

New Zealand Society of Animal Production online archive

This paper is from the New Zealand Society for Animal Production online archive. NZSAP holds a regular annual conference in June or July each year for the presentation of technical and applied topics in animal production. NZSAP plays an important role as a forum fostering research in all areas of animal production including production systems, nutrition, meat science, animal welfare, wool science, animal breeding and genetics.

An invitation is extended to all those involved in the field of animal production to apply for membership of the New Zealand Society of Animal Production at our website www.nzsap.org.nz

[View All Proceedings](#)

[Next Conference](#)

[Join NZSAP](#)

The New Zealand Society of Animal Production in publishing the conference proceedings is engaged in disseminating information, not rendering professional advice or services. The views expressed herein do not necessarily represent the views of the New Zealand Society of Animal Production and the New Zealand Society of Animal Production expressly disclaims any form of liability with respect to anything done or omitted to be done in reliance upon the contents of these proceedings.

This work is licensed under a [Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License](http://creativecommons.org/licenses/by-nc-nd/4.0/).



You are free to:

Share— copy and redistribute the material in any medium or format

Under the following terms:

Attribution — You must give [appropriate credit](#), provide a link to the license, and [indicate if changes were made](#). You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.

NonCommercial — You may not use the material for [commercial purposes](#).

NoDerivatives — If you [remix, transform, or build upon](#) the material, you may not distribute the modified material.

<http://creativecommons.org.nz/licences/licences-explained/>

The Chemical Control of Ecto-Parasites of Sheep and Cattle

W. S. ALLAN,

Technical Adviser to Messrs. Cooper, McDougall & Robertson (N.Z.)
Ltd., Auckland.

IN addressing my remarks to you I am sustained by the belief that sheep and cattle and their products are of vital importance to you. Their protection from the parasites which prey upon them is of equal importance.

With the time at my disposal I can touch only briefly on the practical aspects of the problem and in doing so hope to provide material for discussion.

We, in New Zealand, are extremely fortunate in that two of the world's worst ecto-parasites, namely sheep scab and vector ticks, do not occur here. We were able to eliminate sheep scab in New Zealand by a ruthless and energetic slaughter policy and fortunately have continued to keep it out the country by adequate quarantine regulations and vigilance on the part of our Department of Agriculture. We did this virtually without chemical control. In countries where sheep scab still exists it is now possible through chemical control to eliminate it.

The vector ticks, do not occur in New Zealand but they cause losses running into literally millions of pounds in North and South America, North, South and East Africa, Europe, Asia, Great Britain and Australia. These parasites, as you will know, carry and transmit to animals and sometimes to humans rather obscure blood diseases.

We have a true "tick" in New Zealand, *Haemaphysalis* which occurs from North Auckland as far south as Gisborne and it also occurs in cattle in Nelson. There is, however, no evidence at present to show that our tick has functioned as a vector. It is usually restricted to cattle although I have seen serious infestations on hoggets in Paspalum country.

In New Zealand, our important ecto-parasites as far as sheep are concerned are, Keds, Lice, Sheep Blowfly, and to a lesser degree Chorioptic mange mites.

Parasites which spend their whole lives on one host, for example, keds and lice, are relatively easy to control by applying suitable chemicals to the parasite on the animal. The amount of research work which has been put in to determining which chemicals are most suitable and what is equally important, the amount of work done in formulating these chemicals is such that the farmer need not concern himself about the effectiveness of these formulations. Most of the formulations at present offered to the New Zealand farmer will give 100 per cent control against both keds and body lice at a single dipping.

I propose to restrict my comments on dipping to:—

1. The method of application, and
2. The time of application.

Haphazard methods of application invariably produce unsatisfactory results. A swim dip still remains the simplest and surest way of saturating the sheep although it requires more labour. Too frequently a good bath installation is completely nullified by a faulty approach system and the consequent labour needed to get the sheep to the bath entrance is such that the sheep are unnecessarily and unmercifully knocked about. Dipping need not be a laborious, time consuming and fatiguing operation.

The solution is absurdly simple but how few farmers act upon it. They prefer to continue the forcing of the old ewes right up to the bath entrance when in many cases a slight variation in the approach pen layout will solve the difficulty.

The ideal approach system to a swim through bath is a 15-yard long single sheep width, fully boarded race built on an incline of about 1 foot in five yards, and placed at right angles to the swim bath with a sharp turn of two sheep lengths to the entrance drop. The feeding into the commencement of this race can be controlled by one man and a dog. The sheep travel up the race well and one operator standing at the right angled bend at the top of the race can control the entrance of the individual sheep. Old ewes come up to this right angled bend year after year and the struggle, if any, is limited to the two yards between the bend and the dip entrance. Since this is only a single sheep width the struggle is minimised. Lambs have to be checked at the dip entrance.

Plunge dips either single entry or tipping platform are quite satisfactory, provided there is a check gate.

Shower dips are only as good as the man who operates them. They are not fool proof. In fact, they require much more care in their use than plunge dips. The essential point to remember is that the sheep must be adequately wet. You might get away with incomplete wetting with keds but for lice the skin surface has to be thoroughly wet.

I am not condemning shower dips. They are correctly accepted for statutory dipping and will do the job provided their limitations are realised. Effective control with shower dips and in fact with plunge dips is tied up with the time of dipping or in other words with the degree of wool growth on the sheep at the time of dipping. In-wool lambs are difficult to wet by shower dipping, so are sheep with more than 6 week's wool growth. Why wait two or even three months after shearing before dipping?

I have seen men pre-lamb shear and still dip within the statutory dates. This means 5 months' wool growth. This is of course an extreme, but is cited to emphasise the absurdity of dipping with too much wool.

The idea of waiting until 3 months after shearing before dipping is a relic of the old days when arsenical dips without derris were used. This might have been necessary then, although the risk of scald and arsenical absorption was very real. It is certainly not necessary to-day. In fact, if mustering facilities permit, I would suggest that it is foolish to have more than 6 weeks wool growth on the sheep at the time of dipping. This applies to both plunge and shower dipping.

After all, the parasite population on the sheep is very much reduced by shearing. Why allow the reduced population to multiply for 2 months before signing the death knell to the remainder. With dipping immediately off shears there is a risk of bacterial infection of shear cut wounds. A week after shearing most of the shear cut wounds will have healed. Bacterial contamination of dipping wash cannot be avoided so it is wise, again if holding paddocks permit, to refrain from dipping for a week after shearing. Ten days after shearing would be the ideal time. Dipping then will give a maximum kill of a reduced population of parasites, no danger from wound infection and easy and complete wetting. Shower dip users should regard time of dipping as the most important single factor in effective parasite control.

We come now to chemical control of Sheep Blowfly. Within New Zealand our Sheep blowfly problem is predominately crutch strike of young sheep, due to urine staining. This usually occurs any time

between the docking of the lambs and shearing. Body strike waves also occur generally in the autumn and these are usually associated with wet weather, fleece rot and footrot stains.

Up to the present time the chemical control measures available both for body and crutch strike have been strictly limited. The only chemicals to give results have been D.D.T. and B.H.C. or a combination of these two. The best that could be hoped for was 5—6 weeks freedom following jetting or 10—12 weeks freedom following dipping in these materials. Dipping in D.D.T. or in the necessarily high concentrations of B.H.C. is very expensive and has been ruled out by most farmers on a cost/efficiency basis and in the correct belief that lambs on their mothers should be subjected to as little interference as possible between docking and weaning.

Some farmers have adopted the practice of dipping their young sheep only in these more expensive Fly dips and instead of discarding the wash they replenish and continue dipping their main flock in gammexane dip. This, in fly areas has proved very satisfactory.

I want to discuss now the relatively new synthetic insecticide Dieldrin. Formulations containing Dieldrin have been available in limited quantities during this season but will be fully available in future.

They have been under test during the past two years in the United Kingdom, South Africa, Australia and New Zealand. This insecticide combines a high toxicity to maggots with an extraordinarily long period of protection. Trials have provided conclusive evidence to show that even in bad blowfly areas the protection afforded is in terms of months instead of weeks.

Immersion of the hindquarters of lambs at docking will provide protection against crutch strike for three months (until the lambs are shorn in December). Jetting with these preparations will provide protection against body strike for a period of 20 weeks. This applies even if long woolled sheep are jetted.

Complete control of Maggot Fly for a whole season is, therefore, well within the scope of each individual farmer. To obtain complete control we recommend the following procedure:

1. Immerse the hindquarters of all lambs in these preparations at docking. This takes about two seconds for each lamb and requires roughly 1 pint of diluted insecticide per head. Immersion of the hind end of the lamb is done after earmarking, castrating and tailing and before release of each lamb.

A 44-gallon oil drum cut lengthwise, above centre, and partly set in the ground at the site of the temporary marking pens is ideal. If a knife is used, avoid excessive contamination of the insecticide with blood by limiting the initial volume in the container to 15 gallons. Discard the last two quarts and refill. Treatment of lambs at marking avoids the necessity of an additional muster for jetting.

2. Sheep not treated at marking time should be jetted, preferably with a power operated spray pump.

For crutch strike thorough saturation of the whole crutch area is essential. This requires not less than one pint per head. For body strike, saturation is not essential. One to 2 pints per head according to the wool growth at the time of jetting is sufficient

Cost: The use of 1 pint per head costs the farmer 1½ pence. In other words, for 1½ pence per head, 3 months protection against strike is assured.

I wish to discuss now some of the details of our New Zealand and overseas trials upon which we base our present recommendations.

Most of us realise the shortcoming of field trials as a means of evaluating insecticides and this applies particularly for Maggot Fly control work. It is easy to have a large number of groups under test and the results with the same material will vary according to the incidence of strike in the treated and the controls on each property.

Before commencing field trials, we always use a controlled method of test under insectary conditions. This is a dual test. First against oviposition or egg laying and secondly against larvae.

In the first test small groups of treated sheep are exposed at weekly intervals to a large artificially bred population of ovigerous *L. sericata*. By examining the sheep at intervals after exposure it is possible to determine at what time after treatment any group fails to provide protection against oviposition.

The second test is a severe one and is called the larval implantation test. By applying this test it is possible to decide just when the treatment applied to any group is no longer able to inhibit the development of larvae and the establishment of a strike.

These two combined tests are always used by us to compare the protection provided by the different treatments and the results are always compared with the protection obtained with D.D.T. or B.H.C. preparations of known concentration.

Field trials are then conducted to determine the length of protection provided in the field by any selected treatment.

Our trials in the United Kingdom commenced in 1951, and have continued each year.

In 1951 Dieldrin was tested at wash concentrations of from 0.3% to 0.15%. At both levels it showed very little anti-adult action but a remarkably persistent larvicidal action and the protection which resulted was incomparably greater than any which had been achieved by any previous treatment.

In 1952 repeat trials with concentrations from 0.15% to 0.05% confirmed our previous findings that the fleece of dipped sheep acquired no prolonged anti-adult properties and that the protection against implanted larvae was of the order of 20—25 weeks.

In 1953 a phenolic Dieldrin emulsion and a wettable powder were tested both by dipping and as a surface spray. Surface spraying was done on standard length wool (6 weeks) and on a group in full wool. Sheep in short wool were protected for 22 weeks and sheep in long wool for even longer. All these trials emphasised two points. One is that Dieldrin affords no anti-adult action; it is too slow in its action to inhibit oviposition by adult female flies. It does, however, result in a complete kill of the flies within 24 hours. Treated sheep will therefore receive blows but this does not matter because the larvae which hatch from the eggs are killed. The second point is that the larvicidal action is relatively slow. It may take 48 hours before a complete mortality has occurred.

In the summer of 1953—54 large scale dipping field trials were conducted in Britain on 55 different flocks covering a total of 29,841 sheep. Detailed results were published in *Veterinary Record*, March, 1954.

The overall picture was that over a period of 16 weeks there was absolutely no body strike recorded in any of the 29,841 sheep dipped in concentrations of 0.1% and 0.05%. Of this number 45 showed crutch strike, 26 of which were in the 0.05% groups.

The majority of the 55 flocks were dipped by farmers themselves and the post dipping observations recorded by them. Fifteen trials, however, were conducted under the direct supervision of one or more of the Cooper Technical Bureau's research men.

The overall results from these field trials substantiated the results obtained under the more vigorous controlled testing techniques.

It is not easy to decide on an exact figure for the length of protection obtainable in the field. However, 0.05% controlled body strike for 12-16 weeks and crutch strike at this concentration is almost negligible up to 10 weeks.

In New Zealand, we are adopting 0.1% concentration for crutch strike control and we expect a minimum protection of 12 weeks at this concentration.

We have conducted field trials for two seasons. In September, 1953, we commenced a series of field trials in which the hind quarters of lambs were immersed in 0.1% Dieldrin at docking. These trials were done on ten different properties in the Gisborne area, in the manner I have already described.

Seventeen different groups totalling 4283 lambs were under trial and all lambs whose hindquarters were immersed in Dieldrin at docking remained completely free of crutch strike for 13 weeks (the duration of the trial) when they were shorn.

For these trials properties with a known bad fly history between docking and shearing were selected. Unfortunately, from our point of view, there was an abnormally low incidence of strike in the untreated control groups, but on two properties the control groups showed 14.8% and 12.3% strike against a complete absence of strike in the treated lambs.

I would like now to tell you a little of the work done in Australia by my associate, Mr. N. P. H. Graham.

Mr. Graham has been for the past two seasons concentrating on jetting trials and has conducted both controlled trials and also graziers field jetting trials.

In his controlled jetting trials he used twin cyclone nozzle jets working at 75-100lb. per sq. in. pressure and at the rate of 1/5 gal. per head on merinos carrying 1½ to 2 inches wool. This method saturated a strip about 6 inches wide running from head to rump. For crutch strike the crutch and above the tail were saturated and this also required about 1/5 gallon per head.

Against body strike he found that even at 0.05% treated sheep obtained 5-6 weeks complete protection where 30% of untreated controls were struck. A second fly wave occurred at 11 weeks and 7% of the sheep treated were struck against 36% of untreated sheep. Against crutch strike sheep treated with from 0.05% to 0.25% Dieldrin gave 2½ months complete protection against 30% strike in untreated controls.

Mr. Graham then repeated this work by getting graziers to conduct their own trials. In the 1953-54 summer in Northern N.S.W. severe body and crutch strike waves occurred following rain. In New South Wales a total of 87,600 sheep were under observation. No strikes were recorded in 5 weeks. From 6 to 14 weeks only 143 strikes were recorded and of these only 11 were recorded before the 9th week after treatment. In Southern Queensland of 16,400 sheep treated only 20 were struck during the test period of at least 14 weeks.

The following table summarises results of some of the New Zealand, Australian and British trials.

COMPOSITE FIELD TRIALS, 1953-54.					
Locality	No. of Sheep	Method of Application	Recorded Strikes	Weeks after Treatment	
Britain	29,841	Dipping	45	16	
New South Wales	87,600	Jetting	143	14	
Queensland	87,600	Jetting	20	14	
New Zealand	4,283	Immersion of Hindquarters	Nil	14	
	<u>138,124</u>		<u>208</u>		

The figures given speak for themselves and show that properly applied chemical control can do a very great deal towards eliminating the menace of sheep blowfly.

Control of Chorioptic Mange: Chorioptic mange is caused by a small mite and is usually restricted to the non-woolly portion of the sheep but in rams the scrotum is involved and this may cause either temporary or permanent sterility. Positive identification is not possible without the aid of a microscope.

The application of B.H.C. is the best known chemical control method but unfortunately normal dipping strength (0.0625% total B.H.C.) will not give control. Even a single dipping at twice normal dipping strength cannot be relied upon and a second treatment at a 10 to 14 day interval should be done.

The recommended treatment is B.H.C. at ten times dipping strength. A single application at 4oz. to 1 gallon of water should suffice but here again it is safer to recommend a second application at a 10 to 14 day interval.

Cattle Parasites

Cattle lice are the most important. There are two sucking lice, the so-called long and short-nosed lice. These are more important than the common biting louse because they are more difficult to control. Here again, the best chemical control is obtained with B.H.C. preparations. Where individual animals are to be treated a dusting powder is best used. This gives a good kill and residual protection for up to one month. The procedure is tedious where large numbers are to be treated. An alternative is to spray. We have found that a concentration of 0.2% total B.H.C. is necessary to control all cattle lice.

Where sucking lice are present a double spraying at 12-14 days' interval is always recommended. With spraying the residual effect on the hide of a cattle beast is less than 14 days.

Stomoxys. Most dairy farmers throughout Taranaki and the Waikato are of the opinion that *Stomoxys* is on the increase. I have also seen in Hawkes Bay herds of beef cattle showing red lesions on their legs through the attacks of these biting flies. These flies reduce weight increase and milk yields. For some years now we have been investigating the problem with a view to producing something which will at least give some relief during the actual milking and which will provide at the same time some worthwhile residual protection in the field.

We have been partly successful with the first but cannot claim much success with the second. The most promising chemical control has been obtained with pybuthrins which are synergised pyrethrins. Pybuthrins when used without D.D.T. or B.H.C. are non-poisonous and can be used in the presence of milk without any detrimental

effects. They can be used in aerosol form and when used within milking sheds reduce fly worry to a minimum and at least stop the cows kicking off the teat cups, materially increase milk let down and reduce the time necessary for milking. In totally enclosed milking sheds they afford 100% protection but unfortunately most of our milking sheds are open at least on one side.

We have not been so successful in our endeavour to produce something which will provide any really worthwhile residual effect. Some American research workers write rather enthusiastically about Pyrenone formulations. These are equivalent to our pybuthrins. Our own researches show that to obtain a reasonable protection it is necessary to deposit at least 200 mg. of Piperonyl Butoxide and 20 mg. pyrethrins per sq. ft. of hide on cattle subjected to fly attack. This will give good protection for at least 48 hours with a maximum of 3 days. A deposit of this nature would be given by using roughly 3 pints of a 10 : 1 ratio pybuthrin per head and is too costly.

At the moment, therefore, pressure dispensers (aerosols) can be used for imparting a temporary freedom from fly worry to the cattle at milking time and thereby easing the burden of the dairyman. Such treatment whilst temporarily alleviating the fly worry in the cow shed does not prevent the upset and subsequent milk loss caused by fly attack in the field. This can only be obviated or materially reduced by the use of lethal residual type fly sprays or by substances possessing repellent qualities to give control of all flies on the cattle in the field and cow shed.

Our researches are still continuing but to date no product of a worthwhile nature on a cost efficiency basis has yet been produced.

ACKNOWLEDGMENT:

The writer wishes to express his thanks to the Directors of Messrs. Cooper, McDougall and Robertson (N.Z.) Ltd., for permission to present this paper.

REFERENCES:

- Allan, W. S. (1954): N.Z. J. Agric. 89 : 31.
Downing, W. Harbour, H. E. and Stones, L.C. (1952): Vet. Rec. 64 : 787
Fiedler, O. G. H., and du Toit, R. (1953): Onderst. J. vet. Res, 26 : 65.
Fiedler, O. G. H., and du Toit, R. (1952): J. S. Afr. vet. med. Assoc., 23 : 225.
Graham, N. P. H. (1954), Aust. vet. J. 30 : 121.
Harbour, H. E. (1953): Chem. and Indust. 27 : 651.
Shanahan, G. J. (1951): Agric. Gaz. 62 : 229.
Shanahan, G. J. (1953): Agric. Gaz. 64 : 328.
Stones, L. C., Wood, J. C., and Hart, C. B. (1954): Vet. Rec. 66 : 183.

Discussion

Mr. McFARLANE: We have used Dieldrin in a bad blowfly season and confirm Mr. Allan's findings. We prefer jetting to dipping the hindquarters as it reduces contamination. Dieldrin is unsuitable for the treatment of sheep which are already struck as it kills the maggot slowly but has no repellent action on the adults. I consider that in the treatment of scrotal mange it is essential to remove the thick scabs before treatment. Many properties experience strike after dipping, could this be avoided by increasing the concentration as a second muster might then be avoided.

Mr. ALLAN: B.H.C. is the best larvicide and it can be combined with Dieldrin. With the combination the maggots are more rapidly expelled from the wound and the prolonged protection retained. When immersing the hindquarters of lambs at docking we reduce contamination by limiting the initial gallonage of the container to not more than 15 gallons. The last two or three quarts are discarded and a fresh wash prepared. A Dieldrin dip will be offered and will control post-dipping fly strike.

Mr. WICKENDEN: Are any of the modern insecticides effective when given by mouth or by injection.

Mr. ALLAN: The toxicity danger puts a limit to the quantity of most of these materials which can be given either orally or subcutaneously. We did some work in E. Africa against Tsetse Fly and some very interesting results were obtained. In Australia subcutaneous inoculation against cattle tick with Dieldrin and Aldrin has given very promising results.

Mr. LAING: What is the persistence of B.H.C. in the fleece and what is the effect of heavy rain after dipping? Is Dieldrin very toxic to mammals. Can ewes and lambs be dipped in it safely? What treatment is recommended for the control of biting flies (Stomoxys) on cattle?

Mr. ALLAN: B.H.C. will persist for 3 months in the fleece. Heavy rain after dipping, that is after dry sheep have been through the bath, seems to have very little effect on the persistence of the insecticide. The only real information I have on the subject is that in one trial we conducted, a heavy downpour immediately following was still followed by 3 months' protection. There is a fairly wide margin of safety with Dieldrin. The acute oral LD50 of Dieldrin is between 50 and 70 mg per kg. On this basis a 66lb. sheep would have to swallow 2.7 pints of a 0.05% Dieldrin wash before it would show a toxic reaction. Yes, ewes and lambs can be dipped. We have dipped lactating ewes and lambs under 1 month in 0.15% Dieldrin, three times our recommended dipping concentration, without ill effect. Pybuthrin sprays are the most satisfactory for Stomoxys but they persist for no more than 48 hours.