Research Note

INSECTICIDAL POWDERS CONTAINING METHOXYCHLOR, ROTENONE, OR CARBARYL FAIL TO REDUCE POPULATIONS OF FLEAS IN A CAT IN PUERTO RICO[1,2]

Methoxychlor, rotenone, and carbaryl powders are prescribed by authorities in government agencies for the control of fleas[3,4]. The efficacy of these powders, however, has not been demonstrated by recent documented studies. We present data here which suggest that these insecticides are not effective against the cat flea, *Ctenocephalides felis* (Bouché) in Puerto Rico.

From March, 1978 to May, 1980, a Persian cat, which was a household pet, and never let outdoors, suffered a moderate to heavy infestation with fleas, naturally acquired. The cat was a large cameo male, weighing about 3.62 kg and about 10 years old.

Carbaryl and rotenone powders were obtained from a veterinary supply house, the methoxychlor was purchased locally. According to the labels the active ingredients were: Carbaryl, 1-naphthyl N-methylcarbamate, 5.00%; rotenone, 1.00%, other cube resins, 2.00%, piperonyl butoxide, 0.30%, and pyrethrins, 0.03%; methoxychlor, 2.50%, pyrethrins, 0.06%, and piperonyl butoxide, 0.60%. The labels on the packages indicated that each of these insecticidal preparations was approved for use on cats. The dosages were as follows: methoxychlor, one-half teaspoon (146 mg/kg) applied once per week for 8 weeks (March 27 to May 29, 1978); rotenone, one teaspoon (293 mg/kg), once per week for 8 weeks (December 25, 1978 to February 26, 1979); and carbaryl, one-half teaspoon (229 mg/kg), once per week for 5 weeks (March 17 to May 5, 1980).

To make the tests, we dusted the insecticidal powder over the back and sides of the cat on Monday of each week, counted the fleas each day for several days thereafter, and totaled the counts weekly. The fleas were found by searching the head, back, sides, belly, legs, and tail, passing the hand through the fur. Each day all the fleas were handpicked and destroyed.

The results are shown in table 1. After treatment with methoxychlor for 8 weeks, many fleas were still present on the cat, although from time

[1] Manuscript submitted to Editorial Board July 22, 1983.

[2] Thanks are expressed to Ina M. Fox (Mrs. Irving Fox) for assistance in counting fleas.

[3] U. S. Department of Agriculture, 1976. Controlling fleas, Home and Garden Bulletin No. 121, p. 3.

[4] U. S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, 1981. Insecticides for the control of insects of public health importance, p. 17.

to time some reduction in the average number of fleas had occurred. Rotenone was clearly unsatisfactory because the flea counts remained quite high during the whole period of treatment. Carbaryl did not reduce the heavy infestation of fleas; in fact, after 4 weeks of treatment there were more fleas than before the treatment. Adverse reactions occurred after applying rotenone or carbaryl for 5 weeks, the main symptoms being depression, withdrawal, and anorexia[5]. In the case of carbaryl, the cat seemed to be so ill that treatment was stopped after the fifth week.

TABLE 1.—*Average number of fleas per day removed from a Persian cat after applying powders containing methoxychlor, rotenone, or carbaryl to the fur once per week*

Week	Methoxychlor			Rotenone			Carbaryl		
	Average	Range	Days	Average	Range	Days	Average	Range	Days
0[1]	5.2	3–7	6	8.5	7–10	4	44	15–75	6
1	7.2	4–12	6	9.3	7–12	4	27	21–41	6
2	6.2	5–8	3	18.0	14–22	2	41	19–41	5
3	2.0	1–4	5	8.0	6–10	4	62	21–115	6
4	0.8	1–1	4	6.0	3–9	4	44	17–65	7
5	1.8	0–3	4	5.2	2–10	5	51	30–80	6
6	2.8	2–5	5	8.8	0–18	5	ND[2]		
7	3.8	0–12	4	6.3	4–10	3	ND		
8	10.0	0–20	2	6.5	4–7	4	ND		

[1] Pretreatment count (before applying insecticide).
[2] ND = Not done.

In Puerto Rico the cat flea was shown to be resistant to DDT, dieldrin, malathion, and propoxur, according to results from standard tests made with World Health Organization test kits[6]. It is likely that the cat flea in Puerto Rico is also resistant to methoxychlor and carbaryl, since the former is closely related to DDT and the latter to propoxur.

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[5] Fox, I. and de León, D., 1982. Evaluation of insecticides in collars and powders against the cat fur mite *Felistrophorus radofskyi* (Tenorio) on Persian cats, J. Agric. Univ. P. R. 66 (2): 139–44.

[6] Fox, I., Rivera, G. A. and Bayona, I. G., 1968. Toxicity of six insecticides to the cat flea, J. Econ. Entomol. 61 (3): 869–70.