FIELD TRIAL TO ASSESS THE EFFICACY OF INSECTICIDES FOR THE CONTROL OF HORN FLIES ON PASTURED BEEF CATTLE IN BRAZIL.

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SUMMARY: The efficacy of a spray formulation of cypermethrin alone or combined with dichlorvos, and a pour-on formulation of alpha-cypermethrin, was evaluated for the control of horn flies on pastured beef cattle. Fly populations were monitored between Day 1 and Day 50 post-treatment. The three formulations reduced horn fly populations to zero within 24h after application and provided 100% control for 28 days post-treatment. Although the horn fly counts of the animals treated with cypermethrin alone had begun to rise at about Day 40 (range of 0 to 13 flies per animal), there was no significant differences among treatments.
RUNNING HEAD: CAMPOS PEREIRA *et alii.* - Insecticides in the control of Horn Flies.
KEY WORDS: *Haematobia irritans*, insecticides, beef cattle.

INTRODUCTION

The horn fly, *Haematobia irritans*(Linnaeus,1758), is an Old World species and an obligate blood-feeding ectoparasite of cattle which will also feed on other animals such as sheep and horses (KNAPP,1985;LLOYD,1985). This fly was introduced in North America around 1885 (RILEY,1889) and from that time has established itself in almost all cattle producing areas of the world.

In Brazil it was first reported in Boa Vista, Roraima, possibly introduced from Venezuela (VALÉRIO & GUIMARÃES, 1983). The Amazon Region apparently provided a barrier to its more southerly distribution for a number of years. The horn fly entered the State of São Paulo in 1990, where it is still establishing its range and in certain areas is just beginning to be found.

The economic importance of blood loss by horn flies seems to be negligible, but they produce significant losses chiefly through irritation and annoyance resulting in disturbed feeding and improper digestion (MARCHIONDO,1987). Losses are reflected in lower weight gains and decreased feed conversion efficiency (HARVEY & BRETHOUR,1979; KINZER *et alii*,1984; KUNZ *et alii*,1984). It has been estimated that this insect, if uncontrolled, produces economic losses that exceed US$730.3 million annuall in the United States (DRUMMOND *et alii*,1981).

Efficient cattle production requires control of the horn fly. At the present, the only practical control utilizes treatment of infested animals with insecticides.

The present trial was designed to assess the efficacy of a spray formulation of cypermethrin alone or combined with dichlorvos, and a pour-on formulation of alpha-cypermethrin, for the control of horn flies on pastured beef cattle.

MATERIALS AND METHODS

This study was conducted at the Cachoeira Farm, Santa Maria da Serra County, SP, during the autumn of 1991. Four separately pastured herds of mature Nellore cows were used. Animals weighed about 450 kg and were kept at the same 400-ha farm but in different paddocks. The distance between each paddock was of about 500 m to 1 km while the trial was in progress.

The animals were decreasingly ranked on the basis of the mean values of three pre-treatment fly counts performed on days -2, -1 and 0. Each of the four highest mean fly counts values were randomly allocated to one of four treatment groups. The process was repeated using animals of lower mean fly counts values until all cows had been assigned to the following treatment groups on Day 0: group 1 - 5% Cypermethrin + 45% Dichlorvos , by hand spray, at the 1:400 dilution; group 2 - 15% Cypermethrin, by hand spray, at the 1:1,000 dilution; group 3 - 3% alpha-Cypermethrin, pour-on, 10 ml per animal; group 4 - untreated control.

Treatment of groups 1 and 2 was applied at a nominal rate of 4 litres per animal sprayed over the head, body, undersides and legs, using a Jacto knapsack sprayer. That of group 3 was poured on along the mid-line of the backs of the animals.

Fly populations were monitored at 1-12 day intervals after treatment on 25 animals in each group with operators in a truck driven among the cattle in each herd. The total number of horn flies observed at close range (with a 10x50 binoculars) on one side of each animal was recorded at approximately the same time (between 09:00 and 10:00 a.m.) when the weather conditions were suitable.

A plot of the fly counts revealed a skewness of distribution. For this reason, a square root transformation of counts was used to stabilize the variation and provide a more representative estimate of the average number of flies per animal. The

following formula was used (SNEDECOR & COCHRAN,1973):

$$\left[\frac{x^1 + x^2 + \ldots + x^n}{n} \right]^2$$

where, x^1 =number of flies on animal 1
n = total number of animals

Means determined on Day 0 and subsequently were tested for significant differences ($p \leq 0.05$) using a one-way analysis of variance(ANOVA) and multiple comparisons of means were done using the Student-Neuman-Keuls multiple range test (MILLER,1981).

RESULTS AND DISCUSSION

The pre- and post-treatment mean values of horn fly counts, the standard deviation (S.D.) and the percentage reduction data for all the treatment groups are summarized in Table 1.

On days 0 and 50, statistically significant differences could not be detected among the four experimental groups.

The three experimental formulations reduced horn fly populations to zero within 24h after application and provided 100% control for 28 days post-treatment. Although the horn fly counts of the animals treated with 15% Cypermethrin had begun to rise at about Day 40 (range of 0 to 13 flies per animal), the results of treatment did not differ significantly between Day 1 and Day 40 post-treatment. By Day 50, the horn fly populations increased, all treated groups exhibiting a percentage reduction between 89.41 and 91.28 (range of 0 to 15 flies per animal).

The horn fly challenge in the control group remained aproximately the same until Day 7 post-treatment (range of 7 to 42 flies per animal). After this time a decrease in the populations of flies due the onset of cooler weather was observed. On Day 50 the trial was finished because the horn fly populations on both of the treated groups and the control group did not differ significantly and the herd had to be moved. There was no evidence of treatment failure at this time.

This trial indicate that a treatment with a spray formulation of Cypermethrin alone or combined with Dichlorvos or a pour-on formulation of alfa-Cypermethrin provided a useful weapon for the control of horn flies on pastured beef cattle.

SUMÁRIO

A eficácia de uma formulação em "spray" de cipermetrina ou de sua combinação com diclorvos e de uma formulação pour-on de alfa-cipermetrina foi avaliada para o controle da mosca-dos-chifres em bovino de corte a campo. Populações de moscas foram contadas entre os dias 1 e 50 pós-tratamento. As tres formulações reduziram as populações de mosca-dos-chifres a zero dentro de 24 h após a aplicação até 28 dias pós-tratamento. Embora as contagens de moscas dos animais tratados somente com cipermetrina tenham começado a aumentar ao redor do dia 40 pós-tratamento (0 a 13 moscas por animal), não existiu nenhuma diferença significativa entre os tratamentos.

FRASE CHAVE: CAMPOS PEREIRA *et alii*: Inseticidas no controle da mosca-dos chifres.

PALAVRAS CHAVE: *Haematobia irritans*, inseticidas, gado de corte.

Table 1 - Geometric mean pre- and post-treatment horn fly counts in groups of cows treated with Cypermetrin + DDVP, 15% Cypermetrin and 3% alpha-Cypermetrin.

TREATMENT GROUP		Nº OF COWS	DAY 0	TIME POST-TREATMENT (DAYS) 1	7	14	21	28	40	50
			(a)							
G1	Cypermethrin + DDPV 1:400 (by hand spray)	25	19.73±1.36[a] (5–50)*	0[a] (0) [100.00]**	0[a] (0) [100.00]	0[a] (0) [100.00]	0[a] (0) [100.00]	0[a] (0) [100.00]	0[a] (0) [100.00]	1.72±0.46[a] (0–5) [91.28]
G2	15% Cypermethrin 1:1000 (by hand spray)	25	17.36±1.04[a] (6–48)	0[a] (0) [100.00]	0[a] (0) [100.00]	0[a] (0) [100.00]	0[a] (0) [100.00]	0[a] (0) [100.00]	0.48±1.25[a] (0–13) [96.66]	1.37±178[a] (0–15) [96.46]
G3	3% alpha-Cyperme-thrin (pour-on) 10ml/animal	25	18.03±2.31[a] (3–4)	0[a] (0) [100.00]	0[a] (0) [100.00]	0[a] (0) [100.00]	0[a] (0) [100.00]	0[a] (0) [100.00]	0[a] (0) [100.00]	1.91±0.30[a] (0–4) [89.41]
G4	Untreated control	25	18.60±1.38[a] (4–42)	16.09±1.61[b] (2–42)	18.53±0.78[b] (7–37)	8.19±0.60[b] (2–18)	6.61±0.48[b] (2–17)	5.94±0.65[b] (1–16)	2.77±0.20[b] (1–8)	2.44±0.17[a] (1–5)

(a) Geometric mean ±S.D. based on square root transformation. Different superscript letters within columns indicate that the mean values differ significantly at the P≤0.05 level.

* Horn fly counts (minimum–maximum)

** Percentage reductions

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