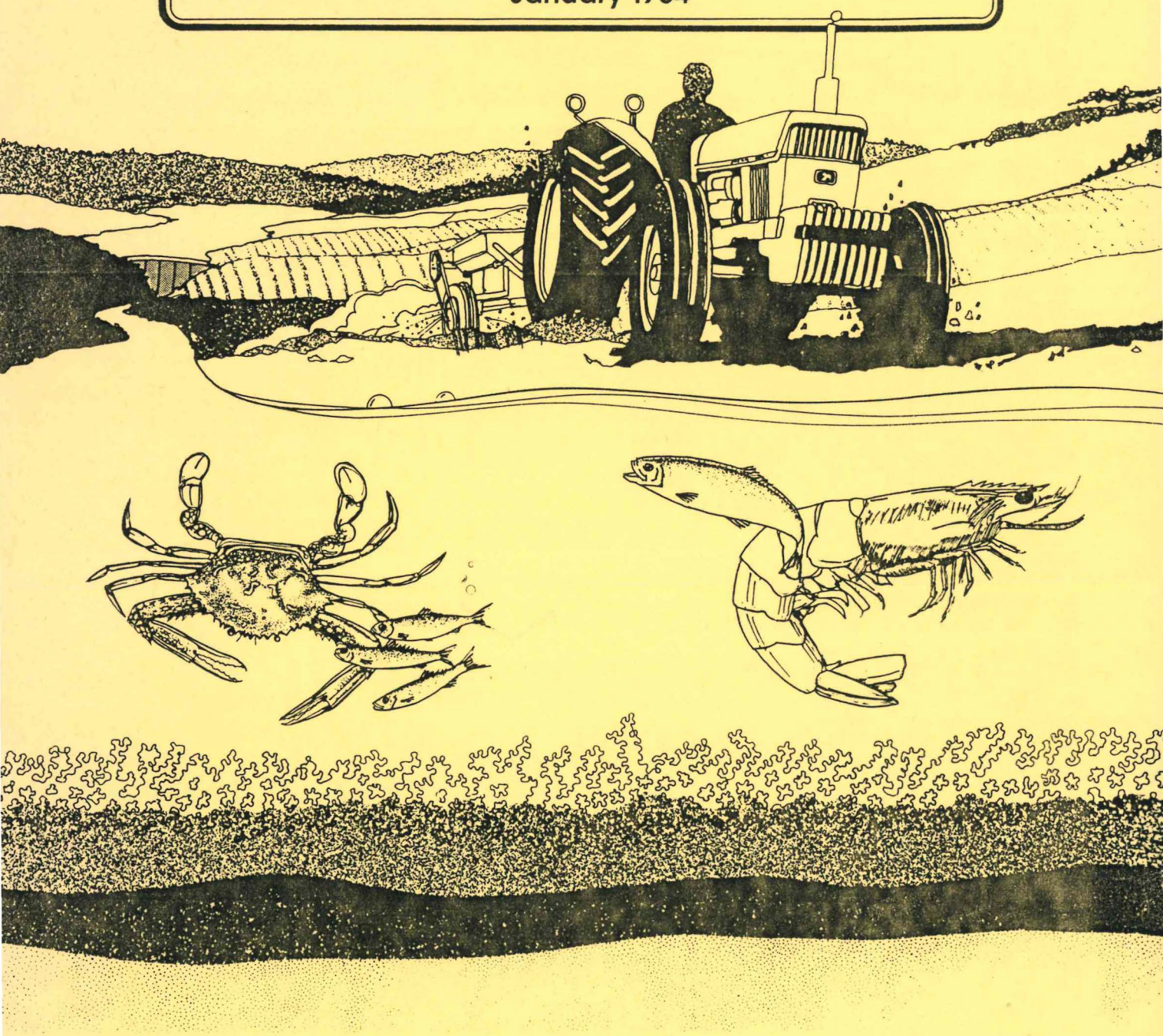
Peel Harvey Catchment Update for Farmers

Newsletter No. 3
January 1984



Produced by

Department of
Agriculture, Harvey
Western Australia

Department of
Conservation and Environment
Western Australia (Bulletin 133)

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ISSN 0811-2053

CONTENTS

The increased interest in farm fertiliser practices on the sandy soils of the coastal plain results from excessive growth of algae in the Peel Inlet and Harvey Estuary. This algal growth creates three main problems:

1. *Masses of algae accumulate in the shallows of the northern and western shore of the Peel Inlet, fouling beaches and decomposing to a stinking, black ooze.*

2. *Sheets of live and rotting algae foul the nets of commercial fishermen.*

3. *Blooms of blue-green algae occur; they have unpleasant odours and deleterious effect on fish and crab populations.*

The problem goes back to the mid 1960's. The first complaints were recorded about 1969 but there is evidence that weed accumulated in 1967. Algal accumulations on the beaches increased between 1969 and 1974-75, but decreased again by the end of the 1970's. In recent years, there have been massive blooms of the blue-green alga called Nodularia, *mainly in the Harvey Estuary. This indicates a further deterioration of the system.*

These algal blooms are mainly the result of phosphorus run-off from agricultural land on the coastal plain but particularly the sandy soils. A MAJOR PART OF ANY SOLUTION TO THE PROBLEM MUST BE A REDUCTION IN THE AMOUNT OF PHOSPHORUS BEING LEACHED FROM FARM LAND.

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My thanks go to Garry Palmer and Phil Fry from the Department of Agriculture in Perth for designing the questionnaire. Caroline Peek who tested the questionnaire, organised the mailing and the follow-up letter and collected your comments. Phil Fry analysed the replies and prepared the report on which my comments are based.

Final thanks go to all the farmers who took the time to fill in the questionnaire and return it. Catchment farmers have been subjected to a barrage of information on what is happening to the estuary and what will probably have to be done to help solve the problem. I hope that they realise that they have as much to gain as anybody from the work being done and I thank them for their co-operation.

REPORT TO FARMERS
ON
EXTENSION PROGRAMME
FOR THE
PEEL-HARVEY STUDY

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Many farmers apply more phosphorus fertiliser than they need for the level of production they are getting, particularly on some of the drier sandy soils. On most farms, superphosphate is being applied as a source of sulphur, rather than phosphorus. Sulphur is an essential plant nutrient which, on sandy soils, has to be applied every year. Unlike phosphorus, sulphur does not build up in the soil. Before farmers can be expected to reduce the amount of phosphorus they apply, an alternative source of sulphur is required.

If a better sulphur fertiliser can be found, farmers can save money by reducing the amount of super they apply and applying sulphur in another form.

The Extension Programme

For the past twelve months, the Harvey Office of the Department of Agriculture has been running an extension programme with farmers in catchment areas aimed at

* making farmers aware of the nature of the problem
* making farmers aware of the part they can play in solving it.
* encouraging the use of soil tests as the basis for decisions on rate and type of fertiliser.
* reducing the amount of phosphorus applied where soil tests showed this was possible.
* encouraging the use of less soluble phosphorus fertilisers on deep sands.

The programme operated at three levels.

1. Mass Media - where public meetings, newsletters, television and radio were used to bring the problem to the attention of farmers and others.

2. Group Extension - where small groups of farmers in different parts of the catchment areas met to talk about

../2

farming catchment soils and to discuss the research being done and the recommendations coming from it.

3. Personal Contact - where individual farmers were contacted with an offer to soil test their properties and advise on the rates and types of fertilisers which should be applied.

As could be expected, the personal contact phase was the most time consuming, intensive and expensive. At the peak of the soil testing programme, five people were involved full-time in the field collecting the samples, one in the office handling the paperwork involved and several more in laboratories analysing the samples. Getting the results back to farmers also tied up a lot of people.

A total of 140 properties were sampled in the soil-testing programme, the bulk of them west of South-West Highway between Pinjarra and Yarloop. The samples - about 1,500 in all - were analysed for phosphorus, potassium, salt and acidity.

On the deep sands, the new slow release phosphorus fertiliser Coastal Super was recommended in place of ordinary super. Where the soil test indicated that phosphorus was not required, gypsum was suggested as the cheapest source of sulphur, even though there are many good reasons for farmers not to use it in its present form.

What The Farmers Thought - A Survey

The 140 farmers contacted during the soil testing programme were sent a survey form at the end of September to find out:

* which fertilisers were used, when and how much
* farmer reaction to the fertiliser recommendations made
* farmer attitude to soil testing
* what problems - if any - cropped up with the use of the new fertilisers
* which fertilisers would be used in 1984
* attitudes to the use of gypsum
* what farmers thought about the other parts of the extension programme.

A total of 87 farmers returned the questionnaire and this report is based on their replies. My thanks go to them for their co-operation.

../3

What They Used and What They Thought

Fertiliser Use

Farmers were asked how much fertiliser they applied in each month from February to September and which fertilisers they applied.

The results show that fertiliser was used in each of the months with the expected peaks in April/May and August/September.

Perhaps surprisingly, the fertiliser used in greatest quantity was super:potash 3:2, followed by super, 5:1, Coastal Super and Coastal Super 3:2.

The amounts used were:

Super:Potash 3:2	-	794 t
Super	-	540 t
Super:Potash 5:1	-	328 t
Coastal Super	-	317 t
Coastal Super 3:2	-	249 t

A large quantity of lime was used and smaller quantities of potash and gypsum.

It is obvious that much less Coastal Super / 3:2 was used compared to ordinary super and mixes. Only about 30 farmers used a slow release fertiliser.

However, when fertiliser use on the different soil types is looked at, the picture changes.

Of the 317 t of Coastal Super sold, 266 t was used by farmers on Bassendean Sands (the deep, grey sands) and only 51 t by farmers on all other soil types. For Coastal Super 3:2, 220 t went on Bassendean Sands and only 29 t on other soil types. Farmers on Bassendean Sands used almost as much slow-release fertiliser as they did ordinary fertiliser.

Overall, about 70% of farmers on Bassendean Sands used the new slow-release fertilisers on at least part of the farm. This is a very rapid adoption of a new fertiliser in its first year and should help reduce the amount of phosphorus getting into drains. Preliminary figures indicate that nearly 30% less phosphorus flowed down Meredith Drain this year compared to last year at similar drain flows following a reduction in the amount of phosphorus fertiliser applied and the use of slow release phosphorus. It is risky to read too much into a change from one year to the next - many more years of monitoring will be needed to make sure that more than just seasonal variation is involved.

../4

Acceptance of the Recommendations

Forty per cent of the farmers said that they followed the recommendations completely, 9% thought that they were too low and 16% thought that they were too high.

It is difficult to know what to make of these figures for two main reasons.

1. They refer to 'fertiliser' recommendations, not to individual nutrient recommendations. Farmers were given recommendations for phosphorus, potassium and sulphur. There is no way of knowing whether farmers thought the recommendations for one or all of the nutrients was too high or low. I suspect that many farmers thought that our recommendations for potassium were high because we generally recommended that they apply more than they had been applying.

2. There is probably some confusion as to what the recommendation was.

   When the results were taken back to the farmer, we generally made a recommendation for each of the nutrients based on the 'ideal' situation. Since the soil tests showed that most farmers didn't need to apply phosphorus, the recommendation was usually that - ideally - they should leave super off and apply sulphur as gypsum. Because this isn't possible on most farms, we had to look for a 'next best' option which usually involved the use of super or Coastal Super as a source of sulphur. There is really no way of knowing whether farmers accepted the 'ideal recommendation' or the 'next best' option but most probably went for the 'next best' option.

There were many reasons for farmers not accepting the recommendations. They fall into three main categories:

- finance
- convenience
- credibility

1. Finance - about 14% of farmers reported that they thought the recommendations were too expensive to follow completely. I suspect that this related mainly to the amount of potassium recommended.

2. Convenience about 20% of farmers gave inconvenience as the major reason for not adopting the recommendations. There were probably two main aspects to this:

   (a) gypsum has to be spread in winter using special spreaders.

../5

(b) on many farms, no two paddocks had the same soil test for phosphorus and potassium. This meant that each paddock had its own recommendation. While the 'next best' option usually overcame most of the problems, some farmers didn't like the idea of having to go over their paddocks two or three times with different fertilisers. In some cases, a small area of the farm had a different recommendation from the rest and this was usually ignored.

In some cases farmers who normally buy their fertiliser from Kwinana were not prepared to go to Picton to pick up a bit of Coastal Super for an area of deep sand on the farm. This will probably be a continuing problem.

3. Credibility - about 9% of farmers thought that the recommendations were too low to give good results - particularly on hay paddocks. All we can hope for in these cases is that the farmers will try the recommendation on at least part of the farm to satisfy themselves that they don't need to keep applying the phosphorus rates they have been used to.

Attitude To Soil Testing

Farmers were asked if they had used a paid soil testing service over the past 5 years and whether they would use a paid service in the future. They were also asked if they followed the recommendations based on the soil tests.

The replies show that just over 30% of farmers had used a paid soil testing service over the five years and that about two thirds of these had used CSBP.

Recommendations from CSBP based on the soil test were followed about half the time. Farmers who didn't follow them completely either thought they were too high or used them as a guide.

About 35% of farmers said that they would not be using a paid soil test service this summer. In most cases, this was because their paddocks had been sampled last summer and they didn't see any need to do it again so soon. A few farmers said that the Department should do it (we are!).

../6

In the longer term, just over half said that they would be using a paid service some time over the next three years, while nearly a third were still unsure. These figures suggest that most farmers, while aware of the benefits of soil testing, are still not convinced of its use to them. It could also be that some are expecting the free service to continue indefinitely. A few farmers said that they wouldn't be soil testing because they couldn't afford to follow the recommendations. On the vast majority of farms, soil testing will save money.

The Slow Release Fertilisers

Coastal Super and Coastal Super:Potash 3:2 were the only slow release fertilisers used by farmers. Both are made by CSBP at Picton. They are not available from Kwinana.

Of the 30 farmers who reported using one of these fertilisers, 7 said that it was too fine and powdery. It was reported that it didn't flow well through leg bins and it didn't throw as far from the spreader. However, it is also reported that spreaders stay cleaner when spreading these fertilisers - there is no build-up on the spinners.

Only one of the 7 farmers said that he wouldn't use either of the Coastal fertilisers next year if the problems had not been sorted out. The others planned to use them again next year.

Overall, just over 30% of farmers used one of the Coastal fertilisers this year and just over 60% said that they would be using them next year on at least part of the farm. Although only a few batches of Coastal were powdery, I hope that the situation will be better next season. No farmer reported any disappointment with pasture growth where Coastal was used.

Gypsum

Gypsum is the cheapest source of sulphur for local farms. At about $8.00/t ex factory it is only a fraction of the cost of using super to supply sulphur. It is a by-product from CSBP's acid plant at Kwinana and it's drawbacks are:

1. The sulphur in gypsum is extremely soluble so it is easily leached from the soil. While 100 kg/ha gypsum will supply enough sulphur if applied in late winter, four or five times that amount has to be used if it is applied early in the season.

2. As it comes from the factory, it is very moist. It won't flow through leg bins or super spreaders; even gypsum spreaders have trouble spreading it at low rates.

../7

Natural gypsum is available from several sources but they are all more expensive than the CSBP product and none of them are particularly easy to spread.

With all these things against it, it is hardly surprising that only 8 farmers used gypsum last year and some of this probably wasn't used on sandy soils. Only about 12 farmers said they would use it next year.

It is possible that time of application of gypsum is not as critical as was thought. Farmers who applied it in August seemed to be satisfied with the results.

Other Sources of Sulphur

Since most farmers use super as a source of sulphur, we will have to find a better source of sulphur than gypsum if we want to reduce the amount of phosphorus used.

To get an indication of farmer's attitudes to using other sulphur fertilisers, we asked a long, fairly complex, hypothetical question. We asked farmers to assume they didn't need phosphorus on a particular soil but, being a sandy soil, they did need sulphur.

The three sulphur fertiliser options compared were:

1. Superphosphate (or Coastal) applied at about 200 kg/ha in early winter - the current situation on most farms: cost about $22.00/ha.

2. Gypsum treated in some way to allow it to be handled by existing equipment but still applied in mid-winter; cost guessed at $4.50/ha (three times the cost of using ordinary gypsum).

3. A proposed new fertiliser containing both slow release phosphorus and sulphur. This would cost about twice as much per tonne as ordinary super but would only have to be spread at half the rate to supply enough sulphur so the cost would be the same - $22.00/ha.

About 3% of farmers would continue to use super as a source of sulphur, about 50% would use the treated gypsum and about 20% would use the new fertiliser. A high 27% were unsure or didn't respond.

The figures indicate that a large number of farmers are prepared to leave phosphorus off if there is a reasonable alternative.

../8

When you look at the $$ involved, this is hardly surprising. The other 23% who made a choice commented that they still wanted to apply some phosphorus, even though it wasn't needed. In the long run, of course, phosphorus will be needed on these soils but most farmers could save a lot of money by leaving phosphorus off until a soil test showed it was needed.

A 'spreadable' gypsum is obviously an attractive proposition. To be really useful, a gypsum pellet would have to do more than just hang together long enough to be spread. The pellet has to be hard enough to slow down the rate at which the sulphur in the gypsum dissolves, so that it can be successfully applied early in the season. This may be feasible but probably not for the $4.50/ha used in the question. However, with the alternatives costing $22.00/ha there is still a big margin to play with.

In the longer run, sulphur-enriched Coastal super is probably the answer, providing, as it will, both slow release sulphur and phosphorus. It has performed well in trials but no decision has been made about when or where it would be produced, what it would cost and which potash mixes would be produced. It could be a few years before all this can be sorted out although small quantities will probably be available shortly.

The Seminars

Seminars were organised at Coolup - with the Coolup Special Interest Group - and Harvey - with the Apex Club of Harvey - in August 1983 to explain the problem and look at some of the work being done to find a solution.

Only 25 of the farmers had been to either of the seminars and most of them went to the Coolup one.

All found the seminars useful to some extent but opinions on how useful varied widely.

Generally, farmers liked the depth of research knowledge presented, the trial results and the level of commitment to the problem. Topics mentioned several times in comments were the tree project at Waroona, the bauxite residue work at Coolup and new fertilisers being looked at.

On the other side, some farmers commented that the trials looked at were not really applicable to their particular situation. Others suggested that copies of planned talks should be circulated before the seminars. The second point can certainly be looked at but it's difficult to get trials which suit every farmer's situation exactly.

../9

The Field Days

Field days were held at Peter Beacham's in Pinjarra and Fred Talbot's at Myalup to look at trials with the new fertilisers.

Only 11 farmers attended these field days and all found them useful. The importance of sulphur was highlighted at these field days and the amount of leaching which takes place on these sands was stressed. The trials also showed that nitrogen could be useful on these sands.

The only adverse comment received on the field days was that they were not publicised widely enough. (We have made a note of that).

The Extension Groups

Nearly 30% of farmers had attended one of the four groups - Meredith, Coronation Rd, Dorsett Rd and Pinjarra - and all thought the meetings were useful.

There is probably scope for forming more groups in the area if there is enough farmer interest.

General Comments

Many farmers made comments on some aspects of the programme. It is difficult to summarise them all but a few deserve comment.

SOIL TESTING

The soil testing programme was generally seen to have been useful and the general feeling was that it should be repeated, with or without the farmer having to pay.

This year, the Department will collect and analyse, free of charge, soil samples from properties where Coastal Super was used. On other catchment farms, the samples will be analysed free provided farmers collect them. It is too early to say what the Department's future role will be in soil testing.

POLITICS

Politics should not interfere with sound agricultural advice.

It isn't. If the soil test shows that a farmer could profitably use more phosphorus, it was recommended. If he couldn't apply gypsum in July, he was advised to use super or Coastal but he was made aware that he was using them to supply sulphur and not phosphorus.

../10

INCENTIVES

Economic incentive to use new fertilisers. Difficult to comment as it is obviously a political decision. However, on the vast majority of farms, farmers will be spending less money on fertilisers in the short term - especially if they can use gypsum as a source of sulphur - and they should also save money in the long term. Use of less soluble phosphorus fertilisers will mean that less phosphorus is lost to leaching so less has to be used. Until we know what the new fertilisers will cost, it is impossible to say much about incentives.

CONCLUSIONS

FARMERS GENERALLY APPRECIATED THE EXTENSION PROGRAMME, THEY SUPPORT SOIL TESTING AND, ON THE DEEP SANDS, THEY STRONGLY SUPPORT THE USE OF THE NEW SLOW RELEASE FERTILISERS.

ON ALL SOIL TYPES, THERE WILL BE LITTLE HOPE OF REDUCING THE AMOUNT OF PHOSPHORUS APPLIED UNTIL A BETTER SULPHUR FERTILISER IS PRODUCED AND SHOWN TO BE EFFECTIVE.