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ACARICIDAL EFFICACY OF ECTOMIN® (A NEW SYNTHETIC PYRETHROID) AGAINST BOOPHILUS ANNULATUS TICKS IN CATTLE.

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SUMMARY

Fourteen crossbred cows (Friesian x Egyptian native) were used to assess the acaricidal efficacy of Ectomin® against Boophilus annulatus ticks. Cows were allocated into treated and control groups, each consists of 7 animals. At day (0) before treatment, ticks of more than 4.5mm in length attached to both treated and control animals were counted and every week thereafter. The average tick number on treated and control animals were counted and the efficacy percentage of Ectomin® was then determined. The number of ticks that laid eggs were counted in treated and control animals and hatching percentage of eggs were then calculated. Spraying of animals with Ectomin® showed that complete elimination of ticks occurred early on the 7th day post-treatment. The average number of ticks was 1673.29 and that of controls was 1578 at day (0) before treatment. The maximum efficacy (100%) was sustained for up to 7 weeks post-treatment after which the efficacy was slightly dropped and reached 98.32%. The results of Ectomin® on oviposition and egg hatchability of the ticks survived treatment were encouraging. The percentage of ticks collected from treated cows that succeeded to lay eggs was 22%, the average number of eggs laid per tick was 259.23 and hatching% was 8.61%.

INTRODUCTION

Boophilus annulatus ticks represent the most dangerous pest infesting cattle and it is one of the major problems affecting health and impairing the profitable productivity of livestock in Egypt. They made invade animals causing annoyance, depriving them of some blood as well as transmitting some bacterial, viral and rickettsial diseases and acting as vectors of certain protozoal diseases such as theileriasis, babesiasis and anaplasmosis.

In the past, tick control has been based on the use of chemically prepared tickicides and this will remain so in the foreseeable future. However, many ticks species have developed resistance to organophosphorus compounds, carbamates, chlorinated hydrocarbons and amidinenes during the many years that they had been exposed to these acaricides. For this reason, tick strains resistant to some or virtually all known tickicides have been found in many countries. This in turn, increasingly jeopardizes the effect of tick control measures (Nolan et al., 1979).

In order to safeguard successful tick management for the future, development of novel chemicals, preferably with other modes of action is indispensable. With the introduction of the synthetic pyrethroids into ectoparasites' control of cattle, the veterinarian now has a new acaricide which possess a number of advantages.

The most important is a wide range of activity against arthropods combined with a relatively long period of action (Ruigh, 1984). In addition, the pyrethroids also possess the advantage of a very low mammalian toxicity and the property of not accumulation in the milk and in edible tissue, and their use entails no withdrawal periods.

From the list of approximately 27 pyrethroids currently known in Veterinary Medicine, flumetrin is a highly effective member of pyrethroid group for tick control and initially for use by spray and dip methods in warm countries (Stendel and Fuchs, 1982; Hopkins and Woodly, 1982; Hamel et al., 1985 and Dorn et al., 1982). Bayticol (flumethrin) pour-on pyrethroid was introduced for tick control in Australia, South America and South Africa (Stendel, 1985; Hopkins et al., 1985 and Liebisch, 1986).

Ectomin® (cypermethrin) was recently introduced in the ectoparasites' control programs of farm aniamls in Egypt. The aim of this field trial is to evaluate the acaricidal effect of Ectomin® in the control of *Boophilus annulatus* ticks in cattle.

MATERIAL AND METHODS

Animals:

A field trial with Ectomin® was conducted on fourteen crossbred cows (Friesian X Egyptian native) naturally infested with *Boophilus annulatus* ticks.

Acaricide:

Ectomin® (cypermethrin high cis), Ciba Geigy, Switzerland. The chemical formula: (RS- -cyano-3-phenoxy-benzyl (IRS)-cis, trans-3-12,2 dichloroviny 11-2,2-dimethyl cyclopropane-carpoxylate.

Experimental design:

Infested animals were equally divided into t groups, the first was treated with the acarici while the other one was left untreated as contro At day (0) before treatment, female ticks of m than 4.5cm in length attached to the left side each animal were counted and multiplied by 2 estimate the total number of ticks on each anin (Nolan et al., 1981). The number of ticks infested animals was counted regularly eve week after treatment in both groups. The avera number of ticks on treated and control anima were taken to calculate the percentage of ticl surviving treatment and accordingly to assess tl efficacy percentage of acaricide.

Ectomin® was applied to infested animals b spraying using a motor sprayer and the sprayer's nozzle was held at 20 cm distance from th animals' body, starting on one side and continued to the other from above downwards. Attention should be paid to the hidden parts of animal body especially under the tail, inner aspects of thighs, abdomen and the perineal region. Ticks from treated and control animals were collected, incubated at 27°C and 95% relative humidity to evaluate the effect of Ectomin® on oviposition and hatchability of eggs.

RESULTS

The effect of ectomin® against *B. annulatus* ticks was studied in naturally infested crossbred cows (Friesian X Egyptian native) The results of the field investigation are presented in Tables (1) and (2). The data displayed in table (1) indicate that Ectomin® is highly effective for control of *B. annulatus* ticks in infested cows. The average tick index at day (0) in treated animals was 1673.29, when infested animals were first sprayed with

Ectomin® at the recommended concentration (1:1000), and it was 1578 in control animals. No ticks could be observed on the treated animals by the 7th day post-treatment proving 100% efficacy of the acaricide. This maximum efficacy was sustained for about 7 weeks post-treatment after which the efficacy was slightly decreased and reached 98.32% where the average tick number in treated cows was 28.43 tick/animal. This may be explained by reinfestation of treated animals by infective larvae from the contaminated environment.

The results presented in Table (2) show that Ectomin® was effective in reducing the oviposition of adult engorged Boophilus ticks collected from treated cows. The acaricide succeeded to reduce the egg laying of treated eggs and the reduction percentage was 22%. The average number of eggs laid by ticks collected from treated animals was significantly lower than that collected from control cows. The average number of eggs laid per tick was 259.22 (± 15.5) and 1759.95 (± 129.94) in treated and control animals, respectively. Most of the eggs laid in treated ticks failed to hatch as the average number

Table (1): Number of *Boophilus annulatus* ticks in Ectomin® treated and control cows

Treatment	Average number of ticks								
	Period after treatment (weeks)								
	Day (0)	1	2	3	4	5	6	7	8
Treated	No. 1673.3 Ef. –	0 100	0 100	0 100	0 100	0 100	0 100	0 100	28.4 98.3
Control	No. 1578	1587.1	1611.3	1653.4	1775.7	1670.3	1709.1	1858	1694.4

No. = Average number of ticks/animal
Ef. = Efficacy % of Ectomin®

Table (2): Oviposition and egg hatchability of *Boophilus annulatus* ticks in treated and control cows

Treatment	% of ticks laid eggs	Average Number of eggs laid/tick ±SE	Average Number of tick hatched/tick ±SE	Hatchability % of eggs
Treated	22	259.22[a] ±15.53	22.32[a] ±2.42	8.61
Control	98.31	1759.95[b] ±129.94	1695.59[b] ±125.06	96.34

Columns with unlike superscripts are significantly ($p<0.05$) different of eggs that succeeded to hatch to infective larvae was 22.32 with 8.61% hatching percentage. The average number of eggs hatched from ticks collected from control animals was 1696.59 (± 125.06) and the hatching percentage of eggs was 96.34%.

DISCUSSION

The foregoing results indicate that Ectomin® applied at the recommended concentration as a spray to cattle naturally infested with *B. annulatus* ticks, has an efficient killing action on ticks 7 days post-treatment. A high degree of efficacy was obtained at the recommended concentration, although the acaricide does not demonstrated a rapid detaching effect as the maximum effect was attained at the 7th day after treatment. Similar results were obtained in controlled and field trials carried out in Brazil, Argentina and Columbia with flumethrin on *Boophilus microplus* ticks (Dorn et al., 1987).

A sterilizing effect of Ectomin® was obtained for up to 42 days after the acaricide application. The results of our field trial proved an excellent efficacy of Ectomin®. Besides the control of the existing tick infestation on cattle at the time of treatment, an additional feature of the Ectomin® is a prolonged residual action, which minimizes reinfestation of cattle with infective larvae for up to several weeks (7 weeks) after treatment.

By this pronounced residual effect of Ectomin®, retreatment intervals can be extended and the number of treatments required for a complete tick control during the tick season can thus be reduced considerably, this means that after killing all tick stages attached to infested animals, the larvicidal concentration of Ectomin® can remain in the haircoat of animals minimizing reinfestation by the infective larvae.

Ectomin® besides its higher and prolonged effect on Boophils ticks, it has a pronounced inhibition action on the oviposition of eggs laid by female ticks collected from treated animals and also on the hatchability of the laid eggs. Only 8.61% of eggs laid from treated ticks succeeded to hatch to infective larvae. This was confirmed in the laboratory and field trials with flumethrin conducted by Stendel and Fuchs (1982).

The sterilizing effect of Ectomin® on the oviposition and hatchability of eggs laid by the treated ticks, one of the acaricide advantage that can be counted for the product. As Ectomin® can significantly reduce the oviposition and hatching of eggs, so it minimizes reinfestation of animals by the infective larvae.

REFERENCES

Dorn, T.J.; Hamel, H.D. and Stendel, W. (1982): The efficacy of flumethrin (Bayticol®) against multi-host cattle ticks in South Africa under field conditions. Vet. Med. Rev., 2:147-157.

Hamel, H.D. and Van Amelsfoort, A. (1985): Tick control with flumethrin 1% m/v pour-on under South African field conditions. Vet. Med. Rev., 2:132-145.

Hopkins, T.J. and Woodley, I.R. (1982): The efficacy of flumethrin (Bayticol®) against susceptible and organophosphate resistant strains of the cattle tick *Boophilus microplus* in Australia. Vet. Med. Rev., 2:130-139.

Hopkins, T.J.; Woodley, I.R. and Blackwell, R. (1985): The safety and efficacy of flumethrin pour-on used to control *Boophilus microplus* on cattle. in Australia. Vet. Med. Rev., 2:112-125.

Liebisch, A. (1986): Bayticol® pour-on: A new product and a new method for the control of stationary ectoparasites in cattle. Vet. Med. Rev., 1:17-27.

Nolan, J. (1979): New acaricides to control resistant tick Rec. Adv. Acarol., Vol. II, 55-64, Academic Press. Inc

New York and London.

Nolan, J. and Roulston, W.J. (1979): Acaricide resistance as a factor in te management of acari of medical and Veterinary importance. Rec. Adv. Acarol., Vol. II, 3-13 Academic Press Inc., New York.

Nolan, J.; Schnitzerling, H.J. and Bird, P. (1981): Evaluation of the potential of systemic slow release chemical treatment for control of the cattle tick *Boophilus microplus* using ivermectin. Aust. Vet. J., 57: 493-497.

Ruigh, G.S.F. (1984): An electrophysical investigation into the mode of action of pyrethroid insecticides. Thesis. Rijksuniv. Utrecht.

Stendel, W. and Fuchs, R. (1982): Laboratory evaluation of flumethrin, a new synthetic pyrethroid for the control of one and multi-host ticks. Vet. Med. Rev., 2:155-129.

Stendel, W. (1985): Experimental studies on the tickicidal effect of Bayticol® pour-on. Vet. Med. Rev., 2:99-111.