

## In vivo evaluation of amitraz against ticks under field conditions in Ethiopia

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### ABSTRACT

An aqueous emulsion of amitraz (Bovitraz, Bayer AH), prepared and applied according to the manufacturer's recommendations, was evaluated for its activity against cattle ticks on a dairy farm in Ethiopia. Eight crossbred heifer calves aged between 6 and 8 months and heavily infested with ticks were selected and divided into equal treatment and control groups. The calves in the treatment group were hand-sprayed with the amitraz emulsion while the control group was left untreated. Each calf was restrained and ticks were counted and identified *in situ*. One hundred percent tick control was achieved on Day 3 after acaricide application, and this was maintained for a further 18 days. The residual effect was long, and protected the animals from re-infestation for 21 days. There was a significant difference between the mean number of ticks on the control group compared to the treated group ( $P < 0.05$ ). An important finding in this trial was the rapid detachment of all tick instars from animals treated with the test acaricide.

**Key words:** amitraz, control, dairy farms, efficacy trial, Ethiopia, tick infestation.

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The numbers of ticks on each of the control and treated calves were counted 2 days before (Day –2) the commencement of the trial and on Day 0 (after treatment had been applied) and Days 1, 2, 3, 4, 7, 8, 10, 14, 17, 21, 28, and 35 post-treatment, during which process the calves were restrained and the ticks were identified *in situ*. Counting was facilitated by using a standard hand tally counter to ensure accuracy. The trial was discontinued when the total tick counts on the treated group started to increase. The percentage control gained was calculated by using the formula of Drummond *et al.*<sup>3</sup>:

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

### INTRODUCTION

Ticks are widely distributed in various agro-ecological zones in Ethiopia<sup>7</sup>, and are responsible for severe losses caused by the effect of tick worry, blood loss, damage to hides, the injection of toxins or through mortality or morbidity caused by the diseases they transmit, such as anaplasmosis, babesiosis, heartwater and theileriosis<sup>2</sup>.

Tick control in Ethiopia is based on the use of acaricides. Resistance to toxaphene (chlorinated camphene) in *Boophilus decoloratus* on dairy cattle and the increase in numbers of crossbred tick-susceptible cattle has necessitated the change to alternative acaricides<sup>8</sup>. The organophosphate group of acaricides is widely used, while the amidine group (amitraz) has recently been registered for tick control in Ethiopia. Various authors have also demonstrated the effectiveness of amitraz against mange mites (*Sarcoptes scabiei* var. *cameli*) in camels<sup>6,9</sup>, ticks on camels<sup>1,5</sup>, and lice<sup>10</sup> and mange in pigs<sup>4</sup>.

This trial was aimed at testing the efficacy and residual effect of amitraz 12.5 % (Bovitraz, Bayer AH) used as a miscible oil formulation against tick species on a dairy farm in Ethiopia.

### MATERIALS AND METHODS

The trial was carried out from 30 November 1997 to 4 January 1998 on a private dairy farm situated in Sebeta (altitude 1900 m), 25 km west of Addis Ababa. The 92 Friesian/Zebu crossbred cattle on the farm were heavily infested with *B. decoloratus*; a few *Amblyomma variegatum* and *Rhipicephalus evertsi evertsi* were also observed. Organophosphates (chlorfenvinphos, quintiofos, diazinon) and carbamate (carbaryl) had been used on the farm prior to applying the test acaricide.

Approximately 100 ticks were collected from the herd and identified to ascertain the tick species present in the area. Eight heifer calves aged between 6 and 8 months were selected from the herd and allocated to a treatment and a control group, each of which consisted of 4 animals. Two days before the trial commenced, the number of ticks on each of the experimental calves was counted to assess tick density. The 4 calves in the treatment group were thoroughly wetted with a hand-sprayed, freshly prepared aqueous emulsion of amitraz at the volume and concentration recommended by the manufacturer. Treatment was applied only once on Day 0 (acaricide application day). The 4 calves selected as controls were left untreated. The 2 groups of calves were ear-tagged in order to identify them and were maintained in separate tick infested camps to avoid contact between them.

### RESULTS

Table 1 summarises the total tick counts on the treated and control groups, and the percentage control achieved by the test acaricide. Tick reduction was observed from Day 1 to Day 28 post-treatment. From Day 3 onwards 100 % control was achieved and this was maintained for at least a further 19 days. On Day 28 post-treatment, 1 experimental calf had acquired 6 ticks but the others were free from infestation. On Day 35 post-treatment all the treated calves were infested and the trial was discontinued. The treatment group had significantly fewer ticks than the control group for a period of 35 days ( $P < 0.05$ ). Tick species identified during the trial were *A. variegatum*, *B. decoloratus* and *R. e. evertsi*, with *B. decoloratus* predominating.

### DISCUSSION

Before the application of the test acaricide the experimental calves were heavily infested with *B. decoloratus*. These heavy infestations probably resulted from resistance to organophosphate and carbamate acaricides that had previously been used on the farm. After treating with amitraz, an excellent reduction in the number of ticks was observed (91 % on Day 1 to 98 % on Day 28), despite the heavy infestations present at the commencement of the trial and the continued exposure of the calves to infestation during the course of the trial. In addition, there was a rapid detachment of all tick

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Table 1: Total tick counts on 4 calves treated with amitraz and the percentage control achieved when compared to 4 untreated calves.

Tick count days	Ticks on treatment group	Ticks on control group	Percentage control achieved
-2	741	756	—
0	176	722	76
1	63	729	91
2	13	667	98
3	0	640	100
4	0	505	100
7	0	416	100
8	0	386	100
10	0	255	100
14	0	220	100
17	0	239	100
21	0	273	100
28	6	259	98
35	136	328	59

instars from the animals treated with amitraz (Table 1), indicating that the heavy tick burdens were reduced to negligible numbers 1 day post-treatment. All treated calves were free from ticks on Day 3 post-treatment, and this trend persisted until Day 21 post-treatment. The results presented here show that a single treatment with an aqueous emulsion of amitraz, prepared and applied to calves according to the manufacturer's recommendation, provided effective protection against ticks in the area.

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