available method of disposing of our surplus production of this by-product. Certainly the material has a definite fuel value, and though the furnace ash obtained in this way contains much of the phosphate and potash derived from the molasses, the valuable nitrogen is entirely lost, and the average content of this plant food confers upon the molasses a manurial value of about 10s. per ton. With the improved methods of transportation and spreading of the material on the field, it is anticipated that in the very near future the demand for this by-product will far exceed the supply. The results obtained from our experiments would certainly justify such a conclusion.

Central and Southern Stations.

It is regretted that the results from field trials at Mackay and Bundaberg during the past year have been disappointing. At Mackay, the unfavourable season, coupled with a heavy infestation of Pentodon beetles, nullified most of our efforts; while at Bundaberg all crops were practically a complete failure due to the unprecedented drought conditions which prevailed throughout the year.

FARM FERTILITY EXPERIMENTS.

The trials harvested during 1932 provide the third series since the inauguration of the farm plot scheme. A continuation of favourable conditions in the Far North enabled us to secure further valuable data; our knowledge of the general needs of the main soil types of those parts is now fairly definite, and we are able to offer advice regarding fertilizer treatments with a high degree of confidence. It was pointed out in earlier discussions of this work that our first aim was to determine the relative importance of the three plant foods—Nitrogen (N), phosphoric acid (P), and potash (K) on the major soil types. The early trials might then be called *qualitative* experiments. Having determined the relative need for these constituents we must consider the amount of each which may be applied profitably. This leads to the so-called *quantitative* trials, two of which were harvested in the Northern districts last year. In the future, the bulk of the trials will be of this nature.

The results from the Mackay area were again disappointing, due in a large measure to the unfavourable season experienced. This is not preferred as an excuse for the failure of the applied fertilizer to show conclusive results. Unquestionably, good and bad years must be considered in evolving an economic manuring programme; but the seasonal conditions of the past three years have been so adverse that many of the trials set out have failed to show payable results, and the grower is susceptible to the deduction that fertilizing is not necessary. This reasoning is, of course, quite incorrect. The fact is, that under the conditions of the experiment inadequate soil moisture is the most serious factor limiting crop production; as a consequence, it frequently happens

that the available plant food supply of the soil is sufficient for the modest needs of the small crop, and the added manure has but slight influence. The ratoons during a poor season, following a light plant crop of the previous adverse year, are practically devoid of vitality, and the crop is frequently a failure.

It is important that these facts be kept clearly in mind, for our knowledge of the old lands of this area tells us that they are essentially very poorly supplied with the necessary plant foods, and even the light crops which are harvested will still further deplete the supply, if fertilizers are not applied. At the same time, the financial difficulties frequently involved under these conditions are definitely appreciated; but there is no side-stepping the fact that these lands cannot continue to remain under cane unless careful attention is paid to the maintenance of soil fertility. The obvious solution to the problem is the provision of an adequate water supply to the crop, to enable it to maintain steady growth through dry seasons, when the benefits of manurial applications would be outstanding.

Similar remarks apply to many of the lands of the Bundaberg area. The drought conditions experienced there during 1932 were such as to render all trials worthless and none were harvested as a consequence.

GENERAL DEDUCTIONS FROM FARM PLOT RESULTS.

(1) *Northern Districts.*

For those areas where our results have been adequately substantiated, we are now in a position to offer tentative suggestions regarding suitable fertilizer treatments. These are purely of a general nature, but should serve to indicate whether growers farming the respective soil types are employing fertilizer mixtures which conform with the demands of the soil, as demonstrated by our field experiments.

Under the discussion of Experiment Station results, definite recommendations were laid down for the *acid alluvial* soils of the Far North. These constitute some of the most productive lands of those areas, but heavy fertilization is essential to high crop yields and the maintenance of fertility.

The *red volcanic* lands which occur in these parts are characterised by a marked deficiency in their supply of available potash. This fact has been amply demonstrated by results recorded both here and in previous bulletins. During the past season, a quantitative potash trial was harvested from the farm of Mr. H. J. Thomas, Bartle Frere, the results of which will be found on page 74. The yields indicate that up to 400 lb. per acre of muriate of potash may be applied with profitable results. This is of interest in connection with so-called potash-rich fertilizer used by growers on this soil type. Even employing a mixture with 12 per cent. potash, it would be necessary to apply practically 1,600 lb. per acre to provide potash equivalent to the above. A suitable drill or ratoon mixture for these conditions is 300 lb. meatworks and 300 lb. muriate of potash per acre; or, alternatively, a mixture of similar proportions of potash and superphosphate. The latter mixture would not carry or store well, but would be quite satisfactory if prepared immediately before use.

These soils will also require subsequent top dressings of sulphate of ammonia as was emphasised when discussing the alluvial soils; that is, from 100 to 400 lb. per acre for plant and ratoons, applying particularly heavy dressings to old ratoons.

In passing, it might be mentioned that we have very definite indications that adequate potash dressings will result in improved c.c.s. returns from crops grown on these red volcanic loams. This is of special interest, for crops from these lands show consistently low sugar content. The problem will be studied more intensively during the coming season, when it is hoped that conclusive evidence will be forthcoming.

The *red and brown schist* soils are the third important series in the Northern areas, and these do not present the same consistent results which characterise our trials on the types already discussed. Sometimes we find pronounced response to phosphate, while again potash is more seriously lacking. Until definite conclusions can be drawn, it is suggested that in general, the following mixture may be employed as a drill or ratoon application:—300 lb. superphosphate and 150 lb. muriate of potash per acre. Again subsequent top dressings with sulphate of ammonia are needed, and we have recorded several instances where in the absence of nitrogenous manures, ratoon crops have been practically failures. Evidence of the value of added nitrogen is presented in the summary of results found on pages 72 and 73. These returns suggest that 400 lb. per acre of sulphate of ammonia would be a satisfactory top dressing for ratoons. This would, of course, be spread in two applications at four to six week intervals.

The fourth important soil type of the Northern districts is the *gravelly loam* of the Tully-Babinda areas. These soils must be regarded as decidedly deficient in plant-food content; yet it is found that where the soil is properly treated, it is capable of yielding 45-ton ratoon crops of Badila. In Tully, it has been the practice to fertilize these lands almost from the first crop, and the wisdom of the policy is clearly evident. It is obvious that this soil type is practically devoid of humus, and, therefore, of the essential plant-food nitrogen. This is borne out by the outstanding response to applications of this plant food. Of the fields so far submitted to plot trial, none is more than a few years old, and in every instance the land has just been brought under the plough. This probably explains the fact that phosphates and potash produce but slight influence on the cane yields as yet; but it is certain that these foods will shortly enter as limiting factors; and growers are advised to forestall the problem by the consistent use of adequate mixed fertilizer. The following drill or ratoon dressing may be taken as suitable:—400 lb. superphosphate and 100 lb. muriate of potash per acre.

As regards the weight per acre of sulphate of ammonia, which should be applied for maximum economic yields, the results from the plot on Messrs. Spencer Brothers' farm (see page 78) should be examined. They show that an application of 400 lb. of sulphate of ammonia increased the yield by 2·66 tons of cane per acre over that from the 200-lb. dressing; and when it is remembered that this particular block is but little removed from the virgin state, 400 to 500 lb. per acre of this fertilizer might be regarded as a reasonable dressing for ratoon

crops on soils of this type. For the plant, from 200 to 400 lb. are recommended, if green manuring has not been practised. Where beans or peas have been ploughed under, this dressing would be reduced accordingly.

(2) *Burdekin Area.*

The results of trials harvested in this area during the past year confirm our previous conclusions. The increased returns from sulphate of ammonia have been outstanding, and it is now conceded by experienced growers that the use of nitrogenous manures has done much towards solving the ratooning problems in that area. We are unable to base recommendations for mixed fertilizer on the results of our field trials to date, but it is suggested that a balanced mixture of phosphate and potash, applied at the rate of 300 to 400 lb. per acre, will help to maintain the fertility of these lands. The subsequent dressings of sulphate of ammonia are all-important, and for successful ratoons, several light dressings early in the lifetime of the crop are absolutely essential. Observation trials indicate that three dressings, each from 150 to 200 lb. per acre, will provide the nitrogen for a heavy ratoon crop.

Basis for Calculation of Value of Crop Returns.

It is as yet too early to determine the net value of the sugar for the past year's crop, but present indications are that it will approximate £18 15s. per ton. This figure has, therefore, been taken as a basis for our calculations. Fertilizer costs are based on current quotations, and full allowance has been made for freight charges to the respective districts.

The cost of fertilizer application has again been reckoned at 10s. per acre.

NORTHERN DIVISION.

The results recorded for the Northern areas (Mossman to Tully) show outstanding benefits from the use of fertilizers. Considering the returns from the fourteen plots here recorded, we find the following average yields from the unfertilized plots and those receiving complete mixtures:—

	Per acre. Tons.
Unfertilized plots	23·9
"Complete fertilizer" plots	32·5
Average increase from fertilizer	8·6

There can be no doubt as to the value of fertilizers, judiciously employed, as an aid in reducing production costs; and, further, the rapid falling off in yields from plant to ratoon crop where fertilizer is not applied, makes it clearly evident that large additions of plant food are necessary for the maintenance of fertility.

Location.—**Messrs. Coulthard and Cox's farm, Saltwater, Mossmann.**

Soil Type.—Alluvial soil; very acid and of characteristic bleached colour.

Variety.—HQ 426. Age of crop—Ten months. Nature of crop—First ratoon.

RESULTS.

—	No Fertilizer.	280 lb. Sulphate of Ammonia + 400 lb. Superphosphate.	280 lb. Sulphate of Ammonia + 200 lb. Potash.	400 lb. Superphosphate + 200 lb. Potash.	280 lb. Sulphate of Ammonia + 400 lb. Superphosphate + 200 lb. Potash.
Tons cane per acre	12·0	16·4	19·7	11·3	18·8
C.C.S. in cane	16·5%	16·5%	16·2%	16·5%	15·9%
Value of crop	£25 16 0	£35 6 0	£41 8 0	£24 6 0	£38 11 0
Less harvesting costs	£4 18 0	£5 18 0	£7 1 0	£4 18 0	£6 15 0
Return	£20 18 0	£29 8 0	£34 7 0	£19 8 0	£31 16 0
Increased or decreased return due to fertilizer	..	Increased. £8 10 0	Increased. £13 9 0	Decreased. £1 10 0	Increased. £10 18 0
Cost of fertilizer and application ..	..	£3 2 0	£3 10 0	£3 6 0	£4 14 0
Profit or loss from fertilizer ..	..	Profit. £5 8 0	Profit. £9 19 0	Loss. £4 16 0	Profit. £6 4 0

The results from the ratoon crop follow those from the plant crop very closely. Sulphate of ammonia was again responsible for a marked increase in yield, and the returns also suggest a potash deficiency. Response to sulphate of ammonia has been observed consistently for all plot trials at Mossman, and these gains indicate the benefits to be derived from green manuring in this area.

Location.—**J. Rice's farm, Redlynch, Cairns.**

Soil Type.—Red schist soil on gentle slope.

Variety.—Badila. Age of crop—Thirteen months. Nature of crop—Plant cane.

RESULTS.

—	No Fertilizer.	250 lb. Sulphate of Ammonia + 300 lb. Super-phosphate.	250 lb. Sulphate of Ammonia + 200 lb. Potash.	300 lb. Super-phosphate + 200 lb. Potash.	250 lb. Sulphate of Ammonia + 300 lb. Super-phosphate + 200 lb. Potash.
Tons cane per acre	23·5	28·1	23·6	26·8	26·1
Value of crop	£38 16 0	£46 7 0	£38 19 0	£44 4 0	£43 1 0
Less harvesting costs	£9 0 0	£10 16 0	£9 1 0	£10 6 0	£10 0 0
Return	£29 16 0	£35 11 0	£29 18 0	£33 18 0	£33 1 0
Increased return due to fertilizer	..	£5 15 0	£0 2 0	£4 2 0	£3 5 0
Cost of fertilizer and application	..	£2 13 0	£3 7 0	£3 0 0	£4 5 0
Profit or loss from fertilizer	..	Profit. £3 2 0	Loss. £3 5 0	Profit. £1 2 0	Loss. £1 0 0

Certain plots in this trial were, unfortunately, damaged by grubs. Until this time, undoubted response to superphosphate could be observed.

Location.—**W. W. Chapman's farm, Hambledon.**

Soil Type.—Red schist soil on gentle slope.

Variety.—Badila. Age of crop—Thirteen months. Nature of crop—First ratoon.

RESULTS.

—	No Fertilizer.	360 lb. Sulphate of Ammonia + 360 lb. Super-phosphate.	360 lb. Sulphate of Ammonia + 200 lb. Potash.	360 lb. Super-phosphate + 200 lb. Potash.	360 lb. Sulphate of Ammonia + 360 lb. Super-phosphate + 200 lb. Potash.
Tons cane per acre	12·9	23·3	28·8	14·9	27·6
Value of crop	£21 6 0	£38 9 0	£47 10 0	£24 12 0	£45 11 0
Less harvesting costs	£5 12 0	£8 19 0	£11 1 0	£5 18 0	£10 12 0
Return	£15 14 0	£29 10 0	£36 9 0	£18 14 0	£34 19 0
Increased return due to fertilizer	..	£13 16 0	£20 15 0	£3 0 0	£19 5 0
Cost of fertilizer and application	..	£3 8 0	£3 18 0	£3 4 0	£5 0 0
Profit or loss from fertilizer	..	Profit. £10 8 0	Profit. £16 17 0	Loss. £0 4 0	Profit. £14 5 0

The increased yield on all plots receiving sulphate of ammonia is very striking. There was also a definite response to potash, but not to superphosphate. This trial is being continued to the second ratoon crop, and it will be of interest to follow the yields on those plots where nitrogen is withheld.

Location.—**G. Cole's farm, Edmonton.**

Soil Type.—Schist soil.

Variety.—Q 813. Age of crop—Twelve months. Nature of crop—First ratoon.

RESULTS.

—	No Fertilizer.	240 lb. Sulphate of Ammonia + 450 lb. Super-phosphate.	240 lb. Sulphate of Ammonia + 200 lb. Potash.	450 lb. Super-phosphate + 200 lb. Potash.	240 lb. Sulphate of Ammonia + 450 lb. Super-phosphate + 200 lb. Potash.
Tons cane per acre	13·3	22·8	18·4	19·6	23·1
Value of crop	£21 19 0	£37 12 0	£30 7 0	£32 7 0	£38 2 0
Less harvesting costs	£5 9 0	£8 15 0	£7 1 0	£7 10 0	£8 17 0
Return	£16 10 0	£28 17 0	£23 6 0	£24 17 0	£29 5 0
Increased return due to fertilizer	..	£12 7 0	£6 16 0	£8 7 0	£12 15 0
Cost of fertilizer and application	..	£3 1 0	£3 6 0	£3 9 0	£4 13 0
Profit from fertilizer	..	£9 6 0	£3 10 0	£4 18 0	£8 2 0

This trial was commenced with the first ratoons, and the consistent response to sulphate of ammonia on the schist soil is again most definite. On this block superphosphate showed an increased yield, with little response to potash.

Location.—**M. Feldman's farm, McDonnell Creek, Babinda.**

Soil Type.—Gravelly loam (granitic).

Variety.—Black Innis. Age of crop—Twelve months. Nature of crop—Plant cane.

RESULTS.

—	No Fertilizer.	360 lb. Sulphate of Ammonia + 360 lb. Super-phosphate.	360 lb. Sulphate of Ammonia + 210 lb. Potash.	360 lb. Super-phosphate + 210 lb. Potash.	360 lb. Sulphate of Ammonia + 360 lb. Super-phosphate + 210 lb. Potash.
Tons cane per acre	17·2	22·2	22·9	18·1	22·4
C.C.S. in cane	12·8%	11·8%	11·6%	12·8%	11·5%
Value of crop	£26 4 0	£30 2 0	£30 6 0	£27 11 0	£29 5 0
Less harvesting costs	£6 12 0	£8 10 0	£8 16 0	£6 19 0	£8 12 0
Return	£19 12 0	£21 12 0	£21 10 0	£20 12 0	£20 13 0
Increased return due to fertilizer	..	£2 0 0	£1 18 0	£1 0 0	£1 1 0
Cost of fertilizer and application	..	£2 18 0	£3 18 0	£3 5 0	£5 1 0
Loss from fertilizer	..	£0 18 0	£2 0 0	£2 5 0	£4 0 0

Though a definite increase in crop yield was effected by fertilizer, the block was harvested so early in the season that the manured cane was quite immature, and therefore losses were shown for all treatments. The need for heavy dressings of sulphate of ammonia on the gravelly loams of the North was again demonstrated on this trial block.

Location.—**J. H. Jackson's farm, Babinda.**

Soil Type.—Gravelly loam (granitic).

Variety.—Badila. Age of crop—Thirteen months. Nature of crop—First ratoon.

RESULTS.

——	No Fertilizer.	240 lb. Sulphate of Ammonia + 360 lb. Superphosphate.	240 lb. Sulphate of Ammonia + 140 lb. Potash.	360 lb. Superphosphate + 140 lb. Potash.	240 lb. Sulphate of Ammonia + 360 lb. Superphosphate + 140 lb. Potash.
Tons cane per acre	29·6	35·4	36·8	29·1	38·0
C.C.S. in cane	16·2%	17·1%	16·4%	15·8%	16·4%
Value of crop	£62 3 0	£79 13 0	£78 11 0	£59 2 0	£81 2 0
Less harvesting costs	£11 7 0	£13 12 0	£14 2 0	£11 3 0	£14 11 0
Return	£50 16 0	£66 1 0	£64 9 0	£47 19 0	£66 11 0
Increased or decreased return due to fertilizer	..	Increased. £15 5 0	Increased. £13 13 0	Decreased. £2 17 0	Increased. £15 15 0
Cost of fertilizer and application	..	£2 16 0	£2 16 0	£2 15 0	£3 18 0
Profit or loss from fertilizer	..	Profit. £12 9 0	Profit. £10 17 0	Loss. £5 12 0	Profit. £11 17 0

On the plant crop sulphate of ammonia produced an increased yield of 5 tons of cane per acre; on the subsequent first ratoons the increase was 9 tons per acre. It is interesting to note that the plots receiving a complete manure averaged 40·4 tons of cane for the plant crop, and 38·0 tons for the ratoons. These results clearly demonstrate the value of manures in maintaining the productive capacity of land of this soil type.

Location.—**H. J. Thomas's farm, Bartle Frere, Babinda**

Soil Type.—Red volcanic loam.

Variety.—Badila. Age of crop—Twelve months. Nature of crop—Plant cane.

RESULTS.

——	All Plots received {300 lb. Sulphate of Ammonia / 300 lb. Superphosphate} plus—				
	No Potash.	100 lb. Muriate of Potash.	200 lb. Muriate of Potash.	300 lb. Muriate of Potash.	400 lb. Muriate of Potash.
Tons cane per acre	27·7	31·5	33·4	34·5	35·5
C.C.S. in cane	13·9%	14·2%	14·0%	14·2%	13·9%
Value of crop	£47 8 0	£55 11 0	£57 15 0	£60 16 0	£60 16 0
Less harvesting costs	£10 12 0	£12 2 0	£12 16 0	£13 5 0	£13 12 0
Return	£36 16 0	£43 9 0	£44 19 0	£47 11 0	£47 4 0
Increased return due to fertilizer	..	£6 13 0	£8 3 0	£10 15 0	£10 8 0
Cost of fertilizer and application	..	£1 6 0	£2 2 0	£2 18 0	£3 14 0
Profit from fertilizer	..	£5 7 0	£6 1 0	£7 17 0	£6 14 0

This trial marks the first attempt at a "quantitative" experiment on the red volcanic loam. The potash dressings showed progressively increasing profits up to the 300 lb. per acre application. It was found also that the crop was over-mature at harvesting—particularly with the heavier potash dressings. In all probability a very definite improvement in the c.c.s. value of the cane would have been experienced had the crop been harvested earlier. This influence will be studied in detail on the ratoons.

Location.—**L. Grima's farm, Mundoo, Innisfail.**

Soil Type.—Highly leached mixed soil—alluvial and volcanic.

Variety.—Pompey. Age of crop—Fifteen months. Nature of crop—Plant cane.

RESULTS.

——	No Fertilizer.	300 lb. Sulphate of Ammonia + 500 lb. Superphosphate.	300 lb. Sulphate of Ammonia + 250 lb. Potash.	500 lb. Superphosphate + 250 lb. Potash.	300 lb. Sulphate of Ammonia + 500 lb. Superphosphate + 250 lb. Potash.
Tons cane per acre	20·5	31·6	29·0	33·7	35·3
Value of crop	£33 17 0	£52 3 0	£47 17 0	£55 12 0	£58 5 0
Less harvesting costs	£7 17 0	£12 2 0	£11 2 0	£12 18 0	£13 11 0
Return	£26 0 0	£40 1 0	£36 15 0	£42 14 0	£44 14 0
Increased return due to fertilizer	..	£14 1 0	£10 15 0	£16 14 0	£18 14 0
Cost of fertilizer and application	..	£3 10 0	£4 0 0	£4 0 0	£4 10 0
Profit from fertilizer	..	£10 11 0	£6 15 0	£12 14 0	£14 4 0

The selected block is typical of much of the Mundoo area—a highly leached soil of markedly low productivity. This trial demonstrates conclusively the nature of this deficiency, and heavy applications of phosphate and potash produced very definite results. A crop of legumes was ploughed under prior to the planting of the cane; this probably accounts for the slight increase in yield from sulphate of ammonia.

Location.—**B. B. Ross's farm, Mourilyan.**

Soil Type.—Acid alluvial soil of Johnstone River.

Variety.—Badila. Age of crop—Fourteen months. Nature of crop—Plant cane.

RESULTS.

——	No Fertilizer.	240 lb. Sulphate of Ammonia + 360 lb. Superphosphate.	240 lb. Sulphate of Ammonia + 120 lb. Potash.	360 lb. Superphosphate + 120 lb. Potash.	240 lb. Sulphate of Ammonia + 360 lb. Superphosphate + 120 lb. Potash.
Tons cane per acre	38·4	44·2	41·3	42·4	45·1
C.C.S. in cane	12·7%	12·7%	12·7%	13·2%	13·4%
Value of crop	£57 17 0	£66 11 0	£62 4 0	£63 17 0	£67 18 0
Less harvesting costs	£14 15 0	£16 19 0	£15 17 0	£16 5 0	£17 6 0
Return	£43 2 0	£49 12 0	£46 7 0	£47 12 0	£50 12 0
Increased return due to fertilizer	..	£6 10 0	£3 5 0	£4 10 0	£7 10 0
Cost of fertilizer and application	..	£2 16 0	£2 13 0	£2 12 0	£3 16 0
Profit from fertilizer	..	£3 14 0	£0 12 0	£1 18 0	£3 14 0

This typical alluvial soil had been green-manured and limed prior to planting. Superphosphate was responsible for a yield increase of 3·8 tons of cane per acre, and, in spite of the green manure, sulphate of ammonia produced an added 2·7 tons. The influence of the potash appears to be confined to earlier maturity, as shown by the improved c.c.s. values recorded in the last two treatments.

Location.—**G. Marano's farm, Mourilyan.**

Soil Type.—Grey, sandy soil.

Variety.—Badila. Age of crop—Sixteen months. Nature of crop—Plant cane.

RESULTS.

——	No Fertilizer.	240 lb. Sulphate of Ammonia + 360 lb. Superphosphate.	240 lb. Sulphate of Ammonia + 210 lb. Potash.	360 lb. Superphosphate + 210 lb. Potash.	240 lb. Sulphate of Ammonia + 360 lb. Superphosphate + 210 lb. Potash.
Tons cane per acre	22·2	29·9	26·7	23·6	28·7
Value of crop	£39 19 0	£53 16 0	£48 1 0	£42 10 0	£51 13 0
Less harvesting costs	£8 10 0	£11 9 0	£10 5 0	£9 1 0	£11 0 0
Return	£31 9 0	£42 7 0	£37 16 0	£33 9 0	£40 13 0
Increased return due to fertilizer	..	£10 18 0	£6 7 0	£2 0 0	£9 4 0
Cost of fertilizer and application	..	£2 16 0	£3 7 0	£3 6 0	£5 0 0
Profit or loss from fertilizer	..	Profit. £8 2 0	Profit. £3 0 0	Loss. £1 6 0	Profit. £4 4 0

The soil type of this block is the characteristic sand which is cultivated in parts of the area. The particular field had just been brought under the plough. As would be expected on a soil so deficient in humus, nitrogenous fertilizer produced good results; superphosphate showed a gain of 2 tons of cane per acre, but potash was without influence. The ratoon crop might be expected to furnish very interesting results; this is certainly a soil on which heavy fertilizer dressings must be applied consistently to maintain its productivity.

Location.—**H. E. and M. P. Lever's farm, South Johnstone (late Adams Bros.).**

Soil Type.—Red schist soil, gentle slope.

Variety.—Badila. Age of crop—Fifteen months. Nature of crop—Plant cane.

RESULTS.

——	No Fertilizer.	300 lb. Sulphate of Ammonia + 400 lb. Superphosphate.	300 lb. Sulphate of Ammonia + 200 lb. Potash.	400 lb. Superphosphate + 200 lb. Potash.	300 lb. Sulphate of Ammonia + 400 lb. Superphosphate + 200 lb. Potash.
Tons cane per acre	19·8	30·3	24·1	31·2	34·2
C.C.S. in cane	15·4%	14·7%	15·6%	14·8%	15·0%
Value of crop	£38 18 0	£56 0 0	£48 3 0	£58 3 0	£64 17 0
Less harvesting costs	£7 12 0	£11 12 0	£9 5 0	£11 19 0	£13 2 0
Return	£31 6 0	£44 8 0	£38 18 0	£46 4 0	£51 15 0
Increased return due to fertilizer	..	£13 2 0	£7 12 0	£14 8 0	£20 9 0
Cost of fertilizer and application	..	£3 4 0	£3 12 0	£3 6 0	£4 16 0
Profit from fertilizer	..	£9 18 0	£4 0 0	£11 2 0	£15 13 0

The soil of this block furnishes an excellent example of the schist soil highly deficient in available phosphates. The increase in yield due to superphosphate was 10 tons per acre, while potash was responsible for further 4 tons of cane, and sulphate of ammonia for 3 tons. This is undoubtedly a soil on which consistently heavy fertilizer applications are needed to build up its fertility.

Location.—**F. N. King's farm, Jaffa.**

Soil Type.—Gravelly loam (granitic).

Variety.—Badila. Age of crop—Thirteen months. Nature of crop—First ratoon.

RESULTS.

——	No Fertilizer.	250 lb. Sulphate of Ammonia + 375 lb. Superphosphate.	250 lb. Sulphate of Ammonia + 175 lb. Potash.	375 lb. Superphosphate + 175 lb. Potash.	250 lb. Sulphate of Ammonia + 375 lb. Superphosphate + 175 lb. Potash.
Tons cane per acre	34·4	42·1	37·8	37·7	44·2
C.C.S. in cane	16·6%	15·8%	16·5%	16·4%	16·3%
Value of crop	£74 12 0	£85 11 0	£81 6 0	£80 9 0	£93 12 0
Less harvesting costs	£13 4 0	£16 3 0	£14 10 0	£14 9 0	£16 19 0
Return	£61 8 0	£69 8 0	£66 16 0	£66 0 0	£76 13 0
Increased return due to fertilizer	..	£8 0 0	£5 8 0	£4 12 0	£15 5 0
Cost of fertilizer and application	..	£2 17 0	£3 3 0	£3 1 0	£4 5 0
Profit from fertilizer	..	£5 3 0	£2 5 0	£1 11 0	£11 0 0

The plant crop from this block followed immediately after "stumping"; each treatment failed to show a profitable increase on that crop, but the position is decidedly different for the first ratoons. Both superphosphate and sulphate of ammonia contributed equally to the increase, and these results demonstrate very clearly the rapid rate at which the plant-food supply of this soil type is depleted. It is interesting to note that the first ratoon plots receiving complete fertilizer actually outyielded those of the plant crop.

Location.—**A. Cousin's farm, Feluga, Tully.**

Soil Type.—Gravelly loam (granitic).

Variety.—Badila. Age of crop—Eleven and a-half months. Nature of crop—First ratoon.

RESULTS.

——	No Fertilizer.	240 lb. Sulphate of Ammonia + 360 lb. Superphosphate.	240 lb. Sulphate of Ammonia + 180 lb. Potash.	360 lb. Superphosphate + 180 lb. Potash.	240 lb. Sulphate of Ammonia + 360 lb. Superphosphate + 180 lb. Potash.
Tons cane per acre	25·6	34·8	29·9	34·3	31·6
C.C.S. in cane	15·7%	15·2%	15·4%	15·3%	15·3%
Value of crop	£51 11 0	£67 3 0	£58 14 0	£66 16 0	£61 11 0
Less harvesting costs	£9 16 0	£13 7 0	£11 9 0	£13 3 0	£12 2 0
Return	£41 15 0	£53 16 0	£47 5 0	£53 13 0	£49 9 0
Increased return due to fertilizer	..	£12 1 0	£5 10 0	£11 18 0	£7 14 0
Cost of fertilizer and application	..	£2 16 0	£3 3 0	£3 2 0	£4 5 0
Profit from fertilizer	..	£9 5 0	£2 7 0	£8 16 0	£3 9 0

The influence of soil variability again entered to vitiate the results of this trial, but there is a definite over-all increase from fertilizer.

Location.—**H. Spencer's farm, Feluga, Tully.**

Soil Type.—Gravelly loam (granitic).

Variety.—Badila. Age of crop—Twelve months. Nature of crop—Plant cane.

RESULTS.

—	All Plots received 100 lb. potash: in addition—				
	No Further Fertilizer.	200 lb. Sulphate of Ammonia + 250 lb. Super-phosphate.	200 lb. Sulphate of Ammonia + 500 lb. Super-phosphate.	400 lb. Sulphate of Ammonia + 250 lb. Super-phosphate.	400 lb. Sulphate of Ammonia + 500 lb. Super-phosphate.
Tons cane per acre	36·8	41·1	41·7	43·8	44·4
C.C.S. in cane	14·3%	14·6%	14·7%	14·2%	14·1%
Value of crop	£65 10 0	£75 5 0	£77 1 0	£77 4 0	£77 10 0
Less harvesting costs	£14 2 0	£15 15 0	£16 0 0	£16 16 0	£17 0 0
Return	£51 8 0	£59 10 0	£61 1 0	£60 8 0	£60 10 0
Increased return due to fertilizer	..	£8 2 0	£9 13 0	£9 0 0	£9 2 0
Cost of fertilizer and application	..	£2 5 0	£3 0 0	£3 4 0	£3 19 0
Profit from fertilizer	..	£5 17 0	£6 13 0	£5 16 0	£5 3 0

This "quantitative" trial on the gravelly loam has provided very interesting data. The extra 200 lb. of sulphate of ammonia and 250 lb. of superphosphate have produced increased yields of 2·7 and 0·6 tons of cane respectively. The results suggest that the double dressing of sulphate of ammonia is warranted, but that 250 lb. of superphosphate approximates to the optimum application of this manure. The results of the second ratoons may be expected to supply further valuable information on this point.

BURDEKIN DISTRICT.

The results of the farm trials recorded below, provide unmistakeable evidence of the need for added nitrogenous fertilizers on the irrigated soils of this area. The average crop increase due to sulphate of ammonia is 9 tons of cane per acre; in each case the dressing was only 300 lb. of this fertilizer per acre. We are now attempting to determine the economic limit to which the dressings may be increased.

As regards superphosphate and potash, we are again unable to record positive evidence of increases due to the use of these constituents. At the same time it must be remembered that where heavy crops are harvested, it is imperative that the supply of all plant foods be restored in order that the productivity of the land may be maintained.

Location.—**B. Tapiolas's farm, Ivanhoe, Ayr.**

Soil Type.—Alluvial loam.

Variety.—Badila. Age of crop—Twelve months. Nature of crop—First ratoon.

RESULTS.

—	No Fertiliser.	300 lb. Sulphate of Ammonia.	300 lb. Sulphate of Ammonia + 300 lb. Super-phosphate.	300 lb. Sulphate of Ammonia + 180 lb. Potash.	300 lb. Sulphate of Ammonia + 300 lb. Super-phosphate + 180 lb. Potash.
Tons cane per acre	24·3	30·3	28·5	29·1	30·5
C.C.S. in cane	17·4%	16·4%	16·6%	16·9%	16·4%
Value of crop	£55 18 0	£64 13 0	£61 16 0	£64 11 0	£65 2 0
Less harvesting costs	£9 6 0	£11 12 0	£10 19 0	£11 3 0	£11 14 0
Return	£46 12 0	£53 1 0	£50 17 0	£53 8 0	£53 8 0
Increased return due to fertilizer	..	£6 9 0	£4 5 0	£6 16 0	£6 16 0
Cost of fertilizer and application	..	£2 0 0	£2 18 0	£3 9 0	£4 7 0
Profit from fertilizer	..	£4 9 0	£1 7 0	£3 7 0	£2 9 0

Location.—**Messrs. Hoey Brothers' farm, Pioneer.**

Soil Type.—Old alluvial loam.

Variety.—Badila. Age of crop—Twelve months. Nature of crop—First ratoon.

RESULTS.

—	No Fertilizer.	300 lb. Sulphate of Ammonia + 360 lb. Super-phosphate.	300 lb. Sulphate of Ammonia + 180 lb. Potash.	360 lb. Super-phosphate + 180 lb. Potash.	300 lb. Sulphate of Ammonia + 360 lb. Super-phosphate + 180lb. Potash.
Tons cane per acre	7·4	15·3	17·5	6·8	18·8
C.C.S. in cane	17·0%	17·1%	17·0%	17·2%	17·2%
Value of crop	£16 11 0	£34 9 0	£39 2 0	£15 8 0	£42 13 0
Less harvesting costs	£4 1 0	£5 14 0	£6 10 0	£4 2 0	£6 19 0
Return	£12 10 0	£28 15 0	£32 12 0	£11 6 0	£35 14 0
Increased or decreased return due to fertilizer	..	Increased. £16 5 0	Increased. £20 2 0	Decreased. £1 4 0	Increased. £23 4 0
Cost of fertilizer and application	..	£3 1 0	£3 9 0	£3 1 0	£4 11 0
Profit or loss from fertilizer ..	..	Profit. £13 4 0	Profit. £16 13 0	Loss. £4 5 0	Profit. £18 13 0

The use of sulphate of ammonia has converted a crop failure into what would be considered a fair ratoon crop in the Burdekin area. In the absence of ammonia, superphosphate and potash showed a complete loss.

Location.—**J. Ahern's farm, Airdale.**

Soil Type.—Alluvial loam.

Variety.—H.Q. 426. Age of crop—Fourteen months. Nature of crop—Plant cane.

RESULTS.

—	No Fertilizer.	300 lb. Sulphate of Ammonia + 360 lb. Super-phosphate.	300 lb. Sulphate of Ammonia + 180 lb. Potash.	360 lb. Super-phosphate + 180 lb. Potash.	300 lb. Sulphate of Ammonia + 360 lb. Super-phosphate + 180 lb. Potash.
Tons cane per acre	23·7	40·9	36·6	25·8	36·0
C.C.S. in cane	16·7%	15·7%	15·2%	16·4%	14·8%
Value of crop	£50 4 0	£82 8 0	£70 13 0	£55 1 0	£67 2 0
Less harvesting costs	£8 16 0	£15 3 0	£13 12 0	£9 11 0	£13 7 0
Return	£41 8 0	£67 5 0	£57 1 0	£45 10 0	£53 15 0
Increased return due to fertilizer	..	£25 17 0	£15 13 0	£4 2 0	£12 7 0
Cost of fertilizer and application	..	£3 1 0	£3 9 0	£3 1 0	£4 11 0
Profit from fertilizer	..	£22 16 0	£12 4 0	£1 1 0	£7 16 0

This trial presents unmistakeable evidence of the value of sulphate of ammonia on a plant crop of cane in this area. The c.c.s. values of the fertilized plots are unaccountably erratic, which detracts from the economic gain for the complete manure.

Location.—**S. Gibson's farm, Home Hill.**

Soil Type.—Alluvial loam.

Variety.—Badila. Age of crop—Eleven months. Nature of crop—First ratoon.

RESULTS.

—	No Fertilizer.	300 lb. Sulphate of Ammonia + 360 lb. Super-phosphate.	300 lb. Sulphate of Ammonia + 180 lb. Potash.	360 lb. Super-phosphate + 180 lb. Potash.	300 lb. Sulphate of Ammonia + 360 lb. Super-phosphate + 180 lb. Potash.
Tons cane per acre	11·3	20·2	18·8	12·1	20·1
C.C.S. in cane	15·1%	14·8%	15·1%	15·1%	14·9%
Value of crop	£21 12 0	£37 13 0	£35 19 0	£23 3 0	£37 16 0
Less harvesting costs	£4 1 0	£7 10 0	£6 19 0	£4 2 0	£7 9 0
Return	£17 11 0	£30 3 0	£29 0 0	£19 1 0	£30 7 0
Increased return due to fertilizer	..	£12 12 0	£11 9 0	£1 10 0	£12 16 0
Cost of fertilizer and application	..	£3 1 0	£3 9 0	£3 1 0	£4 11 0
Profit or loss from fertilizer	..	Profit. £9 11 0	Profit. £8 0 0	Loss. £1 11 0	Profit. £8 5 0

MACKAY DISTRICT.

The 1931-32 season saw a continuation of the unfavourable growing conditions experienced the previous year. As a consequence all crops were light, and plant cane showed little response to fertilizer. The first ratoon crops also lacked vitality following on a poor plant crop, in general.

Location.—**F. D. Pratt's farm, Kolijo.**

Soil Type.—Alluvial loam.

Variety—H.Q. 426. Age of crop—Twelve months. Nature of crop—Plant cane.

RESULTS.

—	No Fertilizer.	300 lb. Sulphate of Ammonia + 300 lb. Super-phosphate.	300 lb. Sulphate of Ammonia +150 lb. Potash.	300 lb. Super-phosphate + 150 lb. Potash.	300 lb. Sulphate of Ammonia + 300 lb. Super-phosphate + 150 lb. Potash.
Tons cane per acre	13·5	16·0	17·8	13·6	16·0
C.C.S. in cane	14·3%	14·7%	13·8%	14·6%	13·2%
Value of crop	£24 1 0	£29 11 0	£30 3 0	£24 18 0	£25 10 0
Less harvesting costs	£5 7 0	£5 19 0	£6 12 0	£5 8 0	£5 19 0
Return	£18 14 0	£23 12 0	£23 11 0	£19 10 0	£19 11 0
Increased return due to fertilizer	..	£4 18 0	£4 17 0	£0 16 0	£0 17 0
Cost of fertilizer and application	..	£2 17 0	£3 3 0	£2 11 0	£4 1 0
Profit or loss from fertilizer	..	Profit. £2 1 0	Profit. £1 14 0	Loss. £1 15 0	Loss. £3 4 0

There are very definite indications in these results that sulphate of ammonia may be used to advantage on the richer alluvial soils of the North Coast area. This would apply with particular force to ratoon crops.

Location.—**A. J. Watt's farm, Kuttabul.**

Soil Type.—Acid loam from sedimentary rock.

Variety.—M. 1900. Age of crop—Fourteen months. Nature of crop—Plant cane.

RESULTS.

—	No Fertilizer.	240 lb. Sulphate of Ammonia + 360 lb. Super-phosphate.	240 lb. Sulphate of Ammonia + 180 lb. Potash.	360 lb. Super-phosphate + 180 lb. Potash.	240 lb. Sulphate of Ammonia + 360 lb. Super-phosphate + 180 lb. Potash.
Tons cane per acre	11·8	15·1	12·9	15·5	16·0
C.C.S. in cane	15·2%	15·1%	14·7%	15·3%	14·6%
Value of crop	£22 15 0	£28 18 0	£23 17 0	£30 4 0	£29 6 0
Less harvesting costs	£5 5 0	£5 12 0	£5 9 0	£5 15 0	£5 19 0
Return	£17 10 0	£23 6 0	£18 8 0	£24 9 0	£23 7 0
Increased return due to fertilizer	..	£5 16 0	£0 18 0	£6 19 0	£5 17 0
Cost of fertilizer and application	..	£2 15 0	£3 2 0	£3 0 0	£4 3 0
Profit or loss from fertilizer	..	Profit. £3 1 0	Loss. £2 4 0	Profit. £3 19 0	Profit. £1 14 0

A general response to nitrogen, phosphoric acid, and potash is in evidence here. Soils of this type certainly require heavy fertilizer dressings to restore them to a state of high fertility. In common with most highly acid soils, the response to superphosphate was particularly marked.

Location.—**P. Hand's farm, Wandaru.**

Soil Type.—Stony hillside loam.

Variety.—M. 1900. Age of crop—Twelve months. Nature of crop—First ratoon.

RESULTS.

—	No Fertilizer.	240 lb. Sulphate of Ammonia + 240 lb. Superphosphate.	240 lb. Sulphate of Ammonia + 120 lb. Potash.	240 lb. Superphosphate + 120 lb. Potash.	240 lb. Sulphate of Ammonia + 240 lb. Superphosphate + 120 lb. Potash.
Tons cane per acre	8·4	11·0	10·2	11·6	12·9
C.C.S. in cane	16·3%	16·1%	16·3%	16·9%	16·7%
Value of crop	£17 16 0	£22 18 0	£21 12 0	£25 15 0	£28 4 0
Less harvesting costs	£4 8 0	£4 18 0	£4 13 0	£5 3 0	£5 9 0
Return	£13 8 0	£18 0 0	£16 19 0	£20 12 0	£22 15 0
Increased return due to fertilizer	..	£4 12 0	£3 11 0	£7 4 0	£9 7 0
Cost of fertilizer and application	..	£2 8 0	£2 13 0	£2 4 0	£3 7 0
Profit from fertilizer	..	£2 4 0	£0 18 0	£5 0 0	£6 0 0

Though little evidence of the value of fertilizer was noted on the plant cane, the ratoon crop showed a general response, particularly with regard to superphosphate.

Location.—**F. Letchford's farm, Finch Hatton.**

Soil Type.—Sandy loam, outwash soil.

Variety.—M. 1900. Age of crop—Twelve months. Nature of crop—First ratoon.

RESULTS.

—	No Fertilizer.	200 lb. Sulphate of Ammonia + 250 lb. Superphosphate.	200 lb. Sulphate of Ammonia + 125 lb. Potash.	250 lb. Superphosphate + 125 lb. Potash.	200 lb. Sulphate of Ammonia + 250 lb. Superphosphate + 125 lb. Potash.
Tons cane per acre	9·8	9·7	10·6	9·3	10·6
C.C.S. in cane	17·5%	16·2%	17·4%	17·2%	16·9%
Value of crop	£22 14 0	£20 7 0	£24 8 0	£21 2 0	£23 10 0
Less harvesting costs	£4 18 0	£4 17 0	£4 16 0	£4 13 0	£4 16 0
Return	£17 16 0	£15 10 0	£19 12 0	£16 9 0	£18 14 0
Increased or decreased return due to fertilizer	..	Decreased. £2 6 0	Increased. £1 16 0	Decreased. £1 7 0	Increased. £0 18 0
Cost of fertilizer and application	..	£2 4 0	£2 10 0	£2 5 0	£3 4 0
Loss from fertilizer	..	£4 10 0	£0 14 0	£3 12 0	£2 6 0

Location.—**P. H. McLean's farm, Pinnacle.**

Soil Type.—Alluvial loam.

Variety.—H.Q. 426. Age of crop—Twelve months. Nature of crop—First ratoon.

RESULTS.

—	No Fertilizer.	280 lb. Sulphate of Ammonia + 280 lb. Superphosphate.	280 lb. Sulphate of Ammonia + 140 lb. Potash.	280 lb. Superphosphate + 140 lb. Potash.	280 lb. Sulphate of Ammonia + 280 lb. Superphosphate + 140 lb. Potash.
Tons cane per acre	14·4	22·0	20·2	14·4	22·1
C.C.S. in cane	14·1%	14·0%	13·7%	13·8%	13·7%
Value of crop	£25 3 0	£38 1 0	£33 18 0	£24 8 0	£37 1 0
Less harvesting costs	£5 10 0	£8 3 0	£7 10 0	£5 10 0	£8 4 0
Return	£19 13 0	£29 18 0	£26 8 0	£18 18 0	£28 17 0
Increased or decreased return due to fertilizer	..	Increased. £10 5 0	Increased. £6 15 0	Decreased. £0 15 0	Increased. £9 4 0
Cost of fertilizer and application	..	£2 14 0	£3 0 0	£2 9 0	£3 17 0
Profit or loss from fertilizer	..	Profit. £7 11 0	Profit. £3 15 0	Loss. £3 4 0	Profit. £5 7 0

These results are interesting in that they indicate the decided value of sulphate of ammonia for ratoon crops on the rich alluvial soils of this area. The increased yield for a modest 280 lb. of sulphate of ammonia suggests that the dressings could be increased quite profitably.

Location.—**H. Barfield's farm, Tannalo.**

Soil Type.—Alluvial loam.

Variety.—E.K. 28. Age of crop—Twelve months. Nature of crop—First ratoon.

RESULTS.

—	No Fertilizer.	225 lb. Sulphate of Ammonia + 300 lb. Superphosphate.	225 lb. Sulphate of Ammonia + 120 lb. Potash.	300 lb. Superphosphate + 120 lb. Potash.	225 lb. Sulphate of Ammonia + 300 lb. Superphosphate + 120 lb. Potash.
Tons cane per acre	11·0	16·4	15·8	12·1	16·5
C.C.S. in cane	14·1%	13·8%	13·7%	13·9%	13·3%
Value of crop	£19 4 0	£27 16 0	£26 10 0	£20 14 0	£26 11 0
Less harvesting costs	£4 18 0	£6 2 0	£5 17 0	£5 2 0	£6 2 0
Return	£14 6 0	£21 14 0	£20 13 0	£15 12 0	£20 9 0
Increased return due to fertilizer	..	£7 8 0	£6 7 0	£1 6 0	£6 3 0
Cost of fertilizer and application	..	£2 9 0	£2 11 0	£2 6 0	£3 8 0
Profit or loss from fertilizer	..	Profit. £4 19 0	Profit. £3 16 0	Loss. £1 0 0	Profit. £2 15 0

Again the value of sulphate of ammonia is in evidence on this crop of first ratoons.

Location.—**B. F. Hogan's farm, Mia Mia, North Eton.**

Soil Type.—Alluvial loam.

Variety.—E.K. 28. Age of crop—Fifteen months. Nature of crop—Plant cane.

RESULTS.

—	No Fertilizer.	300 lb. Sulphate of Ammonia + 300 lb. Super-phosphate.	300 lb. Sulphate of Ammonia + 200 lb. Potash.	300 lb. Super-phosphate + 200 lb. Potash.	300 lb. Sulphate of Ammonia + 300 lb. Super-phosphate + 200 lb. Potash.
Tons cane per acre	31·9	33·7	34·5	32·6	34·4
C.C.S. in cane	15·4%	14·8%	14·5%	14·6%	14·4%
Value of crop	£62 13 0	£62 17 0	£62 11 0	£59 13 0	£61 16 0
Less harvesting costs	£11 17 0	£12 10 0	£12 16 0	£12 2 0	£12 15 0
Return	£50 16 0	£50 7 0	£49 15 0	£47 11 0	£49 1 0
Increased or decreased return due to fertilizer	..	Decreased. £0 9 0	Decreased. £1 1 0	Decreased. £3 5 0	Decreased. £1 15 0
Cost of fertilizer and application	..	£2 17 0	£3 11 0	£2 19 0	£4 8 0
Loss from fertilizer	..	£3 6 0	£4 12 0	£6 4 0	£6 3 0

Fertilizers containing nitrogen appear to have effected a slight—though definite—increase in cane yield on this soil. All treatments recorded a loss, however, due largely to the depressed c.c.s. value where fertilizer was applied. Had the crop been normally matured at harvest time it is probable that the adverse influence would have been eliminated.

Location.—**Branscombe Plantation, Palms Estate, Pleystowe.**

Soil Type.—Alluvial loam.

Variety.—Q. 813. Age of crop—Ten months. Nature of crop—First ratoon.

RESULTS.

—	No Fertilizer.	240 lb. Sulphate of Ammonia + 240 lb. Super-phosphate.	240 lb Sulphate of Ammonia + 120 lb. Potash.	240 lb. Super-phosphate + 120 lb. Potash.	240 lb. Sulphate of Ammonia + 240 lb. Super-phospate. + 120 lb. Potash.
Tons cane per acre	4·8	6·3	7·5	5·9	7·0
C.C.S. in cane	14·0%	14·2%	14·7%	14·2%	14·2%
Value of crop	£8 6 0	£11 2 0	£13 17 0	£10 8 0	£12 7 0
Less harvesting costs	£3 2 0	£3 6 0	£3 10 0	£3 17 0	£3 5 0
Return	£5 4 0	£7 16 0	£10 7 0	£6 11 0	£9 2 0
Increased return due to fertilizer	..	£2 12 0	£5 3 0	£1 7 0	£3 18 0
Cost of fertilizer and application	..	£2 8 0	£2 13 0	£2 3 0	£3 7 0
Profit or loss from fertilizer	..	Profit. £0 4 0	Profit. £2 10 0	Loss. £0 16 0	Profit. £0 11 0

Location.—**C. H. Miles's farm, Te Kowai.**

Soil Type.—Alluvial loam.

Variety.—P.O.J. 2714. Age of crop—Eleven months. Nature of crop—First ratoon.

RESULTS.

—	No Fertilizer.	240 lb. Sulphate of Ammonia + 300 lb. Super-phosphate.	240 lb. Sulphate of Ammonia + 120 lb. Potash.	300 lb. Super-phosphate + 120 lb. Potash.	240 lb. Sulphate of Ammonia + 300 lb Super-phosphate + 120lb. Potash.
Tons cane per care	9·0	12·1	14·0	10·1	13·5
C.C.S. in cane	15·1%	14·3%	15·0%	14·9%	15·0%
Value of crop	£17 1 0	£21 11 0	£26 11 0	£19 0 0	£25 12 0
Less harvesting costs	£4 10 0	£5 0 0	£5 7 0	£4 8 0	£5 6 0
Return	£12 11 0	£16 11 0	£21 4 0	£14 12 0	£20 6 0
Increased return due to fertilizer	..	£4 0 0	£8 13 0	£2 1 0	£7 15 0
Cost of fertilizer and application	..	£2 11 0	£2 13 0	£2 6 0	£3 10 0
Profit or loss from fertilizer	..	Profit. £1 9 0	Profit. £6 0 0	Loss. £0 5 0	Profit. £3 5 0

Nitrogenous fertilizer has again produced results under adverse conditions, where superphosphate and potash have given little or no result. Our knowledge of the plant food content of this land shows, however, that this type of soil is in need of these plant foods to build up its fertility.

SOUTHERN DISTRICTS.

The unprecedented drought conditions which prevailed in the Bundaberg and Maryborough areas resulted in an almost complete crop failure. In no case were the trial blocks fit to harvest as such, and many were allowed to standover. The only trials recorded herewith are those from the Maroochy River area, Nambour, where light rains at critical periods resulted in fair crops in that district.

Location.—**J. W. Tatnell's farm, Maroochy River.**

Soil Type.—Alluvial loam; better class soil of the district.

Variety.—Q. 813. Age of crop—Twelve months. Nature of crop—First ratoon.

RESULTS.

—	No Fertilizer.	240 lb. Sulphate of Ammonia + 320 lb. Super-phosphate.	240 lb. Sulphate of Ammonia + 128 lb. Potash.	320 lb. Super-phosphate + 128 lb. Potash.	240 lb. Sulphate of Ammonia + 320 lb. Super-phosphate + 128 lb. Potash.
Tons cane per acre	14·7	18·2	18·8	17·6	18·8
C.C.S. in cane	15·4%	15·3%	15·3%	15·2%	15·6%
Value of crop	£28 17 0	£35 9 0	£36 12 0	£33 19 0	£37 11 0
Less harvesting costs	£5 9 0	£6 10 0	£6 15 0	£6 6 0	£6 15 0
Return	£23 8 0	£28 19 0	£29 17 0	£27 13 0	£30 16 0
Increased return due to fertilizer	..	£5 11 0	£6 9 0	£4 5 0	£7 8 0
Cost of fertilizer and application	..	£2 15 0	£2 16 0	£2 11 0	£3 15 0
Profit from fertilizer	..	£2 16 0	£3 13 0	£1 14 0	£3 13 0

The plots this year showed a general increase from the use of artificial manures, but it is not possible to state which particular plant food was in greatest demand. In all cases a net profit was shown.

Location.—**W. Niemi's farm, Maroochy River.**

Soil Type.—Alluvial loam, wet clay subsoil.

Variety.—Q. 813. Age of crop—Thirteen and a-half months. Nature of crop—Plant cane.

RESULTS.

——	No Fertilizer.	180 lb. Sulphate of Ammonia + 420 lb. Superphosphate.	180 lb. Sulphate of Ammonia + 180 lb. Potash.	420 lb. Superphosphate + 180 lb. Potash.	180 lb. Sulphate of Ammonia + 420 lb. Superphosphate + 180 lb. Potash.
Tons cane per acre	18·7	22·3	19·7	21·5	22·9
Value of crop	£34 12 0	£41 5 0	£36 9 0	£39 16 0	£42 7 0
Less harvesting costs	£6 14 0	£8 0 0	£7 1 0	£7 14 0	£8 4 0
Return	£27 18 0	£33 5 0	£29 8 0	£32 2 0	£34 3 0
Increased return due to fertilizer	..	£5 7 0	£1 10 0	£4 4 0	£6 5 0
Cost of fertilizer and application	..	£2 15 0	£2 19 0	£3 5 0	£4 4 0
Profit or loss from fertilizer ..	..	Profit. £2 12 0	Loss. £1 9 0	Profit. £0 19 0	Profit. £2 1 0

This area was found to be decidedly acid, and it received a dressing of lime prior to planting. Consistent with previous experience on acid soils, the increased yield due to superphosphate was marked.

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