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The spruce spider mite, Paratetranychus ununguis (Jac.) is now the most troublesome and prevalent pest on woody ornamentals in Kentucky, according to nursery inspections over the last several years.[1] Arborvitae, spruce, juniper, and hemlock are generally attacked by this so-called "red spider." There seems to be no doubt that the spruce spider mite has become the most important pest on conifers and it is generally believed that this fact can be attributed to the widespread use of DDT. (Matthysse and Naegale 1950, Schread 1951).

Control of the spruce spider mite has been somewhat difficult because of its insidious method of attack. Unless plants are frequently examined, infestations may remain unnoticed until considerable injury has occurred. Infestations are influenced by temperature, rainfall, and the general vigor of the host plant. The mite thrives best on mild temperatures, and populations increase rapidly to damaging proportions during April and May; there occurs a leveling-off of population during the hot summer period, followed by another population build-up in the fall.. Mites are washed off plants or trees by heavy rains, and often infestations do not become noticeable until a dry period occurs. Also, in such periods, plant injury is enhanced because plants generally lose vigor from lack of moisture.

A report by Neiswander and Rodriguez (1947) of work done in Ohio nurseries listed five materials as giving excellent control of this mite when used as summer sprays. Two of these materials were experimental and were never produced commercially, and two other materials used are no longer available.

In 1949 the author together with R. B. Neiswander tested a number of acaricides; 20 treatments were used in one test and 15 in another. In these experiments, the material now

1/ Annual Reports, 61, 62, 63, 64, Ky. Agr. Expt. Sta.

known as Ovotran gave excellent control. Further, this material demonstrated unusually long residual control, remaining effective longer than other materials tested. Dimite, Aramite, and NNOR, (a commercial rotenone preparation) proved more effective than EPN, parathion, or TEPP.

Experimental Procedure

In early June of 1951, a potentially large infestation of spruce spider mite was found on juniper in a nursery in Lexington, [1] and preparations were made to conduct control tests. Several beating rains discouraged a population increase, however, and it was July 2 before the first series of acaricides was applied.

This first test was conducted on a planting of spiny Green juniper 2 to 3 feet tall. Plots of five trees, replicated four times, were treated with a number of acaricides; a knapsack sprayer was used in making the applications and the trees were thoroughly wetted with the materials. The treatments were evaluated for both initial kill and residual kill by determining the number of living and dead mites on sprigs approximately 4 inches long, sampled from each tree (Table 1).

The second and third tests were conducted in order to obtain commercial control of infestations occuring on larger blocks of various junipers, using high pressure (400 pounds) application of sprays, and in order to obtain more information on the relative merit of the materials that had performed best in the small-plot test. Trees 2 to 3 feet in height were again used in the tests. Ovotran and Dimite were applied on July 31 to split blocks of several hundred trees of purple spreading, spiny Greek, and Pfitzer junipers (Table 2). Ovotran and Sulphenone were applied to about 100-tree blocks of spiny Greek juniper (Table 3).

The treatments in these tests were evaluated by sampling of sprigs (50 sprigs about 4 inches long) within each block or variety and then counting the living mites found on the sprigs.

1/ The cooperation of Hillenmeyer Nurseries in conducting this work is gratefully acknowledged.

In order to obtain additional information on the residual effectiveness of Ovotran and Dimite, 20 sprigs 4 to 5 inches long were collected at random on March 27, 1952 from the plots sprayed on July 31, 1951. These sprigs were examined for overwintering eggs. Only one egg was found on the 20 sprigs collected from the Ovotran-treated block; 37 eggs were found on the sprigs sampled from the Dimite-treated block, and 43 eggs were found on the untreated sampling. [1]

Results and Conclusions

Ovotran and Dimite were outstanding in controlling spruce spider mite infestations in tests conducted in 1949 and 1951. Ovotran demonstrated long residual control of this mite. Various types of junipers were found free of mites thirty-five days after application of 1 pound of Ovotran, 50-percent wettable powder, per 100 gallons of water, and only 1 overwintering egg was found in 20 sprigs collected the following spring (March 27, 1952), compared to 43 eggs on the untreated check sample.

There was no apparent advantage in using Ovotran in combination with other more volatile acaricides such as parathion or TEPP. Dimite, used at 1 pint of the 25-percent emulsifiable concentrate per 100 gallons of water, was also effective in control but lacked the residual effectiveness demonstrated by Ovotran.

No injury resulted from any of the spray treatments; applications were made at temperatures of 82 to 86 degrees F.

It is suggested that control treatments be applied during April or May before mite build-up occurs.

Literature Cited

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Neiswander, R. B., and Rodriguez, J. G.
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1/ These figures include newly hatched larvae; 59 percent of eggs had hatched.

Table 1. - Spruce Spider Mite Mortality and Residual Effect of Treatments Applied to Spiny Greek Juniper on July 2, 1951

Material per 100 gallons	Average per cent mortality		Average mites per sprig at 34 days
	At 5 days	At 16 days	
1. Sulphenone, [1] 40% WP, 2 pounds	99	89	1.5
2. Aramite, [2] 15% WP, 2 pounds	86	89	5.5
3. EPN, [3] 25%, WP, 1 pound	75	62	30.0
4. Parathion, [4] 15% WP, 1 pound	91	65	11.2
5. Ovotran, [5] 50% WP, 1 pound	99	100	0.3
6. Parathion, 15%, WP, & Ovotran, 50%, WP, 1 & 1 pound	99	100	0
7. Dimite, [6] 25% Emul., 1 pint	100	94	1.9
8. TEPP, [7] 20% Emul., 1/2 pint	93	63	5.8
9. TEPP, 20%, Emul., & Ovotran, 50% WP., 1/2 pint & 1 pound	99	100	1
10. Check (No treatment)	6	6	5.1

1 p-chlorophenyl phenyl sulfone; Stauffer Chemical Co.
2 chloroethyl butylphenoxy methyl ethyl sulfite; U. S. Rubber Co.
3 ethyl p-nitrophenyl thionobenzenephosphonate; E. I. duPont de Nemours & Co.
4 O, O-diethyl O-p-nitrophenyl thiophosphate; American Cyanamid Co.
5 p-chlorophenyl p-chlorobenzene sulfonate; Dow Chemical Co.
6 (p-chlorophenyl) methyl carbino; Sherwin-Williams Co.
7 tetraethyl pyrophosphate

Table 2. - Residual Effect on Spruce Spider Mite on Juniper Following Treatment on July 31, 1951[1]

Material per 100 gallons	Average mite population per sprig		
	Days after treatment		
	6	16	0
Ovotran, 50%, WP, 1 pound	0	0	0
Dimite, 25%, Emul., 1 pint	0	.02	.03
Check (No treatment)	7.4	10.0	24.0

Table 3. - Residual Effect on Spruce Spider Mite on Spiny Greek Juniper Following Treatment on August 9, 1951

Material per 100 gallons	Average mite population per sprig		
	Days after treatment		
	6	25	35
Ovotran, 50%, WP, 1 pound	.08	.08	0.9
Sulphenone, 40%, WP, 2 pounds	1.9	7.6	14.0
Check (No treatment)	14.0	4.7	10.0

1/ Varieties: Spiny Greek, Purple Spreading: Pfitzer