such as Lawson, Enchantress and Bradt may also prove to be advantageous.

The temperature necessary for successful carnation culture is quite favorable for the development of insects and diseases common to carnation plants. For this reason the future of *Pediculopsis graminum* and the associated fungus, *Sporotrichum poæ*, as parasites of the carnation, will be watched with considerable interest.

EXPERIMENTS FOR THE CONTROL OF THE RED SPIDER IN FLORIDA (TETRANYCHUS BIMACULATUS, HARV.)

By H. M. Russell, *Bureau of Entomology, Washington, D. C.*

During the early spring of 1908, it was very dry for weeks in Florida, with little rainfall. Under these conditions red spider injury to truck, general crops, and citrus trees was very noticeable. The writer found a small field of wax beans very badly infested by the red spider, May 16, 1908. Some of the leaves were badly distorted and curled, and discolored by numerous yellow blotches, while others were dried up and lifeless from the work of this insect. The red spider lives on the under side of the leaves, spinning a slight web of delicate threads, under the protection of which it feeds.

About the first of June the rainy season in Florida set in and when the plants were examined about a week later, the red spider had almost disappeared.

Experiments for the control of the red spider were conducted at Orlando, Fla., from May 22, until June 1, 1908, the results of which are summarized below.

Experiment No. 1.—May 22, 1908. Lime-sulphur (at the rate of 1 pound of lime and 1 pound of sulphur to 25 gallons of water,[1] *a*) was sprayed on a row of wax beans, using an underspray. This was at 5.30 p. m., the sky being cloudy, and a fair breeze blowing. On May 28, a number of leaves of sprayed plants were examined as were leaves of unsprayed plants also (for the purpose of checking), with the following results:

[1]In Circ. 65, U. S. Dept. of Agriculture, Bur. Ent., Prof. E. S. G. Titus states that the heat generated by slaking lime will dissolve the sulphur. The writer finds that, when made up in small lots, it is necessary to boil the two ingredients together as enough heat is not generated to dissolve the sulphur.

TABLE FOR FORMULA *a*

No. of leaf.....	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Live red spiders on leaves sprayed.....	3	7	1	100	7	1	1	1	0	10	8	7	2	2	16	1
Live red spiders on unsprayed leaf.....	80	78	39	36	37	36	12	55	2	59	60	26	0	3	5	5

Total number red spiders left on plants sprayed, 167 [1].
Total number red spiders left on plants unsprayed, 533.

The above figures show a total of 76 per cent killed by the one spraying; the plants showing no injury from the spray.

Experiment No. 2.—May 28, 1908. Lye-sulphur (1 pound sulphur and ½ pound of lye to 40 gallons of water, *c*) was sprayed on a row of wax beans, using an underspray. The spray was applied at 10.15 a. m., the day being cloudy and there being a fair breeze. On May 30, 1908, an examination was made of a number of sprayed leaves and checks, the results of which are as follows:

TABLE FOR FORMULA *c*

No. of leaf.....	1	2	3	4	5	6	7	8	9	10	11	12	Total
Live red spiders on leaves sprayed..	0	1	1	0	0	0	0	0	3	0	0	0	5
Live red spiders on unsprayed leaf..	1	77	74	6	17	39	3	8	37	11	1	1	275

This count gives 98.4 per cent killed by the one spraying, and seems a very high percentage to the writer. The plants show no injury resulting from the spraying.

Experiment No. 3.—May 28, 1908. Sulphur (1 ounce to 1 gallon of water, *d*) was sprayed on a row of wax beans, using the underspray. The spraying was done at 11 a. m., the sun shining brightly and there being a fair breeze. On May 30, a number of sprayed leaves and checks were examined with the following results:

TABLE FOR FORMULA *d*

No. of leaf.....	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Live red spiders on leaves sprayed	0	1	1	0	1	0	1	1	4	?	0	0	0	0	1=10
Live red spiders on unsprayed leaf	5	3	3	1	4	17	2	8	10	?	4	22	11	10	5=110

[1] Of the sprayed leaves, one examined had 100 red spiders upon it and, it seems to the writer, that a truer result would be obtained by ignoring this one leaf and its check.

This count gives 91.7 per cent killed by this spraying. Plants show no signs of damage from spraying. On the date of this examination the sulphur was found still adhering to the beans in small particles.

(*c*) In making this spray the lye should be finely pulverized.

(*d*) In making this spray the sulphur should be made into a thin paste with a small amount of water, after which the balance of the water is added.

Experiment No. 4.—May 29, 1908. Kerosene-soap emulsion (1 part of the stock solution to 10 parts of water, *e*) was sprayed on a row of wax beans, using an underspray.

This was applied at 10.30 a. m. with a bright sun and a good breeze. On May 30 a number of sprayed plants and checks were examined with the following results:

TABLE FOR FORMULA *e*

No. of leaf	1	2	3	4	5	6	7	8	9	10	11	12	Total
Live red spiders on leaves sprayed..	1	0	0	0	2	0	0	1	1	0	0	0	5
Live red spiders on unsprayed leaf..	5	3	3	1	4	17	28	10	5	4	22	11	113

This count gives a total of 95 per cent killed by this spray. The plants show a few leaves with burned edges, but in no case seriously.

(*e*) This stock was made up four weeks previous to using, and the writer finds a small amount of free oil.

SUMMARY OF EXPERIMENTS IN SPRAYING FOR THE RED SPIDER

No. of Expt.	Date.	Insecticide.	Effect on Red Spider.	Effect on Plant.
1	May 28	Lime-sulphur	Killed 68 to 85%	None.
2	May 28	Lye-sulphur	Killed 98%	None.
3	May 28	Sulphur-water	Killed 91%	None.
4	May 29	Kerosene emulsion	Killed 95%	Slight.

Conclusion

The results of these experiments show that this pest can be controlled by spraying with any of these four insecticides; but because of the difficulty experienced in making the kerosene emulsion, as compared with the other three, it is not likely to be employed, at least in Florida.

At the same time that these experiments were conducted, observations were made on the effect of rain on the red spider. On the 27th

and the 30th of May it rained very hard, and on June 2d a check row of beans was examined and 207 red spiders were found on 13 leaves.

On June 8th, after a week of daily rain, very few red spiders were to be seen. From this it appears that one or two rains will not seriously injure the red spider, but that continued rains for several days are fatal to a large proportion of the insects.

A LIST OF PARASITES KNOWN TO ATTACK AMERICAN RHYNCHOPHORA

By W. Dwight Pierce, *Bureau of Entomology, U. S. Dept. of Agriculture*

As the weevils become more important economically there will be a growing necessity of understanding the parasites which may check their injuries. A preliminary list of these parasites was published by the writer in Bulletin 73 of the Bureau of Entomology, without, however, indicating the sources of the records. Since that time many other important records have been added, and if all the species bred by the boll weevil investigation force were determined, double the number of additions could be included.

The credit for parasite breeding records made at the boll weevil laboratory during 1907 and 1908 must be shared equally by the writer with Messrs. R. A. Cushman and C. E. Hood.

Notice of omissions is very earnestly requested.

Fungi.

Aspergillus sp. is recorded by Hunter and Hinds (1904. 105) as bred from *Anthonomus grandis* Boh., at Victoria, Texas.

Cordyceps sp. was found attacking the boll weevil (*Anthonomus grandis*) at San Juan Allende, Mexico (Townsend 1895a).

Empusa (*Entomophthora*) *sphaerosperma* attacks the clover-leaf weevil, *Phytonomus punctatus* Fab., abundantly at Annapolis Junction, Md. (Johnson 1898).

Entomophthora phytonomi attacks the same weevil in Ontario (Fletcher 1900).

Isaria tomicii Lugger is recorded as killing adult *Platypus compositus* Say (Hopkins 1896).

Sporotrichum globuliferum was bred from the imbricated snout beetle, *Epicaerus imbricatus* Say, by Chittenden (1900b. 31).

Acarina.

Tarsonemidae.

Pediculoides sp. (nec. *ventricosus* Newp. mis-spelled *ventriculosus*) is a common parasite of *Anthonomus grandis* Boh. (Rangel 1901a, b) and