

Effectiveness of BAY SRA 12869 Against Mosquito Larvae in Laboratory and Rice Field Plot Tests

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BAYSRA 12869, an organophosphorous insecticide, is being studied primarily for control of rice water weevil in rice. Currently it is labeled (Amaze^R) for use against soil insects in grain sorghum and corn. Recently the material was found to control mosquito larvae. The purpose of this test was to measure and compare the effectiveness of both G and EC formulations as larvicides.

The study was conducted at the Rice Branch Experiment Station, Stuttgart. Treatments and a control plot, 6.10m by 6.10m, were replicated 3 times in a randomized block design. Treatments were made in 1977 using high and low dosages of both formulations: 144 and 48 ml of EC and 136 and 45 g granular. Only the lower dosages were applied in 1978.

The G formulations was evenly distributed with a hand-held perforated container, while the EC was applied by hand sprayer in 3,840 ml H₂O total mixture per plot. Determination of larvicidal mortality included field bioassays and laboratory cup samples, which were conducted for 10 and 3 days posttreatment, respectively, 1977. In 1978 only field trials were made. The treatments had been made too late the previous season to measure extended residual efficacy, so the 1978 test was continued for 67 days.

In-pool bioassays were made on field-collected early 2nd and 3rd instar *Psorophora columbiae* (Dyar & Knab) larvae. Bioassay containers were made from

plastic pipe 10.3 cm in diameter and 25.6 cm long. Nylon gauge mesh was glued onto the bottom of the containers. To aid in circulation, 3 holes 1.3 cm in diameter were drilled into the sides of each container and also covered with the nylon mesh. Cheesecloth was fitted over the container top with a rubber band to exclude natural predators.

These containers were attached to a stake and driven into the plots so that about 3/4 of the container was submerged in water. Ten larvae were placed in each container and mortality was recorded at various posttreatment intervals.

For laboratory bioassays, unwaxed cardboard cups containing water samples taken from each plot were placed in a room at about 75°F. Bioassay cups were used only once, with new cups taken each time a new laboratory test was conducted.

Results of the field and laboratory bioassays are presented in Tables 1 and 2, respectively. In field trials EC dosages resulted in 100 percent mortality within 20 minutes after treatment in 1977. From the 1st to the 10th day posttreatment the EC formulations produced 100 percent mortality in both lab and field tests, while the granular formulation resulted in 100 percent mortality 2 to 10 days posttreatment, with nearly 100 percent mortality after the 1st day.

In the laboratory no mortality occurred in the low-dosage granular treatment samples after the first 24 hours, while 83

percent was obtained 24 hours after treatment in samples treated at the high granular dosage. Both EC dosages gave 100 percent mortality after 24 hours.

In the field trials conducted in 1978 the compound exhibited excellent residual properties for 60 days after treatment, but after 67 days G and EC formulations gave only 66 and 63 percent control, indicating a breakdown somewhere between 60 and 67 days after treatment.

Thus, our results of field and laboratory test samples indicate that this compound is very efficient in controlling 2nd and 3rd instar *P. columbiae* larvae. The granular formulation had a slower release than the emulsifiable concentrate for the first 24 hours, but both dosages produced 100 percent mortality after the 1st day of treatment, through the 60th day.

The compound needs more investigation including non-target and residue studies. However, it definitely offers promise as a long residual larvicide.

Anopheles quadrimaculatus (Say) mosquitoes also are pestiferous in Arkansas ricelands, and efficacy data against this species are needed. Since the species breeds in continuously flooded situations throughout the rice-growing season, use of the compound is perhaps even more pertinent against it than against *P. columbiae*.

Table 1. Field Bioassays of Rice Field Water Treated with BAY SRA 13 at Different Formulations and Dosages against *P. columbiae*

| Days post-treatment | 1977 | | | | 1978 | | |
|---------------------|----------|------------------------------|----------|-------|----------|-------------------------|-------|
| | Con-trol | Rate per 3.72 m ² | | | Con-trol | Per 3.72 m ² | |
| | | EC 48ml | EC 144ml | G 45g | | EC 48ml | G 45g |
| | | Percent mortality | | | | | |
| 1 | 0 | 100 | 100 | 96.6 | 100 | 0 | 100 |
| 2 | 0 | 100 | 100 | 100 | 100 | 0 | 100 |
| 3 | 0 | 100 | 100 | 100 | 100 | 0 | 100 |
| 6 | 0 | 100 | 100 | 100 | 100 | 0 | 100 |
| 10 | 0 | 100 | 100 | 100 | 100 | 0 | 100 |
| 12 | .. | .. | .. | .. | .. | 0 | 100 |
| 24 | .. | .. | .. | .. | .. | 0 | 100 |
| 36 | .. | .. | .. | .. | .. | 0 | 100 |
| 43 | .. | .. | .. | .. | .. | 0 | 96 |
| 60 | .. | .. | .. | .. | .. | 0 | 90 |
| 67 | .. | .. | .. | .. | .. | 0 | 63 |

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Table 2. Laboratory Bioassay Results, 1977

| Formulation | Days posttreatment | | |
|-------------------------------|--------------------|-----|-----|
| | 1 | 2 | 3 |
| | Percent mortality | | |
| Control | 0 | 0 | 0 |
| EC, 48ml/3.72 m ² | 100 | 100 | 100 |
| EC, 144ml/3.72 m ² | 100 | 100 | 100 |
| G, 45g/3.72 m ² | 0 | 100 | 100 |
| G, 136g/3.72 m ² | 83.3 | 100 | 100 |