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FIELD TRIAL WITH AMITRAZ AGAINST ANIMAL ECTOPARASITES OF MAJOR IMPORTANCE IN TURKEY

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Türkiye'de önemli hayvan ektoparazitlerine karşı Amitraz ile yapılan saha çalışmaları

Özet : *Amitraz'ın, N-methylbis (2,4 – xylyliminomethyl) amine, ektoparazitler üzerine etkisiyle ilgili bir çalışma yapılmıştır.*

Hyalomma detritum, H. excavatum ve Dermacentor marginatus ile enfekte 523 *sığıra bir defa, Linognatus vituli ile enfekte* 65 *danaya,* 7 *gün ara ile, iki defa püskürtme yoluyle uygulanan* 0.21 *gr/ lt amitraz solüsyonu hayvanları bu parazitten arındırmıştır.*

Rhipicephalus bursa ile enfekte 2147, *Ornithodorus lahorensis ile enfekte* 95, *Prsoroptes ovis ile enfekte* 180 *koyuna, Rhipicephalus bursa ile enfekte* 596 *ve Damalina limbata ile enfekte* 105 *keçiye banyo yolu ile uygulanan* 0,21 *gr/ lt amitraz solusyonu hayvanları bu parazitlerden de arındırmıştır. Ancak O. lahorensis enfeksiyonunda, reenfeksiyonları önlemek için,* 7 *gün arayla banyonun tekrarlanması gerekmiştir.*

Bu şartlar altında uygulanan amitraz'ın hayvanlar üzerinde zararlı bir etkisi görülmemiştir.

Summary: *In a number of field trials carried out in* 1980–1981 *the effect of amitraz, N-methylbis (2,4–xylyliminomethyl) amine, was tested against ectoparasites of farm animals.*

In the summer of 1980, *single spray treatment with amitraz at* 0.21 *g litre*$^{-1}$ *eliminated Hyalomma detritum Schulze, H. excavatum Koch and Dermacentor marginatus Schulzer on* 523 *cattle; but two spray treatments,* 7 *days apart, were required to clear* 65 *calves of Linognathus vituli Linnaeus. On the other hand single dip treatment with amitraz at* 0.21 *g litre*$^{-1}$ *expelled Rhipicephalus bursa Canestrini and Fanzago on* 2147 *sheep, R. bursa Canestrini and*

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Fanzago and Damalina limbata Gervais on 596 *and* 105 *Angora goats respectively. Reinfestation with these parasites did not appear on the treated animals during the* 5 *week posttreatment observation period. In addition* 47 *cattle infested with Hippobosca equina Linnaeus were clear of the parasite in single spray treatment with amitraz at* 0.21 *g litre*$^{-1}$. *But repeated spray treatments at weekly intervals were used to protect the animals from reinfestations.*

In the autumn of 1980, *the trial showed the efficacy of amitraz at* 0.21 *g. litre*$^{-1}$ *against Hyalomma nymphs of* 35 *cattle in a single spray treatment. Repeated spray treatments at weekly intervals were required, however, to protect the cattle from the occurence of reinfestation.*

In early winter of 1981, *a group of* 95 *sheep infested with Ornithodorus lahorensis Neumann was found to be clear of the parasites* 24 *hours after single dip treatment with amitraz at* 0.21 *g litre*$^{-1}$. *But repeated dip treatments at* 7 *day intervals were necessary for the prevention of reinfestation. Single dip treatment with amitraz at* 0.21 *g litre*$^{-1}$ *resulted in clinical cure of* 180 *sheep sufferd from psoroptic mange. Skin scrapings taken from treated animals,* 5 *times at weekly intervals, did not reveal any live mite.*

Introduction

A wide variety of ectoparasites are found on farm animals in Turkey. Ticks are extremely common throughout the country. The productivities of the animals are low and tick borne diseases such as theileriosis and babesiosis show a wide and large scale distribution. A number of good surveys for ticks have been conducted. The most common species infested livestock are *Hyalomma excavatum* Koch, *H. detritum* Schulze, *H. savignyi* Gervais, *Rhipicephalus sanguineus* Latreille, *R. bursa* Canestrini and Fanzago, *Boophilus annulatus calcaratus* Birula, *Haemaphysalis otophila* Schulze, *H. sulcata* Canestrini and Fanzago, *Dermacentor reticulatus* Schulzer, *Ixodes ricinus* Linnaeus, *Ornithodorus lahorensis* Neumann and *Argas reflexus* Fabricius (14, 15, 16, 21). Apart from ticks and diseases they transmit, the mange conditions due to *Psoroptes spp.* and *Sarcoptes* spp. are commonly found. In addition biting and sucking lice and sheep ked infestations appear to be very prevalent (5, 19, 21).

The traditional organochlorine and organophosphorus compounds are available in Turkey and are used for the control of ectoparasites in those areas where severe infestation occurs. Continued tick control has resulted in the development of resistance to these chemicals (5, 10, 13). A new acaricide with a mode of action different from those of the

organochlorine and organophosphorus compounds has been therefore needed in this country.

As an acaricide amitraz, N-methylbis (2,4 - xylyliminomethyl) amine, is recomended to fulfil that requirement (11). The acaricide properties of this chemical were first described in 1972 (9). It was developed initially as a cattle tick ixodicide (9, 20) and is currently being widely used in the major cattle rearing areas of Australia and South America (11). A number of trials carried out in Australia (18), Europe (1, 2, 4, 6,7,11,12,17), Africa (22) showed the efficacy of amitraz against not only ixodide ticks but also skin mites (4, 7, 11, 17), biting and sucking lice and sheep keds on farm animals (11). Amitraz has not so for been used in Turkey and its worth, in the control of ectoparasites of farm animals, was not known.

In this paper some field trials carried out in Central Anatolia region are described to illustrate the efficacy of amitraz against ectoparasites of farm animals.

Materials and Methods

A number of field trials with amitraz were carried out in Central Anatolia in the years of 1980 and 1981. Central Anatolia is a hilly region where the typical climate of inland subtropical areas prevails. Temperatures vary widely from cold winter to hot summer with spring and autumn separating the two exterems. It is rainy in spring and autumn, snowy in winter and dry in summer. Many flocks of sheep, herds of Angora goats and of cattle are present in this region. From April to November the animals which are usually in groups of 100 to 300, move around an area of common land and during that time they feed. From December to March the animals are usually kept in shelters and have indoor feeding.

During this study 3 trials were organised in different parts of Central Anatolia. Before treatment a large number of animals were examined to observe their infestation level and to decide the trial sites. Only the animals found to be infested with ectoparasites were included in the trials.

In summer of 1980 a sum of 3266 animals (2174 sheep, 596 Angora goats and 523 cattle) infested with adult ixodide ticks were treated with amitraz and 250 animals (100 sheep, 75 Angora goats 75 cattle) were main intained as untreated controls. Pretreatment tick count was

made on the animals and some tick samples were collected for identification. Post- treatment tick counts were carried out 24 hours after treattmen and then 5 times at weekly intervals. In the same season 105 Angora goats, 65 calves and 47 cattle infested with biting lice, sucking lice and hippobocid flies respectively were also treated with amitraz and 25 Angora goats, 15 calves, 12 cattle were untreated controls. In the cases of louse infestations a large sample of skin scraping from the different part of each animal body was taken once before treatment and 5 times at weekly intervals during the post-treatment period. Louse counts in skin scraping samples were made under a stereomicroscope. In the cases of hippobocid fly infestations pretreatment and post-treatment fly counts were made on the animals.

In autumn of 1980, a small trial was undertaken to confirm the efficacy of amitraz against ixodide nymphs on 35 cattle. In this trial 10 animals were controls. Tick counts were made on the animals once before treatment and 5 times at weekly intervals during post-treatment period.

In early winter of 1981, a further trial was carried out to determine the effect of amitraz against argaside tick and mange on 95 and 180 sheep respectively. In this trial 25 sheep infested with mites and 20 sheep infested with soft ticks were maintained as untreated controls. Tick counts were made on the animals, and mite counts were carried out with stereo-microscope in the skin scraping samples taken from each animal, once before treatment and 5 times at weekly intervals during post-treatment period.

In all of these trials cattle were each sprayed with an aqueous solution of amitraz at 0.21 g litre^{-1} at the rate of 1.0–1.5 litre per 150 kg body weight. A portable sprayer was used to apply amitraz to the animals. On the other hand sheep and Angora goats were dipped in a aqueous solution of amitraz at 0.21 g litre^{-1}.

Single amitraz treatment was applied to the infested animals. But in the cases when reinfestation occurred two or more applications were used to keep the animals clean.

Results and Discussion

In summer the surveys carried out in the trial sites showed that the main tick species were *Rhipicephalus bursa* Canestrini and Fanzago on sheep and Angora goats; *Hyalomma detritum* Schulze, *H. excavatum*

Koch and *Dermacentor marginatus* Schulzer on cattle. The ticks consisted of adult male and female. Their mean incidence varied from 50 to 100 percent in respect to the trial sites. Infested animals usually carried between 1 and 12 ticks each. Angora goats harboured more ticks than sheep and cattle. The ticks centered mainly on the aears, head, udder and perianal regions. Apart from ticks *Damalina limbata* Gervais, *Linognathus vituli* Linnaeus and *Hippobosca equina* Linnaeus were present on some Angora goats, calves and cattle respectivley. Only animals which harboured the parasites were considered for treatment.

Tablo 1 shows the results of amitraz treatments for tick control. Single dip treatment with amitraz eliminated the ticks on 2147 sheep and 596 Angora goats 24 hours after treatment. One spray treatment also eliminated the ticks on 523 cattle in 24 hours. Approximately one hour after treatment the ticks detached and moved over the animal at random, eventually falling on the ground. Tick mortality took about 1 to 8 days. During this period the ticks lay on their backs and moved their legs. Gravid females did not lay egg. Five post-treatment examinations at weekly intervals revealed that ticks did not re-appear on the animals after treatment. During the post-treatment observation period adult ticks were always found on the untreated control animals. In the course of time the incidence of ticks and their population on each control animal decreased gradually. We presumed that the treated and control animals contacted each other when they grazed on the same pastura; this led to fall progressively the counts on the control animals.

Haemaphysalis otophila Schulze and *Dermacentor reticulatus* Schulzer appeared on 200 treated sheep and 100 Angora goats approximately 3 months after the first application. One more dip treatment with amitraz resulted in the elimination of the ticks from the animals.

Table 2 shows the results of amitraz treatments for lice and mange. Amitraz was effective against *Damalina limbata* Gervais on 105 Angora goats when applied in single dip treatment. Reinfestation with this parasite did not appear on treated Angora goats during the 5 week posttreatment observation period.

Amitraz was alos effective against *Linognathus vituli* Linnaeus on 65 calves in a single spray treatment. There was evidence, however, that the eggs of lice were uneffected by the treatment and louse infestation became re-established 7 days later. Reinfested calves given a

Table 1. Results of field trials with amitraz for control of ticks on sheep, goats and catle.

Animals	Number of animals infested	Total number of ticks found on the animals						
		Pretreatment tick counts	Mean burden per animal	Post-treatment tick counts				
				1st week	2nd week	3rd week	4th week	5th week
Treated sheep	2147	8568	3.99	0	0	0	0	0
Controls	100	486	4.86	317	152	90	82	67
Treated goats	596	4172	7.00	0	0	0	0	0
Controls	75	365	4.87	245	169	169	73	60
Treated cattle	523	1565	2.99	0	0	0	0	0
Controls	75	335	4.47	211	141	121	69	57

Table 2. Results of field trials with amitraz for the control of *Damalina limbata* on goats, *Linognathus vituli* on caattle and *Psoroptes communis* on sheep

Animals	Number of animals infested	Total number of parasites found in the skin scrapings from animals						
		Pretreatment Parasite counts	Mean burden per animal	Post-treatment parasite counts				
				1st week	2nd week	3rd wedk	4th week	5th week
Treated goats	105	515	4.90	0	0	0	0	0
Controls	25	92	3.68	103	111	85	117	108
Treated calves*	65	193	2.97	0	12	0	0	0
Control	15	63	4.20	47	58	71	53	59
Treated sheep	180	297	1.65	0	0	0	0	0
Control	25	47	1.88	35	41	31	51	64

* The animals received a repeat treatment with amitraz.

repeat spray treatment 7 days after first amitraz application were cleaned completely from lice.

On the other hand 180 sheep with sever skin lesions attributed to *Psoroptes communis* were dipped with amitraz and the flock showed marked clinical improvement 21 days after the treatment. Skin scrappings taken from the treated anmials 5 times at weekly intervals did not reveal any live mite.

Table 3 shows the results of amitraz treatments for hard and soft ticks and hippobocid flies. Amitraz was effective against *Hippobosca equina* Linnaeus on 47 cattle in a single spray treatment. But 8 days after first treatment this species reappeared on the treated animals. Repeated spray treatments with amitraz at weekly intervals gave a complete control of this parasite.

A spray treatment also comfirmed the efficacy of amitraz against *Hyalomma* nymphs on 35 cattle in a single treatment. But reinfestation with tick nymphs occurred on cattle 11 days after first treatment. Repeated spray treatments with amitraz at weekly intervals protected the cattle from the establishmet of nymph reinfestation.

A sum of 95 sheep infested with *Ornithodorus lahorensis* Neumann and each dipped with an aqueous solution of amitraz were found to be free from the parasite 24 hours after treatment. But the ticks reappeared on the treated animals 7 days after amitraz application. Dip treatment with amitraz at weekly intervals, however, protected the animals from reinfestation in the infested shelter.

No clinical sign indicating harmful effect of amitraz was observed on the treated animals.

Without exception the heards selected for the test described in this paper could be regarded as moderately infested with the ectoparasites. These made suitable subjects for demonstrating the ectoparasitic action of amitraz tested. It should be noted that amitraz at 0.21 g litre^{-1} was completely successful in the tests in eradicating ticks, itch mites, lice and hippoboscide flies on animals. Although single application of amitraz kept the livestock clean from hard tick infestation for more thean 5 weeks in the hot and dry semidesert area, an application interval in the seriously infested region of nearly 7 days was requested to protect the animals against this parasite.

Table 3. Results of field trials with amitraz for the control of *Hyalomma* nymph on cattle, *Ornithodorus lahorensis* on sheep and *Hippobosca equina* on cattle.

Animals	Number of animals infested	Total number of parasites found on the animals						
		Pretreatments Parasite count	Mean burden per animal	Post-treatment parasite counts				
				1st week	2nd week	3rd week	4th week	5th week
Treated cattle *	35	727	20.77	0	27	0	0	0
Controls	10	296	29.60	203	189	217	202	257
Treated sheep*	95	284	2.98	0	18	0	0	0
Controls	20	92	4.05	71	63	87	55	47
Treated cattle*	47	237	5.04	0	11	0	0	0
Controls	12	81	6.91	63	77	83	79	57

* The animals received treatments with amitraz at weekly intervals.

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