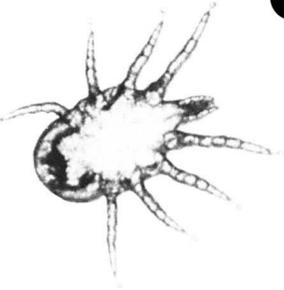


Synthetic pyrethroids effective



Northern fowl mites were controlled for up to three months on chickens sprayed with a synthetic pyrethroid.

Previous studies showed that the synthetic pyrethroid SD-43775 (Ectrin) effectively controlled northern fowl mite, *Ornithonyssus sylviarum* (Canestrini and Fanzago), for approximately 2 months when layer hens were hand- or power-sprayed with a concentration as low as 0.0125 percent. The present studies were conducted to obtain additional information on other pyrethroid compounds for potential control of this major external parasite of poultry.

Material and methods

Pyrethroid formulations evaluated were Atroban and Ectiban with the common chemical structure of permethrin: (3-phenoxyphenyl) methyl (\pm)-cis, trans-3-(2,2-dichloroethenyl)-2,2-dimethyl cyclopropanecarboxylate. Feather trials were first conducted in the laboratory with emulsifiable concentrate formulations of permethrin at 0.05 and 0.005 percent applied with a small atomizer. New Hampshire hens and roosters, 8 to 10 months old, housed in single, raised wire cages, were used for field tests at the University of California poultry ranch. Atroban was field tested at 0.05 and 0.125 percent mixed from a 42.5 percent emulsifiable concentrate (EC) solution (3.6 pounds [1.63 kilograms] active ingredient per gallon) and a 25 percent wettable powder (WP) formulation. Ectiban was tested at 0.05, 0.005 and 0.0005 percent from a 25 percent EC solution (2 pounds [0.9 kilogram] active ingredient per gallon). These formulations were compared with sprays of a registered acaricide, stirofos (Rabon 22.3 percent EC), used at 0.5 and 0.05 percent. Control hens were sprayed with water only.

Various dosages were applied to hens using a Hudson hand-pump, 2-gallon (7.57-liter) sprayer operated at 30 psi (196 kPa). Atroban treatments were made by the commercial method of spraying underneath the cages while walking down the cage aisle. Ectiban was applied by inserting the spray

wand into each cage and spraying directly the vent region of each bird.

Mite infestation ratings were made on all birds before and at frequent intervals after acaricide treatment. Precautions were taken to avoid transfer of chemical residues between treated birds by using clean gloves to inspect each acaricide-treated group and by inspecting the control group first, followed by the low- and then high-concentration acaricide groups.

Acaricide-treated hens were challenged at frequent intervals with mites removed by means of a mechanical aspirator from the control group. Mite samples counted in the laboratory averaged 7,995 mites (2,730 eggs, 3,015 nymphs, 2,250 adults) in 1977 trials and 5,245 mites (1,795 eggs, 2,240 nymphs, 1,210 adults) in 1978.

No birds used in these trials underwent a molt, showed unusual side effects, or decreased egg production following spray application, and no abnormal mortality was seen. All acaricide-treated birds were destroyed at the end of the trials, and all eggs were disposed of daily.

Results and discussion

The laboratory trials showed that mite-infested feathers sprayed with 2 milliliters (ml) per feather of Atroban at 0.05 percent and with 2.8 ml per feather of Ectiban at 0.005 percent produced 92 and 100 percent mite control, respectively, 2 and 5 days after treatment. No fumigant action was evident when the permethrin-treated feathers were stored with untreated feathers in the same desiccator.

Table 1 shows results of the 1977 field trial using Ectiban and Rabon sprays at dosages of 29.5 ml per hen. The 0.05 percent Ectiban concentration gave 95 percent mite control for 49 days beginning 1 day after treatment. One hen with a 1 rating was responsible for the lack of 100 percent control in this group. Mite challenges to

four of the eight hens in this group 36 and 40 days after treatment indicated that sufficient acaricide residue was present to prevent reinfestation except for the one hen just mentioned. Concentrations of 0.005 and 0.0005 percent Ectiban produced less than 60 percent mite control one week after treatment, and for this reason the two groups were resprayed using a 0.005 percent solution at the same dosage of 29.5 ml per hen. The original 0.005 percent group remained free of mites for 84 days beginning 6 days after retreatment. This same group resisted mite challenge 55 days after retreatment. The original 0.0005 percent group of hens remained mite-free for almost 1 month following retreatment at 0.005 percent. Some of the hens in this group were susceptible to mites following the challenge made 62 days after retreatment.

The Rabon-treated hens showed only 50 percent mite control 7 days after treatment. This group was retreated with a 0.5 percent spray, and mite control varied between 60 and 85 percent during the remaining 11 weeks of the trial. This level of control was due to three of the eight hens that retained a low density of mites, in contrast to the five negative hens in the group. The results supported similar findings in previous years when 0.5 percent Rabon sprays failed to give total mite control on hens at this ranch.

Table 2 shows the effectiveness of Atroban. Little difference in effectiveness was observed between the various concentrations and dosage rates of emulsion sprays. In general, 100 percent mite control was obtained 1 week following sprays of 0.05 and 0.125 percent at dosages of 74 ml per bird, whereas the 0.05 percent spray at 44 ml per bird resulted in mite-free birds 2 weeks after treatment. All hens in the 0.05 and 0.125 percent treatment groups remained mite-free for 91 days, during which time five hens in each of these two groups were unsuccessfully challenged with

against fowl mite

Edmond C. Loomis □ Lorry L. Dunning

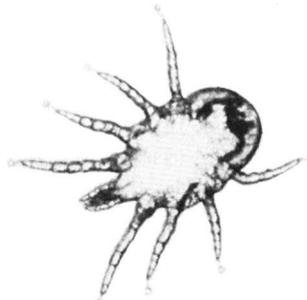
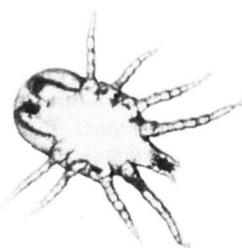
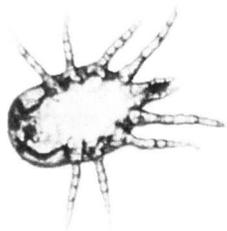


TABLE 1. Average Mite Ratings on Hens Sprayed with Different Concentrations of Ectiban and Rabon, 1977

Dates	Ectiban (25% EC)*			Rabon (25.3% EC)*		Control*
	0.05%	0.005%	0.0005%	0.05%		
March 4	2.6	3.4	3.1	3.0		4.5
9	spray			spray		spray
10	0.12†	2.0	2.9	2.1		4.2
16	0.12	1.4	2.0	1.4		4.2
24	0.12	1.6	2.4	1.6		4.2
30	0.12	(0.005% sprays)		1.9		4.6
31	0.12	0.25	1.1	1.9		4.6
April 6	0.12	0	0.25	1.9		4.6
9	‡	—	—	0.5% spray		—
13	0.12‡	0	0	0.25		4.6
20	0.12	0	0	0.40		4.6
27	0.12	0	0	0.40		5.0
May 11	0.25	0	0	0.50		4.3§
18	0.37	0	0.12	0.62		3.5
June 1	0.62	0 ‡	0.25‡	0.75		3.2
15	0.75	0	0.25	0.71§		3.0
29	0.87§	0	0.50	0.71§		3.2

*Sprays of 29.5 ml per bird at 30 psi to eight New Hampshire layers per treatment group (four hens in control group sprayed with water only) on dates indicated. Ratings are on a 0 to 5 index system, where 0 = no mites and 5 = 200,000 mites or more.

†Due to one hen with a 1 rating from March 10 to April 27.

‡Challenge to four hens in each group with mites transferred from control hens.

§One dead bird on dates indicated.

TABLE 2. Average Mite Ratings on Chickens Sprayed with Different Concentrations and Dosages of Atroban Formulations, 1978

Dates	Concentration: MI/bird: No. birds:†	42.5% EC*			25% WP*		Control*
		0.05%	0.05%	0.125%	0.05%	0.05%	
		74 20F	44 13F 8M	19F	89 11F 12M	44 4F 4M	
Feb. 9‡		2.4	1.9	2.7	—	1.8	2.5
11		0.7	—	0.4	—	—	2.2
12		0.3	0.3	0.1	—	0.4	2.1
16		0	0.1	0	—	0.4	2.1
23		0	0	0	2.8‡	0.1	2.3
25		—	—	—	0.4	—	—
28		—	0	—	0.2	0	—
Mar. 4		0§	—	0§	—	—	2.3
7		0	0	0	0	0	2.3
20		0	0	0	0	0	2.2
Apr. 4		0§	0	0§	0	0	2.0
18		0	0.04**	—	0	0	2.0
May 11		0	0.09**	0	0	0	1.7

*Ratings are on a 0 to 3 index system, where 0 = no mites, and 3 = 10,000 mites or more.

†Number of birds: F = females; M = males.

‡Ratings made before spraying.

§Challenge to five hens in each group with mites transferred from control hens.

**Due to one male with ratings of 1 and 2 on April 18 and May 11, respectively.

mites 23 and 44 days after treatment. The discovery of mites 68 days after treatment on one of eight males sprayed in the 0.05 percent group of mixed sexes suggests marginal coverage using the 44 ml dosage rate.

The 0.05 percent WP solutions provided mite control similar to that obtained with the emulsion sprays. Dosages of 89 and 44 ml per bird resulted in 95 percent control 3 and 14 days after treatment, respectively; all birds in both groups remained mite-free during the following 2½ months.

Mite populations remained at constant densities on the control groups during both years, despite the removal of mites for challenges of the treated groups. The eventual decrease in average mite ratings on birds in the control group during May and June was considered normal, because this is consistently observed during extremely warm weather.

The results of these field trials showed permethrin to be as effective as Ectin for control of northern fowl mites. Low dosages of 29.5 ml per hen applied by the experimental spray method were acceptable for treatment of individual birds, but higher doses were required to assure complete coverage with the rapid undercage spray method commonly used on large commercial ranches.

Edmond C. Loomis is Parasitologist, and Lorry L. Dunning is Staff Research Associate, Cooperative Extension Veterinary Medicine Unit, University of California, Davis. G. Pearson, Burroughs Wellcome Company, and G. B. Braithwaite, ICI Americas Inc., supplied formulations of Atroban and Ectiban, respectively. P. C. Fleming and M. J. O'Rourke, Laboratory Assistants, Cooperative Extension, Davis, assisted in conducting these trials.