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Evaluation of large scale trapping of flies as a means of reducing the incidence of flystrike in lambs

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ABSTRACT

The potential of large scale bin trapping of flies as a means of reducing the incidence of flystrike was evaluated. Two 5 ha paddocks of similar soil type and pasture species composition, but more than 500 m apart, were used. From Nov. 16 to Dec. 24 flies were trapped in paddock 1 using four 200 l bin traps baited with sheep's offal and sodium sulphide. Both paddocks were grazed continuously with lambs, the lambs being interchanged between paddocks on Dec. 7. This procedure was repeated, using different lambs and with the bins transferred to paddock 2, between Feb. 22 and Mar. 25, with the lambs being interchanged between paddocks on Mar. 16. All lambs were yarded and examined for flystrike 3 times each week. All strikes were treated with insecticide after samples had been collected for fly species identification. Small (3 l) West Australian fly traps were used to monitor background fly populations in both paddocks throughout the trial.

There was no difference between paddocks in either numbers of lambs struck or in strike rate (strikes / lamb / day), indicating that the presence of the bin traps had no effect on the incidence of flystrike. A possible explanation for this is that 90% of the flies caught in the bin traps were *Lucilia sericata* while the dominant fly striking sheep was *Lucilia cuprina* (i.e., 68% of strikes comprised *L. cuprina* alone whilst 30% comprised a mixture of *L. cuprina* and *L. sericata*).

Keywords: flystrike; lambs; traps; bin traps; *Lucilia cuprina*; *Lucilia sericata*.

INTRODUCTION

Insecticidal dips are the tool most commonly used by farmers for the management of flystrike and animals may be treated a number of times each year to prevent strike (Heath, 1994). A number of factors now threaten the long-term sustainability and/or acceptability of this reliance on insecticides.

Increased awareness of pesticides and pesticide residues has seen a growing reluctance by the public and regulatory authorities to accept products containing pesticide residues and this trend seems likely to increase (Whalon, 1993; Wakelin, 1994). Also, the future effectiveness of currently available dips is threatened by the widespread emergence of insecticide resistance, with fly populations exhibiting detectable resistance to the organophosphorus dips now being widespread throughout New Zealand (Wilson & Heath, 1994).

Alternatives to the current reliance on insecticides for the management of flystrike will therefore be required in the future. One of the options currently under investigation for managing flystrike is the large scale trapping of flies (Heath, 1994). Intensive trapping of flies may function in two ways to reduce the incidence of flystrike; either by reducing the number of flies in a locality, or, by attracting flies away from the sheep (Heath, 1994). Previous attempts to assess the impact of mass trapping of flies on the incidence of flystrike have concentrated on reducing the fly populations by trapping throughout the fly season (Mackerras *et al.*, 1936, Anderson *et al.*, 1990, Dymock *et al.*, 1991), but of these only Mackerras (1936) demonstrated a clear effect of trapping on flystrike. Results of the other trials were either inconclusive (Dymock *et al.*, 1991) or presented only circumstantial evidence to support its efficacy (Anderson *et al.*, 1990), largely as a result of not includ-

ing an untrapped area in their trial designs. In this trial the potential of bin traps to attract flies away from sheep and hence reduce the incidence of flystrike was investigated.

MATERIALS AND METHODS

Two paddocks, of similar size, soil and pasture type and topography were selected for the trial. Both were flat, approximately 5 ha in area, had conventional ryegrass / clover pastures, and each had a shelter belt of mature pine trees at one end. The paddocks were 540 m apart at their nearest point; a distance we assumed sufficient to ensure that the traps in one paddock would have minimal, if any, influence on the fly population in the other.

The bin traps consisted of 200 l steel drums, painted yellow. Four 15 cm diameter holes were cut at equal spacings around the sides of each drum. These were fitted with wire mesh funnels, to allow dispersal of the odour and to allow entry but restrict escape of the flies. Once inside the bin, flies were attracted upwards and into a 5 l container mounted on top of the drum, by the entry of daylight through a transparent top. A bucket filled with 10 l of sheep's offal and 1 l of a 5% sodium sulphide solution was placed in each drum as bait. Every 7 days the baits were changed and the flies caught in the collecting chambers on top of the bins were identified and counted. An exact count of the total number of flies caught in the bins was not possible due to the impracticality of separating dead decaying flies from the offal slurry at the bottom.

From 16 November to 24 December 1992 flies were trapped in paddock 1 using 4 bins, at a density of 0.8 bins/ha. No bins were present in paddock 2 over this time and both paddocks were grazed continuously with lambs. Initially 136

lambs grazed paddock 2 and 84 grazed paddock 1 with the lambs being interchanged between paddocks approximately half way through the trapping period (7 December). Three times each week (Monday, Wednesday and Friday) all lambs were yarded and examined for flystrike. The position and severity of each strike was recorded and maggot samples were collected to enable identification of the fly species. All strikes were terminated by treatment with a 0.25% solution of cypermethrin (Cypor: Young's Animal Health (N.Z.) Ltd).

The procedure was repeated between 22 February and 25 March 1993 using different lambs (two groups of 72) and with the bins transferred to paddock 2. The lambs were interchanged between paddocks on 16 March.

Background fly populations were monitored in both paddocks from October to April using two West Australian fly traps (3 l volume) in each paddock. These were baited with 100g of sheep's liver and 150ml of a 5% sodium sulphide solution (Vogt *et al.*, 1983). Baits were changed weekly at which time flies were removed from the traps for counting and identification.

As there were different numbers of lambs in the paddocks for different periods of time the efficacy of the bins at reducing flystrike was assessed on the basis of the strike rate *ie.*, the proportion of lambs struck (strikes/lamb) for each day that a particular mob of lambs was in each paddock. The values of strikes/lamb/day were compared using a test for the difference between two proportions (Walpole, 1974).

RESULTS

Both the number of lambs struck and the strike rate were the same in the presence of the bins as when they were absent (Table 1). Also there was no indication of a lowering of the background fly population, as measured by the number of flies caught in the West Australian traps, associated with the presence of the bins (Fig.1).

TABLE 1: Number of lambs struck and strike rate for paddocks with and without bin traps.

	Nov. 16-Dec.24		Feb.22-Mar.29		Combined	
	strikes	strike rate	strikes	strike rate	strikes	strike rate
bins	11	0.27%	33	0.31%	44	0.29%
no bins	12	0.28%	32	0.30%	44	0.29% NS

There was, however, a marked difference in the relative proportions of the different fly species recovered from the traps and from the strike samples. The dominant fly species in both the bins and the West Australian traps was *Lucilia sericata* which accounted for more than 90% of the strike flies caught. *Lucilia cuprina* made up less than 5%, with the remainder being a mixture of *Calliphora stygia*, *Calliphora hilli* and *Chrysomya rufifacies*. In contrast, *L.cuprina* dominated in the maggot samples collected from struck sheep. 68% of strikes involved *L.cuprina* alone, 30% were a mixture of *L.cuprina* and *L.sericata*, while only one of the 53 strikes from which samples were collected comprised *L.sericata* on its own.

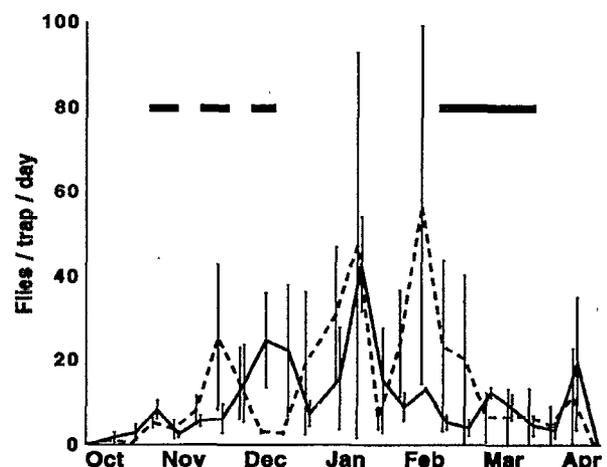
DISCUSSION

There can be little doubt that under the conditions of this trial the use of large scale bin traps had no effect on the incidence of flystrike. In terms of our original objective then it is clear that bins baited with offal and sodium sulphide have insufficient attraction to flies to prevent them from locating and striking susceptible sheep in the immediate vicinity. Mackerras *et al.* (1936) averaged a 50% reduction in flystrike by the large scale trapping of flies, using bait similar to that used in this trial. However, they trapped flies over the whole strike season, commencing trapping some time before the first strikes were recorded. It is not clear whether the shorter trapping period in the current trial is responsible for the lack of any reduction in the level of flystrike or whether it is due to the considerable differences in climate, habitat type and fly species between Australia and New Zealand.

James (1990) has suggested that bin traps are unlikely to be effective once strike waves have begun or in wetter areas where fly populations are high. While we have no direct estimate of the size of the fly population in this locality over the trapping period, it can easily be calculated that over most of the summer the West Australian and bin traps removed from the fly population every day, enough flies to strike more than half of the lambs in the trial (*ie.*, 140-220 lambs). Also, when the bin traps were operating there was no apparent reduction in catches in the West Australian traps despite the considerable number of flies removed by the bins. These observations suggest that the fly population was indeed large, almost certainly many times larger than that required to cause the observed level of strike. It would follow then, that unless trapping removed a very high proportion of the flies present there would always be sufficient remaining to strike those lambs which were susceptible.

It is notable that while *L.cuprina* was the dominant species recovered from strikes it was only a minor component of the flies caught in the traps. This has been a consistent pattern over a number of seasons at this site (Atkinson,

FIGURE 1: Mean (± 1 Se) number of strike flies caught in the West Australian traps in paddock 1 (—) and paddock 2 (- -) between October 1992 and April 1993. Heavy lines indicate periods over which bin traps were operating in paddock 1 (—) and paddock 2 (- -).



unpublished data) and has also been recorded elsewhere (Dymock *et al.*, 1990). These findings reinforce the assertion that the incidence of flystrike in New Zealand has increased since the arrival in this country of *L.cuprina* (Heath *et al.*, 1989). The bin traps may therefore have been less than optimally effective because they were not catching enough *L.cuprina*. A different bait, more attractive to this species, may have proved effective at reducing strike.

It should be remembered that the objective of this trial was to assess whether bin traps have sufficient attractiveness to flies to draw them away from susceptible sheep and reduce the level of flystrike. It remains to be seen whether, under New Zealand conditions, mass trapping of flies over the entire fly season can sufficiently reduce the fly population to impact on the prevalence of flystrike.

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