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Conference paper

EFFICACY OF SELECTED SPOT-ON, SPRAYS AND SHAMPOO INSECTICIDES IN THE TREATMENT OF DOGS INFESTED WITH FLEAS (*SIPHONAPTERA*)

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Abstract

Most insecticides do an excellent job of eliminating existing fleas from the host during the initial application. The problem is that reinfestation is a common occurrence. Flea control was achieved through repeated application of on-animal products and application of insecticides and insect growth and development regulators (IGRs & IDRs) into the premises. If flea products are applied at the appropriate dose and treatment intervals, there should be adequate residual activity between applications to kill most newly acquired fleas before egg production is initiated. Flea survival and reproduction may occasionally occur for a variety of reasons such as: infrequent product reapplication; simple under-dosing; bathing that can reduce insecticide levels applications; genetic variability of different flea populations means that none of the currently available residual flea products are 100 % effective against all flea strains.

Key words: flea, dog, control, fipronil, fenthion, permethrin

Introduction

Fleas are very important pests that persist all year indoor. Adult fleas are not only a nuisance to humans and their pets, and other warm-blooded animals but can cause medical problems including flea allergy dermatitis, secondary skin irritation and in some extreme cases anaemia. Even more seriously, fleas can carry infectious agents as *Yersinia pestis*, the causal agent for bubonic

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plague, *Rickettsia typhi* (Wedincamp and Foil, 2002), the causal agent for murine typhus, and *Dipylidium caninum*, the tapeworm that normally infest dogs and cats but may appear in children if parts of infested fleas are accidentally consumed.

Adult fleas begin feeding immediately once they acquire a host. Consumption of blood is necessary for ovarian development and reproduction (Dryden, 1990). Fleas spas through a complete life cycle consisting of egg, larva, pupa and adult. A typical flea population consists of 50 percent eggs, 35 percent larvae, 10 percent pupae and 5 percent adults (Rust and Dryden, 1997). Completion of the life cycle from egg to adult varies from two weeks to eight months depending on the temperature, humidity, food, and species. The female flea lays about 15 to 20 eggs per day up to 600 in a lifetime usually on the host. Eggs loosely laid in the hair coat, drop out most anywhere especially where the host rests, sleeps or nests (Lyon, 1997).

Most insecticides eliminate existing fleas excellent. The problem is that reinfestation is a common occurrence. Therefore the successful flea control involves the use of residual insecticides to control the adult fleas and a growth inhibitors to control the eggs from developing.

Material and methods

In the test of the study 30 short-haired dogs were experimentally allocated to 5 groups. All dogs were naturally infested with fleas – *Ctenocephalides canis* and *Ctenocephalides felis*.

1st group – 6 dogs treated with Fipronil (Front line - spot on). Environment was controlled with 1 % emulsion of deltamethrin (K-Othrine Flow).

2nd group – 6 dogs treated with Fenthion (Tiguvon – spot on). Environment was controlled with 0,8 % suspension of bendiocarb (Ficam 80 W).

3rd group – 6 dogs treated with Permethrin (Exspot sol. – spot on). This group was divided to subgroup A – environment was controlled with 0,8 % suspension of bendiocarb (Ficam 80 W) and subgroup B - environment was not controlled.

4th group – 6 dogs treated with Permethrin (Diffusil V – spray a.u.v.). This group was divided to subgroup A – environment was controlled with 0,8 % suspension of bendiocarb (Ficam 80 W) and subgroup B - environment was not controlled.

5th group - 6 dogs treated with Permethrin (Orthosan V – shampoo a.u.v.). This group was divided to subgroup A – environment was controlled with 0,8 % suspension of bendiocarb (Ficam 80 W) and subgroup B - environment was not controlled.

Each preparation was applied in accordance with the manufacturers label recommendations complying with the Slovak legislation dealing with scientific experiments on live organisms (Bugarský et al., 1999). The number of live, dead and moribund fleas before and during the test was determined by combing each dog.

Results and discussion

Mean number of live fleas and percentage efficacy are summarized in Tables 1 and 2. Dogs treated with Fipronil reached 79,7 % efficacy during 21 days. Tiguvon treated dogs reached average of efficacy 81,9 %. The efficacy of various forms of permethrin to fleas depended on the treatment of environment (subgroups A and B) and probably of development of resistance (Bossard et al., 1998). On the other hand, resistance is often cited as the reason a product has failed, however lack of control may be poor application technique, lack of an understanding flea biology, and too infrequent reapplications.

Table 1. - MEAN NUMBER OF LIVE FLEAS AND EFFICACY (%) FOLLOWING FIPRONIL AND FENTHION TREATMENT ON DOGS 24h, 7d, 14d AND 21d AFTER ADMINISTRATION

	1st group - FIPRONIL		2nd group - TIGUVON	
	Mean No of live fleas	Efficacy (%)	Mean No of live fleas	Efficacy (%)
Mean No of live fleas before treatment for 1 dog	26,4	-	18,2	-
24 hours after treatment	15,5	41,3	8,8	51,6
7 days after treatment	5	81,1	3,5	80,8
14 days after treatment	0,67	97,5	0,5	97,3
21 days after treatment	0,2	99,2	0,33	98,2

In dog treated with Permethrin spot on the mean efficacy reached 86,8 % in subgroup A versus 41,9 % in subgroup B. The mean efficacy of spray was 65,3 % and 43,1 % respectively, and of shampoo 53,2 % and 31,5 % respectively.

Table 2. - MEAN NUMBER OF LIVE FLEAS AND EFFICACY (%) FOLLOWING PERMETHRIN TREATMENT ON DOGS 24h, 7d, 14d AND 21d AFTER ADMINISTRATION

		3rd group – ExSpot spot on		4th group – DIFFUSIL V – spray a.u.v.		5th group ORTHOSAN V – shampoo a.u.v.	
Mean No of live fleas before treat-ment for 1 dog		16,6	-	22,3	-	19,7	-
24 hours after treatment	A	7,2	56,6	2,1	90,6	1,3	93,4
	B	15,8	4,8	9,3	58,3	8,3	57,9
7 days after treatment	A	1,3	92,2	4,2	81,2	5,7	71,1
	B	12	27,7	6,5	70,9	10	49,2
14 days after treatment	A	0	100	8,3	62,8	10,3	47,7
	B	7	57,8	15,2	31,8	17,2	12,7
21 days after treatment	A	0,3	98,2	16,4	26,5	14,7	25,4
	B	3,7	77,7	19,8	11,2	18,5	6,1

Flea control is best achieved with a simultaneous, coordinated effort involving strict sanitation, pet treatment and premise treatment both indoors and outdoors. It should be remembered that the goals of flea control in the first step is to protect the pets, and the next phase is indoor and outdoor application of appropriate insecticides. As previously indicated, none of the residual adulticides are 100 % effective throughout their labelled duration of activity and these surviving fleas may be capable of producing viable eggs. Continued reproduction can be prevented by administration of insect growth regulators such as lufenuron, methoprene, pyriproxyfen or fenoxycarb (Kočišová et al., 2003). These IGRs affect flea larvae, causing them to die during molting or by developmental failure in the pupal stage. IGRs generally stop production of adult fleas within the home but are not active on pupae existing at the time of treatment (Bennett et al., 1997). Formulations of chlorpyriphos, bendiocarb, propetamphos, propoxur, carbaryl, diazinon, permethrin and other pyrethroids are available for residual use indoors. Combination of residual insecticides, mechanical cleaning and insect growth regulators can give a long-term control of fleas.

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EFIKASNOST ODABRANIH INSEKTICIDA U OBLIKU TRAKA, SPREJEVA I ŠAMPONA U TRETIRANJU PASA INFESTIRANIH BUHAMA

Sažetak

Većina insekticida obavlja izvanredan posao uklanjajući postojeće buhe sa domaćina u vrijeme prve aplikacije. Problem je što se najčešće pojavljuje reinfestacija. Kontrola buha ostvarena je ponovnom aplikacijom insekticida i regulatora rasta insekata (IGRs & IDRs). Ukoliko su ti proizvodi primijenjeni u prikladnoj dozi i pravilnim intervalima, trebala bi se razviti rezidualna aktivnost između aplikacija koja bi uništila novo razivjne buhe prije nego dođe do odlaganja jajašaca. Preživljavanje buha i njihovo razmnožavanje može se povremeno pojaviti zbog nekoliko razloga: nedovoljno česta reaplikacija proizvoda, smanjena doza, kupanje koje može smanjiti količinu prisutnog proizvoda, genetsku raznolikost različitih populacija buha. Sve navedeno znači da niti jedan danas prisutni rezidualni proizvod protiv buha nije 100 % učinkovit.

Ključne riječi: buha, pas, kontrola, fipronil, fenthion, permethrin

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