EFFICIENCY OF ALDRIN AND DIELDRIN IN THE FIELD CONTROL OF NATURAL BLOWFLY STRIKE IN SHEEP

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GRAVID females of certain species of blowflies, *Lucilia caesar*, *Lucilia sericata*, *Phormia regina*, and *Callitroga macellaria,* lay their eggs in any moist or soiled areas of sheep or lamb fleece. Dirtying or soiling of the fleece about the hind-quarters is conducive to fly “strike” resulting in acute distress and even death of the infested individuals. While this problem is of extreme importance in countries such as South Africa and Australia, it also can assume considerable importance in most of Eastern North America under conditions of wet, warm weather combined with the normal soiling of the rear of most lambs put on fresh, lush pasture at weaning.

Insectary and limited field trials have indicated that aldrin and dieldrin provide control of blowfly strike in some areas of the world where the climate favored their use (Du Toit and Goosen, 1949; Du Toit and Fielder, 1953; Moule et al., 1955; Stones, 1951). A series of field trials on the two substances was conducted under Canadian conditions over a three-year period. These results were compared with those from the use of DDT on the Central Experimental Farm, Ottawa, sheep flock.

**Experimental**

*Experiment No. 1.* The entire ewe and lamb flock at the Central Experimental Farm, Ottawa, consisting of 644 individuals in 1954 and 773 in 1955, was used in the project. Routinely, during the first week in June and immediately after shearing, the flock was sprayed with DDT for the control of keds using 6 lb. of 50% wettable powder per 100 gallons of water. Within one week of spraying, the ewes were “jetted” over the dock and breech regions with a 0.5% aldrin solution at from 75 lb. to 100 lb. pressure. Sufficient material was used so that the skin at the base of the wool was dampened. The solution was applied with a common garden-type sprayer having an open-head tank of 4-gallon capacity and fitted with a fine nozzle.

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1 Aldrin and dieldrin contributed by Shell Oil Company of Canada, Limited, Chemical Division.
2 Assistance in gathering the data and applying treatments was given by R. H. Holt, J. Arcand, and J. Cavanagh, members of the field staff, sheep section, Central Experimental Farm, Ottawa.
4 These products are not presently licensed for sale in Canada for use on warm-blooded animals. They are licensed for sale in the United States at levels equal to, or higher than, those used here, and application has been made for licensing in Canada.
5 Application of a fine spray under pressure to a specific area, thereby generally delivering more liquid than by routine spraying.
At the same time the lamb flock, consisting of 312 individuals in 1954 and 387 in 1955, was treated similarly, and randomized within an age, weight, and breed basis into five groups: Group 1—Control (no treatment), group 2—0.5% aldrin, group 3—0.3% aldrin, group 4—0.5% dieldrin, and group 5—0.3% dieldrin.

At the time of jetting all lambs were examined for fly strike and infested animals discarded from the experiment. All groups were segregated and allowed to dry thoroughly and then the entire ewe and lamb flock was run together as a unit until weaning in early August. Following weaning the ram lambs, consisting of about 15 from each experimental group, were segregated as an independent flock, but the remainder were run together until marketed.

At weekly intervals until September 30 all lambs were inspected individually for fly strike and all individuals infested were recorded and given suitable treatment. This procedure was followed for the two years 1954 and 1955.

Experiment No. 2. In 1956, in the light of results from the previous two years, the procedure was amended as follows: The entire band of 847 head was given the customary spraying with DDT using 6 lb. of 50% wettable powder per 100 gallons of water for the treatment of external parasites, but the ewe band was given no further treatment.

The 482 lambs were divided as before within an age, weight and breed basis into three groups: Group 1—Control (no treatment), Group 2—0.3% aldrin, and Group 3—0.3% dieldrin.

In all other respects the flock was given the same care as previously.

Results and Discussion

Several investigators (Du Toit and Fielder, 1953; Du Toit and Goosen, 1949; Stones, 1951; Waterhouse and Scott, 1950) have shown that compounds of the DDT group give excellent control of blowfly strike for very short periods of time, but are limited in their effectiveness because they lack the property of diffusion along the growing wool fibre, and are quickly removed by rain. The normal expectation of blowfly strike in the Central Experimental Farm flock, based on a moving ten-year average, has been slightly more than 7%, ranging from 4% in a dry year to 11% in a year favorable for infestation. This incidence occurred despite the use of DDT as a routine ked control. Du Toit and Fielder (1953) and Moule et al. (1955, 1957), have reported that gamma BHC, dieldrin and aldrin do have properties of protracted residual larvicidal action and diffusion, thus protecting the lamb or sheep against fly strike for long periods of time. It was expected that, if the treatments were ineffective, from three to seven animals per group would be struck in 1954, from three to nine in 1955, and from six to seventeen in 1956. The actual results are shown in tables 1 and 2.
TABLE 1. THE EFFECT OF ALDRIN AND DIELDRIN ON THE INCIDENCE OF BLOWFLY STRIKE IN 1954 AND 1955

<table>
<thead>
<tr>
<th>Group</th>
<th>1954 No. of lambs</th>
<th>1954 No. struck</th>
<th>1955 No. of lambs</th>
<th>1955 No. struck</th>
</tr>
</thead>
<tbody>
<tr>
<td>1—Control</td>
<td>64</td>
<td>1</td>
<td>79</td>
<td>3</td>
</tr>
<tr>
<td>2—0.5% aldrin</td>
<td>64</td>
<td>0</td>
<td>78</td>
<td>0</td>
</tr>
<tr>
<td>3—0.3% aldrin</td>
<td>64</td>
<td>0</td>
<td>78</td>
<td>0</td>
</tr>
<tr>
<td>4—0.5% dieldrin</td>
<td>64</td>
<td>0</td>
<td>78</td>
<td>0</td>
</tr>
<tr>
<td>5—0.3% dieldrin</td>
<td>60</td>
<td>0</td>
<td>75</td>
<td>0</td>
</tr>
</tbody>
</table>

\[ X^2_{10}=18.22^{**} \quad X^2_{10}=20.8^{**} \]

** P<.01.

A chi-square test was applied to the data, the average incidence, based on data of the ten years preceding the experiment, being used as the expected value.

No fly strike occurred in any of the treated groups, indicating that the treatments were effective as applied (P<0.01). Fly strike did occur in the control groups each year, but the number of infested individuals in the control groups was consistently below expectation. This was possibly due to the fact that all animals were run together, and had equal chance for initial strike. The lethal effect of the insecticides would probably kill the gravid female fly that contacted treated individuals before the untreated controls, thereby reducing the incidence of ovi-position on the non-treated lambs. As the entire experimental flock ran together, it is also possible that owing to contact enough of the insecticides were transferred to the control animals to cause some repellant action. However, the latter is highly unlikely since, after spraying, all groups were thoroughly dry before being turned together on pastures large enough to preclude forced contact. Also the dock and breech regions are unsuited to a transfer of this nature.

As a further check on the incidence of fly strike, no spraying, other than the normal DDT for the control of external parasites, was done in 1957. During the first week in August there were 23 cases of fly strike in lambs, plus two on yearling wethers. This was slightly in excess of

TABLE 2. THE EFFECT OF ALDRIN AND DIELDRIN ON THE INCIDENCE OF BLOWFLY STRIKE IN 1956

<table>
<thead>
<tr>
<th>Group</th>
<th>No. of lambs</th>
<th>No. struck</th>
</tr>
</thead>
<tbody>
<tr>
<td>1—Control</td>
<td>160</td>
<td>4</td>
</tr>
<tr>
<td>2—0.3% aldrin</td>
<td>160</td>
<td>0</td>
</tr>
<tr>
<td>3—0.3% dieldrin</td>
<td>162</td>
<td>0</td>
</tr>
</tbody>
</table>

\[ X^2_{10}=26.5^{**} \]

** P<.01.
6% in a single week. All animals were jetted with aldrin at 0.3%, and no further cases were recorded, despite favorable conditions for further infestation.

It can therefore be concluded that aldrin and dieldrin, used at the levels indicated one week after spraying with DDT provide a suitable method of prevention and control of blowfly strike in Eastern Canada, while DDT alone provides no prolonged protection.

Summary

In a series of field trials no cases of fly strike occurred in lambs previously jetted over the dock and breech regions with 0.5% and 0.3% solutions of aldrin or dieldrin during the years 1954, 1955 and 1956 at the Central Experimental Farm, Ottawa. The number infested in the control groups was markedly reduced as compared to previous years, probably due to the gravid female flies contacting treated individuals and being killed prior to completing egg laying. All lambs in all groups had previously been sprayed with DDT to control external parasites. The treatment is a simple, cheap, and effective method of preventing blowfly strike in sheep and lambs in the area tested.

Literature Cited


