THE NOXIOUS WEEDS INSPECTORS' INSTITUTE (Inc.)

1976 CONFERENCE PROCEEDINGS

HELD AT HAMILTON

FROM

TUESDAY, 27th TO THURSDAY, 29th APRIL, 1976

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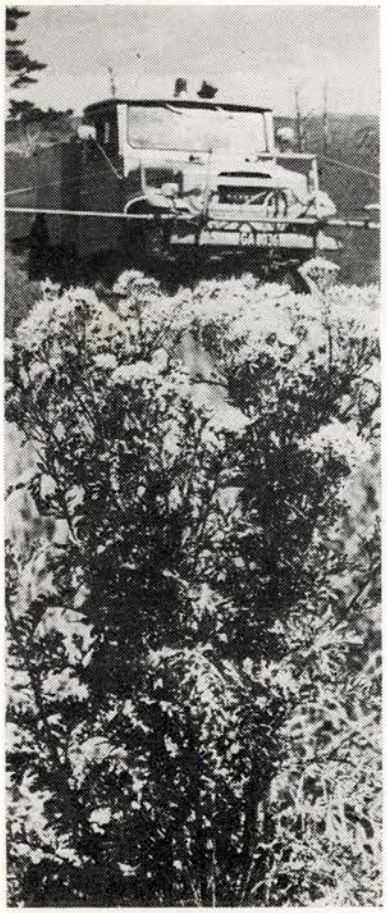

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PREFACE TO PROCEEDINGS

The 27th Conference held at Hamilton once again brought more than 90% of our members together, some attending for the first time, and others attending for the last time due to pending retirements.

It was pleasing to see new and old members mixing freely and striking up new friendships, and trying to iron out the frustrations that are peculiar to our chosen occupation.

Addresses by the opening speakers gave us some guide as to the way the present subsidy scheme would continue. My thanks go to all speakers who presented papers at Conference.

The wide range of papers presented at the conference must in some way help when we return to our counties. The group session involving County Chairmen in discussion over the present subsidy scheme showed the variations in the implementation at present and also helped to enlighten the Chairmen concerned on the advantages that have been gained with such a scheme.

We have received advice that the Government are ready to meet us early in July to discuss a suitable Training Course, this no doubt originated out of having Mr Malloy and Mr Burns at our conference and listening to the wishes of the members.

The change in administration at the Annual Meeting will have taken the load off some of our officers. Our past President Mr Daniels came into office when the Institute was having a battle to survive and also had growing pains that had exhausted our finances. At considerable expense, and time (to himself) he has now handed over the Institute in a very sound position. Our secretary Mr Fred Marsh has been of great assistance, and in many ways credit must go to him for the growth of the Institute, and the introduction of the News Letter which has now reached a high standard.

Our Editor Mike Simpson must be congratulated on the work he has done in producing the News Letter and also for filling in so ably as Secretary for the Conference at Hamilton.

Space will not allow me to say all the things that these people deserve for the work they have put into our Institute.

Darby Finlayson
PRESIDENT

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Cover photo:—
Field Day—Ruakura Agricultural Research Centre.

NOXIOUS WEEDS INSPECTORS INSTITUTE

(INC.)

THE OPENING SESSION OF THE 27th ANNUAL CONFERENCE

Held at Hamilton on 27th, 28th and 29th of April, 1976

DEPUTY MAYOR'S WELCOME TO CONFERENCE

The President: Ladies and Gentlemen. At this, the opening session of the Noxious Weeds Inspectors Institute's 27th Annual Conference, we have with us the Deputy Mayor of Hamilton, Dr. G. S. Heather. Dr. Heather, a general practitioner in the city, has been with the Council some ten years, he comes from a farming background and, I believe, is a keen, horticulturist. Whether this means that he tends his wife's garden I'm not too sure but its something like that. Dr. Heather is at present Chairman of his Council's Works Committee. I would now like to welcome to the Conference and introduce to you, Dr. G. S. Heather.

Dr. G. S. D. Heather: Mr. President, Mr Luxton, Mr. Thomas, Ladies and Gentlemen. Usually on an occasion such as this, the Mayor or the Deputy Mayor likes to stand up and say what wonderful weather we have, welcome to this beauiful part of New Zealand. Well, I'll certainly say the second half, welcome to the beautiful city of Hamilton in the Waikato. The weather, no doubt, has been especially put on because in this type of weather I understand the weeds don't grow quite so fast.

Mr. President mentioned some thoughts about my horticultural interests. Well, although I am a keen gardener I don't find much time nowdays. As far as weeding and working in my wife's garden is concerned, I seem to be the one who pulls the weeds out. She looks after putting all the plants in and picking the beautiful flowers that grow. We do welcome you, very warmly, to Hamilton.

We are becoming increasingly accustomed to welcoming people here to conferences and I don't know why this should be because the four main centres always hog the limelight in this respect. Perhaps people are getting the message that some of the smaller centres are quite pleasant places to hold conferences. I've had a good look at your programme and I'm sure, by the topics to be discussed and the calibre of your speakers, that you are going to have a very rewarding and interesting conference.

I hope you won't mind if I take a few moments to talk about the question of urban weed control and make a few comments regarding some of the problems we have in Hamilton, particularly in relation to the control of ragwort. You probably know that as a City Council we are obliged to administer the Noxious Weeds Act whereas County Councils do not have to administer the Act. We're not obliged to appoint inspectors to control noxious weeds but in fact of course we have a number of inspectors for this purpose. We have 5,555 hectares which is a fairly small area in comparison with some counties but I'll tell you in a moment how many notices we send out each year. We don't get administration subsidies and this is a bit of bone of contention. Perhaps Mr. Luxton can take note of the comment that what's good for the Counties should be good enough for the boroughs and cities. As far as ragwort control is concerned we send out between 500 and 600 notices annually to between 1,000 and 1,500 property owners or occupiers. In addition to that there are contracts with a number of property subdivisions within our own Council Departments and also the Crown. As to the question of the Crown's responsibility, you probably all know that the Crown is not bound by the Act and we feel that this is something which should be remedied. There's a considerable amount of expenditure involved in administering the Act as we do at the moment and we are currently reviewing our policy because we don't think we are getting the results we should for the money spent.

We have a number of complaints from our neighbouring counties and it is always a disappointment to us because we have a pretty good record of co-operation with the Waipa and Waikato Counties and we want to keep it that way. So one of the first things we'll be doing in our review of our weed control programme in Hamilton is to talk to the Counties and possibily set up some permanent standing committee at staff level which, I would imagine, co-ordinate the weed control of ragwort in particular. We should be able to discuss and sort out any misunderstandings we have had in the past. We are certainly not too happy to read in our local newspaper that Waipa County Councillors are unhappy about ragwort growth (in Hamilton City).

Now one of the reasons we have had problems in Hamilton City is that in the past Council has been taking a rather soft approach to the question of control. We have never instituted prosecutions

until we had served notice on the public. You will appreciate that the time the weed or the ragwort starts to grow you are coming into the summer period when people are going off on their holidays and it becomes a real question to get them to do something to stop the growth of the plants. So its not a good policy in the sense of good control and we are going to see what we can do about it. We have not become involved in the clearing of properties but have left private and Crown land alone and requested the owner or occupier to do it. This again is something that may need to be tightened up. I think we really need to have a much tougher policy because we are due for a boundary extension shortly by arrangement with two counties and we hope, with the local Government Commission, to take in the minimum amount of land required for our housing development. This means that the farmers will continue to use the land and, we hope, keep the weeds under control. Otherwise, if it comes into the city and developers purchase the property, we immediately have the problem of poor control over weeds, in particular ragwort.

So, in summing up, we are looking for administration subsidies. We hope the Crown, sooner or later, will be bound by the Act. We are very keen to work in harmony with our neighbours and I am sure that we will have a much tougher policy concerning control within the city in the not too distant future. Once again, welcome to Hamilton. I do hope you have a very enjoyable conference.

The President: Thank you very much, Dr Heather, for your warm welcome to this lovely city. It is many years since I was here myself and it has certainly grown extensively since then. If your other scenic views are as good as the one from here then it is indeed a beautiful city. I believe the olympic rowers even use the river out here to row up and down on so they might be able to grab a weed or two as they go past and whip them out of some of your gardens.

ADDRESS TO CONFERENCE BY THE MEMBER OF PALIAMENT FOR PIAKO

The President: Now, the fact that we had expected to have the Minister of Agriculture here to open our Conference doesn't in any way lessen our pleasure in having Mr Jack Luxton, M.P. for Piako, here to perform this duty for us. Mr Luxton is no stranger to Hamilton, even though he comes from Piako up the road as I believe he was educated here in Hamilton. Hence, he is a very logical choice for the one to open our Conference. He has been farming for 26 years and has been in Government for nine years and has travelled right through the ranks of the Dairy Councils and various high organisations like the Dominion Council of Federated Farmers. As a member of a special committee on agricultural education he was a spokesman for the previous opposition on Fisheries. I believe at the moment he is on the Agricultural Committee of caucus. Naturally, this gives him very good opportunity to become involved in our sphere. I would now introduce you to Mr J. Luxton, M.P. for Piako.

Mr J. Luxton: Last week, I was asked if I would speak to this Conference and officially open it for you. It was possible for me to rearrange my flight time to Wellington and when I was on my way over this morning I thought that may have been just as well because the fog conditions at the airport didn't look too great. However, I can say that Hamilton does have the occasional fog but for those who come from distance areas we certainly have a warmer climate than many parts of New Zealand. We have a good climate and that is why we have such good land surrounding the Hamilton area.

I was interested in Dr Heather's comments regarding the city of Hamilton and its weed problems. I'm sure we hear voiced on numerous occasions the problem, as farmers see it, of the lack of weed control within the borough and urban areas. I think the story is that farming areas should not become part of the city area until development is approaching so that there isn't the same kind of weed problem as on farm land. As the Chairman has already stated Mr McIntyre was to be with us today, however, as you know, he has been overseas trying to support better access to the Japanese market for some of our farm produce. Mr Jim Bolger, the Under Secretary, was also unable to attend on this particular occasion. Last Friday in Wellington I spoke to Mr Burns from the Ministry of Agriculture and Fisheries and asked him if I could have some theme for today because it seemed that time was running out but the Department was unable to give me very much in the way of background to speak to you today. His comment was "you'll be batting a sticky wicket at this year's Conference".

The new Government has taken time in recent weeks, time not available if the House sits early in session, to study the legislation and the type of legislation that will be required for Noxious Weeds Administration in this country. The Committee has been studying in detail the Fitzharris report which received 138 submissions from throughout New Zealand and no doubt the Com-

mittee worked hard and long to give a fair view as to what type of legislation was required. The calibre of those on the Committee would, in my opinion make it difficult for a caucus committee to go too far from those guidelines set out by that very able and experienced group of men. Your President, Mr Daniel attended a meeting at Parliament House only last week and I understand he will be giving you his impressions of the progress made to date. Suggestions and advice have been asked and received from the Counties Association, Federated Farmers, the Contractors Federation, agricultural chemical manufacturers, stock and station agents, grain and seed merchants, the aviation industry and last but not least, the Noxious Weeds Inspectors Institute. So there is no shortage of ideas coming forth as to the type of structure and legislation required.

Government is very anxious to make progress this year but there could be delay due to the legislative programme being fairly full for 1976 and this could cause difficulties. However it may not be a disadvantage as there is an opinion, which I support, that a terminal framework could be set up and this could give opportunity for discussion and needed changes. Or likely, when the Noxious Weeds Act goes before the Select Committee, there could be a wide discussion at that stage.

I would be the first to admit that changes have taken a very long time to bring about. It was in 1963 I attended the Dominion Conference of Federated Farmers as the Waikato Representative. Mr Brian Tallboys, Minister of Agriculture and Fisheries at that time, also attended. In setting out Government's intentions, he asked the Conference to accept Government's intention that there be an Agricultural Development Conference. He stated that the idea was to establish increases in meat, wool and dairy produce and make recommendations as to the measures that would be necessary to achieve those targets. I remember so well when the Minister sat down at the completion of his speech and I asked the first question, namely, What useful purpose will this Agricultural Conference achieve if we are not given a clear assurance that Government would act on the recommendations that were today restricting growth? The Minister answered along the lines that the aim was to set up the conference and it would be Government's intention to carry out those recommendations. I must state that Government did carry out many of the recommendations which came from that Conference and this was responsible for a great deal of the growth we had in agriculture during the 1960's.

As a result of this Conference in '63/64, several recommendations were made on weed control. For instance, the setting up of a National Council who's first task would be to review the current policy of administration. That was twelve years ago and I certainly would be one to express regret at the lack of progress over those years but you would know of the conflict of interests regarding the parties involved as to who should administer in these areas.

Your letter requesting a guest speaker for this Conference, invited a member of the Caucus Committee. Unfortunately a Minister was unable to attend in order to indicate the Government's intention regarding the present subsidy scheme. Mr Bolger has advised that the Subsidy Scheme is to continue as at present but that some changes are likely to be made and these could be announced in the Budget.

Few would disagree that the present scheme has not had benefits. Similarly all would agree that it has not been without its difficulties. There have been many areas of abuse. We all know that it was never intended to be a method of supplementing income and I would think there has been cases where this has resulted. If Government is to invest substantial expenditure it is better to have long term planning for continued control and this must be part and parcel of the deal. There is no doubt that sufficient weed sprays have been used to eliminate all the major weeds in this country several times over.

Weed control is largely a matter of economics. On first class land, costs are low, relative to the financial return per hectare. If the land is more marginal, the control costs become much more important. It is on this more marginal land that the fluctuating fortunes of farming or our adverse terms of trade encourage stop-go methods of weed control and stop-go methods of weed control are certainly not in the National interest. Weed subsidies as a form of assistance in whatever form allocated are a system of taking money from people and then giving it back so as to make it appear as a gift. We must ensure that taxpayers get value for money spent. It is my view we should see that a weed control plan entered into which requires taxpayers' assistance must be designed to be an on-going rather than a stop-go operation. I am quite sure that Government will come up with a worthwhile plan which will continue with weed control in the future.

Gentlemen, I sincerely hope this Conference is a very successful one. I read that the definition of a conference is a meeting where people talk about what they should already be doing. I'm quite sure that you will be doing justice in the next few days of your Conference but I do trust that when the 1977 Conference is held that solutions have been found regarding administration and that your status has full recognition, a recognition you deserve as a people carrying out a very important job which requires a certain amount of expertise.

Gentlemen, I have much pleasure in declaring this, your 1976 Conference, open.

The President: Thank you very much, Mr Luxton, for those words of encouragement and your opening address which I feel very applicable under the present circumstances. I too, like you, am hoping that this time next year we are not still saying as we have for the last three years, "it's coming up chaps, we're working on it." Now this is not good for any industry where promises, fully intended to be kept in the long run, are continually being put off. So, Sir, I would hope that what you hear today will also add strength to our request to the Ministers of the Department that these necessities, which I feel is a fair word in this case, for the future of noxious weeds control, are implemented at the first occasion. Thank you very much for being here today, I hope we didn't disrupt your trip too much. We have certainly enjoyed the pleasure of your company and the comments you have made.

ADDRESS TO CONFERENCE BY THE PRESIDENT OF THE INSTITUTE

The President: At this stage, ladies and gentlemen, I would like to say a few words regarding the Institute and where we are going. This is something not usually done at the opening of our Conference as it is generally kept for the A.G.M. Unfortunately, or fortunately, as the case may be, the A.G.M. is restricted to members of the Institute and for this reason I have brought my report forward to the opening session so that non-members attending, including visitors, invited guests and wives of members, will have an opportunity to hear just what we are gathered here for. Hence, I am going to break protocol on this occasion and give a resume of what the Institute is all about.

As I havn't previously done so, I will take this opportunity, on behalf of the members of the Institute, to welcome to this Conference all visitors, wives and invited guests. As I mentioned before, this is our 27th Annual Conference and the thing that is often lost with respects a conference is just what we're gathered together for. What is the Noxious Weeds Inspectors Institute?

The Institute is a group of men made up from inspectors employed by local authorities throughout New Zealand carrying on the inspection of noxious weeds. They started from a small beginning when several inspectors of counties in the north island banded together and formed a small group. From that group has grown an Institute covering the whole of New Zealand and involving all county inspectors. Now we embrace the urban inspectors within our ranks as well. It is a voluntary membership. The aims and objects of the Institute as laid down in our rules are to promote educational facilities and the exchange of ideas which will lead to a uniformity of approach to noxious weeds problems.

Representation to official bodies over the years leaves no doubt in my mind that we have done a great deal to encourage the presentation of the Fitzharris Report on Noxious Weeds Administration. This in itself gives us the right, (within the objects of the Rules), to help guide Government and the various organisations set up to do this very thing, provide a uniformity of approach to noxious weeds problems. Also to assist local bodies in the securing of any necessary legislation to improve the noxious weeds approach in New Zealand. Here again, this is within the aims and objects of our Institute.

The reason for us getting together is to promote and maintain a high level of efficiency among our members. Something we are always attempting to achieve. I say the word 'attempt' as I suppose a lot of us take things in and a lot of us don't. Nevertheless we have always tried and succeeded in getting a very high calibre of people to our Institute. We have had very willing co-operation from people, recognised in their fields, who show no hesitation in coming along and giving us the benefit of their knowledge.

With the backing of the Counties Association the Institute has taken a strong middle of the road line. We feel that we are above the dictates of commercialism. We have a job to do, virtually for the Government, which we endeavour to accomplish to the best of our ability. Obviously criticism is levelled at anybody and everybody at some time or other. No doubt some of it is deserved but much is not and in our case I think that a lot of the criticism comes through the legislation we are trying to administer. Most of it is without foundation but one particular point which is an exception is the wide variety of policies as adopted by different counties. The Act is fairly broad and the counties are autonomous in their right to interpret the administration of the Act as they wish. This, I hope, will be changed as a result of the implementation of the Fitzharris Report. The main change will be one of attitudes. From enforcement of the Act, to encouragement, education and involvement.

One of the main topics of conversation that Mr Luxton and I have spoken on is the Noxious Plants Subsidy Scheme. Submissions on review have been accepted by Government from various organisations. We have had a meeting in Welling-

ton and being vitally concerned with our involvement in this you will be pleased to hear that our submissions were very well received. In fact, I would go so far as to say, they were most favourably received. Although this is my opinion, I think it has been substantiated by people who were there and people I have been talking to since. Mr Bolger did a very good job of chairing the meeting and I believe, from later conversation, it was indicated that all submissions were, to his mind, of very high value and beneficial to him in decision making.

I'll quickly summarise as I havn't the time to read the whole of our submissions. In fact I really don't think this would be desirable because they were presented in confidence to the appropriate quarter. But I do feel it is appropriate that the Institute knows what the basis of our submissions were. The Fitzharris Report states that the control and placement of weeds is becoming of ever increasing importance to the wellbeing of New Zealand and must be tackled on a national scale by every means at the Government's disposal. The following points were made and elaborated on through the report.

Firstly, the need for a national uniform approach and administration by a specialist weed control organisation in a form such as the proposed Noxious Plants Council and its supporting structure. We have from the Minister, in his summing up, an assurance that this is going to be done, either by legislation or on order of Council. Whatever the procedure, the National Council and its workings from thereon, i.e. planning, education and common policies throughout New Zealand, will be implemented sometime in the very near future.

Secondly, national support to a problem that is becoming an economic danger to our national production can take the form of subsidies, as at present, or research grants. This is the nature of the thing we are talking about.

Thirdly, the ecological side of noxious weeds control is probably just as important as the actual clearance. A farmer will tell you that its going to cost his $10.00 to clear noxious weeds off a piece of land that has been out of production. It's going to take him another $90 to use that ground effectively. He has fencing, topdressing, oversowing etc. to do. The first noxious weeds control programme is the smallest part of it but is the first step.

Finally, the last point made was that the employment and training of adequate and specialist field personal responsible to an over-all administrating authority is most necessary. Our Institute, as I see it, is to further the well being of our inspectors. Obviously, education of our members should be of paramount importance. Inspectors over the years have always had this attitude and it is accepted in Government that we have the ability and the background to run this future proposed scheme. But don't let's stop it there. Let us make sure that we, on our own initiative, prepare ourselves for what I feel is going to be a large change in the attitude toward noxious weeds control in New Zealand. It will be a challenge to those administering it and for those upon whom it is administered, the people it is for, the farmers of New Zealand.

Thank you, Ladies and Gentlemen, for allowing me this time. I think it most interesting for us to get this background information.

Mr Somerville who was to have been on our programme is the President of the Counties Association, Chairman of Ward 2 and Chairman of the Waitomo County Council. He was one of the gentlemen on the Fitzharris Report Committee, one of the experts in his field and I believe a very good administrator. Unfortunately, Mr Somerville has not arrived but we do have with us Mr Thomas who is Chairman of the Piako County Council, a position he has held for two of the seventeen years he has been on the Council. He is from a well-known Morrinsville farming family and has accomplished many things like being on the Board of Governors of Morrinsville College and former Chairman of the Morrinsville Primary School. I believe he is a man who has moved around in his county and achieved a great deal of good in the area. He has had a long involvement with Federated Farmers. Mr Thomas, I would now introduce you to this gathering and trust that you will, in some small form, give us the message that Mr Somerville would have.

ADDRESS TO CONFERENCE BY THE CHAIRMAN OF THE PIAKO COUNTY COUNCIL

Mr Thomas: Mr President, Mr Luxton, Dr Heather, Ladies and Gentlemen. As your President intimated, I have been landed at rather short notice with a considerably larger amount on my plate than I originally anticipated on coming here, I must sincerely apologise for the absence of Mr Somerville this morning because I know he is a man much respected by the weed controlling authorities of New Zealand, and the Noxious Weeds Inspectors Institute. We of the Counties Association are extremely proud to have such a man as our President. The fact that he is not here this morning is causing me some concern, I must admit. Mr Somerville, from my experience, is most punctual and not a man who lightly forgets to notify people if something un-

toward should detain him. I do sincerely apologise and I'm equally hopeful that nothing unexpected has occured to obviate his presence here this morning. The other on the full scale of apologies is the Chairman of the Waikato County who, as you will appreciate from your programme, was to welcome the Inspectors to your Conference held in the Waikato area, an area which is covered by the counties of Ward 2. Mr Henderson, being in Wellington, is unavailable and it was suggested that I take his place.

Consequently I am cheerfully in a position to welcome you to the Waikato, particularly to that rural area of the Waikato which supports Dr Heather and his organisation very fully and I know that Dr Heather appreciates this and from time to time has even admitted it. Dr Heather, in his welcome to you this morning, was a little upset that he could not refer to the sunshine which is allegedly a characteristic of the Waikato. Being a farmer I am a little bit more prosaic on these matters and I accept that sunshine is a great thing but without a bit of rain from time to time my operations as a farmer and yours as Noxious Weeds Inspectors would be infinitely less rewarding. The very rain which allows my pastures to grow and hopefully give some return has been recognised as giving the ragwort population in particular a tremendous boost this present season.

We of the Waikato are proud of our district. We are proud of the fact that it is recognised as one of the leading pastoral areas in New Zealand and, indeed, in the world. We are expanding. Farming is a rapidly changing operation and at no time can you say that the farming operations of New Zealand remain static. You will have the opportunity, particularly Inspectors from further afield, to travel through our countryside where you will see a big upsurge in the area under cultivation, particularly the acreage of maize being grown. There is a substantial move from pastoral farming to agricultural farming and as weed inspectors this will have an additional effect upon your operations because what was considered to be a major weed under a pastoral operation can become insignificant in agricultural. By the same token, something which you may have paid very little attention to as a pastoral weed, was easily controlled by livestock, becomes an entirely different proposition in an agricultural setting.

In addressing you gentlemen here this morning and looking around the hall I'm particularly reminded of the extremely important position which you are now taking in the administration of weed control and County government in particular. Old images die hard and one is that of the retired cocky, looking to add a few bob to his pension, who knocked on the council door and said, "Hey, got any jobs going, Jack?" and Jack, being an old friend, answered, "Yes, we need a Noxious Weeds Inspector. You go off and serve a few 'blueys'." Now, this was a characterisation admittedly but very largely and very unfortunately, in many cases, was actually the true bill.

Well, let's face the facts today, gentlemen. Noxious weeds control is an important aspect of the farming and economic well-being of the country. Not only that but the control of noxious weeds is a far more complex business than it ever was in the past. We expect from you chaps a high standard of education. You have to become practically an agricultural scientist, a botanist, certainly a public relations officer and you have to try to be an educationalist. It's no use saying you are not going to be any of these things because this is the way you have to operate. I'm not interested in prosecutions. Our job is the elimination of noxious weeds and there are far more effective methods of getting rid of noxious weeds than slapping a bloke into court, fining him twenty dollars and giving him a licence to grow weeds. By the time that the operation is complete this is exactly what he has done. The things have seeded and you're back with the position again of one year's seeding, seven years' weeding.

I think I can speak fairly enough that within our county over the past few years our weed inspectors have been enabled to develop a liaison with the farming community and have been accepted as people who are prepared to help. When the Noxious Weeds Inspector's van goes along the road a farmer no longer thinks to himself that he wished he'd got those couple of things out of the front paddock before that 'B' went past. It's more a case of, "Hey, I want you. Have you seen this brute before. What is it?". So they don't necessarily know what it is right off but they'll soon find out if it's going to be troublesome and whether or not it can be readily eradicated and if so by what means.

We talk about hormones, we talk about all our noxious weeds chemicals and the various things we have at our disposal today. I think a lot of us lose sight of the fact that what I refer to as the longhandled hormone is, in many cases, still the most effective tool we have. Particularly in a large amount of the country around here where a certain proportion of your weeds are scattered. Quite frankly, an hour or two on the end of a shovel would do as good a job as belting around the paddock on a tractor. As Mr Luxton was referring to earlier, the amount of hormone weedkiller used in New Zealand should have eradicated every weed that could possibly grow on the place, seven times over. We tend to lose our sense of proportion with some of these things. There are many, many facets and many, many means of control for various weed species. Just

because someone is issuing a one minute flash spot on television doesn't necessarily mean that it is the most effective or efficient method in every case.

A weeds inspector must be in a position to note his weeds. He must be in a position to know the type of control. Lastly, he must have the confidence of the men on the land. And if he has those three attributes, then we can get control of noxious weeds, a control which any other form of operation would fail to achieve.

We had an instance in the Piako County just recently which I think bears out the point I am trying to make. A farmer rang up the Noxious Weeds Inspector and said, "I've got something peculiar down here that I've never set eyes on before." They went and had a look and what they found was a nice flourishing patch of water hyacinth. Now, I don't have to tell a Weeds Insepctor or the Ministry of Agriculture and Fisheries boys what a water hyacinth is. One of our Inspectors has brought along a couple of large coloured photographs of the infestation and possibly the ladies would say, "By Jove, Dr Heather, your wife might like a patch of this in her garden." No two ways about it. This weed is a real purler to let loose through the counties of Piako and Hauraki Plains in particular where low lying counties rely completely on the drainage systems of the plains. Water hyacinth has choked up waterways throughout the United States and Australia. It causes flooding due to its restriction on the flow of water. She's a purler all right. A beautiful little thing. Just like a woman, she's lovely but by gum, she can cost you the earth!

We were able to get hold of this particular hussy early in the piece because our farmers have confidence in the weeds inspectors that the County employs. Those weeds inspectors have enough knowledge so as to realise what they were facing. They received the complete backing of the Ministry of Agriculture and Fisheries, Ruakura and the patch under discussion has been cleaned out. The Catchment Board Authorities went in by boat and on foot for the whole length of the river including its tributaries and a very close watch is being kept on the entire area. Where this lot came from, heaven only knows, but no other infestation has been found at this stage. One of the scientists from Ruakura has been able to propagate seed that he took from some of these flowers and it was found that these seeds could remain viable for some twenty years. Hence, over the next twenty years there is going to be a very, very close inspection kept of one particular area on the banks of the Waitoa River.

One thing, mind you, that I think you can be sure of is that you will be having morning tea a little earlier than what you expected according to the Programme. I did not get up here, nor did I become a local Government politician anymore than Jack became a central Government politician because of my inability to fill in a few moments on my feet. But for all that, I have no intention of endeavouring to bore you to tears.

There is one aspect though and it has been mentioned tentitively in the Fitzharris Report with regards to the control of noxious weeds through local authorities, municipalities and counties. There is one new facet which is at present pretty closely under wraps, as I understand it. However, I feel that what we do know of it, should be told to you, the Noxious Weeds Inspectors Institute. There is a proposal that what could be known as land protection boards be set up. A land protection board is a system that is obviously a new ad hoc authority which is being proposed and will take the place, to a large extent, of the Pest Destruction Boards and will incorporate in it the ramifications of noxious weeds and pest control.

Apparently, it is considered in some quarters that the present local government authorities are incapable of being able to handle the administration of weeds or pests. I feel this is something we must watch very closely and if the time comes and the proposals are open for comment and people may journey forth to Wellington to make representations then you want to be in the position to know what you're going to do and take some fairly drastic measures. I dislike this type of operation intensely. I feel that whenever you are dealing with matters aplying to the land and the landowners, the farmers who are the people with whom we are working and whom we represent; then we must be absolutely certain that we keep the control of these operations within the hands of your farmers and your local committees.

The ramifications which have been suggested imply an operation which is headed by the Ministry of Agriculture and Fisheries. A fine organisation in their place. I hope they stay there. Forestry, Lands and Survey, the Pest Boards and suchlike enter the picture with the result that the overall operation becomes slightly orientated away from farmer/landowner control.

Now, I bring this to your attention, gentlemen, expecting that you as a responsible organisation will follow the passage of this type of suggestion with considerable interest and I sincerely hope that you may be of the same lines of thought as I am. We have looked at the subsidy scheme, now in operation and implemented during the period of our previous government. One of the things we have felt is that there has been insufficient use made of local government in this field. We have the position whereby all the claims which are verified by your group chairmen must

be checked if necessary and then they go to the Ministry of Agriculture and Fisheries in Hamilton. This has put a tremendous administrative load on the Ministry and it has been our feeling since the inception of this scheme that this business can be handled very comfortably by the administration set-up of the local authority.

You, our Noxious Weeds Inspectors, as qualified men, should be able to verify whether or not these types of operations have been carried out on a particular property. You know the properties. You have a card system and if you havn't you should of the various properties under your care. You know straight away by the look of a claim that comes in whether or not its reasonable. If there is any query its going to come back onto your plate anyhow so why not, in the first place have these claims vetted by our weeds Inspectors with the assistance of officers of the Ministry of Agriculture and Fisheries. Then the local authority can make payment of subsidy and make bulk claims quarterly to the Ministry.

Something along those lines, we consider, would streamline the operations considerably with the farmer getting money back into his hand in a much shorter time and considerably relieving the load put upon the Ministry of Agriculture and Fisheries.

Mr. President, I've taken up my time, Mr Somerville's time, possibly Mr Henderson's time and a heck of a lot of your time. I thank you very much for the opportunity to address the gathering and I once again formally welcome you all to the greater Waikato. I sincerely trust that your Conference is a rewarding one and that while you're up here you have a chance to look around the district. Thank you very much.

The President: We consider that a very good address and I'm sure the points you made are very valid ones. I can assure you that your attitude toward the responsibility and involvement of counties and their inspectors is almost word for word with my submissions on behalf of the Institute to the Minister. That may give you some satisfaction, Sir. Thank you.

ADDRESS TO CONFERENCE BY MR. W. J. BURNS
ASSISTANT TO THE DIRECTOR, ADVISORY SERVICE DIVISION
MINISTRY OF AGRICULTURE AND FISHERIES

Mr. Burns: Mr Chairman, Dr Heather, Mr Luxton and Mr Thomas. It gives me a great deal of pleasure to be with you once again under circumstances which Mr Luxton referred to as rather similar to my first appearance before you in Wanganui, two years ago, having to apologise for the lack of action as far as the implementation of the Fitzharris Report and its equally disturbing to find we are still in this situation. But I am very pleased to have the opportunity of coming along here to be with you again and certainly to accept the invitation from your Chairman to participate in the discussions, particularly those that are going to take place regarding the Noxious Plants Subsidy Scheme.

Referring back to the passage of legislation or should I say the slow pasage of legislation, I am very encouraged at the moment with current attitude of Government towards the intent and the implementation of the Fitzharris Report. I was nearly going to say that we might get it in this year. I don't know whether I'd be foolish to make a statement like that but certainly if it doesn't go in this year it's not through any lack of interest, I can assure you, on the part of the Caucus Committee on Agriculture. They have been most encouraging and are supporting fully the intent of that Fitzharris Report.

You have heard something today from two speakers of the meeting at which a review took place concerning the Noxious Plants Control Scheme, the discussions that went on and you have had some clues as to what in fact might eventuate. This is all we can expect for the moment as to interpret Government thinking at the present time and appreciate between the establishment of a line of though and the development of an implementation policy slight hitches can occur. Nevertheless, I think Mr Luxton made it quite clear that the intention of the Caucus Committee was to get stuck in and try to get the intent of the Fitzharris Report implemented even before the legislation. I find this is most encouraging and I am grateful to your organisation for the part that your people have played in this review.

Your Chairman mentioned the review which he prepared and sent to the Minister. Let me assure you that it was of extreme value in looking

at the scheme and looking at the wider possible aspects of weed control, even beyond the boundaries of the present scheme. I think the important factor is that your organisation is thinking wider than others who are thinking more in terms of what the assistance scheme is doing. You are looking at it in the broadest possible way and I believe this is a reflection of the attitude and the intent of the Fitzharris Report. For this I am extremely grateful to your President for the way in which he responded, as you are probably aware, within a framework of certain internal administrative problems. I am very grateful to you, Mr Daniel, for your actions on behalf of your committee and assure you that I appreciated it as did indeed the Minister and the Agricultural Caucus Committee.

As you are aware of the prospect of moving slightly toward the structural changes recommended by. the Fitharris Report I feel that all the things that Mr Thomas has said become even more immediate and more true. Any message I could give you today surely wouldn't be as eloquent as Mr Thomas's. But this is your role, the wider role, the friend of the farmer role which is becoming more and more pointed as we move toward the implementation of the Fitzharris Report. And I would like you to look at the Fitzharis Report. Not so much in the terms of the present Noxious Plants Subsidy Scheme but rather in the wider implications of co-ordinated regional weed control because this is what it's all about. The subsidy scheme is only an appendage, an incentive if you will, but nevertheless it is only a part of the total package that you people are going to have to get in and establish over the next month or four.

If the structure of the Fitzharris Report is established it will in fact bring noxious weed control down to a noxious plant authority. The administration with the local authority. This puts you guys fairly and squarely in the gun and could I suggest that the most important thing you can do is go back to that green covered book and read it for the umpteenth time. Read it critically and try to understand what people like Alan Talbot, Max Somerville, Jack Fitzharris, Con Herberston and Co. had in mind when they drew up this blueprint for weed control. For positive action on control. Not, as Mr Luxton said, showering enough herbicides all over the countryside to kill the weeds over and over again. But something positive, a step forward in regaining the frontiers, the pastures that have been lost. In developing new pastures to the benefit of New Zealand. So I suggest that it is extremely important for you people to understand completely what the intention is of that Report.

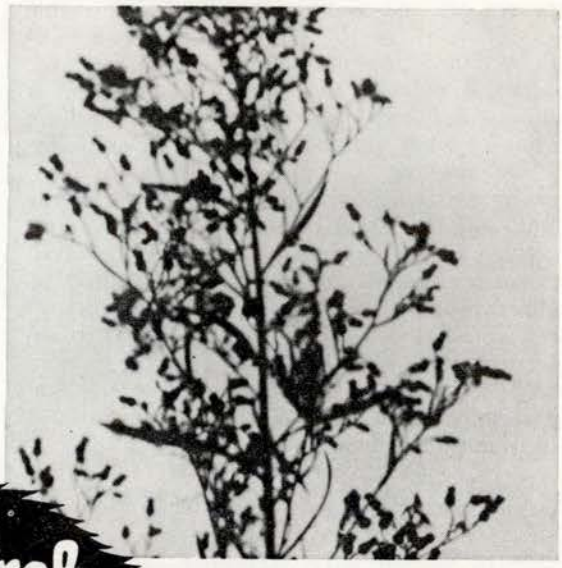
If I can draw your attention to any one thing in the Fitzharris Report it's a group of about three pages from 45 to 48 and you can even forget about the Class A weeds and think on the Class B weeds because these will be the ones that you will mostly be concerned with. Look at it. Think about it. Try and see what in fact they mean when you look at the criteria they have established. If we manage to get this structural arrangement set up for weed control then this will place you people, the professionals, in an extremely important position and you must understand the intent of the Report to be able to do your job properly.

As Mr Thomas said, you have an educational role to play and I might suggest that one of the areas of education that you may have to direct your attention to is your weed control committee or your local authority weeds control committee. This is to make sure that they have the same sort of feeling, the same understanding and the same sort of determination required to take this positive step in weed control. It's a different concept than the old. The attitude that obtains in some counties of establishing a bluey here and a bluey there is not the sort of thing intended here. So, I believe, you have this intial job of making sure that the people directing your operations in fact understand them as well as you do. This apparently is what the inspector's role is in Piako County.

You have been giving vocal suport to the establishment of legislation to implement the Fitzharris Report and you are getting to a stage where I feel you will have the opportunity of putting your money where your mouth is. This is the challenge before you today. To accept the opportunities and the challenges that have been offered by your Chairman and indeed by Mr Thomas.

I look forward to joining with you for the next couple of days and trust you not only have an enjoyable conference but that you go away imbued with the idea of being able to put the hand of progress on weed control in your respective districts.

The President: Thank you Mr Burns. With due respect to other speakers, I'm sure that caps off what we've been talking about and the intention of conferences such as this. Ladies and Gentlemen, I would thank the visitors, invited guests for being with us this morning and a warm invitation is extended to you to sit with us on any sesion during the Conference that you may care to attend.



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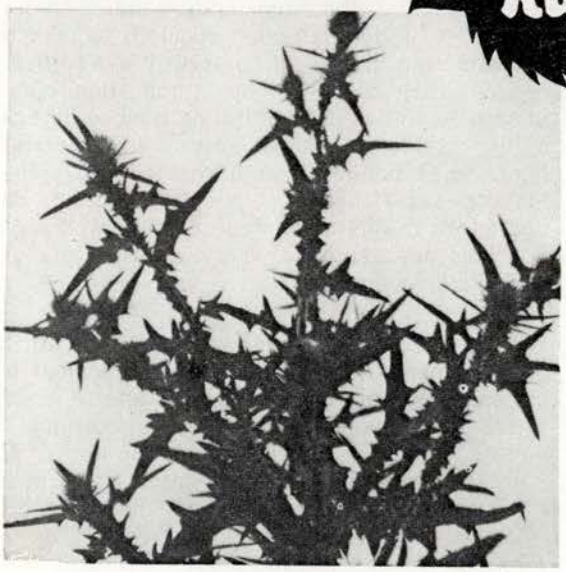

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VOCATIONAL TRAINING FOR NOXIOUS WEEDS INSPECTORS

Presented by:—
Mr C. Molloy,
Senior Liaison Officer,
Vocational Training Centre,
Auckland.

Mr C. Molloy: Mr President, Ladies and Gentlemen. Thank you for your welcome. Although the notice was admittedly short I am very happy to be here, Mr Chairman, due to this shortness I am going to read a basic paper prepared by David Johnson and then I'll discuss one or two particular points that will be of interest to your Institute and I will leave you time to ask questions which I'll do my best to answer should you have any.

The subject is The Vocational Training Council and Local Government Training. The Vocational Training Council was established by Statute in 1968 with its function prescribed as an advisory one to Government, State Departments, industry, commerce, agriculture, social welfare and other interested organisations. Recommendations of the Council may relate to improved training schemes, levies, or other means of financing or encouraging training. The award of scholarships, the fostering of research, the carrying out of enquiries, and investigation in any field of training and maintainance of an information service. The Act provides for the Ministers of Education and Labour, acting jointly, to appoint a chairman and to appoint seven members on the nomination of the New Zealand Employer's Federation. Two from New Zealand Federation of Labour, one from the New Zealand Manufacturers Federation, one from the Technical Institute Association and one from the Technicians Certification Auhority. Then the Ministers may appoint five other members and so far two appointments have been made to embrace Polynesians in the work force and women in the wor kforce. The Director General of Education and Secretary of Labour are ex officio members. The Council includes three associates who are non voting members. One being appointed by the State Services Co-ordinating Committee, the second by the Combined State Services and the third by the Chairman of the University Grans Comittee. So the endeavour here is to ensure that you have as wide a coverage of industry interests, Government interests, employer and union interests and education and training organisations.

The policy of the Vocational Training Council is that training involves considerable monetary investment and if undertaken purely for its own sake is wasteful of resources and effort. Training action in industry and commerce must be planned to meet specifically identified business nees and assist to enhance the individual's prospects of contributing toward his or her development. This means results, including hard commercial results, so that one is training not only for the employer and the trainee. Consequently, the importance of assessing training needs in an objective and systematic manner cannot be over emphasised. Trial and error methods must be replaced. Council has encouraged each industry to first identify its needs before formulating and implementing remedial programmes in co-operation, where necessary, with appropriate educational and training organisations.

For this reason, industrial and commercial training boards or their equivalent have been established in 25 industries and others along with local government are pending. I would like to say this: that the V.T.C. itself does not attempt to train or tell industry or Government Departments what training they should have. The Vocational Training Council is an advisory body to industry and Government. Its main function is to set up the machinery by getting the co-operation of leaders in various industries to set up their own training boards and to determine their own training requirements. Council believes that only industry itself, if it carefully examines the situation, can decide on its own particular training scheme. Hence the Industry Training Board was set up. Boards are set up by agreement between employer and employee groups for a particular industry to formulate and implement effective training at all levels.

The general pattern of composition is representation from employer, employee and educational interests together with a representative from the V.T.C. Some boards have included one or more specialist groups such as relevant Government Departments or professional bodies and co-opted individuals with special expertise. In 1972 the V.T.C. Amendment Act gave the Boards corporate status and the Council power to delegate functions to the Board. These Boards may be seen as a voluntary counterpart to the statutory boards operating in the United Kingdom which are engaged in wide ranging activities.

Essential to an industry training board and systematic training have been the appointments, by the Board, of executive training officers. The activities of these trained officers have made and are making a major contribution towards improving the quality and effectiveness of educational and training programmes. Their role is that of an executive specialist who acts for an industry as a focal point for advice and information and the executive action for an Industry Training Board. He acts as a co-ordinator, not as a course producer. He must be acceptable to top management of industry, trade unions and educational institutes. He must be of management status and of a calibre and competence which will warrant the status. Now, who are the industry Training Boards — There are 25 of them as folows:- Agricultural Training Council, Preparatory Industry Training Board, Aviation, Building, Contracting, Dairy Industry, Distribution, Electronics, Engineering, Fishing, N.Z. Footwear, Furniture, Hotel and Catering, N.Z. Journalists, Meat Industry, N.Z. Motor Trade Certification Board, (which is a very old established Board), Plumbing, Gas and Drainlaying, Road Transport, Shipping Industry, N.Z. Stock and Station Agents, Canning Industry, Textile Indstry, Trade Union Training Board and the Waterfront Training Organisation.

Each industry has its own board and makes its own decisions. In other words it becomes a voice for its own particular industry as far as training requirements are concerned. In addition, the V.T.C. has established certain innumerous back-up activities including committees which administer study Awards, trade training apprenticeships, hostels for technical institutes, the rationalism of management education and training, supervisory training, the training of training officers and continuing education. These are special committees because they apply not to one particular industry but can be of importance to various industries. I mean, an apprenticeship covers not just one engineering group. It might cover engineering workers in the meat industry, engineering workers in the avaition industry, and so on. The employment of polynesians is an important factor in a number of industries. Many manufacturing companies with widely ranging activities, particulary in the Auckland area, encounter certain social problems in training their people to live in relation to their employers.

The V.T.C. has set up advisory committees and working parites on apprenticeship and related trade training. A Women's Advisory Committee made up of women in the work force. A Polynesian Advisory Committee which is very important in the Auckland area and we have or own Advisory Officers there. There is a Regional Consultative Committee on Polynesian employment set up in Auckland and Wellington and these report to the Polynesian Advisory Committee, which I mentioned earlier, as it is a national Committee. There is also a working party on institutional personnel such as people employ in large cafeterias and hospitals and so on. It goes across the face of all industry. Those engaged in training personal need, of course, to understand the principles and practice of training. To satisfy this need a training working party has been established over the last twelve months. It has been working actively in Dunedin under Professor Rosswell and doing very satisfactory work there. Massey University has also been training trainers, although to a lesser extent and I expect that shortly in Auckland there will be a similar group established, probably sometime in October.

Then there is a supervisory work section. This has been very active in industrial training with the U.E.B. organisation. Mr Whelan, who has now gone out on his own as a Consultant is also acting on contract to the V.T.C. and is producing complete training packages to use in industry for the training of supervisors.

In 1974 new training incentives were introduced. The Government has now, through the V.T.C., established a means of assisting employers to assist in industry. I mentioned the setting up of Training Boards first of all but now too often you can set up in an industry and this has been happening too much in the past. You can set up a group of enthusiastic employers who want to see training established not just within their companies but throughout a group of compaines or in their industry and usually the busiest man is the one who tries hard to get some sort of training prescriptions or some sort of training schemes going. As a result of the setting up of the V.T.C. Act it is possible to give these people considerable assistance in the administration of their training. Administration grants of up to $15,000 per annum for each executive training officer employed by an industry training board are made to the boards by the V.T.C. Some boards have received up to $90,000 in grants because they have employed six training officers.

Let's take the example of a local body setting up a training board. Providing it has the right representation of employers and of the employees relevant groups of occupation and also brings in educational training interests then it could have a member either from the University, the Technical Educational Direcorate or of the Industrial Training Service. As long as it is an accepted member representing educational training, is a V.T.C. representative on the board, applies to bring in an educational training programme over the face of that industry and which, in due course, will cover all aspects of it from shop floor to top management; then the Government is prepared to pay 19% of the administration costs up to a

maximum of $15,000 per annum for each full-time officer. It means then, that if you appoint a suitable person, he can do the research for your particular industry and, given certain guidelines by the Board and Educational Training Committee, he can do the researching of the priorities and bring in recommendations for training.

This has been a tremendous asset to industries. In the 1974-75 financial year I believe the amount of grants was about $480,000 which represents well over 30 training officers working for something like 25 training boards and a training board is something that I would hope your Institute will establish accordingly. We would be able to appoint a training officer and get the full benefit of someone who would concentrate on your needs and come up with a specific training programme. Two small boards could share a training officer and the grant would still apply with each board putting their own 5% toward the full 10% of the cost. The grant would still apply of $15,000 for one person.

Let's illustrate the group training. You want a group training on some particular aspect of Noxious Weeds Inspectors. For example, the safe handling of pesticides. It could be that in a certain area you don't have enough people able to attend a course established by yourselves or the local technical institute and you want specialists in this field. So it could be that within a reasonable geographical area that you are able to get something like a dozen people together and specially employ someone for a one or two day seminar. In circumstances such as this the Government would offer training incentives of $2.00 for $1.00 subsidy to employers per group trainer. In other words, if you want to have a person to take this scheme he could be paid a $2.00 for $1.00 subsidy for his wages up to a maximum subsidy of $3,500 per annum. If you had to bring someone from a distance you could receive a considerable subsidy on his travel expenses and overheads with a maximum of $2,000. Now, there is a certain criteria which I wont go into but this is one particular instance.

I would like to comment about local Government training and I will do so fairly quickly and then leave it for any questions. For several years the V.T.C. has had a number of discussions with the Municipal Association, Counties Association, various local authorities and professional organisatiosn with the ultimate possibility of establishing a local government training board similar in some ways to that which exists in the U.K. and similar to other industry training boards which exist in New Zealand. The standard of training in New Zealand local government at present is not really known as each local authority is completely autonomous and the standard therefore can vary from very good to rather poor. One thing for certain is that the training which exists at present is not co-ordinated or systemetised with the context of overall man-power development for local government as an industry for the whole country.

With suport of ministers for local government we have progressed to the stage now of setting up a steering committee to examine the training needs in New Zealand local government. This steering committee comprises representatives of the New Zealand Council Municipal Association, the Department of Internal Affairs, the Institute of County Clerks and the Institute of Town Clerks.

I have been led to understand that in your area a feeling exists that there is a great need for training. From what you people have told me and from my experience of meeting other industries and so on I would say this is something that is occurring in your industry just as it is occurring in a number of other industries where there are personal requirements, technical requirements, administrative requirments and so on. One of the things I would recommend you do, is take any plans, and I believe you have quite a few, prepared in a way to show the training areas you need, assemble these together into as compact a package as possible and send them to the steering committee of the Local Government Training care of the Vocational Training Council.

I feel that it shouldn't take too long to get some of your training under way if this is accepted in principle. One thing I believe you may want to do is have various types of training for your members. It may be in the nature of personal relationships, supervision or dealing with people. These are things usually set up by you yourselves through a local technical institute, industrial training service or whatever group you wish to use. You could, I imagine, obtain training incentives once you have established your claim through the steering comittee.

There are also technical institutes and universities which can offer assistance and I would like to refer to the more technical aspects of training. I believe that the Technicians Certification Authority could prepare courses that would be suitable for young people coming in, cadets, or they could set up as an authority for established training but, shall we say, outside the trade. The Trade Certification Board does the training for apprentices and so forth over something like thirty odd trades, including typists etc. The T.C.A. would probably have already in existence a wide number of subjects and various certificates which could be applicable.

The President thanked Mr Molloy commenting that he had covered the information very well and then invited questions from the floor.

Questions:

Simpson, Wellington Region: With regards education for this Institute, Mr Molloy, would you suggest block courses or correspondence courses?

Mr Molloy: This, I feel, is very much a matter for you yourselves to decide on. It depends on the type of course but I would expect both types. For the older man working out in the country who wants more of a reading type of course related to management or things prepared by your Institute, then I would say a correspondence course would probably be the most suitable. But for the young cadet I think a block course would be the best, set up at a technical institute. Where you can get personal tuition I would recommend it.

McGaw, Waimate West: Could Mr Molloy tell us what the minimum number is that they would involve on these courses, for example a block course.

Mr Molloy: We usually try to get fifteen persons as a minimum but if its a short block course we may reduce it to 13 or 14.

Daniel, Waitaki: Sir, all this education and training is fine up to a point but at the end there must be qualifications. At what stage does the Vocational Training Council come into this? Do they make provisions for qualifications in a case of new concepts like this?

Mr Molloy: The Technicians Certification Authority have their own recognised certificates. There is what they call a Technician's Certificate obtained after 3 years. The Forestry people even have 5 year certificate which is called a New Zeaalnd Certificate and this could well apply. There is every reason to suppose that a certificate should be available to Noxious Weeds Inspectors. You should have one and this is something you must aim for.

Fawcett, Banks Peninsula: Does the Agricultural Chemicals Certificate on herbicides have any bearing on the situation regarding certificates?

Mr Molloy: I think these other courses could have value because if your committe can draw subjects out of those which are useful they have a twofold value. One is you have something in your own language and the other is that it's easier to get courses going if you have a mixture of Noxious Weeds Inspectors and others attending a subject. Many of these courses are borrowed from one certificate and another and put together to make a suitable course for the situation required.

LIAISON BETWEEN FARM ADVISORY OFFICERS AND NOXIOUS WEEDS INSPECTORS

Presented by:—
Mr G. Banfield,
Regional Farm Advisory Officer
Hamilton Region.

Session Chairman: Mr J. S. E. Holden, Raglan County.

Chairman: Gentlemen, it's my privilage to introduce you to Mr George Banfield, Hamilton Regional Advisory Officer serving the Waikato, Bay of Plenty and Thames Valley regions, involving some seventeen counties. He's widely known and respected in farming circles and I have much pleasure in handing you over to Mr Banfield.

Mr G. Banfield: Thank you, Mr Chairman. Gentlemen, I don't intend to make this a long address because I think we'll get far more out of the discussion which should follow. All I want to do is give you an indication of my policy as Regional Advisory Officer for this region. As you know, one recommendation of the Fitzharris Report has already been implemented. This particular recommendation was that the involvement of the Animal Health Division be given over to the Advisory Services Division. This is a more logical relationship but one that has been resisted by Farm Advisory Officers and myself for many, many years because of the belief that our involvement in noxious weed control could compromise our acceptance in the farmer community as a source of impartial advice.

It is still our policy for Advisory Officers to keep clear of regulatory aspects of weed control and leave this to the Noxious Weeds Inspectors, a purpose for which they are employed. It is unfortunate that because of deficiencies in the present noxious plants control scheme, with all due respect to you, Willis, that some of our Officers have been involved in the regulatory aspects of the scheme. It is most undesirable that this should continue and I trust that if the Scheme is to carry on it will be modified so that it will be administered by the counties through their Noxious Weeds Inspectors.

The introduction of the noxious plants control scheme may have tended to cloud the issue but the respective roles of Farm Advisory Officers and Noxious Weeds Inspectors have not really change. Farm Advisory Officers are required to provide an advisory service to the primary producers of this country on all aspects of farming which includes advice on weed control. The Ministry of Agriculture and Fisheries, as an agent of central Government, is also required to authorise and pay subsidies and grants which come within the scope of the present Noxious Weeds Act, the Nasella Tussock Act, the Australian Sedge Subsidy Scheme and the more recent Noxious Plants Control Scheme.

These duties, in my opinion, in no way conflict with those of a Noxious Weeds Inspector. Because Noxious Weeds Inspectors devote virtually the whole of their life to the control of weeds it would be most surprising if they did not become experts in this field, in fact I would think they had a very low I.Q. if they didn't become kings on the subjects in the areas in which they act as a Noxious Weeds Inspector. This being so, it is important that this expertise be used to maximum advantage.

We have two agencies. Farm Advisory Officers and Noxious Weeds Inspectors. Both are operating on finance made available in whole or in part by the Government. It is imperative that we tell the same story and this means a liaison between us which must leave nothing to be desired. As near as possible we must be in complete agreement regarding rates of application of chemicals and optimum time for application and many other facets of weed control in which there is plenty of room for divergence of opinion.

Although the present Noxious Plants Control Scheme has its weaknesses it has in most counties helped to cement very good relationships which already existed. The Scheme has also done more in one year than has been achieved in the previous ten years to ensure that the two groups are not providing conflicting advice. Even when Farm Advisory Officers and Noxious Weeds Inspectors are in complete agreement their advice may conflict with the views of local noxious weeds sub-committees of councils. To overcome this problem it is desirable that the Ministry be included in the membership of such committees, even if it not necesary for its Officers to attend every meeting. This is happening in many counties already. All I'm suggesting is that we ought to go along a bit further and make this a little more formal.

These committees could be the forerunner of the District Noxious Plants Authorities which have been recommended in the Report of the Committee of Enquiry into noxious weeds administration and it is reasonable we go part of

the way towards the achievement of this goal. From what we have heard today, Mr Burns, it sounds as though this might be coming even sooner than we expected. Maybe June or July. Something like that.

Some County Councillors believe that Noxious Weeds Inspectors should not give advice at all because in the case of litigation, farm owners have been known to claim that unsatisfactory results achieved have been the result of following advice given them by the Noxious Weeds Inspector. Of course the same applies to advice given by Farm Advisory Officers and this has been held up as a reason for failure. For this reason I suppose, where there's a chance of litigation one ought to be careful to put one's recommendations in writing and I think this will stop the kick-backs. Unless of course you do give the wrong advice and then it will sew it up! If this is the official view of a Council then there's little that can be done but I feel pretty sure that if the Fitzharris Report is fully implemented we will have to get away from that and move more towards advice and a little less perhaps on giving a 'bluey'. It is my view, however, that the expertise of a Noxious Weeds Inspector should not be wasted where the Inspector is competent to give sound advice and in my opinion, this would normally be the case.

It may be that the new, young fellow could have quite a lot to learn and it may be desirable, in the early stages at least, that he be a little slow to give advice. We have this sort of thing with Farm Advisory Officers. With new recruits. I have been in close contact with Noxious Weeds Inspectors since the war and I believe that we now have a new breed of Inspector and that's no reflection on you, Tom. I remember you way back in the early days of the Hauraki Plains. But as Mr Thomas mentioned this morning, the old image of the Noxious Weeds Inspector was a retired farmer who went along and looked for a job when he was too late in life to really get with it and was interested only in earning a little bit to keep himself going. I have personally been impressed by the emphasis which most Inspectors are now placing on the management aspects of weed control. Aspects which are most important if pasture damage and weed re-infestation is to be minimised.

I realise, of course, that the dissident farmer provides a difficult problem because he neglects to carry out weed control measures at the correct time when more harm than good is achieved from spray applications. It is under these circumstances that Farm Advisory Officers have to be very careful not to provide advice to the dissident farmer which could be used by the farmer against action taken by the Noxious Weeds Inspector under the Noxious Weeds Act. This, once again points to the necessity for close liaison between the Noxious Weeds Inspector and the Farm Advisory Officer to ensure that problems of this nature do not arise.

If the Report of the Committee of Enquiry is implemented I will be required to chair one of the eight regions of co-ordinating committees. It is my hope that before that comes about the liaison between our staff and yourselves will have already strengthened to the point where little further improvement could be achieved. This stage has already been reached in most of the counties that I am familiar with and where the liaison needs to be strengthened I will be encouraging my staff to take the inititive in this respect. If you also take the initiative from your direction I cannot see how we can fail to meet our common objective. It will be my hope that most problems and differences will be settled at the local or county level. This is the normal protocol and it should not be necessary to go over the heads of the local Farm Advisory Officers.

Some councils believe in taking up everything with the Minister even before they have taken it up locally, thinking this will speed action. In actual fact it mostly slows up action because the whole train of communication is invoked which includes a report from the local Officer of the Ministry. Most problems can be corrected at the local or regional level in a fraction of the time as a result of a phone call or a visit to the local or regional office.

The same applies to inflammatory reports to the press. This always annoys one party or another and especially so when only half of it is correct and the other half not known. I personally get annoyed when a half-baked story is published and they could have obtained the whole story had they wanted to. I don't think this leads to the sort of liaison I'm talking about. I think we can be in agreement on what is published if we can achieve this kind of liaison.

As a one-time Advisory Officer, I used to welcome a visit to my office by the local Noxious Weeds Inspector as it provided the opportunity for us to get on the same wavelength and I might say this happened fairly frequently. It probably happens now to a certain degree around the country but I feel it could happen to a far greater degree. I would also hope that Farm Advisory Officers and Noxious Weeds Inspectors could join forces to arrange field days and seminars dealing with weed control and once again I would stress the necessity for all to present a common policy to the maximum degree possible. I know this is already happening as I have been to quite a large number of field days where we have had this joint liaison and I want to say this is a good idea. There's no reason why the suggestion for

such an occasion can't come from your side of the field if you think that there's a need for a field day or seminar to deal with some particular topic. I believe that liaison between our two groups is very good and you can rest assured that it is my policy to foster even better relationships.

Chairman: Thank you, Mr Banfield. I'm sure there are going to be some very interesting questions and likewise some very interesting answers.

Questions:

Fawcett, Banks Peninsula: Where a farmer has complied with the requirements of the Noxious Weeds Inspector to clear ragwort and the farmer alongside him hasn't with the time gone for any effective control measures to be taken, chemical wise. What should be the attitude of the Noxious Weeds Inspector to safeguard the other fellow? Do you think that pressure by court action will help? If not, how does one get over the continuing situation of farmers who promise you the world but do nothing? Isn't prosecution the end result in this case?

Mr Banfield: Yes, I did say the dissident farmer was a problem. Unfortunately I don't think the Fitzharris Report really helps us on how to deal with this particular problem which is a real one, I agree. Where you have one farmer who has allowed his ragwort to flower and you're required to protect his neighbour, spraying may not be the answer. The flat country that we get around on here may be covered easier with a forage harvester type of instrument or mower and you can simply cut the ragwort, rake it up or burn it. Anything rather than go and spray which will probably knock the pasture very severely at this stage and may even knock the clover right out or open up the pasture so that you get a greater infestation come Autumn. It's something we have to look at and something that we don't have a satisfactory answer for.

If we were to follow Les Matthews hypothesis, the thing to do would be let it flower so that the old men plants, and the old lady plants too, I suppose, would probably die and we would be left with seedling ragwort which we spray in the Autumn with generally good results. Alas, there's always an exception to the rule with weed control that proves that you're a damn fool and telling lies. However, spraying at the spraying time when you know it won't normally do much good is, in my opinion, not the thing to do and very often it would be better to pull or mow them rather than spray.

Chiles, Ohinemuri: Do you think it more fitting instead of prosecutions to put in a contractor and get the work done by this method?

Mr G. Banfield: This is being done in some counties. The county itself takes the necessary action and it seems to me that if the cost cannot be recovered then it goes on the land and hopefully the county recovers it when the land is sold. Now the problem is, I gather, that some counties don't have money to spend in this manner.

Robertson, Piako: In Piako, we, and I say we in the context of Council as well as weed inspectors, favour invoking Section 7(3) of the Act taking fundamentally the view that money spent on weed control is money better spent than on prosecutions. We have, unfortunately, in some instances utilised Section 7 but most inspectors would find and I'm sure many here will agree with me, that when it comes to the crunch: if Section 7 has been administered democratically, sensibly and your ratepayer has been instructed of his right of appeal, if taken step by step you will find that not many farmers will face the fact of a contractor going in on their property. In over four years we have reached the court doors only twice. We can't see the wisdom in money being spent on prosecutions when it could be spent on the removal of noxious weeds which is the source of our total problem. In relation to the charges discussed this morning, I believe that if a case is proven all the way through these charges can legally go back on the land so that the county council or local body would never be ulimately be lumbered with the cost of such weed control.

Chairman: Adding to that. In my own county, we have had available for some years, not only our own weed spray plants but the contractors as well and very often you'll find that a backsliding farmer when confronted with the availability of a contractor to do the work is very, very reluctant to refuse any request. Depending, of course, on his financial set-up.

Kennedy, Hauraki Plains: Is it true that any action taken under Section 7 does not qualify for subsidy?

Mr G. Banfield: That's my understanding.

Fawcett, Banks Peninsula: Regarding this subsidy under Section 7, just where does this thinking come in? We started this caper down south and were told we couldn't get subsidies. We don't want the subsidy! It's for the farmer himself and I'll quote the case in point. The job cost $300 which we can claim back off the farmer. There's no doubt about that. But our theory was and still is that if the job cost $300, then the county spends this and we recover $150 finishing only $150 out of pocket. Now, if you are doing this on a large scale, spending many thousands of dollars; what county will be able to stand it? It would only cost the farmer the same amount as if he did the work himself and received the subsidy. I can't follow the Department's thinking when it comes to this.

Mr W. Burns, M.A.F.: I think that the short answer to this question is that it's a curly one.

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The concept of the subsidy scheme is operating with a willing participant and this is the basis of co-operation, where encouragement versus the old carrot on the stick bit. However, the thinking for Section 7 situations is where the land occupier is an unwilling partner to the whole operation. I take your point regarding being successful in recouping the cost of the operation. Perhaps this is the sort of penalty that the occupier gets for not co-operating in the first place. Where you don't get it you could be in another ball game altogether and perhaps it should be looked at in a different light. We see no justification for the public supporting a guy who's not going to do his own work. If he's carying a can, let's hope he carries the whole can. On the other hand, if the council is carrying the can, which in fact means council ratepayers, perhaps we should have another look at it.

Fawcett, Banks Peninsula: This is a particular hobby-horse of mine and although what Mr Burns says is correct it is still a matter of co-operation in the farming group. It must be borne in mind that the whole background to the thing is the Noxious Weeds Act and if my county sets out a policy which we're going to enforce by going to court if necessary, then we can't be concerned as to whether a farmer is willing or not. If the subsidy wasn't there he'd still be for the gun. I can't see that it makes any difference at all. There is a certain amount of penalty in the thing insomuch as we charge administration costs, inspection costs and various things like that which he doesn't get subsidy for. But a straight-out job of say $300 done by himself gets $150 back if it was done within the group programme. If he doesn't do it, the council does and nobody gets any subsidy.

Forbes, Tauranga: With regards channels of communication. You mentioned that it saves time to adopt the correct channel as a noxious weeds inspector which is through the local Farm Advisory Officer. That's fair enough. You also said that the Noxious Weeds Inspector is king in his field of noxious weeds control and for that I thank you. One could discern from this that the Noxious Weeds Inspector's knowledge in weed control would surpass that of the local Farm Advisory Officer so therefore any information required by us would probably be something of a higher plane.

To illustrate this, we have under his group scheme guidelines set down for he control of various weeds. These guidelines have come down from the Regional Authority, through the sub-Region to a local level. The guidelines set down for aerial operations require a water rate of eight gallons per acre. This is very good, I think, as a minimum. However, since their release, certain pressures have been exercised by the aviation industry with the result that the M.A.F. have acceded and stated that on a sub-Regional level, providing control is obtained, they will accept a much lower rate.

I would like to know where we stand. What is the minimum rate of water we can apply and expect acceptable control of nodding thistle. I cannot get this from the sub-Regional level because they have left the gate wide open for low rates of water carrier to be used. Hence, I want to contact the person who is in a position to advise me and I go direct to the man I consider to be the leading authority in the country, Mr Matthews and he says "Eight gallons". Now is that outside the reasonable channels? Or must I go through the local M.A.F. who have acceded to the aviation industry's proposals to the low water rates?

Mr G. Banfield: On your first point, we havn't really acceded to this lower rate of water. We are still convinced that to get reliable results you can't go down below 8 gallons. Now it may be proved, in the light of further research, that you can come down lower and Marine Helicopters Ltd. have prepared some reports which sound very convincing. However we still remain somewhat unconvinced There's no problem of killing, say a nodding thistle, if you can get the chemical into the weed. In actual fact it's very easy to kill but the problem is getting the chemical down onto it. It seldom ever fails when you apply the chemical by ground methods but the moment you start applying it from the air you can expect to get failures and our experience, particularly in the Rotorua-Taupo area, is that the failures seem to mave been associated with the lower water rates like 2 gallons, of the carrier per acre.

So. with not having enough research backing to steer us in any other direction, we are still stipulating 8 gallons of carrier which you obviously agree with. Now, we say that if a farmer uses less than 8 gallons, the risk is his and he may not receive his subsidy if he has a failure because he hasn't followed the guidelines. This is our thinking and perhaps it isn't so good. Maybe we have left the door open or closed. If it is possible to get success with this 2 gallons of carrier per acre naturally it lowers the cost of the job and possibily makes it easier to get more done. But we don't go along with it.

As to the second part of your question regarding communications. I think you have had a long standing arrangement regarding access to Mr Matthews which is not the sort of protocol that operates within Government Departments. You normally find that you have to operate through your local offices of, for example Lands and Survey, Maori Affairs, etc, This is the normal situation and the same applies here. We would hope that you take up a problem with your local Officer and if he doesn't know the answer, it is

then his responsibility to take it up with his sub-Regional Officer or the Regional Officer and if we don't know, then we refer it to research but the danger is that research will be dogged down answering enquiries which are the job of an extension division.

Daniel, Waitaki: At what stage would the Ministry refuse payment of subsidy where a job doesn't succeed on a 2 gallon rate? In theory, the applier for subsidy, can put the chemical on and within two days put his application in, signed by the chairman of his group and it could go through to the Ministry and be paid long before any results were known.

Mr G. Banfield: That could happen but in actual fact the time lapse has been a little longer than that. Mostly the Noxious Weeds Inspectors have been on the ball and checked these things out long before they come to us and I believe that in the past there has been sufficient time for failures to be noted.

Daniel, Waitaki: I would agree on the ones coming to the notice of the Noxious Weeds Inspector however with the present authorisation by a committee chairman it doesn't necessarily come to their attention until such time as it has been sent away.

McCauley, Cook County Council: We have recently overcome a problem of Johnson Grass and I think that without the undaunting support of the M.A.F. we'd still have the problem. I hear inspectors asking questions about the Noxious Plants Subsidy Scheme which we are supporting by having this good liaison between the M.A.F. and the country. I think it essential that this should be so in all counties because it's aiding us in our job of weed control and also acting as a very good public relations exercise.

Chiles, Ohinemuri: A farmer in our area has submitted a claim for treatment of ragwort involving 700 man hours and 700 tractor hours. I've taken this up with Don McKenzie of Tauranga and also our own local weeds group in the Golden Valley. We worked it out in the county office at a weeds meeting last week that one gallon of chemical in 140 gallons of water would take 5 hours to apply at normal going. This comes to a total of 200 hours but he still maintains that he has done 700 man and tractor hours. We have given him a bit of grace and brought it up to 300 hours but he will not accept this. If he did accept it he would want in writing from the Department, evidence that it only took him 300 hours and not 700. How do we get on in a case like this?

Mr G. Banfield: Well, I don't know that you would get anything in writing anyway and his submission would be turned down. Firstly, because you wouldn't agree with it and will have said, "no we can't support this" and secondly because Don McKenzie would probably go along with you. He would know the case. I forget what the appeal rights are but this would be the first case I know of where this would happen, if in fact it does.

Blair, Waimate: You may be interested to know that we have done quite an amount of helicopter work at 2½ gallons per acre and its been reasonably satisfactory. 4,050 acres were done last year and of that, and I say this with care, we had somewhere near an 80% result which was pretty good.

Higgens, Vincent County: I would like to comment on a situation which has arisen in the Vincent County. Under the present set-up of the Subsidy Scheme the County gains no benefit at all from the weeds eligible for subsidy as the major problems in the County would probably be briar and barley grass with very little in the way of broom and gorse. From the inception of the scheme approaches have been made to past and present Governments asking that they at least recognise the fact that briar, along with barley grass, is a major problem in our county. I may be wrong and there might be other counties with this problem but it seems to be unique to ours and since this particular problem arose we've approached the M.A.F. Field Officers who were in on the group schemes with us all of a sudden they have cold feet and have stepped back and it's still that way in the county with them having very little to do with the group schemes. The applications for subsidy in our county total 12. We would be lucky to get anywhere near $800 for spraying a small amount of nodding thistle and broom. How would you remedy the situation with Field Officers under your control?

Mr G. Banfield: Not all of these people would be under my control and we have put up more weeds than have been accepted nationally. Probably the same thing may have applied to your county where the local staff may have put up sweet briar and barley grass, in fact they have been put up by many counties, but have been turned down. Originally, because the scheme came out on the 23rd May last year, which was very late as far as getting out any programmes were concerned, Wellington said, right, these weeds are eligible for subsidy and for a while we were able to make a case for additional weeds. Then I think, as you said, someone got cold feet. Probably the Government when they saw how much it was going to involve and so at that stage it was chopped and no further weeds were added. Having made this statement from my end on a regional basis, perhaps Mr Burns can speak on a national basis.

Mr W. Burns, M.A.F.: I don't think there is any question that in no way are the local people

responsible for this situation because across my desk have come applications for at least 37 additional weed species which have been transmitted in the form which was requested to justify the inclusion of a weed. It is certainly not a local or regional problem. You can lay the blame fairly and squarely in Wellington if you are in fact looking for somewhere to lay it. How you correct the situation and sift through 37 different eligible species hopefully, shortly, will become your own problem and I think this is where the situation should be placed, back where the application is going to take place. This is why I suggest you read again very carefully the criteria for Class B weeds and see whether weeds like sweet briar, manitoto from Central Otago right through Canterbury, fit this classification. I feel this is the sort of question you have to ask.

I think George was quite right in his assessment of the situation. As you'll recall it was last May when the scheme was announced and the shutters came down three months later on the 28th August when we found that the forecast of expenditure which we originally made at the time of the budget was obviously totally inadeqate to meet the sorts of demands made because of the weeds we had selected. I can't defend the weeds which we selected because this was done in a fairly arbitrary manner and it had to be done at the time so that some action could take place. The logical thing to do, considering the way the scheme was announced, would be to say, O.K., what are the important weeds in all districts? Let's get the people together who are interested. Now, by the middle of June or the beginning of July a few replies would have come in and by Christmas we'd probably have had about 15-18 weeds which looked as if they could be eligible for the subsidy. Then we'd ask what kind of expenditure would be involved by the following May, or even by now, and we'd have a list of things that would probably apply. I agree that the weeds selected may not have been the best. To my mind, by and large, the impact of the scheme was good. The exception of course, is the place where you are fortunate enough not to have nodding thistle, gorse, broom or ragwort. O.K., maybe that's just unfortunate. However, I think that the amount of herbicides that have gone on indicates to some extent that coming straight out and saying, "these are the weeds whether you like them or not", was an action taken which could be described as a necessary evil and something that just had to be done.

The next phase of the operation sets out not only the structure for weed control but quite clearly defiines the responsibilities of each particular party in this whole deal and puts back to regional and district noxious plants authorities the requirement to recommend the weeds that shall receive priority in their areas. So it's back to you guys. The weeds which will be given priority on a regional basis are going to be co-ordinated by the Regional Co-ordinating Committee which will be an almalgam of your district committees and district authorities. In addition to that you also have the responsibility as a district authority to recommend those weeds which require assistance and this is why I suggest that you look at the whole operation of the Fitzharris Report, not in the terms of the subsidy, but in the terms of weed control. And, as a second string, look at those particular weeds which you can justify need a measure of assistance in their control. I think this is geting the decisions back to where they are important with them not being mad in some airy-fairy distnce with no knowledge whatsoever of the situation.

Bickers, Hobson County: Is the suggested procedure that we make these weeds recommendations to our council or to our local Advisory Officer and carry on from there so that it's a co-ordinated effort?

Mr W. Burns, M.A.F.: We're talking about something that hasn't happened and something I'm not sure is going to happen. This is Government thinking and hopefully it will be carried through. If this structure is set up then the Ministry will revert to virtually its true function as an advisory service and the line of communication will be free from the noxious plants authority which will possibly be the noxious weeds committee of a local authority or may indeed be a noxious weeds committee of a group of local authorities. This depends on your set-up. The next tier of your structure will be the Regional Co-ordinating Committee which has no implementation function but has a co-ordinating function so that we can sort out the problems that appear due to the difference between the way Piako applies its weed control programmes and Waipa next door does or Hawkes Bay-Patonga or Hobson-Hokianga. So the function of that body will be to co-ordinate and indeed assess the recommended species that you have, with their justifications, in the light of what other counties have and it may turn out that even districts have slight differences.

The whole stream of command, as it were, is from your district noxious plants authority to the regional co-ordinating committee and then on to the top where there will be a national weed control council or advisory council or something or other which will be the guide that says, "Thou shalt not, good as gold or this is the range of weeds available". The role of the countries in this is quite obviously

compatable to your true function as noxious weeds inspectors. The Ministry will be represented on your District Noxious Plants Authority by your local Farm Advisory Officer officio. That will be the authority. The regional advisory officer will chair the weed co-ordinating committee and our Ministry will be represented on the national council. That, roughly, is the way we see it at the present moment.

Mr Sherwin, Councillor, Waipa County: I would like to point out that the Waipa County is adjacent to the Hamilton City Council, not Piako. The situation we have where the subsidy scheme should come more under the control of the counties. s far as we are concerned in Waipa, the scheme is as much under the control of the county as it's possible to have it. When the original groups were set-up, this was done under the supervision of our Weeds Inspector. He moved the thing into action and all the clerical work arising from the weeds subsidy is done by the county. If our Weeds Inspector has a problem, the riding member is called in to try and solve it. If he doesn't do any good, the Chairman of the county is caled in and on the very, very rare occasion, Ithink about once in recent times, we take someone to court.

The point I'm trying to make is that the scheme is working very satisfactorily as far as the council and the ratepayers are concerned. I think, to date, we have had paid out in subsidy money, in the Waipa County, something in the vicinity of $60-70,000 to farmers. What concerns me is that with the Government looking for an excuse to cut down spending and with all the dissension we are having, if we don't get into gear and do something pretty soon they might use this as an excuse that the scheme's not working and we'l lose the lot.

Chairman: I would like to thank Mr Banfield very much for his address and ask that you show your appreciation in the usual manner.

THE MISUSE OF HERBICIDES IN AGRICULTURE

Presented by:—

Mr L. J. Matthews,
Research Officer,
Ruakura Agricultural Research Centre,
HAMILTON.

Session Chairman: Mr H. B. Green, Whangaroa County.

Chairman: I think I have just about the easiest job of the day as the next speaker is a gentleman who needs no introduction to this meeting. Gentlemen, Mr Matthews who is going to speak on the mususe of herbicides.

Mr L. J. Matthews: Thank you, Mr Chairman.

Herbicides are often grossly misused. The ways in which this occurs are many and varied. This paper highlights some of the major causes of misuse of herbicides where misconception often occurs. Other equally important causes of misuse that are largely self explanatory are listed.

Over application

Unless operators are highly skilled, herbicides are normally over-applied particularly when employed as a spot application. For annuals and first year biennials over-application is not detrimental for weed control but pasture productivity may suffer. For second year biennials and perennials where translocation is required over-application may reduce the end control. In the case of 2,4-D for instance, this reduction in translocation is largely affected by the formulation as follows: salts and amines ➧ to higher aliphatic esters ➧ to lower alkyl esters, with the poorest results being obtained with the lower alkyl esters such as the ethyl ester.

Incorrect calibration of equipment is a primary cause of over applying herbicides. For boom application this is normally a simple issue of checking nozzle wear, nozzle delivery, adjusting pressures, boom height and speed of travel and generally if herbicides are over-applied they are not grossly over-applied. With spot application the use of fixed dilutions (spray mixture) and operator skill are the primary cause of over application. Many operators use the same dilution, irrespective of nozzle size, nozzle wear, variable pressures, type of vegetation, operator skill and spraying conditions. How many spray operators calibrate the active ingredient required with the necessary diluent per given area for the type of vegetation to be sprayed? How many operators trace the outline of the weed from several angles with the spray pattern to ensure adequate coverage and minimum loss of spray?

Calibration is simply done by taking an area of 5m x 2m and determining the quantity of water required to cover this adequately. This area is 1/1000 of hectare and there are 1000 ml in a litre. The active ingredient may then be added and this forms the correct dilution for the type of vegetation to be treated.

Wetting agents

Additional wetting agents (surfactants) are often added to the spray mixture for foliar application with little or no cognisance of the end results. Three types of wetting agents are available, non ionic (most widely employed in the formulation of herbicides), cationic (as in paraquat and diquat) and anionic. Anionic and cationic wetting agents may be incompatible. Wetting agents or surfactants are highly necessary to allow emulsification of organic herbicides not soluble in water in the first instance, and secondly to reduce the surface tension of water employed as a carrier. If too much wetting agent is utilised the surface tension is reduced so that spray particles coalesce and drop off the leaf surface. If too little surfactant is employed the spray droplets are not atomised adequately and the large droplets fall off the leaf surface, thus the ideal is seldom obtained. Furthermore, different leaf surfaces have varying capacities to hold sprays. Succulent annuals such as variegated thistle (Silybum marianum) for instance hold spray so much better than the spines of gorse (Ulex europaeus). Under poor growth conditions or moisture stress plants tend to become more difficult to wet, less penetration of the active ingredient occurs and thus more of the herbicide remains on the outer leaf surface and is decomposed by light. The addition of further surfactant seldom mitigates these effects and even may help decomposition by excessive flattening out of the spray particle on the leaf surface.

The question arises, when are additional surfactants required? This depends on nozzle size, pressure, type of weed to be sprayed, growth conditions, clarity and hardness of water and spraying conditions (relative humidity, temperature and wind). To assess these factors and come up with the correct answer is almost an impossibility. For hairy plants and plants covered in dust additional wetting agents (how much again is an open question) may be warranted.

The short answer is "don't employ additional surfactants unless recommended by the manufacturer or statistically sound trial results have shown that it is necessary.

Droplet size

Droplet sizes are referred to in microns (0.001 mm). To give practical approximation the following droplet sizes are compared:

Diameter in microns	Approximate equivalent
1000	Moderate rain
500	light rain
200	drizzle
100	misty rain
5	fog

This Table may become more meaningful if droplet densities are taken.

Droplet (Diameter in microns)	No. of Drops per cm^2 at: 1 litre/ha	10 litres/ha	40 litres/ha	No. of drops per litre
100	19.10	191	764	$1.91\ 10^9$
250	1.22	12.20	49	$1.22\ 10^8$
500	0.16	1.60	6.4	$1.6\ 10^7$

From this Table it is apparent that if the diameter of a droplet is increased twofold the volume of liquid is increased eightfold. Even so, the number of droplets per litre is still very large .It is the best use of this information that is important.

For ground spraying under optimum conditions (i.e. humidity high, temperatures low and wind speed less than 10 km per hour) spray particles sizes should be in the 25 to 100 micron range. As the relative humidity decreases and temperatures rise, spray particles sizes have to be increased to compensate. This means reducing the pressure and employing more water.

For aerial application droplet sizes vary from 200 to 500 microns depending on the operator. At 10 litres per hectare and a droplet size of 200 microns, less than 10 droplets per cm2 reach the ground even under optimum conditions. These few droplets may not always be adequate.

Spray Drift

All nozzles under pressure produce a range of droplet sizes - Fines (droplets less than 25 microns for ground operators) are pproduced at the edge of the nozzle. These fines tend to drift. At the moment, for pressure equipment there is no method of selecting a droplet size and ensuring that all particles are of that size. To obviate spray drift pressures should be reduced, the droplet size increased, volatile materials employed and wind (preferably greater than 10 km) should be blowing away from the susceptible target. Beware of cool conditions, high relative humidity and no wind. As wind force and direction is very variable under New Zealand conditions, a constant check should be made on wind conditions.

f additional weting agent has been employed this also implies that pressures will need to be reduced even further as one of the effects of wetting agents or surfactants is to increase the atomisation of spray particles which may increase spray drift.

Spiking

Normally this term is applied to the act of adding herbicides to other herbicides to obtain improved efficiency. in practice, this is done effectively for wee dcontrol in crops, waste areas and brush control. The results obtained with mixtures are seldom truly addititive ($1 + 1 = 2$) and there are definitely no case of true synergism ($1 + 1 > 2$). In most cases mixtures give poorer results than if the individual components were applied separately. For example, the efficiency of 2, 2-DPA is reduced if amitrole is added and 2, 4, 5-T mitigates the movement of picloram and dicamba.

Mixtures are acceptable as:

(a) only one application is made
(b) normally vegetation is varied and more than one chemical is required.

Note: Usually more herbicide is utilised in mixtures.

Commercial mixtures are normally based on adding materials that react largely in the same way, for example, slow-acting materials such as 2, 4, 5-T, picloram, 2, 2-DPA and amitrole are mixed. Except where desiccation is required fast-acting herbicides, paraquat, diquat, sodium chlorate and diesel fuel oil are not mixed with slow acting materials. In commercial mixtures other than for desiccation there is no example of a fast acting material being mixed with a slow acting herbicide, yet this tends to be a noxious weed inspector's speciality - examples sodium chlorate and 2, 4-D, diquat and 2, 4-D etc. The fast acting material nullifies largely the activity of the slow acting compound.

Other aspects

Herbicides may be misused in a number of other ways. These are listed but not dealt with fully.

Volatile versus non volatile preparations

Wrong advice or not identifying the problem correctly

Not employing approved herbicides or wrong choice of herbicide
Wrong time of application or stage of growth
Using dangerous herbicides where safer alternatives are available
Employing poor equipment or wrong equipment for the particular job
Applying herbicides immediately after fertiliser application
Mixing herbicides several days or weeks ahead of intended use
Grazing too soon after herbicide application
Using too much herbicide too often
Overall application where spot application would be adequate or the reverse.

Most of these misuses are self explanatory. In my opinion, the largest percentage of herbicides are not employed as efficiently as they may be, due largely to lack of technical expertise and in some cases technical development. Technical developments are likely to progress more quickly than technical expertise. This places an onus on us all to continually improve our knowledge and expertise in applying herbicides.

Questions:

Chairman: Out of your talk, Mr Matthews, perhaps I could ask Mr Banfield one thing, We had several questions with the last speaker about the different rates of application being made of different chemicals. Would the Ministry be prepared, under the Subsidy Scheme, to make recommendations as to what rates should be used for the various chemicals used on the different weeds which come under the subsidy programme?

Mr Banfield, M.A.F.: No, I don't think we would go as far as that. That would mean sticking our necks out a little too far unless our Research Department could come out very, very strongly with recommendations. We try always to base our advice on research backing but sometimes we are unable to. And this is one of the problems arising now with aerial spraying in that we havn't really any research backing to decide whether 2 gallons is adequate or not. All we have is some field observations of apparent failures that have occurred with the low rates and that is why we have stipulated the 8 gallons minimum. We have a problem and it will remain until research comes out with something firm. Perhaps the speaker would comment on this?

Mr Matthews: Well, this business of aerial application has come up repeatedly and my own views on it are this.

If you want to cut out spray drift you have to use a spray particle size somewhere in the order of 500-1,000 mews. The Americans have said this very emphatically and clearly. There was something like 30,000 hectares of thistles sprayed from the air last year and on the evidence we have, at least 30% of the material supplied didn't hit the ground. I don't know how long this sort of thing is going to be permitted. I firmly believe that if you apply something, you apply it to the plant. You don't apply it and have half of it land somewhere else and this is common. I think this is one of the reasons that actually pushed D.D.T. out of New Zealand because of every 154 grammes of D.D.T. applied apparently less than 1% was killing grass grub and the other being offensive. This is the sort of thing that is happening at the moment. We know about it, the public might not.

So, to cut a long story short what we're aiming to do, and we have this organised right at the moment, is to get the co-operation of the aerial industry and the manufacturers and make a list of areas they're going to treat. We'll then do transects on these for a start and find out what the problem is. We'll cover so many transects, making a note of the method of application, and at the same time or shortly after this aerial application we'll apply the equivalent by ground methods so that we have a logical check of what is actually occurring in practice. If we do this over 100-300 sites we will then have some valid information. This is how wise we are on the low rates of material being applied from the air.

Forbes, Tauranga: With regards the low rates of water for aerial application. We called quotes for aerial application and one had a supplementary letter attached to it giving a guaranteed kill of all ragwort and nodding thistle seedings providing that the rate of chemical is confined to 3 pints 2, 4-D per acre for ragwort and 3 pints M.C.P.A. per acre for nodding thistle and that the rate of water carrier is left to the discretion of the applicator. At the present time we are trying to operate on a co-ordinated basis so that all farmers spray around the same time. However, the situation could arise where you have an attractive offer of a lower cost rate per acre and if it gets among the farmers who are free to use any contractor, it may attract many to use the offer. Would you comment on this guarantee control and this 2½ gallon rate of waetr which is left to the applicator's discretion, at a price of $1.80 per acre?

Mr Matthews: Well, I think the 2½ gallons you mention is equivalent, roughly, to 25 litres per hectare. On the figures available which I have no reason to doubt, anything under 100 mews, under the best of conditions, is likely to be windborne and furthermore, if you get anything under that, the terminal velocity of the droplet is such that it's likely never to hit the ground. So even with 25 litres per hectare, on a centimetre square you are likely to get only 190 drops of that magnitude on the ground under optimum conditions, Those optimum conditions would be

when the relative humidity is high, the convection currents are down, meaning that the earth is cooler than the air, a windspeed of less than 5 m.p.h. and the helicopter or plane flying not too high above the ground. This would be my interpretation. Now how many times do you get these under the wide variation of conditions that we have in New Zealand?

The thing is, the smaller quantity of water you use, the more precise you have to be with everything you do and the margin for error is small. As I said, theoretically we don't know the answers to all these questions. One mitigating factor in all this is that a lot more spray is applied by helicopter in New Zealand than by fixed-wing and, provided they don't have too long a boom, they may be getting away with being able to apply the material more precisely than a fixed-wing aircraft.

Mr Banfield, M.A.F.: In their report, Marine Helicopters claim that their average size particle is 200 microns, ranging from 150-250 microns and we are talking in terms of about 80-120 litres of actual carier and what you have said is supporting the observations of my staff. We don't want to be wrong with this and we are much looking forward to the results of these trials that we have asked you to do.

Greig, Waitemata City: What happens if we use 2,4-D and Paraquat for sedge control? Do you think 2,4-D on its own would do the job or just Paraquat?

Mr Matthews: I don't think the evidence on this is too precise. We know that about 8 kilogrammes per hectare of 2,4-D will kill sedge and that we can drop this rate by including Paraquat. In actual trial work, the 2,4-D is always an ester and doesn't move much anyway so that in this situation I think the 2,4-D and Paraquat are probably doing an additive job. I don't disagree with that one but I do disagree with adding these types of materials to other materials when you are expecting movement down into rhizomes. This is the point I was trying to make.

Rossiter, Rangiora: What, in your view, is the most adequate way of spraying a gorse bush? A straight stream, a wide fogging movement, or a bit of both?

Mr Matthews: I've always held this view and I think we've been able to prove it in practice, that a particle size somewhere around 25 microns which is between a fog and a very fine drizzle, projected right at the plant and tracing the shape of the plant with the spray pattern, will give you the best effect.

Chairman: Would you agree that the spray pattern directed by ground application to cover gorse would largely depend on the type of gorse you are spraying?

Mr Matthews: No, my impression of gorse spraying is this: You have a very thin spine there and it's very highly 'cutanised' and the absorbent surface is there. If you put on a very fine misting spray you are likely to get far more droplets adhering to it than if you stand off at 30 feet and drive something like a raindrop at that spine. I'm under the impression that this goes straight past, where if you're prepared to fog the spray in, it stays there. In other words if you stand under a tree, you can have a fairly heavy rainfall and not get wet. If it's sea fog, or any fog for that matter, you get wet under the tree. This is the same principle. By direct comparison, if you have a very misty rain you can stand under the tree for quite some time yet not get wet but if coarser particles fell, then it wouldn't be long before you received some rain.

Chairman: In my experience of dense, grazed gorse ,it is quite easy to kill the one and two year old growth on the exterior portion of the plant but you must direct a larger proportion of bigger particles to the internal part of the plant in the first phase of the spraying, then fog it off, to get satisfactory results.

Mr Matthews: My paper was entitled "Misuse of Herbicides" but I agree that in some instances by super saturation you are going to get a better effect, that is by using larger quantities of material.

Calkin, Waipa: When implementing s.7 of the Noxious Weeds Act we found that we had outstanding success spot spraying ragwort at the flowering stage with 3 pints of 2,4-D in 150 gallons of water. The following autumn there was less regrowth of plants sprayed at this time in comparison to plants sprayed in the spring and winter. The regrowth and amount of ragwort in the paddock is about a quarter of that which remains in a paddock normally sprayed in the spring. This comes up consistently. Can you give us a reason?

Mr Matthews: No. I think that if you are going to control these plants that produce vegetatively or from rhizomes or root-stocks etc., there is really only one time to treat them and that is in full flower to get the maximum benefit. At that stage, all your so called reserves are in the flowering head and there's minimal reserve in the roots so that the plant is probably less dormant at this stage than at any other stage of its life cycle. We have sprayed mature plants in the winter and early spring months and received very disappointing results. However, spray them in full flower with the best preparation on the market at the moment and you apparently get as much as 80-90% control. My hypothesis, which I really want to talk about, is that if you left these plants at that stage most of them would die anyway and we have a far higher percentage of them

dying as a result of leaving them alone than by spraying them. What I'm advocating, is that you put on just a light application of 2,4-D to take out the seedlings, doing this in the early autumn/ winter period and anything that survives this applicaiton, leave them alone.

Fawcett, Banks Peninsula: Would you consider that aerial spraying of gorse and broom at the high rates of either 2 gallons of 2,4,5-T-Picloram or 2,4,5-T-Dicamber is overdosing.

Mr Matthews: No, but I think you would probably be able to use half that rate from the ground and kill that gorse if its seedling, regrowth plants. I honestly feel, that the latest registration we have had for these very high rates for 2,4,5-T-Picloram on gorse and broom control is largely due to inefficiencies of aerial operations and we're compensating with higher rates of application to overcome that deficiency.

Chairman: Thank you, Mr Matthews for a most informative discourse and the capable manner in which you answered the questions put to you.

GROUP PANEL DISCUSSION ON THE NOXIOUS PLANTS SUBSIDY SCHEME

Group Chairmen: Messrs Rushbrooke, Otorahanga County Council; Thomas, Piako C.C.; Sherwin, Waipa C.C.; Bennett, Matamata C.C.; Holmes, Waikato C.C., Conn, Whakatane District Council; Till, Thames - Coromandel District Council; Leonard, Tauranga C.C. and Cockram, Franklin C.C.

Group Chairman: Mr Rushbrooke, Otorahanga County Council.

Mr Rushbrooke: In outlining my group's findings, the first thing I want to say is that there seems to be as many different views on the scheme as there are people involved. The time we had was hardly sufficient to explore these views as much as they warranted. Looking at the advantages of the scheme, the group felt that in general a better relationship now existed with the farmer. Noxious Weeds Inspectors no longer feel that they are going to a property as policemen with nothing to offer. Education of farmers has been made easier by the fact that perhaps more than ever in the past, the inspector is welcomed. Several inspectors, one in particular, said that before the introduction of the scheme their counties had no weeds policy worth mentioning but now they had quite reasonable ones. Most have found that it has led to better co-operation with M.A.F. staff, particularly in the early stages of implementing the scheme.

There is one group that I was interested in down in the McKenzie Basin who formed co-ordinating committees in 1969 and these groups had some good results until such time as the subsidy on hormone was removed and they found that their function was largely lost. With the introduction of the present scheme they were able to resume activities very quickly.

Disadvantages: There were mixed feelings as to whether it was necessary to have the farmers in groups to administer the scheme or just what the advantages were of doing so. All were in agreement that in a scheme of this nature we do require some sort of time limit on when the subsidy is available, when the work should be done and so on. This, I feel, is one of the weaknesses. At present the thing could go on for an unlimited time. Also the number of weeds. We didn't have time to explore this very thoroughly but it seemed to be the opinion of several counties that rather than being selected on a national basis, the weeds should be selected on a regional basis. The only other matter was the method of claiming and here seemed to be mixed reaction as to just how the claims should be forwarded. Some counties appear to be taking the whole job over, others have it sent direct to the M.A.F. whereas others have a mixture.

Mr Burns, M.A.F.: There are two questions that I would like to ask. Firstly, whether the scheme has had any effect upon the relationships between your Noxious Weeds Inspectors and the contractors and the distributors?

Mr Rushbrooke: I think that due to the subsidy on hormone and the costs of applying it people are more willing to do something about a weed problem and naturally are demanding the services of a contractor more than in the past. We have always had a fairly good relationship existing between our Inspectors and the contractors.

Mr Burns: Could I ask all Inspectors here present, what has been the impact on relationships between contractors and Noxious Weeds Inspectors?

A show of hands indicated that a generally improved relationship does now exist.

Dulieu, Taupo: Have you had an improved relationship with the M.A.F.?

Mr Rushbrooke: In most cases, yes.

Mr Burns, M.A.F.: How many in this group system do actually have reasonable consultations with contractors?

Mr Rushbrooke: Where practical, most contractors' views were taken into account when forming an opinion on application rates of chemical.

Group Chairman: Mr Thomas, Piako County Council:

My group had a fairly interesting hussle in the corner and we came out largely with the same sort of answers that Mr Rushbrooke has already intimated. We decided that one advantage of the scheme was a better recognition of the Inspector's status in the community. We found that the responsibiliy of administering the scheme, has been delegated in many cases to the Inspectors and that farmers in the groups are accepting to a very large extent that these are the people who are authorising claims and forwarding them to the M.A.F. It was pointed out that more money is being spent on weed control than before and in some areas where farmers were prepared to spend a fixed number of dollars, they are now still spending that amount plus the additional money available. They are consequently covering considerably greater acreages and particularly with contract spraying available which wasn't previously the case. This, then, would be one of the advantages .

It has brought the noxious weeds problem out into the open with much discussion taking place at different levels such as Federated Farmers, Council meetings and gatherings like this. I think, as a result of the group concept, liaison with the Inspectors has had a very salutary effect on a large number of contractors as we have found that some blokes in our area were making a killing and make no mistake about it. We have had good quotes, quite competitive and we have been able to ensure that the correct rate and amount of chemical is being applied at the right time and being sprayed on the maximum amount of territory. These are certainly advantages.

However in no way should we be thinking that we're on Cloud No. 9 as there definitely are disadvantages too. One of the members pointed out that in his particular area had no effect whatsoever on the hard core character who wasn't interested in doing his weeds, subsidy scheme or not. Another Inspector in the south thought that the guidelines set down in the gorse control programme were too restrictive. An urban representative wasn't exactly rapt in the scheme as he gets nothing from it. He feels that if the urban land is being farmed they should be entitled to the subsidy just as those in the rural counties. We felt that one of the major disadvantages is the arbitrary restriction on the species of weed eligible for subsidy.

Mr Burns, M.A.F.: You said that more money is being spent and people getting twice the work done. Does your group feel that the definition of these weeds does in fact fix the focus from weeds which more desirably should have been attended, apart from Maniototo or Vincent Counties? Has there been a shift from what you think should be done to what has been encouraged by the subsidy scheme?

Mr Thomas: A general census of opinion was that in some areas this has occurred but on the whole the scheme has achieved good results.

Group Chairman: Mr Sherwin, Waipa County.

We had an interesting discussion and quite a few things I wasn't aware of came out of it. It would seem that Inspectors working in the counties are operating quite well. We had one or two urban Inspectors who said they had a very good relationship with the M.A.F. and were pleased with their set-up due to the capable officers of the M.A.F. In one county we found that the weed subsidy group met together and the main topic of conversation was how much subsidy they were going to get and they weren't operating as a group very satisfactorily at all. It was also felt that we're expecting too much of a chairman of a weed subsidy group to peruse or supervise the payment of the subsidy as they believed this was an imposition.

One thought was that there should be a special operation as far as gorse is concerned with the subsidy in the first instance and then a follow-up programme. The other aspect brought out was that you could have a farmer playing around with a spray-gun and getting as much money as a contractor or a man operating a highly efficient spray-rig and we felt that this could be looked into as well. We believe that smaller groups would be more efficient and they would know what was going on in the neighbourhood. Time sheets and work sheets would be an added guide to see that no skulduggery went on. The final thought was that the counties should be careful that they don't pay the subsidy, that it should still come from the M.A.F.

Mr Burns, M.A.F.: Do you consider that the farmers' labour be looked into? What sort of recommendation would your group make if somebody was looking into the subsidy on farmers' labour?

Mr Sherwin: I think this is a job for the county Weeds Inspector. He knows the different types of gear being used and he knows just how much goes on certain weeds. I think this can be likened to a contractor using highly efficient plant and employing labour and a farmer using not so sophisticated gear. The rates can then be worked out with this in mind.

Mr Burns: Do you feel that all farmers should be registered applicators as required of contractors?

Mr Sherwin: No.

Mr Banfield, M.A.F.: How many feel that the subsidy on farmers' application should be withdrawn and subsidy paid on material and contractors' application only? This has been suggested by several counties.

Mr Sherwin: I would say the feeling is that the present system is of greater advantage.

Group Chairman: Mr Bennett, Matamata County Council.

The financial benefit, resulted in greater areas being treated and the more efficient use of material was also of help to the younger farmers. Group schemes have resulted in better relationships between the Farmer and the Inspector. If the scheme were withdrawn weed control would be put back some years. It appears that in the Waipa County the scheme is running very smoothly because it is mainly administered by the Noxious Weeds Inspector. One disadvantage was that other species peculiar to an area could not be included for claim. Another disadvantage was the great complexity of claim forms which should be simplified. Administration of the scheme could be centralised and the criteria should be the same for all groups which I think means administering it through local bodies. Summing up, it appears that where local bodies and their Inspectors run the Scheme there will be less abuse and greater efficiency.

Mr Burns, M.A.F.: How much better do you think the scheme would have been if you had known, for example, that it was going to run for three years?

Mr Bennett: I think continuity is one of the keynotes of the scheme.

Group Chairman: Mr Holmes, Waikato County Council.

The first advantage, we feel, is that for the first time money is being spent on weed control and everything is going where it should. In other words the applied cost is being subsidised and not just chemical which could be sitting in a shed. We feel that the subsidy, in going to agricultural uses, is going to the right areas and is resulting not only in benefits to the farmers but also to the nation as far as production is concerned. We feel there is definite regeneration of interest from farmers in all aspects of weed control because of the group set-up. They have a much greater prospect of success in their weed control because of the possibility of the scheme being on-going and also the social awareness of the various problems in the district due to the group's activities was also an important factor.

It was felt that another advantage is the better planning and utilisation of machinery through the scheme. Because of the way the scheme is planned, subsidy is now an incentive to farmers as well as an assistance. This results in the Inspector's time being better utilised because he has more opportunities through the scheme for education and eradication.

We felt that if the scheme is to be a success it must be planned as an on-going programme. The abuse of the scheme, we feel, is minimal because of the set-up operating in the groups with the chairman knowing what's going on in the local scene, along with the close liaison with the Noxious Weeds Inspector. Naturally, this side of it could be improved. Disadvantages we listed were: the inflexibility of the present scheme because of the three weeds involved. We felt that some classification of the needs of various regions could be mapped and planned out and this could solve some of the problems of this inflexibility along with some of the complaints that farmers have whose major problem is a weed in their area other than the three eligible, for instance blackberry.

Mr Banfield, M.A.F.: I wonder if people have in mind when talking about the inflexibility of the scheme, the question of welted thistle? The Department holds that welted thistle and nodding thistle are the same thing. There's no difference between the two.

Group Chairman: Mr Conn, Whakatane District Council.

You gave me an almost impossible job to control fourteen wildly enthusiastic inspectors who are quite rapt in the scheme. The only point they were completely unanimous on is that the scheme is worthwhile. Right throughout there was some diversification of opinion. There were gaps with the M.A.F. and the region and back to the groups but generally most Inspectors had good liaison with the M.A.F. One or two from the south Island weren't particularly happy and there could be some improvement in that area. On the local scene, within the groups, here again some groups worked particularly well while others were questionable. The majority agreed that the groups should continue. If they were done away with and the counties were made the administering authorities, the interest that farmers have now through the groups they are associated with would be lost. One question asked, was why it is necessary to have the receipts from dairy companies, stock firms and the like receipted with official stamps. It was felt that the invoices as presented should be paid out in. The other question to come through was that perhaps the lime and super should be brought out of the shed and the chemicals left in. It was felt that the M.A.F. could become more involved in getting the farmers interested in better pasture management.

Group Chairman: Mr Till, Thames-Coromandel District Council.

Mainly, we were concerned with the follow-up programme. It was suggested that if the scheme were to continue for three years it would be a far better set-up. The group were quite adament that the follow-up programme is most important Another point regarding the scheme was that perhaps the groups themselves could nominate their own weeds so that where some didn't have,

say, nodding thistle, they could have something else. It was agreed that farmer participation regarding their own problems is a good thing and that the subsidy scheme is well worthwhile. Some of the Inspectors felt it was placing on them a greater burden than they would like to carry. This, it was felt, is the responsibility of the Noxious Weeds Inspector.

Mr Banfield, M.A.F.: I would just like to emphasise that we do not wish to be implicated in the regulatory side of the work. We are an advisory organisation and this is what we wish to stay. Advisory only and not checking out in the field. We believe this to be the work of the Noxious Weeds Inspector.

Group Chairman: Mr Leonard, Tauranga County Council.

It was generally agreed that it is a good scheme. Approximately double the area is sprayed than in previous years. Co-operative tendering for sprays and application has saved a lot of money. There exists more co-operation between the farmers, particularly following the formation of the groups. A few criticisms. There's too much gorse sprayed and farmers in one area are not able to farm it following the spraying. The scheme was implemented too hurridly for good manage ment .I think we all agree on that. The scheme should be policed better and farmers should not be put in the position of having to police their neighbours. It's done nothing for problem farmers. Problem farmers are still problem farmers. With this extra work it has been found that Farm Advisory Officers are harder to contact. A contact date for spraying is desirable. Spring applications are still coming through. Government Departments that don't need the money should not be in the scheme. Weeds of local importance should be included in the various counties. Summarising, the scheme should continue and be extended to include other weeds of importance. Farmers now have a better appreciation for Noxious Weeds Inspectors and in my own area one farmer has even remarked to me, "He's not such a bad guy after all!"

Mr Banfield, M.A.F.: I would agree that there has been much gorse sprayed with no idea of any follow-up work or programme for the ensuing years.

Group Chairman: Mr Cockram, Franklin County Council.

Perhaps I was fortunate. I had an unanimous committee. They felt that the scheme was too restrictive in its first approach due to the number of eligible weeds. They were unanimous in their support for it being administered by local government and that each local government should submit it its own weed species. Finance should be allocated by regions on a needs basis if possible. That would be the approach as we see it.

The group agree that the scheme has done very little to encourage the laggers so we, in the Frankin County, have asked these laggers to appear before council to see if any solution can be found and I feel that this practise could grow and gain support. The committee agreed that there could be problems with the Ombudsman in the foreseeable future, let's be sure on that point. Where excessive claims are made I thought they came up with a very good answer. If the Noxious Weeds Inspector or the group chairman are not happy with a claim, they mark it so and it is sent to an adjudicator either at local body level or M.A.F. What we would like to know is whether a farmer can claim subsidy without showing hormone?

Mr Burns, M.A.F.: The answer is no.

Daniel, Waitaki: From my experience, contractors don't have to show purchase receipts for their chemical. They only put down that they have used X number of gallons of chemical and write this down on the claim.

Mr Burns, M.A.F.: In my view, in a situation like this the guy whose land it was on would be treated as the farmer. Not the contractor. I'm sure he should show the hormone and if the contractor is supplying the hormone then he in fact becomes the retailer.

McCormack, Cook County: Hand grubbing is not eligible for subsidy but in our county we have a lot of variegated thistle which is grubbed and the general feeling from committee meetings it that his should be included and we are wondering if it could be brought in under the subsidy?

Mr Burns, M.A.F.: I think everyone would recognise the importance of all operations in weed control and I feel your hand operation, the long-handled hormone, is as good a weed control method as any. Equally, if you're looking at gorse country, I think everyone would agree from a management point of view, you break it up first, then use your chemical as a follow-up. Certainly this has been looked at but administratively is just not on.

Louden, Thames-Coromandel: Where the registered chemical applicator is the wife of the farmer and she has done the work on the property charging contracting rates of $10 per hour plus chemical costs. Can they claim full rates for that amount?

Mr Burns, M.A.F.: I think this particular question could be far better answered by Mr Banfield who is much more aquainted with the fairer sex than I am.

Mr Banfield, M.A.F.: I feel you should give us this one in writing letting us know the average contracting rates operating in the area.

WATERWEED PROBLEMS AND MANAGEMENT IN NEW ZEALAND

Presented by:—
Brian T. Coffey (Scientist Aquatic Weeds)
D. Ross Thompson (Technician)
Ruakura Agricultural Res. Centre
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Introduction

The 1973 Report of the Committee on Noxious Weeds Administration, referred to the aquatic weed problem in New Zealand as a "no-man's land" with occasional unco-ordinated forays undertaken by Government, Universities, or commercial organisations as renewed interest or public pressure required.

An attempt was made to rationalise this situation as early as 1964 with the establishment of the Lakeweed Officials Committee. Since 1970, this was replaced by or was widened into an Officials Committee on Eutrophication. It comprises representatives of Government Departments, Universities, and local bodies, and is charged with assembling the facts relating to natural and man-induced nutrient enrichment; and recommending the steps and organisations which should elucidate the issues involved.

Whilst is has an advisory and co-ordinating role in the general area of aquatic weed research, the Officials Committee has no resources of its own to carry out such work, nor can it direct particular projects to any specific organisation. It is not responsible for the control or eradication of aquatic weeds and unfortunately not all aquatic weed problems are causally associated with eutrophication.

Hence we are left with the situation where no Government or local body organisation is responsible or equipped for taking action on a national or regional scale.

The Officials Committee on Eutrophication must however be credited with focusing attention on the existence of a national aquatic weed problem, and this has contributed to the establishment of an aquatic weed research group of which we are a part, in the Agricultural Research Division of the Ministry of Agriculture and Fisheries. It is further a reflection of its efforts that the freshwater team in the Fisheries Research Division of the Ministry is being strengthened, and that the freshwater ecology group of the Department of Scientific and Industrial Research is being built up.

As Noxious Weeds Inspectors you clearly have a significant role to play in this field particulary with regard to containing the spread of troublesome weeds, and we welcome the opportunity to address you on this basis.

The question of legal ownership of watercourses, thus responsibility for action is reasonably clear with regard to artificial drainage systems, but is particularly compicated in the case of lakes (natural and man-made), of rivers, and of estuarine areas.

Aquatic weeds have a major impact on farm production, recreation and the environment, and on Hydro-electric power generation. However the general unawareness of the real nature, extent, and potential hazard of aquatic weed problems in this country is evidenced by the naive debate in the news media, for the past 20 years, that one of the alternatives: herbicides, grass carp, or mechanical harvesting alone, is the final answer to the numerous weed species, and the diverse habitats which are afflicted with water weed problems.

Our particular role or terms of reference in the aquatic weed field is to investigate and report on the ecology, phenology, and control of aquatic weeds.

New Zealand apparently has a paucity of native aquatic plants with regard to both number of species and life forms, prior to 1840. For example, aquatic plant families which were well represented overseas, such as the Ceratophyllaceae, Nymphaceae, Podostemaceae, Hydrocharitaceae, Alismataceae, Pontederiaceae, Naiadaceae, and the Batrachium section of the Ranunculaceae were not represented. Since 1840 however, about 90 aquatic or semi aquatic species of adventive plants have become established in our waterways. Many were introduced intentionally as stock foods (e.g. floating sweet grass, kneed foxtail) for culinary purposes (e.g. watercress, mint) or as ornamentals (e.g. oxygen weeds, water hyacinth). At present it is only the Podostemaceae and the Naiadaceae which are not present in N.Z. We now have virtually the complete international rogues gallery to intrigue the academics and to alarm our applied managers.

It is clear that the combination of —

(a) ever increasing eutrophication,
(b) ever increasing water use demands on our waterways,
(c) a relatively non competitive or unsaturated native floral,
(d) the introduction of adventive species in

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isolation from the control check situations which had evolved in their native habitats, has provided the opportunity for these exotics to spread rapidly and dominate large areas. Our primary objectives are to;

1. To encourage preventive weed management in weed free watercourses.
2. To predict the success and nuisance potential of species beyond their present geographic range.
3. To resolve and model environmentally acceptable control or eradication programmes for existing weed problems.

I will now hand over to Mr Thompson, who will detail our approach to modelling management programmes for aquatic plants.

Thank you, Brian.

Water use requirements in a particular area govern our attitudes towards what are acceptable and what are non-acceptable weed management practices. For example, weed control in Lake Taupo, or in areas highly prized as trout fisheries, will be considered in a separate category to weed control in restricted use watercourses such as drainage and irrigation systems.

In naturally occurring, multiple use watercourses aquatic plants are essential as primary producers, and for wildlife and fisheries management. These beneficial attributes of aquatic plants are detailed in the handout we have prepared for you.

These benefits may be overcome to a greater or lesser extent, however, by the disadvantages associated with dense stands of water plants. The disadvantages or nuisance attributes are also detailed in your handouts.

Our less troublesome native species could provide these beneficial effects so we are normally concerned with selective control of a particular plant rather than non-selective vegetation control.

If I may, I will take a few moments to discuss the rather protracted procedure involved when proposing a weed management programme, the main points of which are detailed on the board.

1. The first thing to prepare is an objective statement of the existing and potenitial problem which is presented by a particular plant in a particular area.
2. The second criteria is the prompt and correct identification of the weed causing the problem. This involves a persistent surveillance programme in virtually all waterways for as Brian has mentioned we have this very large number of introduced plants in the country, many of which have yet to exploit their potential geographic range. The unmanageable situation in the Rotorua lakes during the late 1950's, early 1960's largely resulted from our failure to differentiate between the two oxygen weeds **Lagarosiphon** and **Elodea** until the former had spread to a point where eradication proposals were clearly impractical.
3. Thirdly we require basic physio-ecological field data on the weed species causing concern. We would be in for numerous surprises if we assumed that only realised weeds at other localities have the potential to be troublesome in new areas. The primary advantage of this approach is to identify the limiting factor(s) or critical factor for the success of the plant at that locality. If that factor can be readily and economically manipulated without detriment to other use requirements, habitat manipulation recommends itself as a corrective measure. In this context eutrophication arrestment normally recommends itself as a prime objective or corrective measure.

As well as these plant studies it is necessary to describe environmental conditions to detect changes which may have contributed to the weed problem, or which may have resulted from the weeds presence. It also provides baseline information which will allow any undesirable effects of subsequent control measures on the environment to be detected.

The next consideration is to select a control measure which involves a co-operative effort between all interested parties. A decision on the degree of control required will be necessary and this is where interested groups should make their views known. Is complete eradication, controlled growth or occasional control desirable? Will the proposed treatment achieve adequate control? What effect will the control measure have on other plants and animals (i.e. is it selective?). What restrictions are imposed by the availability of labour and finance?

Once an apparently suitable method is selected it is necessary to conduct a number of preliminary field and laboratory trials to test the method in the particular situation of the problem area.

At this point policy decisions on the extent and intensity of the control measures must be formulated. How much weed is necessary in the area to prevent erosion, and to support breeding populations of fish and wildfowl? How little weed is necessary to maintain efficient drainage, the recreational amenities in the area, prevent depletion of dissolved oxygen and obstruction to industrial plants? What is hte amount of weed that will achieve a balance between these two opposing requirements? It is a question of controlling one particular plant or general vegetation control? How much weed can be maintained at this selected level at an economic cost?

Monitoring of the Subsequent Management Programme

is a most important facet of the control phil-

osophy. Our ability to model natural ecosystems is not reliable at present. Where results obtained are both predictable and acceptable, the programme wold continue. It it is unpredictable or unacceptable alternative control measures must be researched. In all cases the programme must be sufficiently flexible to permit modification or review pending the feedback gathered.

I will now hand you back to Dr Coffey.

Thank you Ross.

With regard to the specific problem areas we might first consider the effects of aquatic weeds on farm production.

Much of New Zealand's high quality agricultural land relies on efficient private/community drainage systems for their continued production. Similarly irrigation systems, particularly in the wind shadow of the Southern Alps are essential for farm production.

The essential nuisance value of waterweeds in these systems is that they impede flow, thus water discharge, they may cause flooding, block pumping stations, and enhance siltation or infilling of canals.

Weed clearance from irrigation/drainage canals is best viewed as a facet of canal maintenance, hence the more efficient the procedure, the lower will be the maintenance costs. The value of this maintenance programme is ultimiately related to production.

The most troublesome weeds in these situations include the natives **Potamogeton cheesmaniil,** and **Callitriche stagnalis,** and a wide range of exotics such as **Elodea canadensis** and **Myriophyllum aquaticum.** Emergent species such as **Glyceria maxima, Ludwigia peploides, Polygonum hydropiper** and **Alternanthera philoxoides** are also particularly troublesome.

Control measures have evolved in isolation as individual bodies have been forced to resolve their own particular problems. Temporary relief has been gained in most instances by a combination of mechanical and chemical methods.

The present situation is quite unsatisfactory as

1. An increasing number of aquatic weed species are invading new areas.
2. Repetitive chemical control has witnessed the dominance or establishment of resistant species.

These factors have presented individual farmers, catchment, drainage and irrigation authorities with ever increasing expenses and difficulties to maintain such waterways in a weed free state.

With regard to the effect of aquatic weeds on recreation and the environment, we are normally concerned with larger water bodies such as natural lakes and rivers. In these situations, unlike the well defined and restricted water use requirements of drainage/irrigation systems, we are concerned with multiple use watercourses in which biota which is not necessarily exploited by man has the right to exist.

In this context we adopt the substantial view that waterplants may contribute to the aesthetic and recreational resources of many areas, particularly wildlife reserves.

The nuisance value of waterweeds in natural and artificial lakes, and in larger rivers has been expounded by numerous authors and are contained in your handouts.

The economic consequences of such lake weed problems include:

—expenditure on research and interim control procedures,
—potential loss of power production from Hydro-electric installations,
—potential loss of tourist revenue if the lowering of the aesthetic and recreational value of lakes is unchecked.

Biological consequences include:

—displacement of our unique, native, waterplant communities by introduced species,
—the ill defined role of dense submerged macrophyte stands in the eutrophic process, particularly the potential "biological pipelining" of normally inaccessible "substrate nutrients" back to the water in an organic form,
—the ill defined effect of submerged macrophyte densities and growth form on other aquatic biota ,i.e. community structure in the broadest sense.

The social consequences are rather more subtle and defy quantification. Factors such as:

—loss of recreational factilities,
—loss of public confidence in the ability of Government Departments to deal effectively with a problem,

might be proposed for consideration but it is clear many are unresolved.

Two facts are clear in this regard. We know something about the autecology of species which are responsible for lake weed problems in New Zealand. They are **Elodea canadensis, Lagarosiphon major, Egeria densa** and **Ceratophyllum demersum.** We do not have sufficient ecological data on their relationships to phytoplankton and periphyton species, nor their relationship to aquatic animals generally; to discuss their biological impact on our waterways.

Secondly, if nothing is done, it is only a matter of time before all of our lakes are effected. This will have a considerable social impact on boating, swimming, fishing, and the general enjoyment and appeal of these assets.

Hydro-electric lakes are a rather special case in this scheme of things. The prime water use requirement in this instance is the generation of electricity.

In essence the nuisance value of lakeweeds

to the NZ Electricity Department is as flotsam (i.e. floating debris). It is normal practice to place screens in front of the turbine intakes, to prevent logs and other debris entering the turbines.

Screen cleaners are fitted to the intake screens to remove normal flotsam loads, but their loading capacity cannot cope with the quantities of weeds which pile up against the screens during crisis periods. Cooling water intake filters are also prone to clogging by fragmented waterweeds which pass through the main intake screens. As water flow is restricted through the clogged screens, a differential head of water develops across the screens, resulting in their collapse.

Subsequent to the Ohakuri shutdown (1965), weed booms were constructed upstream of the dam well to intercept floating weed, and deflect it to a suitable beaching area.

Whilst weed booms are certainly useful to intercept floating islands of weed and the screen cleaners are an indispensible last line of defence, the fundamental problem is that the weed beds in the lake are permitted to obtain unstably high densities so that wind, wave, and current action dislodge the plants, and these drift down to the turbine intakes.

These problems are most acute in the Waikato River system but similar problems are developing in the Clutha, Waitaki and Waikaremoana systems.

Fortunately we now have a considerable amount of autecological/environmental data on the realised and potential performance of this group of lakeweeds. We can, in the Waikato lakes for example, on the basis of repetitive mapping data, predict the most successful community structure which will develop in each area should the species spread, and conditions remain relatively constant. Predictive models of this kind have been particularly useful in resolving management policies in areas such as the Clutha Valley where Lagarosiphon has been identified and contained at an early stage of its invasion.

The relationship of the control measures proposed for lakes to plant growth is diagrammed in this figure. The flow of light energy nutrients and an inorganic carbon source through plant growth, death, plant residues, decay and regeneration of nutrients and carbon dioxide is shown in the centre column. The generation and consumption of oxygen is shown to the left, as is the diversion of plant growh to herbivores/ carnivores.

Three control measures are contained within the ecosystem box, hence these act to short circuit the turnover of organic / inorganic materials.. Habitat manipulation can theoretically produce a block upstream of plant growth. Chemical treatment or mechanical cutting/pulverising decrease the transit time between plant growth and plant death.

The control procedures outside the ecosystem box are considered theoretically desirable as they remove plant nutrients, an oxygen deficit; and reduce the rate of infilling. Moreover they represent potentially useful products outside the watercourse. The first of these is mechanical harvesting which removes plant growth; the second is sport/ commercial fishing which would include the grass carp programme, and the third in dredging which removes plant residues and fertile sediments.

In New Zealand we find mechanical removal of plants is a relatively routine procedure in irrigation/drainage canals where siltation is a problem. It is also employed to a limited extent to remove Salvinia from Western Springs lake. The major developers of weed collection techniques however remain the Electricity Department as even moribund weed would clog their intake screens. At present they are considering the logistics of either land disposal of the harvested weed or merely pulverising it to a point where it will pass through their screens; and returning it direct to the water. Environmentally the former is the most acceptable alternative.

Many catchment authorities, and the Department of Lands and Survey conduct a routine chemical control programme in our waterways. Again these are corrective measures to a nuisance condition.

The biological control of weeds by grass carp is at a critical point. Fish have been used in drain trials and they are in a few areas such as the Waihi water supply reservoirs as control agents. Here again however we do not have national authority to impose the most suitable control in a particular area. Local bodies or parochial interests have the assumed authority to choose their own solutions.

The only large scale programme of habitat manipulation in progress at present is lake lowering by NZED although we have made detailed recommendations for preventive weed management in NZEDs new Hydroelectric projects. The other habitat manipulation method we are studying at present relates to the Waikato Hydroelectric lakes. Egeria densa is not as prone to dislodgement as others such as Coatophyllum, hence is an acceptable ecological control agent from NZED's point of view. It is however a considerable recreational/aesthetic nuisance in local areas and we are presently resolving the technique of bottom lining to maintain weed free conditions in these local environs.

We suggest that the most sensible attitude one can adopt with regard to waterplant management at present is that one cannot have a weed problem without a weed. Hence every effort should be

made to contain the spread of adventive species in this country, and where new, potentially troublesome infestations are identified at an early stage, a co-ordinated eradication policy, and a preventive weed management policy should be adopted.

BARLEY GRASS RESEARCH AT RUAKURA

Presented by:—

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Ministry of Ag. and Fisheries
Hamilton.

INTRODUCTION

The paper presents a brief summary of the current research being conducted from Ruakura on the barley grass problem. The need to control barley grass is supported by indications of the financial losses caused by the plant; and control measures, chemicals and managerial, are discussed. Because of the complexity of the problem and diversity of conditions throughout New Zealand, results and recommendations should be taken as general indicators and not necessarily applicable to all situations.

COST OF BARLEY GRASS

Sheep product devaluation (1971/72)

The devaluation of lambs pelts has been estimated at $500,000 per annum by at least two independent surveys of Freezing Company data (Rumball, 1970; Shugg and Vivian 1973). Shugg and Vivian also estimated the down grading of slipe wool due to seed to mount to $280,000/an which represented 1% of the value of New Zealand slipe wool production. If this same 1% devaluation was extrapolated to clip wool, the figure would be approximately $2 million. The Wool Board does not consider the cost of deseeding wool to approach this figure but it is resonable to suppose the devaluation of seedy clip wool would be similar to that of seedy slipe wool. It is probably the farmer who looses through lower market prices a loss that does not appear in the Board's records. It must, of course, be remembered that barley grass seed is not the only vegetable contaminant of wool.

Stock Productivity

New Zealand exports annually about 40 million lamb carcasses. It has been estimated that 10% of our lambs are affected by barley grass, that is four million lambs. If each affected lamb was depressed in weight by as little as 1 kg, we could lose 2,000,000 kg of lamb meat, allowing 50% killing rate. At current ex-farm prices this amounts to about $1 million or at ex-works price $1.4 million. Our trial work has shown that lamb growth rate depressions of 6-8 kg can result from barley grass seed damage (Hartley and Atkinson, 1972; Hartley and Bimler, 1975). At such a rate of depression losses could amount to $10 million/an.

Cost of herbicides

In the 1971/72 season the estimated cost of herbicide appied for barley grass control was approximately $1,200,000. This figure included application costs but not subsidy then applicable. The probable cost to the country would have been in the order of $2 million.

These figures, though very approximate, give an estimate of the annual cost of barley grass of around $5-8 million which does make it an undesirable plant requiring control.

CONTROL MEASURES

Herbicides

After a few years of testing potential herbicides on plot trials the more promising materials have been field tested under sheep grazing in Waikato and Hawkes Bay. The materials used were:—

Propyzamide (Kerb 50W) at 0.5 kg a.i./ha — July/August.

TCA/2,2-DPA (Teedal) at 6.0-10.0 kg product/ha—June/August.

Ethofumesate (Nortron) at 2.0 kg a.i./ha—May.

All three materials have been used in the Waikato trials and the latter two only in Hawkes Bay. Both single applications and applications on two consecutive years have been tested.

Barley grass control

In Waikato (light to moderate barley grass infestation) propyzamide gave best initial control of 90-99% with one application and near 100% after a second application. However, the clover dominant sward remaining after treatment allowed a rapid build up of barley grass if control was any way short of 100%. TCA/22-DPA was less effective initially, 80-85% control but up to 95% after a second treatment. However, the resulting

improved sward appeared more able to prevent re-invasion of barley grass so improvement was maintained. Ethofumesate gave disappointing initial control in the Waikato trials, 75-80% first year, but improvement continued into second and third years. In Hawkes Bay, on the other hand, ethofumesate gave exceptionally good control, 99% first year and 100% after a second application. Even the single application has maintained 80% control into the third season while on the same site TCA/2,2-DPA failed.

Pasture and stock production

Propyzamide reduced pasture production during the year of application by 25-30% with a 10% depression in the second year. By the third year production was as good as, or better than, untreated pasture. Stock production was reduced by 30% first season but was back on par by the second year.

TCA/2,2-DPA caused a 15% reduction in both pasture and stock production first season. Production returned to normal second year and improved in the third year after treatment.

Ethofumesate reduced pasture production by 15-35% (higher rate where barley grass was major component of sward) but had little effect on stock performances in the first year. After a single application production was only slightly reduced in the second year but a second application had a severe affect on pasture with the prolonged effect in clover, which was severely depressed.

Summary of herbicide effects

Ethofumesate—best barley grass control with little immediate effect on pasture production (if proportion of rye grass high) but production suffers later as a result of clover depression.

Propyzamide—good barley grass control (in moister areas) but control short lived unless near 100%. Pasture effect drastic in yield and species change though sheep like the clover dominant sward produced.

TCA/2,2-DPA—less dramatic barley grass control but improves sward composition thus maintains level of barley grass control and probably best treatment by second and third year.

Generally herbicide treatment of pasture is only of benefit to stock (lambs) during the summer. Annual productivity is generally depressed but over the "barley grass season" lambs perform better on treated pasture.

Grazing Management

New work has recently been commenced to measure the effect of grazing systems on the incidence of barley grass.

The first few months have shown hard set-stocking during the spring to reduce barley grass seed production by 75% while two rotational systems achieved 50 and 60% control. The heavier rotational grazing, though not obtaining as high a final level of control as set-stocking, delayed flowering and gave good "lamb feed" about Christmas time. This delay in seeding would help to reduce seed damage by giving another month to get lambs away to the freezing works.

The objectives of managerial control are two-fold. Firstly, to reduce seed production by controlling spring growth and secondly to create adverse conditions for seedling survival by maintenance of pasture sward during the summer. The demands of such grazing are contrary to natural production patterns and could not be operated on a whole farm at one time but may well be useful to reduce the incidence of barley grass on limited areas—at no cost.

RECOMMENDATIONS

Where barley grass is limited to nuclear area knock these out with herbicides. For this purpose ethofumesate in May/June is probably the best material, expensive but effective. If compared to the losses in productivity of pasture and animals in the presence of barley grass or the cost of controlling barley grass after it is established, the expense of ethofumestate for eradication would be small.

Once barley grass is established across the paddock TCA/2,2-DPA is probably the best general herbicide treatment. Propyzamide can give control in areas of reasonable summer growth and treatment results in good summer sheep pasture but total production is reduced. Whatever herbicides are used management will be important. If management is wrong and creates conditions favourable for barley grass any benefits from herbicides will be short lived and repeated application will be necessary. If we get management right this should lead to a continuing reduction in barley grass, at least in those parts of the country with a helpful climate. However, control by management could well be assisted by initial herbicide treatment.

We must intergrate control. Herbicides are not a magic panacea that can cure all our problems without any alleviation of the conditions that created the problem.

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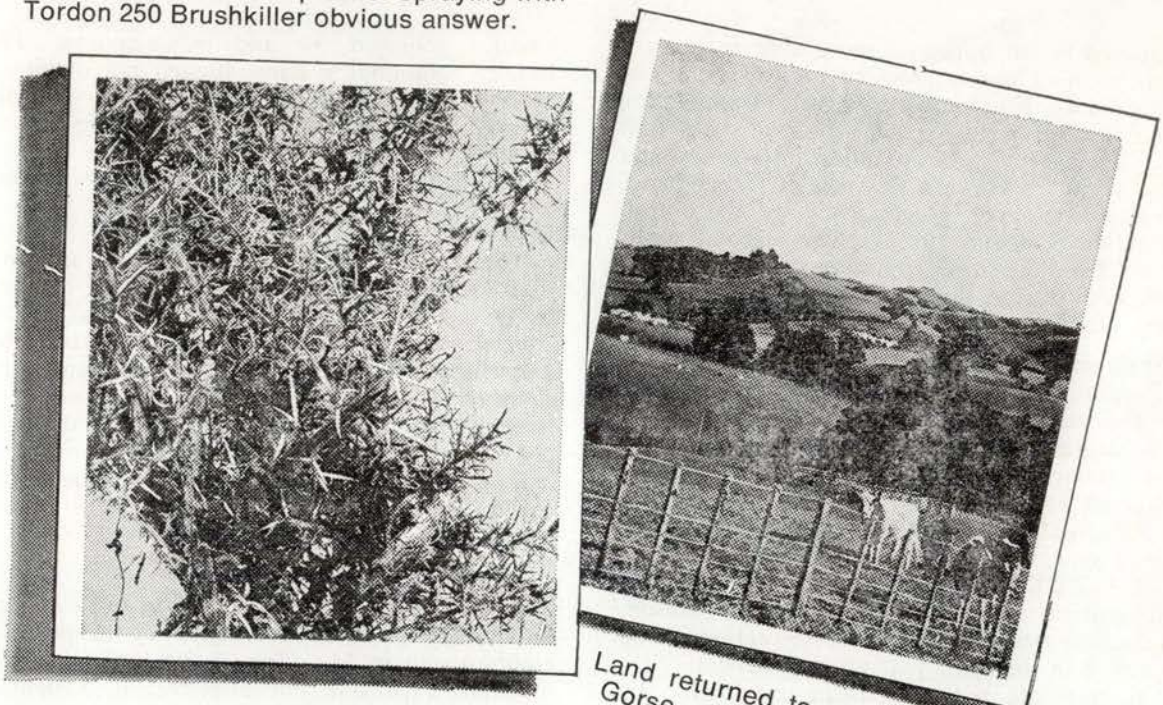

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A REVIEW OF GORSE (ULEX EUROPAEUS) STUDIES BY THE WEED SCIENCE GROUP, RUAKURA AGRICULTURAL RESEARCH STATION 1972-75

Presented by:—
Mr A. Thompson
Senior Technical Officer
Soil & Field Reearch Organ.
Ruakura Ag. Res. Stn.

Introduction:

Although gorse has probably had more herbicide applied to it than any other weed in New Zealand, it remains the country's most common and aggressive scrub species, occupying several hundred thousand hectares of potentially farmable land. It must therefore remain the subject of continuing research into methods of control, as well as agronomic investigations to achieve a better understanding of the reasons for its success as a weed.

Over the period under review work has included studies of gorse responses to fertiliser, the effect of pasture competition and defoliation on gorse seedling survival and the effect of fertiliser on competition between gorse seedlings and pasture species. Herbicide work has included studies of times and rates of application of the commonly used materials, the effect of herbicides on regrowth and seedling gorse, the movement of herbicide effects within treated gorse plants and the effect of soil moisture on the uptake of herbicide by gorse plants.

Although much of the work has already been published (Thompson 1973, 1974, 1975), the purpose of this review is to make the information more readily available to Noxious Weeds Inspectors and others involved in practical field work and advice.

Gorse Response to Fertiliser

It is generally accepted that gorse regeneration is not a problem under high fertility conditions but little information has been available about the effect of applied fertiliser in low fertility situations. Table 1 summarises the response of seedling and mature gorse to phosphate, potash, nitrogen and lime under low fertility conditions.

Table 1: % Gorse response to fertilisers (nil fertiliser = 100)

		Seedling gorse (assessed at one year old)			Mature gorse (one season's growth)	
Element	(kg/ha)	Weight	Height	Branching	Weight	Height
phosphate	54	245	136	242	123	111
potash	150	115	100	100	104	101
nitrogen	66	135	118	106	105	104

These results show that gorse exhibits a fairly typical legume response to fertiliser. There was a strong response to phosphate, particularly at the seedling and juvenile stage. Potash increased gorse vigour but had little effect on height or density. Nitrogen completely inhibited nodulation and initial seedling growth but as plants established they rapidly adapted to utilise the applied nitrogen. Lime retarded the early growth of gorse seedlings but had little effect on established plants.

Effect of Pasture Competition and Defoliation

All practical recommendations stress the importance of pasture competition and frequent defoliation as a defence against invasion and establishment of gorse seedlings in pasture but no detailed studies of competition effects have previously been undertaken. Table 2 shows the effect of four seeding rates of ryegrass and white clover on gorse seedling survival under a regime of frequent close trimming to simulate grazing.

Table 2 % gorse seedling survival 6, 9 and 12 months after sowing pasture species (100 = gorse seedling numbers one month after sowing)

Ryegrass				White Clover			
Seed (kg/ha	August	November	Feb.	Seed (kg/ha)	August	November	Feb.
0	70	44	40	0	82	43	41
5	37	27	24	1	70	29	9
10	22	16	15	2	57	9	2
20	24	14	13	4	48	8	0
40	23	15	14	8	47	2	0

Ryegrass competition was more severe during the winter-early spring period but ultimately was considerably less damaging to the developing gorse plants than was clover. Ryegrass vigour and competition declined in the spring to the point where it had little effect on gorse survival, while the competitive effect of clover increased. Sustained clover competition through the late spring and summer, combined with attack by rhizoctonia fungi for which clover provided a favourable microclimate, eliminated gorse at the higher rates of clover seedling.

Fertiliser Effects on Gorse Seedling/Pasture Competition

Once it was understood how seedling gorse responded to fertilisers and to pasture competition the next step was to examine what happened to the seedlings when these effects were combined in low fertility situations. Table 3 summarises gorse seedling survival in two trials where phosphate, potash, nitrogen and lime were applied to ryegrass and white clover sown in autumn with gorse seed on low fertility sites.

Table 3: % gorse plants present 3, 6, 9 and 12 months after sowing in April (nil fertiliser = 100)

	Element			
Month Assessed	**Phosphate**	**Potash**	**Nitrogen**	**Lime**
August	48	110	88	90
October	64	119	51	84
December	67	95	48	82
March	73	70	62	87

In these low fertility sites he overwhelming initial (August) response was to phosphate, in the form of vigorous grass growth which smothered over half of the original gorse plants. However, the later pasture response to P was inadequate to prevent the establishment of gorse seedlings which came in during the spring and summer. During the winter and early spring potash enhanced gorse survival but later the vigorous clover response to this element reduced gorse numbers by 50% from October high. The slight winter and strong spring response in grass growth to nitrogen was reflected in the figures for gorse survival in the August to December period. During the summer, clover suppression by nitrogen and subsequent poor grass growth allowed the ingress of new gorse seedlings. The reduction in gorse numbers caused by lime reflected competition from the somewhat better pasture growth as a result of higher soil pH.

Effect of Herbicides on Regrowth and Seedling Gorse

In pasture weed control it is a generally accepted principle that a low rate of herbicide applied at an early stage is better than a higher rate later. This recommendation is seldom applied to the treatment of gorse seedlings and regrowth in oversown pasture, as effective herbicides tend to be severe on clover. In order to determine the effect of 2,4-D and low rates of 2,4,5-T an area of gorse which had a fair undergrowth of grass and white clover was burned and oversown with ryegrass and clover in March. In the following October and March butoxyethanolester formulations of 2,4,5-T and 2,4-D at the rates indicated in Table 4 were boom sprayed. Table 4 shows treatment effects assessed in November after the final March treatment.

Table 4: % gorse regrowth, seedling numbers and white clover treated 6 and 12 months after burning and oversowing. Assessed November 1973.

Treatment Applied			October 1972		March 1973			
kg/ha	October	March	Regrowth	Regrowth	Seedlings*	Seedlings*	Clover	Clover
Nil			100	53	100	100	31	100
2,4,5-T	0.25	0.50	19	6	86	36	2	53
"	0.50	1.00	5	9	67	9	0	36
"	1.00	2.00	<1	3	54	0	3	22
2,4-D	0.50	1.00	58	13	91	68	11	81
"	1.00	2.00	38	9	78	54	2	70
"	2.00	4.00	21	4	72	3	2	46

*Gorse seedlings: 100 = numbers present at initial spraying.

All treated gorse seedlings were destroyed by all rates of 2,4,5-T at both times of treatment. Seedlings present at assessment came in after treatment. 2,4,5-T at 0.25 kg in October and 0.50 kg in March gave inadequate control of stump regrowth but control by the higher rates at both times was satisfactory to excellent. Some gorse seedlings survived 2,4-D at the lowest rates in October and March but higher rates at both times gave complete elimination, those present at assesment coming in after treatment. Regrowth control by 2,4-D was unsatisfactory at all rates and times except 4.00 kg in March.

Much of the white clover noted at assessment was regrowth from established clover present before burning. Although 2,4,5-T had a more severe effect on clover than 2,4-D, even at the highest rate of 2,4,5-T clover was recovering well at assessment.

Times and Rates of Herbicide Application

Esterformulations of 2,4,5-T remain the basic material for gorse control but there is increasing emphasis on its use in combination with various addative herbicides with the object of reducing regrowth or to extend the time over which gorse may be successfully treated. Table 5 shows treatments from two trials to compare the effectiveness of 2,4,5-T/picloram, 2,4,5-T/dicamba and 2,4,5-T/diquat wth each other and with ester 2,4,5-T. Treatments were applied in November, February, and April and June but for brevity results of the first and last treatments only are given in Table 6. Trial A was peat and trial B on mineral soil.

Table 5: Herbicides and treatment rates (kg/ha)

Rate No	2,4,5-T	2,4,5-T + picloram	2,4,5-T + dicamba	2,4,5-T + diquat
1	2.67	1.50 + 0.37	1.50 + 0.74	1.50 + 1.24
2	4.00	2.25 + 0.56	2.25 + 1.12	2.25 + 0.36
3	5.33	3.00 + 0.75	3.00 + 1.50	3.00 + 0.48
4	6.67	3.75 + 0.95	3.75 + 1.90	3.75 + 0.60

Table 6: % gorse regrowth from treatment in November and June (assessed 12 months after June treatment)

Herbicide		**2, 4, 5-T**		**2, 4, 5-T +**		**2, 4, 5-T +**		**2, 4, 5-T +**	
Rate	**Time**	**—**		**picloram**		**dicamba**		**diquat**	
	Trial	A	B	A	B	A	B	A	B
1	Nov	2	15	2	10	4	20	25	30
2	"	3	5	<1	<1	3	2	4	15
3	"	0	0	0	0	5	<1	2	10
1	Jun	80	100	15	60	80	100	40	80
2	"	30	90	2	40	30	100	20	40
3	"	10	30	0	20	15	70	10	40
4	"	6	20	0	5	5	25	8	8

The level of gorse control on trial A was superior to that on Trial B. This was assumed to be largely due to better gorse growth in the more moist peat soil of the Trial A site. Results confirmed what is already well-known; that most herbicides, but particularly 2, 4, 5-T, give much more effective control of vigorously growing gorse treated in November than of the relatively dormant June growth. There was little evidence to show that 2, 4, 5-T/dicamba or 2, 4, 5-T/disuat were superior to 2, 4, 5-T alone in suppression of gorse regrowth. The level of regrowth control by 2, 4, 5-T/picloram was generally superior to that of other materials.

Movement of Herbicide Effects Within Gorse Plants

Because 2, 4, 5-T is a poorly translocated herbicide, parts of gorse plants missed or inadequately covered by 2, 4, 5-T usually survive and regrow. Picloram and dicamba are recognised as considerably more mobile within treated plants but information was required about the capacity of these materials to move in lethal amounts into inadequately treated parts of gorse plants, and about the extent to which this could compensate for incomplete cover. The suggestion that the rapid brown-off caused by diquat as an addative to 2, 4, 5-T could further limit the movement of 2, 4, 5-T into gorse plants also required investigation.

In separate trials in May and December gorse bushes on each of which three branches had been protected from herbicide treatment, were sprayed with the herbicides shown in Table 7. Table 7 also gives assessments made 12 months after treatment of herbicide effects on treated and protected gorse growth.

Table 7: Effect of herbicides on treated and protected gorse.
(1 = no effect, 10 = apparently, 12 months after treatment)

Treatment (kg/ha)		May		December	
		Treated	Protected	Treated	Protected
picloram	0.50	6.7	7.7	10.0	10.0
dicamba	0.75	1.7	1.1	6.7	3.0
diquat	0.60	8.0	1.0	7.0	1.0
picloram + 2, 4, 5-T	2.0	7.3	7.8	10.0	10.0
dicamba + 2, 4, 5-T	2.0	5.0	1.4	9.0	5.9
diquat + 2, 4, 5-T	2.0	8.0	1.0	8.3	1.7
2, 4, 5-T	2.0	3.7	1.3	9.0	4.2
2, 4, 5-T	4.0	7.3	1.7	9.0	5.7

All herbicides with the exception of diquat, were considerably less effective in May than in December against both treated and protected parts of the gorse plants. 2, 4, 5-T even in December had only a moderate desiccating effect on protected foliage and dicamba did not significantly enhance the translocation of 2, 4, 5-T into protected branches. Picloram showed a much greater capacity than any other material to move in lethal amounts into protected parts of gorse plants. At both times of treatment diquat reduced the desiccant effect of 2, 4, 5-T on protected foliage and increased regrowth on treated parts.

Effect of Soil Moisture on Uptake of Herbicide by Gorse

In order to determine whether otherwise inexplicable variations in herbicide effect on gorse might be due to differences in the amount of moisture available to the plants, a trial was conducted in which pot-grown 2-year-old gorse plants were subjected to pre- and post-herbicide regimes of low and high soil water. After 5 weeks of pre-herbicide differential watering 2, 4, 5-T 2.0 kg and picloram 0.5 kg were applied as separate treatments. The pre-herbicide watering groups were then subdivided and differential watering continued to give pre-post herbicide watering regimes of low-low, low-high, high-low and high-high. Post-herbicide water regimes were maintained for 8 weeks.

Table 8 gives results of assessments made 6 and 9 months after herbicide treatment.

Table 8: Herbicide effects on gorse 6 and 9 months after treatment.
(1 = no effect, 10 = apparently dead).

Water			2, 4, 5-T		Picloram	
Pre	Post	Assessed	August	December	August	December
Low	Low		4.5	6.8	3.3	7.0
Low	High		5.5	6.8	7.8	9.8
High	Low		7.3	9.0	4.5	9.0
High	High		6.8	8.8	5.0	9.0

Table 8 shows that the restricted gorse growth induced by low water prior to herbicide application caused highly significant reductions in 2, 4, 5-T effect. Variation in the amount of water available to the gorse plants after treatment had little practical effect on the performance of 2, 4, 5-T, regardless of the pre-treatment water rate.

Picloram appeared to be considerably less dependent than 2, 4, 5-T on the level of pre-herbicide soil moisture. Although the lowest desiccation scores for this herbicide were recorded where water was kept at a low level both before and after herbicide treatment, there was no significant differences in effect between other water regimes, and the highest effect scores were achieved where picloram was applied in conjunction with a low-high water regime.

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FARM FORESTRY AND THE CONTROL OF NOXIOUS WEEDS

Presented by:—
Auckland Conservatory.
Forest Service Extension Officer
Mr D. Barry-Walsh

Session Chairman: Mr D. Finlayson, Waikato County Council.

Chairman: Gentlemen, it is my pleasure to introduce to you Mr Barry-Walsh from the Forest Extension Service of New Zealand. I'm sure that the paper he is going to present to you will prove to be both educational and of benefit to our jobs. Mr Barry-Walsh.

Mr Barry-Walsh: Good morning, gentlemen. It is my pleasure to address you. I confess to being in a slightly alien society inasfar as I havn't had very much to do with Noxious Weeds Inspectors personally, thank God. My designation with the Forest Service is Extension Officer in Auckland and this means that we are Advisory Officers within the Forest Service.

The control of noxious weeds by afforestation has been practised by farmers for many years. The ability of a number of exotic conifers to create a dense canopy has been utilised to create an unsuitable environment for the growth and spread of a wide range of noxious weeds through the simple process of light occlusion.

It must be recognised that the control achieved is temporary as once the trees are clearfelled, the problem re-occurs unless replanting is carried out. Afforestation for purposes of weed control is not inconsistent with production forestry although rotations will necessarily be extended because of the undesirability of early thinning.

The tree species ideally suited for weed control should be rapid growing to overcome early vegetative competition and be capable of developing a dense canopy to low levels. Unfortunately trees possessing the latter quality are relatively slow growing shade-bearing species which take some years to establish.

From experience we know that Pinus radiata a fast growing conifer, although lacking the deep crown of the shade bearing trees, if planted sufficiently close will supress most understorey weeds in four to six years, because of its rapid growth rate on a wide range of sites. It has the distinct advantage of being a saleable commodity at maturity.

For these reasons, it is a logical choice as a species for weed control.

Site Preparation

It is ironic that the first and most important step in establishing a woodlot to achieve weed control is the removal of existing vegetation and the reduction by any practical means of the capacity of surrounding vegetation to compete with the trees during the first two years after planting.

On tractorable country a large arsenal of weapons is available for land clearing and cultivation in various situations. These include crawler tractors fitted with blades or rootrakes, roto-slashers, flails, roller crushers and herbicides. The objective in land preparation is to obtain as clean a site as possible to allow for unrestricted early tree growth and easy planting conditions. Essentially the vegetation is left in a condition suitable for a hot fire, with subsequent cultivation by discing or ripping.

Gorse sites are probably the most difficult to control. Its initial removal by fire is not usually a problem, particularly if the area is previously dessicant sprayed, but because of persistent and and rapid regrowth from stumps and seed, newly planted trees are often smothered unless additional land preparation measures are taken or the trees are kept clear by repeated and costly hand releasing.

Where heavy discs can be used the gorse can be burnt and then the land double disced. This can be done in spring or early summer to allow dormant seed to germinate, a second discing follows in late summer followed by heavy harrowing to minimise gorse regrowth and to provide easy planting conditions and excellent growing conditions for the young trees.

Even with this comprehensive treatment a post-planting hormone spray may be required.

It would be prudent at this point to observe, that Pinus radiata is sensitive to most hormone sprays, consequently post plant spray formulations normally recommended are restricted to concerntrations of the order of about 3 litres 2, 4, 5-T in 220 litres of water per hectare, applied in early spring before the trees show soft green growth. The trees become increasingly susceptible to sprays with age and because of this, control sprays are scheduled for the first year after planting.

"Old Man" gorse on steep untractorable country is more difficult and costly to establish in trees and it is advisable that land preparation should commence at least two, if not three years before planting.

The area is firstly dessicant sprayed and burnt standing. When regrowth is sufficiently high the area is reburnt. This second fire will consume residual stick material which would otherwise impede planting. In the following January regrowth is sprayed with 2,4,5-T at a rate of 11 litres in 450 litres of water per hectare. Planting is carried out the following winter.

There will be variations of the methods outlined above, but the point to remember is that preparation requires advance planning, and must be thorough.

Treestocks and Planting

Where weed control is a management objective, 1½ year old trees are a must. Well hardened treestocks with good fibrous root development and a height of at least 300 - 400 mm are recommended for planting.

Nowadays ample planting stock of adequate quality are available from private nurseries, provided an order is placed well in advance of the planting season.

Trees are packed in cardboard containers in which the trees are placed in polythene bags. Alternatively they will arrive in stout multiwalled paperbags. In either case it is important that only sufficient trees for 4 or 5 days planting are collected from the nursery at a time, because tree-stocks deteriorate after lifting, and stockpiling for periods longer than 7 days may lead to unacceptable mortality.

The principle to follow is to reduce the delay between lifting in the nursery and planting out to a minimum and to hold on the planting site just sufficient trees to meet the day's planting requirements, the balance being stored in a shed out of wind and sun.

Even in this day and age there are a bewildering variety of planting methods and tools currently employed in State Forest planting operations. There is however a concensus of opinion that the single notch planting method normally seen in private planting is the least efficient in terms of survival, root distortion, and early height growth and this is borne out by trials carried out by the Forest Research Unit.

A recommended planting method using either spade or planting adze is as follows:

1. Clear all vegetation from an area about 30 cm square and break the ground up to a depth at least equal to the depth of the tree roots. After loosening the soil, tramp it down lightly.
2. Make a hole in the centre of the cultivation pulling the soil to one side.
3. Place the tree in the hole making sure the roots lie naturally.
4. Replace the soil around the roots, keeping the tree perpendicular and slightly lower in the ground than in the nursery.
5. Firm the tree by tramping, being careful to avoid damage to the stem.

Planting spacing for a commercial woodlot will vary from 1.8m x 2.4m (2300/ha) to 1.8m x 4.3m (1350/ha) according to terrain and management aims. However, early canopy closure is required, obviously the choice will be for the closer spacing.

A common fault found in planting small private woodlots is a failure to adopt a system of sighting poles to obtain straight planted lines and accurate spacing. Pairs of poles are set out before planting so that the planter by keeping them dead in line will achieve a straight planted line. For practical purposes all that is required is to pole every fourth line, the intervening lines being planted by reference to lines on either side.

The importance of poling becomes evident a few months after planting when weed growth develops on the site and hand releasing is required to prevent tree smothering. If the trees are evenly spaced in straight lines they can be easily located in fairly dense regrowth and a great deal of time will be saved. On carelessly planted areas with uneven tree distribution it is surpising how difficult it is to locate trees and worse still, it is all too easy to sever the young tree at ground level with a sharp slasher even where experienced workmen are employed

In Sate Forest planting, poling is regarded as an essential part of the operation.

Tree Releasing

Trees cannot be expected to grow much in the first year after planting because the effect of lifting from the nursery and transplanting into a new medium, means that virtually a new root system must be developed. There is usually a delay of some months before the trees commence growth and during this period they are particuarly vulnerable to suppression and smothering by competing vegetation. The tree crop will usually require assistance by way of a reduction in weed competition. This may be effected by using sprays or hand releasing.

Whatever the method the operation is defined as releasing and it can be an unpopular, time-consuming and costly business.

It would probably be true to say that more trees have failed in farm woodlots because of a failure to recognise the need for timely releasing than for any other reason.

Silvicultural Tending

Where weed control is essential reason for planting there will be obvious restrictions on the timing and intensity of thinning.

Nowadays the most profitable forest regime

calls for early thinning and pruning to achieve optimum diameter growth of crop trees, thus maximising clear wood production (knot free timber) and keeping the length of the rotation to a minimum.

Early thinning would mean that at about age 5 or 6 years 50% of the trees would be selectively felled thus opening the stand out considerably thereby encouraging the persistence of ground cover weeds, an undesirable effect where, for instance, gorse or blackberry was present.

The alternative management regime is to delay thinning until the trees are about 17m in height and approximately 300 - 350 trees per hectare and to omit pruning other than the outside 2 or 3 rows of trees. By this means the branches on the bottom two log lengths (11 metres) will be kept within the dimensions suitable for sawing to framing grade timber, a product in high demand for the housing industry. The penalty to be paid is in terms of the longer rotation required to reach minimum sawlog diameter, and the reduction in the quantity of high quality veneering and clear timber produced which reduce the market value of the logs.

Cost of Establishment

For our purposes it is assumed that the site to be planted will probably be small (1 - 10 ha) situated on steep country and carrying rank growth of various weed species.

Although it is difficult to estimate costs without detailed knowledge of a specific site, it is possible to quote a range of experience costs derived from Government assisted projects throughout the country. On this basis then a range of indicative costs is as follows:

Tractorable sites	$199 - $287 per hectare
Non tractorable sites	$350 - $450 per hectare

Profitability

The value of a woodlot at maturity will vary widely according to the quality of the timber, the geographic location, access and market demand.

The cost of transporting logs is high, and therefore the distance to the point of utilisation will have a decisive effect on the stumpage offered.

As an indication of the effect of transport costs it can be said that each 16 km increase in haulage distance represents a loss of about 44c per metre[3] to the grower. To put it another way, the grower can expect about $232 less per hectare for each 16 km extra the logs have to be hauled to a sawmill or port.

Remote locality combined with poor quality trees may reduce the stumpage offered to the point of extinction.

Access to the woodlot for logging trucks must also be considered. A loaded logging truck will be restricted to a maximum adverse grade of about 1 in 7 and there are limitations on the minimum radius curve which can be negotiated. Where woodlots are remote from public roads with intervening steep country, high roading costs incurred by the purchaser will be deducted from the stumpage. In extreme cases, unfavourably located woodlots may be virtually unsaleable.

Questions:

Louden, Thames-Coromandel: Could you give us an idea of the number of acres planted in your conservatory area and how many trees per acre are planted. Also the men employed for a period of, say, one year?

Mr Barry-Walsh: The last part of your question is most difficult and I couldn't give you any indication of that but the figures I have in my head for 1975 are, I think, reasonably accurate. Other than State planting we would be planting 6,700 hectares and by state forest, 4,300 hectares and there would be around another 27,000 hectares planted in the Auckland Conservatory alone. The number of trees planted per acre would vary but be around 723. As to the number of men employed I really wouldn't know.

Chiles, Ohinemuri: What is the average planting rate of trees per day for one man?

Mr Barry-Walsh: This would not have dropped. The highest tallies that I know of would be at East Taupo where some reach 3,000 per day on country that has been disced and is easy planting. On normal line planting on clay soils, planters are averaging 800-900 per day. On pumice soil the average would probably be 1,500 per day.

Hodgson, Hawkes Bay: What would the smallest area be that a farmer could claim a grant on?

Mr Barry-Walsh: There is a statutory minimum of 2 hectares.

Green, Whangaroa: The grant you spoke of. Is it still available to local authorities?

Mr Barry-Walsh: No. We have a separate incentive available for them, namely, the Forestry Encouragement Loan. Under the Forest Encouragement Act local authorities can apply for loans on land which they own, of up to $450 per hectare with an interest of 6¾% being payable.

Holden, Raglan: Could you comment more fully on grazing in forestry? Particularly in

difficult gorse areas?

Mr Barry-Walsh: We would really require a session on its own to discuss even the basis principles of forestry and grazing but can I take you are talking of steeper areas? I think the prognosis of steeper areas of grazing is not good because, even assuming they're in a reasonable sward of grass before you start, I doubt you can supply sufficient grazing pressure on those steep areas to prevent reversion and that has been my experience, admittedly very limited, over the past 3-4 years. With trees and grass you can only carry out very limited grazing in the first two years or you're going to lose all your trees and it would strictly speaking be an autumn-winter grazing. With this type of grazing quite a portion of the grass would tend to become unpalatable. On steep country this type of grazing is not proven.

Gould, Pohangina: My county planted 10,000 trees this year and I'd like to know at what stage they should be released? They are two years old and in pasture.

Mr Barry-Walsh: If they are in grass they should have been released before you planted them. We would urge on grass areas that you spot spray with herbicides, using Paraquat, before putting the trees in. You do this a fortnight before you plant to avoid any chemical damage to the tree root. You should get complete grass control for the first season. Ideally, you can spray after planting using either a blanket spray of a selective herbicide or protecting the individual tree as you spray around it.

Collins, Eltham: Is it true that more trees are lost through oppossum damage than any other cause?

Mr Barry-Walsh: We have losses with radiata pine but it hasn't been a major problem. Some other species such as Southern Pine, the pinus poleski can be severely attacked by the opposums but I still maintain that far more trees are lost by not releasing them than by anything the oppossum has ever done.

Fawcet, Banks Peninsula: Did you mention that eucalypts would be of use for suppression of some weeds?

Mr Barry-Walsh: I didn't mention eucalypts at all. Eucalpts are what we call a very crown-shy species and if you bother to look at the thing you'll find at the end of the branch a little naked bud which is very susceptible to any form of brushing between branches and so forth. Being a crown-shy species it tends to be open-growing and you get a very high degree of light at ground level. Therefore, normally, under even a semi-mature eucalypt stand you find quite a dense story of weeds This to my mind, is definitely undesirable for the purpose of noxious weeds control. As a plantation tree, yes, they grow quite well.

Murray, Bruce County: In my area, I'm getting quite a lot of isolated gorse, broom, and various other weeds, not necessarily noxious. In your conservancy, are yau having similar problems and do you think you will be able to afford to keep spraying these areas if you can't get at them by any other means?

Mr Barry-Walsh: In the Auckland Conservancy we have had minor problems where we have done early thinning. In fact it has re-stimulated gorse growth and there's nothing you can do about it. There's no question of controlling gorse by spraying. One case in question is a farm lot where blackberries were growing in an area of one acre. The farmer waited until the trees were twenty feet high and we had to trim them back to eight feet so that he could, on a calm day, use a mist blower. He completely eradicated the blackberry without damaging the trees but it was a costly job and certainly not a practical solution on a large scale.

Marsh, Wellington Region: Are posts a viable proposition on steep country and what sort of a price could a farmer expect to get for a plantation of pines that have been well looked after?

Mr Barry-Walsh: On steep country it just isn't on for posts. Post thinnings on steep country or any situation have to be carefully supervised to ensure there is absolutely the minimum damage to your remaining crop of trees. $1,400 an acre is a reasonable price for a farm crop. It depends how hard they bargain. Often farmers give their timber away at ridiculous prices without checking first with the Forestry Service as to its true worth.

Mr Matthews, M.A.F.: I question this conception that planting trees is a sound method of weed control. In Allington Bay, French Pass, in 1946, pinus radiata was planted at a very high density to control Cape Tulip. We monitored this Cape Tulip and found that bulbs in the plantation were more viable than those outside the plantation. The trees have been clear-felled within the last year or so and the Cape Tulip density is unbelievable.

Chairman: I would like to thank Mr Barry-Walsh for his very fine address and ask you to express your appreciation.

CALIBRATION OF EQUIPMENT

Presented by:—
Mr G. Garden
Senior Research Officer
N.Z. Agricultural Engineering Institute.

Session Chairman: Mr I. Frizzell, Amuri County Council.

Chairman: I would like to introduce you to Mr Graham Garden of New Zealand Agricutural Engineering Institute College who will speak on the aerial application of herbicides and the calibration of equipment. Mr Garden.

Mr Garden: Good afternoon, gentlemen. Very briefly I'll outline the work we have been doing illustrating this with slides and then we can have questions. In 1969 we had a visit from Professor Yates of Davis, California who has spent some time involved in aerial spraying research. He was on a scholarship and stayed with us for nine months. His forte was aerial application. Although at the time the N.Z. Engineering Institute at Lincoln College hadn't been involved in aerial spraying, the opportunity of making use of this man's experience was too good to miss. We sent him around the country and in effect asked him if he thought we should be involved in aerial spraying. The short answer was yes.

He started us off by building some equipment to do the measuring that's required, similar to what they're using in Davis, then he took off home. That left us in the middle of the pond swimming for shore. So, we had to think about what we were trying to achieve and consequently we set out a programme in aerial spraying research. This, we decided, would be necessary to look at what current practice was all about. It's no good getting involved in any research unless you know what you're trying to do and understand the problems. One of the interesting things that came out of the questions asked was that an aerial operator utilises a spraying aircraft for approximately one hour per day in the air. Hence the need to hopefully extend the spraying hours of an aircraft.

Before solving any problems we had to learn what they were so we embarked upon a field programme to collect information on what was considered current commercial practice. We were associated with forestry spraying activities for the sole reason that if we had attempted to do the same thing in rural spraying operations, spraying would have been finished before we managed to get our gear set up. With forestry spraying, on the other hand, you're at it for long periods. There is an aircraft or two, even up to four, working off the same strip for weeks at a time. This meant we could set up our gear, operate from the one site and collect a wealth of information. It's only after we have done all this that we can sit down and say, right, this is what we're doing, these are the areas we can contribute usefully in. That is the stage we are at now.

At the testing site we had an open area and in this we laid little stainless steel plates for a distance of some 500 feet. Adjacent to this collecting area was a large mast with several anomometers for measuring wind speed. Also on the mast were units for measuring temperature, difference and turbulance. On another mast was a wind vane to give wind direction. There was a truck for instrumentation and a caravan to live in with the inevitable washing on the line. The information from the census on the mast came into a recording system which produced printouts. Other recording gear gave specific traces of what was going on. From this equipment these are the sorts of things we found.

Regards a single day's recording of the temperature. Early in the morning, as you would expect, the temperature starts off fairly constant and then slowly rises. At nine o'clock things warm up a bit and there are quite considerable fluctuations. Just on one o'clock it starts to rain and the temperature begins to crash.

Our instruments showed us the effect of turbulance that a pilot would experience on a hot day and they indicated strong thermal turbulance which is the sort of thing that mixes spray and drift material and disperses it within the atmosphere.

We learned that wind direction can change dramatically particularly when wind speeds are low. For example, a relatively low wind speed of 3-4 mph average can change direction by 360° in a space of only seven minutes. The implications from this are that a pilot does one load and after filling up, comes back and could spray the next load in exactly opposite wind directions from the last load. In fact it isn't until the wind speed gets up a bit that the wind direction tends to become more stable. For example, with a 12 m.p.h. wind we found that the excursions in direction were much smaller than those under the low wind conditions. This is nothing new as the Met. Service have had this information for years.

Two things we were interested in were the percentage recovery on the ground and how much got away and never reached the target area on the ground. We were also interested in the eveness of distribution. We believed we would be able to use the calibration of the aircraft to get the flow

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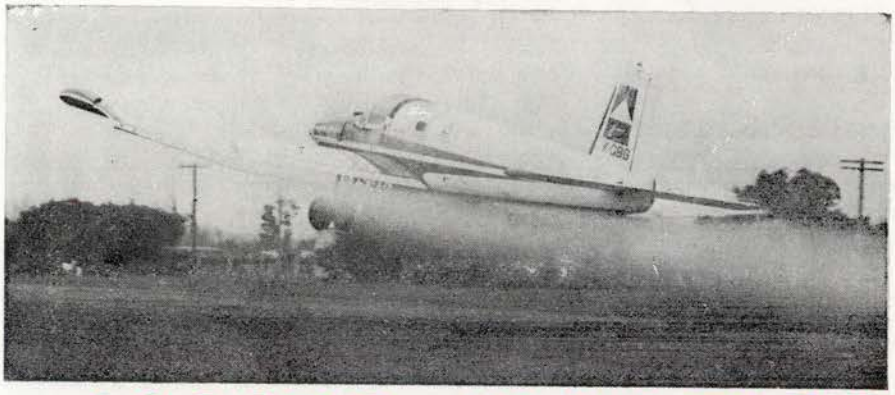

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rate as this was a necessary part of the exercise This however was an incorrect assumption. The material we were using on that particular occasion was 'Coopersoxide' and it tended to settle out in the tank as well as all the plumbing causing the pilot to continually adjust his pressure to maintain the flow rate. So we designed and built a flow-meter which was self-scouring and couldn't clog. The recordings we obtained from this flow-meter were quite interesting. The two different operations we monitored were an application of ten gallons and another of five. The traces which showed on our metal plates enabled us to calculate our percentage of recovery. As I mentioned we were also looking at eveness of distribution and we found that the closer the aircraft flew to the ground, the more even the pattern whereas the higher it went the more uneven the distribution.

We were also interested in the way the droplets got down as we have to explain the reasons for the results we obtained. We had very large and very small droplets. Now, when a drop lands on a piece of paper it spreads and the stain is larger than the droplet that made it. Hence, we built a rig which would enable us to understand this spread factor and ultimately still be able to measure with accuracy the size of droplets.

In the meantime, the Agricultural Chemicals Board approached us and wanted to know if we could do anything about drift. Also, a couple of years ago, when 2, 4, 5-T was all the rage, we found Brian Watts being the meat in the sandwich. On the one hand were the operators and chemical companies, seeing the advantages in lower volume rates of diluent and who wanted authority to use these lower rates. On the other hand were the people concerned about the enviroment starting to make their voices heard. Horticulturists, market gardeners and so on, seeing the protection offered to grapegrowers by regulations and wanted to know why they couldn't have the same sort of thing. Brian Watts wanted to be able to answer some of their questions and he wondered if we could help. We said, all right. We will do a monitoring programme. We'll look at commercial operations and see if we can come up with some information which will help you. We did six trials but didn't really experience the weather conditions in which we woud expect to have the most serious drift problem. So the results were only appropriate to the particular conditions in which they were recorded. To monitor damage to plants from spray drift, plants were placed at strategic points up to a mile down wind from the spraying operation. The types of plants were grapes, tomatoes and beans and altogether 160 plants were laid out at this one mile distance. At some of these points we had air-monitoring equipment. A chemical analysis was done in this area which was on Lands and Survey. The plants were brought back to the D.S.I.R. where they continued to grow for a month at the end of which the damage was assessed fom the spray drift. Although we smelled hormone at these one mile sites there was no apparent damage to the plants.

The conditions where 'drift' is likely to be most serious are those where operators tend to spray when they consider the conditions ideal. That is, first thing in the morning, wind speed right down, still, humidity high and the likelyhood of an inversion. Under these conditions you have a drift hazard and you're apt to get into trouble. This is known from ordinary pollution type studies. The inversion condition is one you should not spray in if you wish to avoid a drift problem.

Questions:

Fawcett, Banks Peninsula: In view of the Agricultural Chemical Vineyard Registration did you consider putting the testing stations five miles away from the spraying operation?

Mr Garden: We couldn't find an area suitable for this type of test. It was hard enough to get one mile away but I'll agree that drift has been known to travel five miles.

McCormack, Cook County Council: In your drift trials, did you use any anti-drift agent? If so could you comment on the effectiveness of it?

Mr Garden: The answer to the first part of your question is no. As to the second part there is no material on the market, that I'm aware of, which will prevent drift. There are aids to reducing drift. What creates drift problems are fine or small droplets which, if small enough, are carried a long way. All the conventional aircraft equipment produces fine droplets and large droplets. There is only one atomiser that I'm aware of which could be fitted to an aircraft and only produce one droplet size. It's called a Microfoil Boom and is suitable for fitting to aircraft which fly at less than 50 m.p.h. Faster than this and the droplets shatter putting you back to square one.

Feierabend, Dannevirke: I believe early morning spraying can be just as lethal as spraying with a wind as the fines can drift around and break up, whereas with the wind they break up fairly fast. Would you comment?

Mr Garden: I'll add only one word to your statement - more lethal.

Forbes, Tauranga: You mentioned that although you had your pot plants one mile away and there was a smell of hormone, you had no damage occur. Was this because smell is a sense thing and not physical? Would it be correct to assume that because you can smell hormone,

it is there in a physical capacity?

Mr Garden: I take your question to mean that because you can smell hormone it doesn't necessarily follow that you will get damage. I suppose it would depend on how long you could spray it for. Extensive spraying operations would be liable to cause damage and by this I mean long periods of spraying would cause a build up in the area. Short periods of spraying would not be so dangerous.

Mr Matthews, M.A.F.: There must be some relationship between the amount of dilutent you are using and this cross wind effect which causes dispersion of the spray particles so that you may get them all over New Zealand but not on one particular area. Could you elaborate on this sort of relationship. The amount of stuff that was actually landing on the ground with the amount of diluent you were using in the cross wind that existed and the factor of dispersion?

Mr Garden: What we did find where we had the flow-meter attached to the aircraft was that in all bar 5-6 runs we had percentage recoveries in excess of 60% and they went all the way from 60 to 100%. As far as diluent is concerned, that's a long trail. If someone came along and said, "It's uneconomical to cart all this water around, let's cut the rate down and use half but still the same amount of chemical," I think the natural tendency would be to shut off every other nozzle so that you end up with the same droplet spectrum from the remaining nozzles. This means that you now have half the number of droplets to cover the ground. What people should be doing is selecting nozzles, not on the basis of flow-rate but on the basis of droplet size because what you are aiming for is coverage. I don't know whether you should use five gallons of two pints to the acre. I don't think many people do know. If some people are doing a good job with low application rates, good luck to them, but watch out for drift. There has been very little work done with herbicides in this regard. Most of the work carried out has been with insecticides where the smaller the droplet the better. Of course this also applies to herbicides where the smaller the droplet the more efficient the use of the chemical.

Chairman: At what point would wind readings be taken during spraying operations.

Mr Garden: As in many cases, spraying operations take place in excess of a mile from the airstrip where it is common for the wind speeds to be taken. In my opinion, to obtain a correct reading, it should be taken as close to the actual point of application as possible.

Chairman: On behalf of those present, Mr Garden, I would thank you very much for a most informative talk and I would call upon the audience to show their appreciation in the normal custom.

PANEL DISCUSSION

Panel Chairman: Mr N. Daniel, Waitaki C.C.

Chemical Representatives: Messrs R. Carmichael, Shell Oil N.Z. Ltd.; J. Porter, Neill, Cropper and Co. Ltd.; J. Wilson, I.C.I. N.Z. Ltd and A. Smith, Ivon Watkins-Dow Ltd.

Clarasich, Hokianga: Could you explain why Tordon 75T has been taken off the market?

Mr Smith, I.W.D.: I think there is a number of reasons for this and in fact one of our main ones was that in the manufacture of Tordon 75T, which was an amine salt, the company had considerable difficulty in maintaining the stability of the product. We had trouble with it precipitating out and there was a number of complaints about this aspect. As a result this was one of the prime reasons for it being withdrawn from the market. We have been able to produce Tordon Brushkiller 520 which is its replacement in a much more stable form and it is hoped that this chemical has overcome that particular problem.

Rossiter, Rangiora: Could the members of the panel confirm, if true, that low volatile 2,4,5-T is off the market?

Mr Wilson, I.C.I.: As far as I.C.I. is concerned no it is not. It's still available if you request it.

Mr Smith, I.W.D.: The demand for this chemical is very limited.

Hough, Opotiki: I would like the opinion of the panel and other weeds inspectors regarding the declaration of thorn apple as a noxious weed and what the criteria is when assessing whether or not to declare it as such?

Chairman: As far as I know this was requested by the Counties Association to help authorities in the first instance. The only point, as I see it, in considering whether to declare thorn apple a noxious weed in your particular county, is if it's a common problem which warrants such an action.

Calkin, Waipa: We have many acres of maize growing in our county and this is where thorn apple is most prevalent. The Waipa County declared it for this reason.

Collins, Eltham: We received a circular from the M.A.F. in New Plymouth asking us to keep an eye out for a species called 'ferox', a native to Australia. This plant is very similar to thorn apple but the spikes are much larger and much more vulnerable. They have found damage to cows' udders caused by these spikes.

Bickers, Hobson County: Does the panel consider the addition of diquat to 2,4,5-T makes it more efficient for gorse spraying?

Mr Wilson, I.C.I.: The initial trials that were carried out by using various rates of diquat to 2,4,5-T were done at different times of the year. The initial use of diquat tended to be an all round use, adding it to 2,4,5-T. A lot of diquat was added in the period September, October through to January, February. During that period of gorse growth we did not find that the addition of diquat enhanced the end result making it any different than if we had used just 2,4,5-T. In fact, in a very growthy early stage, in the spring, it can tend to go the other way. In areas where the growth slowed down this could tend to be more pronounced. Perhaps more so in the southern areas, compared to the northern ones, the addition of paraquat did improve the end result of the 2,4,5-T. Generally speaking, this would be in the colder areas and from March on.

Feierabend, Dannevirke: The question came up at our last ward meeting as to why there is a shortage of chemicals at certain times of the year. The answer we received was that the shortage only occurs at the selling point because of the reduction in the distributors' discount system to stock firms is approximately 7½% plus the fact that the turnover is down in line with farmers' expenses and the firms are reluctant to carry excess stock. Therefore heavy demands may cause delays in supply. I cannot see why the distributors can't make sure that sufficient chemical is available when it is most in demand.

Mr Wilson, I.C.I.: I don't have any knowledge of reduction in distributors' discount that would in anyway influence a reduction in the amount of stock held.

Mr Nairn, I.W.D.: I agree with Mr Wilson that there is no need whatsoever for distributors to be out of stock at any time, except for a year or so ago when there was a very great stress on production as most of you are aware. The discounts or margins havn't varied for many years.

Chiles, Ohinemuri: Why do the chemical firms appear to be hopping on the bandwagon with a 30% increase in the cost of their products?

Mr Wilson, I.C.I.: You couldn't have brought up a better point at this stage as I have been entertaining a director of the company for many hours preceeding my arrival here today and he has been telling me that if we want to produce the result that the shareholders are looking for, then the prices may have to go up again. I don't think anyone would deny a company the right or the need to produce a profit over the year.

Mr Carmichael, Shell: Chemical pricing is a little like petroleum pricing inasmuch as it is Government controlled. I think though, petroleum wise, the finger is kept a little tighter than chemicals but it's all geared to the buying-in price from overseas. Prices that dictate the selling price here.

Mr Porter, N.C.: Yes, we have had this battle with the costs versus the trade price versus the retail price but we're in the same situation as all other companies. Our chaps have one hell of a problem trying to convince the Minister of Industries and Commerce to get a price rise in the chemical to cover costs.

Mr Smith, I.W.D.: If you care to look at our company's annual report which came out 2-3 months ago you'd find it indicated a much lower rate of profit than we have had in the past. The company dividend was reduced quite substantially and in actual fact, the Managing Director's report indicated that the problems, as far as the inventory were concerned, in keeping price with price increases that were coming from overseas, was one of the prime problems facing the company as far as reduced profitability was concerned. With the devaluation, the company suffered a loss in excess of $400,000.

Mr McLean, Fisons: I might add a little bit of light to this. as an importer and also a seller of chemicals, basically from the European centres, one of the biggest problems facing the chemical industry is inflation in excess of 15% a year. For example, with some of the products we have sold into New Zealand from the U.K. we have remained static in our selling price. However, because of the New Zealand dollar devaluation and the halving of other currencies, you can quickly calculate between a 25% and 30% increase in New Zealand dollars to pay for it.

Higgins, Vincent County: I would like to know what the panel's views are regarding counties making bulk purchases either direct from manufacturers or through individual noxious weeds groups on their bulk purchasing arrangements. Also whether the manufacturers are interested in coming through the stock firms?

Mr Carmichael, Shell: My comments on this are that in the North there is a different situation to that in the South and to my knowledge counties have been very active in reselling chemicals to the ratepayers and I believe it is solely for the destruction of noxious weeds. Now, as far as the South goes, the Stock Firms are very much stronger down there and the counties havn't become involved to the same extent at all in actually handling the material. Up here there are some companies dealing direct with the individual counties and there are other companies who deal through the distributors, like Stock Firms, and quote to the counties who distribute the material.

Mr Porter, N.C.: As far as dealing direct with the counties is concerned I feel that we would be doing a little bit of disservice to the stock firms who have traditionally been the outlet for the

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distributing of agricultural chemicals. As far as we are concerned the bulk of chemical supplied to counties is done on a tender system except in a few individual cases when we would tender through either two or three stock firms. We don't envisage changing our system unless there was a big swing in the market place or if the idea was tossed over and the move was made.

Mr Wilson, I.C.I.: Certainly, our marketing policy at this stage is to remain with the distributors. Where they are required to deliver a bulk quantity to one point they could reduce their margin accordingly.

Mr Smith, I.W.D.: I think one of the priority things that we must remember which is also the reason why the Agricultural Chemical Industry is a strong supporter of distribution through the stock and station agents, is that at certain times of the year, the stock and station agents industry heavily supports the farmers with finance and I think this is something we have to bear in mind and be quite honest about, that farmers from time to time are wanting finance from these people.

Louden, Thames-Coromandel: Over recent months we have had a couple of fatalities with paraquat poisoning. Do the representatives know at this point whether their companies are interested or becoming involved in the relabelling or additional labelling that may be added to paraquat containers?

Mr Wilson, I.C.I.: Would you like to comment on where inadequacies lie with the present labelling?

Louden: I know one firm that uses paper labels which wear off with dampness or water. It's a white container and there are a lot of white containers with other cemicals or preparations in them.

Mr Wilson, I.C.I.: We are just as concerned as anyone in the industry with regard to the fact that containers holding schedule poisons be suitably labelled but if you are going to associate problems with the taking of paraquat, invariably it is as a result of decanting out of the labelled container which may be in perfect condition, and putting it into an unlabelled one.

Mr Morrel, Franklin Councillor: On this matter of labels; many farmers are over fifty and have great difficulty in reading them due to the smallness of the lettering.

Mr Carmichael, Shell: One of the problems that we do find as far as labelling goes is that the Ag. Chem. Board lays down stipulations as to how a label is to be set out and they register and approve every agricultural chemical sold in this country. There are many directions on the label regarding application, rate, active ingredient, precautions as far as the user goes and so on. A big problem exists with transporting from the places of manufacture to the different areas of sale because the majority of our products are handled by rail and where you have a whole side of a container plastered with lettering, whether it's a paper label or some other type, they seem to get shuffled around in these wagons to such an extent that when they reach their destination the labels are actually undecipherable. To overcome this many containers are being put in an 'outer-container' or an area on the side of the container is recessed so that this rolling and shuffling doesn't result in the removal of the instructions.

Mr Wilson, I.C.I.: We could make the label bigger but that would mean a bigger container and you would have to purchase more chemical. As to labels rubbing off, our company have been looking into this and we have come up with a suitable pack where the labels are recessed. Some of I.W.D's are actually printed on the plastic pack which do stand up to a fair amount of rough treatment before they rub off.

Fitchett, Wanganui: I wonder if the panel could comment on the almost non-availability of 10% 2,4-D dust?

Mr Carmichael, Shell: We did market 10% dust but now market 90% dust. It's mainly a question of economics. You were paying a lot of money for the packaging and freighting of just clay dust or something like it.

Feron, Awatere: Could the chemical firms supply direct to the counties as there is no legislation to stop you? Yes or no?

Mr Smith, I.W.D.: No doubt the answer could could be yes.

Mr Wilson, I.C.I.: I must be honest, I don't know.

Mr Porter, N.C.: I don't know whether legislation exists or not.

Mr Moore, McKenzie: A point was made by the panel that they didn't favour supplying direct to local bodies because they feel a loyalty to their normal outlets, the stock firms. In one area of the South Island, one stock firm alone, has 90% of the clientele and that stock firm could quite easily miss out on a tender. How would you cater for servicing stock firms under these circumstances? Another thing is that where counties are organising and purchasing chemicals the stock firm doesn't carry the bundle too long because they are paid under the auspices of the county.

Mr Wilson, I.C.I.: I think marketing policies are continually being reviewed and I don't believe for one moment that as far as I.C.I. are concerned that our current policy is the one we've budgeted for, to keep for the next ten years. No, we are continually reviewing our marketing policy.

Calkin, Waipa: Could you comment regarding

the effect temperature has on Velpar? Also on experiments with mixtures of glycomate and other chemicals for the control of barley grass?

Mr Porter, N.C.: Velpar temperature, for foliar contact, is similar to paraquat. Experiments have shown that the time to apply Velpar for optimum results would be between the months of October through to the end of December-January. In the autumn months, which are cooler, perennial grasses are not growing as they normally do in the spring. They've already produced their seeds and are dying back over the autumn period. Therefore, if you spray at this time, you get a less effective kill. In all cases, I have never seen Velpar fail to work under normal spring or summer conditions as a foliar action. The residual value of the chemical is right through the year due to being in the soil. If you had a low temperature of 8°C I would expect the foliar activity to be less than what it would be at 20°C. The answer to the glycosomate mixture for barley grass is that I have never worked with these mixtures. I have done extensive experiments using glycosomate mixed with other chemicals, mainly the residule types such as urasils and eureas. From my experience with paspalum control you will get better results in the spring than in the autumn.

Fawcett, Banks Peninsula: Are the panel aware of the revived interest in bulk buying under the subsidy situation? Are they aware of the stress that the M.A.F. put on the desirability of group buying in the interests of economy?

Mr Wilson, I.C.I.: Are you saying that the M.A.F. has issued a document which is recommending very strongly that people buy in bulk at as cheaper price as possible, irrespective of the preservation of existing lines of distribution, financial wise? Is that what you are saying?

Fawcett: That' exactly what the recommendations were. Every weeds inpector in this hall will be aware of that.

Simpson, Wellington Region: Is there any trial work going on at the moment with regards Tawhini and if so, how far advanced are these trials?

Mr Carmichael, Shell: If our technical rep. had been present today he could probably have answered this but to the best of my knowledge we are not doing any work on it.

Mr Smith, I.W.D.: In actual fact, from some of the trial work we have had going on in the Wairoa-Gisborne district in the course of developing a new chemical we have found that its activity towards Tawhini looks very encouraging and we have made many observations of this in conjunction with our commercial scrub spraying operations and I believe with our timing of treatment with these particular rates, that we do have some reasonable hope.

Holden, Raglan: Commenting on the question of local bodies purchasing chemicals. I can quote as my county is pretty involved in this thing. We invite all chemical companies to submit a price for a number of chemicals and we indicate approximately the amount we require. Now, they can submit their price anyway they choose, through the Health Department if they like. My experience is that where we have shifted large amounts of chemical for weed control, in many instances the account has been paid by a stock firm.

Chiles, Ohinemuri: In my county the groups were encouraged to purchase their chemical in the same manner as they had been doing for the last twenty years.

Forbes, Tauranga: Although there may be specific instances when you can get away with aerially applying chemical with the low 2½ gallon rate of carrier haw can you accept it as a general recommendation when the same firm manufacturing the chemical is making a recommendation for ground application of 15-30 gallons of water per acre?

Mr Smith, I.W.D.: I think this is one of great contention amongst a wide range of people, the Government, the farming groups, the aerial operator and the chemical manufacturer. I think that over the years, in controlling a wide range of broadleaf weeds, the bulk of them being thisles, nodding, scotch, variegated and the like, we are finding that the accepted norm with many of these applications is getting well down below ten gallons to the acre. In actual fact, the accepted norm is very much in the vicinity of 5 and 2½ gallons to the acre. And I think we concede that the efficiency is very good on these particular problems. We have effective control of ragwort with rates down as low as 5 gallons per acre.

When we come to our brushweed spraying you'll find that recommendations made in the past indicated rates of 40 - 50 gallons as being desirable and necessary. Now who made those recommendation in the first place and why were they made? I don't believe there was any scientific basis for making them. From the work that we have done, not just trial work but in our commercial work as well, we've brought out recommendations for the control of scrub weeds and the like. We're certainly getting down to a very viable proposition with more than adequate results through spraying with two passes of 10 gallons per pass, making a total of 20 gallons. I think Noxious Weeds Inspectors throughout the country can see areas in their own districts where this has happened.

Mr Hawthorn, I.W.D.: I'd like to comment, as an ex-contractor, to Bill Forbes' discussion of ground operators' rates. When I sprayed thistles

at 11 gallons to the acre I used 32 Fan Monarch nozzles. I drove at 5 m.p.h. using 30 p.s.i. pressure. Now, I would dearly have loved to put on 2½ gallons or 5 gallons but filtration for 32 Fan nozzles was the problem. If I had put on smaller nozzles I'd had nothing but blockages all the time. This is mainly the reason for the higher rate for ground application.

Clarasich, Hokianga: We've all been told about inflation and increased costs and I'd like to give an example regarding the Australian Sedge Scheme. In early 1973 to October 1975 we analysed the cost between a farmer doing it and a contractor with a two man unit. The actual increase was 84%. The point to bear in mind is that the farmer still received a 50% rebate but it was costing him 42% to get it. Another point I'd like to make is that 2, 4-D from early 1973 to the present day has increased approximately 250% in price. Paraquat, strangely enough, has remained fairly stable. Since the subsidy came off it went up to $24 and I think it is only $30 now which is an increase of only 16%.

Mr Wilson, I.C.I.: I'm not an expert on the relative proportions of phenol involved in phenoxies or going back to the oil coming out of the ground. But what's happened to petrol prices in that time. That is what you have to ask. That's where it all starts.

Manson, Lake Counties: What are the results of your trials on hawthorn in the Lake County areas, Mr Porter?

Mr Porter, N.C.: We've been trying two new compounds on most scrub species. I havn't seen them lately and all I can say is that Velpar, which was not used in your area, does control the species you mentioned, hawthorn. Another compound which we are using on hawthorn actually controls the species by preventing the forming of buds the following year. Hence this compound takes a year to work. Perhaps you could comment on your observations to date, George.

Manson: Yes, it did appear that there was good control at the start but later on there was nothing there.

Murray, Bruce County: I would like to ask your opinion of using 2, 4, 5-T after the 28th February in the Bruce County and whether other chemicals such as 520 could be used to extend the cut-off date to April 30th? Do you consider this reasonable for this area?

Mr Carmichael, Shell: I wouldn't make much comment on that other than in the northern area in which I am involved, we sold a lot of 2, 4, 5-T after the end of February.

Mr Wilson, I.C.I.: I assume you're talking about gorse. I believe it has been known for years that the best time to spray gorse is October, November, December. You may be able to spray slightly earlier in some areas. In the northern part of the country where droughts set in, in December, ideally it would pay to have it completed by then. The problem is the availability of contractors to apply it or the farm labour to apply it because it co-incides with seasonal work such as hay-making etc. Inevitably, this is a carry over point. I think, as long as you have reasonably good growth conditions you can probably go as late as February.

Mr Porter, N.C.: You inferred today that everything was so dear and it was important to cut costs. I look at things differently. If you are prepared to pour 2, 4, 5-T or diquat on gorse after the end of January, as far as I'm concerned, in most circumstances you're wasting your money. You must plan your programme properly and carry it ot in the period of active growth. By doing this you save a lot of money and a lot of frustration. What can't be done, do it next year. It's not going to increase that much. If you follow the directions on the label, you'll save money. If you don't, you'll waste it.

Mr Smith, I.W.D.: I don't think we can be too dogmatic when setting an arbitary date for spraying. I believe it's going to vary quite markedly throughout the country.

Mr Morrell, Franklin County Councillor: We all know that ragwort should be sprayed in the small leaf stage but when we see a yellow flower, what do we do? We let them pull it out or we insist that they spray it. Can the Panel name a spray that will kill ragwort without regeneration once it's gone into the flowering stage at that seems to be the time when most farmers wake up to the fact that they have it?

Mr Smith, I.W.D.: We have carried out trials in the Whatawhata District on ragwort at various stages of growth. The treatment was carried out on the 25th of November. We cut the plants out of a pot 15 feet in radius, about 90 in all and all we used was a knife to make a circular hole and we left it at that. We sprayed another plot with 2,4-D, a third with 2,4-D and dicamber and a fourth with 2,4-D and Tordon. We looked at these particular areas quite often and within a period of three weeks the plot where we had cut the plants out by cutting around the periphery showed that of those 90 plants there was a 80-90% very strong regrowth. At that time we cut some of the plants which had been sprayed with just 2, 4-D and found that the root system was still very firm and wasn't disintegrating very well. But on both the dicamber and Tordon plots we discovered that root disintegration was very great. Consequently in the New Year we had a field day at which we inspected these areas and found that in the control plot there was

significant re-growth. In the second plot the 2,4-D had performed exceptionally well and this astounded us. I have recently looked again at this area, thinking that the quesion might come up. We have no root development but a heavy infestation of seedling ragwort all around.

Mr McLean, Fisons: I would like to ask a question about barley grass in pasture. I have recently been doing a study on this and I wonder if you could give some confirming information. It seems to me that the incidence of barley grass since 1970 has reduced rather than increased as a pasture weed species. It certainly increased rapidly from 1954-64, something like 600% as you can judge by pelt damage in seedy wool and the like. But, in fact it does appear that is now stabilising if not slightly turning down.

Chairman: As you well know, barley grass is increasing quite a lot down south, in fact dramatically under places like trees. Incidence of barley grass in relation to seedy pelts and skins is dependant entirely on the price they are getting for those very things. I can prove this beyond a shadow of a doubt because each year I get the Seedy Pelt Schedules from three works and you can follow the graph of the prices.

Cooper, Whakatane: Are the chemical companies prepared to accept the recommendations of Mr Matthews which is to allow flowering ragwort to die without chemical treatment? If not I would like them to produce a chemical that will kill the old-man ragwort.

Mr Carmichael, Shell: I have come across a number of people, manly on smaller blocks of land such as ten acres. This sort of chappie, possibily without a farming background, has a big ragwort problem because he's done as he was told by those who he terms 'the experts'. He's sprayed with 2,4-D and wiped out his clover 2-3 times. He's then got onto something stronger. Once again the ragwort on his place is getting real big. Old-man multi-head plants. The only thing I have recommended is that if the apnlt is in the seeding stage, you must break off the seedhead and dispose of it. We have a chemical called 'Prefix' and have found it very good on multi-crown ragwort, even the old-man plant when put on the crown.

Robertson, Piako: We have had a lot of experience with Prefix and in my mind, without a doubt, they do an exellent job on ragwort. However, to use them on large infestations would be impractical but in relation to the ten acre section they are one of the most positive ways of control.

DISCUSSION ON NEW CHEMICALS

Mr Carmichael, Shell: Our company is in close contact with Ruakura and our research team is at present working on several chemicals which I am not at liberty to disclose. Over the last 2-3 days that I have been with this group I have heard Les Matthews mention that he is working on one or two of our chemicals and I know there are a few more insecticides coming up which in the long run will have quite an effect on the noxious weeds problem.

Mr Porter, N.C.: We have two chemicals at this stage. Velpar which will be widely used in the non-selective vegetation control to control paspalum, blackberry, bracken and any other weed you like to name. Its life in the soil would be 4-5 months. It would appear that at low rates it still remains very toxic. Pine trees are tolerant to this chemical up to 16 kg per hectare hence it is widely used in forestry. The other chemical is Krenite which will be of great benefit to you as it is a non-hormone brushkiller and is very low in toxicity. It gives very good control of blackberry as it is taken through the canes and any effect is not apparent for a period of 2-3 months. It totally eradicated the plant. It has a short soil life and must be applied January through May.

Mr Wilson, I.C.I.: We have some new insecticides coming along for the control of grass grub, black beetle and so on which contribute towards some of your pasture problems. We have a new product coming up called 'Frenock' and we have done an amount of trial work on this. It kills paspalum and kikuyu. It not only kills the plant but gives a quite long-term residual control. It has no control over broad leaf plants and we're looking at mixtures perhaps with some of the tryazines. On the cost efficiency basis it could be quite attractive.

Mr Smith, I.W.D.: One of our new materials with regard to scrub operations is Tordon 1050 and we are going to look at this with a view to updating the label claims and adding things like Tauhini plus a wide range of native species, especially with refenrence to forestry and site preparation. Shortly we will be able to come out with a range of susceptibility with different types of native species towards this particular formulation.

The Chairman of the Panel Discussion, Mr Neville Daniel, then thanked the four represenatives from the four chemical companies and by means of acclamation appreciation was expressed by those present.

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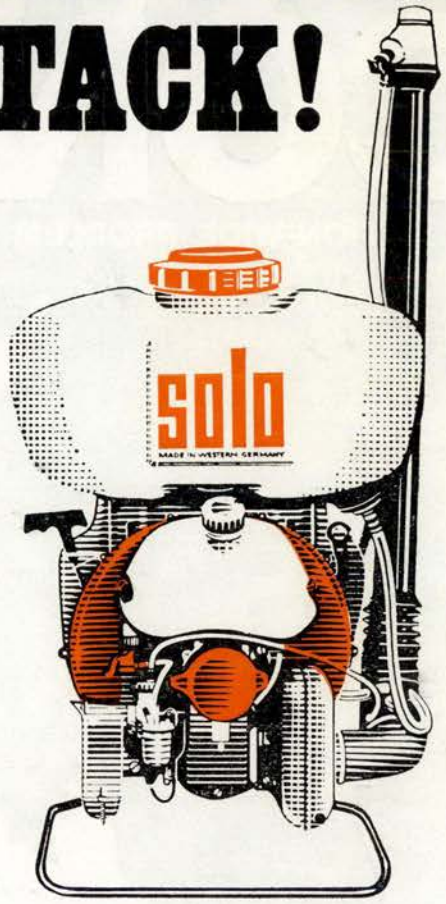

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