



## Efficacy of flumethrin 1 % pour-on against ticks on cattle under field conditions in Ethiopia

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### ABSTRACT

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The efficacy of a flumethrin 1% pour-on (Bayticol, Bayer AH) was evaluated against natural infestations of ticks on cattle on a dairy farm in Ethiopia during 1997/98. The cattle, ( $n = 92$ ), which were Friesian/ Zebu crosses, were heavily infested with *Boophilus decoloratus*. Dry cows ( $n = 8$ ) were randomly selected and allocated either into a treatment or a control group. Flumethrin 1% pour-on was applied to the treatment group according to the manufacturer's recommendation, i.e. along the dorsal mid-line from the head to the base of the tail. Ticks were counted and identified *in situ* on treated and control animals. When the total tick counts of the treated group were similar to those on the control, the trial was discontinued. Excellent results were achieved with flumethrin against heavy tick infestations. There was a rapid kill after 24 h post-treatment, and from day 4 onwards 100% control was achieved and maintained for a further 29 days. The results obtained indicate that there was a significant difference between the mean tick counts of the control group compared with those of the treatment group ( $P < 0,05$ ). The evidence presented here suggests that the flumethrin 1% pour-on may be applied at 45 day intervals and should provide effective protection against the economically important ticks if it is used at the recommended dosage rate and applied correctly.

**Keywords:** Acaricide, Bayticol pour-on, cattle, dairy farms, efficacy, Ethiopia, flumethrin 1%, ticks

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### INTRODUCTION

Tick infestations and tick-borne diseases (TBDs) are two of the major constraints to the improvement of cattle productivity in Ethiopia. The major TBDs are anaplasmosis, babesiosis, cowdriosis and theileriosis. Ticks identified in the country include species of *Amblyomma*, *Boophilus*, *Haemaphysalis*, *Hyalomma* and *Rhipicephalus* (Mekonnen 1998). Ticks not only cause damage by transmitting diseases, but also affect hides and skins, reduce productivity and carcass weight, and increase susceptibility to other

diseases. Tick control in Ethiopia has been based on the use of acaricides. The widespread resistance to toxaphene by *Boophilus decoloratus* on dairy cattle and the increase in numbers of crossbred cattle necessitated the use of alternative acaricides for tick control (Regassa & De Castro 1993). Flumethrin is a broad-spectrum synthetic pyrethroid effective against ectoparasites of cattle (Bhushan, Garg, Rajesh-Katovh, Chauhan, Bhushan, Katoch 1999; Pangui, Belot, Houndete & Angrand 1993; Dumanli & Yilmaz 1992; Cantoray & Dik 1988; Rinkanya & Tatchell 1988), sheep (Werner, Posch, Ilchmann & Hiepe 1989; Akkaya, Vurusar, Gargill, Gulamber, & Arslan 1994), goats (Dumanli 1991) and camels (Ome 1996). Flumethrin has been widely used to control ticks on exotic and crossbred cattle on dairy farms in Ethiopia (Mekonnen 1996). The objective of this trial was to test the efficacy of a flumethrin pour-on preparation against major tick species under the prevailing local conditions of Ethiopia.

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TABLE 1 Total tick counts and the percentage control achieved

D	-2	0	1	2	3	4	5	8	12	15	19	22	26	33	40	47
T	2 685	2 552	140	101	1	0	0	0	0	0	0	0	0	0	44	101
C	2 153	2 183	2 931	2 754	3 087	2 949	2 494	1 830	1 030	422	242	178	222	375	385	204
%	-	-	95,2	96,3	99,9	100	100	100	100	100	100	100	100	100	88,6	50,5

D = Tick counting days

T = Treatment group

C = Control group

% = Percentage control achieved

## MATERIALS AND METHODS

The trial was carried out on a private dairy farm situated at Sebeta (altitude 1 900 m), 25 km west of Addis Ababa. The farm was selected on the basis of the tick challenge and cattle management conditions. In the farm friesian/zebu cattle ( $n = 92$ ) were heavily infested with *B. decoloratus*, but lower numbers of *Amblyomma variegatum* and *Rhipicephalus evertsi evertsi* were also observed. Clinical cases of heart-water (*Cowdria ruminantium*) and babesiosis (*Babesia bigemina*) were reported to occur on the farm. The organophosphates (chlorfenvinphos, diazinon, quintofos) and the carbamate (carbaryl) had previously been used on the farm to control ticks prior to applying the test acaricide.

The trial was conducted from 23 November 1997 to 11 January 1998 and the cattle were identified at the trial site. A random sample comprising of one hundred ticks was taken from five cows for identification to determine the species found in the area. Eight dry cows were randomly selected from the herd and allocated into a treatment group (four cows) and a control group (four cows). Two days before the trial commenced the numbers of ticks on these cows were counted to assess the tick density. The cows in treatment group were treated with 1 ml/10 kg body mass of flumethrin 1% applied along the dorsal midline from the head to the base of the tail as recommended by the manufacturer. The pour-on was applied only once (day 0, acaricide application day) to determine the efficacy and residual effect of the acaricide. The four cows in the control group were not treated with acaricide. The two groups of cattle were ear-tagged and kept separate to avoid contact and any possible rub-off effect of the acaricide. They were kept in paddocks where they could continue to pick up new infestations.

The ticks on the control and treated cows were counted at the following intervals: day -2 before treatment and on day 0, 1, 2, 3, 4, 5, 8, 12, 15, 19, 22, 26, 33, 40 and 47 post-treatment (Table 1). Counting was done early in the morning when each cow was restrained and the ticks on it were counted

and identified *in situ* but none of them was removed. The percentage control gained was calculated by using the formula of Drummond, Whestone & Miller (1981) which is:

$$\frac{\text{No. of ticks on control group} - \text{No. of ticks on treatment group}}{\text{No. of ticks on control group}} \times 100$$

## RESULTS

The application of flumethrin 1% against these heavy tick infestations on cows in the treated group produced an excellent control for a prolonged period. Table 1 summarizes the actual tick counts on the treatment and control groups obtained and the percentage control of ticks achieved by the test acaricide. The reduction of the tick burden was striking. Ninety-five per cent control of ticks was achieved with 1% flumethrin pour-on one-day post-treatment and 100% control from day 4 post-treatment, which was maintained for a further 29 days.

The acaricidal effect of a single application of the flumethrin 1% pour-on preparation was immediate, and its residual effect, in the face of continuous re-infestation, persisted for a period that is considered to be long. On day 47 post-treatment the ticks on all the cows in the treatment group had increased in number to such an extent that it was decided to discontinue the trial. The results obtained indicated that the treatment group had significantly ( $P < 0,05$ ) less ticks than the control group.

## DISCUSSION

The tick burden on the cattle was very high before the trial commenced and the high infestation of the cattle with *B. decoloratus* was probably the result of tick resistance to organophosphate and carbamate acaricides used previously on the farm. As demonstrated during the trial, flumethrin, both in its knockdown effect and its residual protection, was very successful in controlling the tick burden on the cows in the treatment group. It protected the treated cattle from

re-infestations for a period of about 45 days. Gupta, Satyavir, Banerjee & Singh (1998) reported a residual protection for it that ranged from 19–70 days. During the trial 100 % control was achieved from day 4–33 post treatment. These results are similar to the findings obtained in several other trials: Ahrens, Davey, George & Cooksey (1988) reported 97 % control; Cantoray & Dik (1988), 99,5% control; Dumanli & Yilmaz (1992), 100 % control, and Akkaya *et al.* (1994), 99,8% control. Results presented here shows that a single flumethrin 1 % pour-on application to a cow provides it with an effective protection against economically important ticks if used at the manufacturers' recommended dosage rate and if it is correctly applied.

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