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EFFICACY OF METHOPRENE PELLETS AGAINST *COQUILLETTIDIA PERTURBANS* LARVAE

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ABSTRACT. Of 21 wetlands in the Minneapolis–St. Paul area that supported similar densities of *Coquillettidia perturbans* larvae, 7 wetlands were treated with Altosid® methoprene pellets at 5.6 kg/ha on May 28, 1992, 7 were treated with Altosid® XR extended residual methoprene briquets at 1 briquet/9.3 m^2 in March 1992, and the final 7 remained untreated. Emergence data collected from May 28 through late August in all sites indicated pellet and briquet treatments achieved greater than 90% control.

Sustained release methoprene briquets (Altosid® XR extended residual briquets), designed to persist for 150 days, effectively control *Coquillettidia perturbans* (Walker) larvae (Sjogren et al. 1986). However, most emergence of *Cq. perturbans* in Minnesota wetlands occurs over less than a 30-day period (Batzer and Ranta, unpublished data). Thus, the use of Altosid® pellets designed to persist for 30 days may still effectively control these larvae. Based upon 1993 prices, the use of pellets rather than briquets could save 85% in material costs per hectare (personal communication, Zoecon Corp.). In addition, aerial application of large briquets is problematic and would be more promising for a smaller sized formulation. In this study, we evaluated the efficacy of Altosid pellets against *Cq. perturbans* larvae in Minnesota wetlands.

We selected 14 cattail (*Typha* spp.) wetlands in Washington County and 7 wetlands in adjacent areas of Anoka County, MN, that supported similar concentrations of *Cq. perturbans* larvae. The Washington County sites had never been treated previously with methoprene, whereas the Anoka County sites had been treated yearly with Altosid briquets. Personnel in chest-waders used a Spyker hand seeder to treat 7 of the Washington County sites with Altosid pellets at 5.6 kg/ha (5 lb/acre) on May 28, 1992; the other 7 sites served as untreated controls. The 7 sites in Anoka County were treated in February and March, while sites were ice covered, with Altosid briquets at 1 briquet/9.3 m^2 (100 $ft.^2$).

Following the May 28 treatments, we placed 6 1-m^2 mesh-walled emergence cages (Sjogren et al. 1986) over randomly selected clumps of cattail in each of the 21 wetlands. Emergence cages are needed to evaluate methoprene efficacy because this material controls mosquitoes by preventing emergence (Sjogren et al. 1986). Every 3–4 days, emerged mosquitoes were collected from cages with a modified Dustbuster® hand-vacuum and transported back to the laboratory for identification and tabulation. Total emergence among pellet-treated, briquet-treated, and untreated sites was compared using one-way ANOVA followed by Student-Newman-Keuls (SNK) multiple range tests (Snedecor and Cochran 1967). Prior to analysis, data were transformed (log[x+1]) to equalize variances. Chi-square contingency tests were used to determine whether timing of emergence in pellet and briquet treated sites differed from expected patterns in untreated sites. For this analysis, data were pooled from the latest 5 collections in August to ensure that expected emergence exceeded one mosquito/cage.

In untreated control sites, an average of 196 ± 79 (SE) *Cq. perturbans* mosquitoes were collected from each emergence cage. Numbers emerging from both pellet-treated (16 ± 11 mosquitoes/cage) and briquet-treated sites (10 ± 9 mosquitoes/cage) were significantly lower than from untreated sites (Fig. 1; one-way ANOVA, $F_{2,18} = 5.41$, $P = 0.01$ followed by SNK test, $P < 0.05$). The large variances in both treatments were from relatively high emergence in a few cages. From May 28 through late August, pellet and briquet treatments achieved 92% and 95% control levels, respectively. Numbers emerging did not differ statistically between pellet- and briquet-treated sites (SNK test, $P > 0.05$). However, overall control levels in pellet-treated sites were probably lower than our estimate of 92% because data from untreated sites suggest that some mosquitoes emerged prior to the date of pellet applications (Fig. 1). Briquets, which had been in place since March, should have still controlled early emerging mosquitoes at the 95% rate.

Although emergence in untreated sites and briquet-treated sites similarly peaked in mid-June (Fig. 1; $\chi^2 = 6.04$, df = 7, $P > 0.05$), emergence in pellet-treated sites peaked first during early June and a secondary peak occurred in late July and early August (Fig. 1; $\chi^2 = 162.3$, df = 7, $P < 0.001$, expected emergence rates derived from

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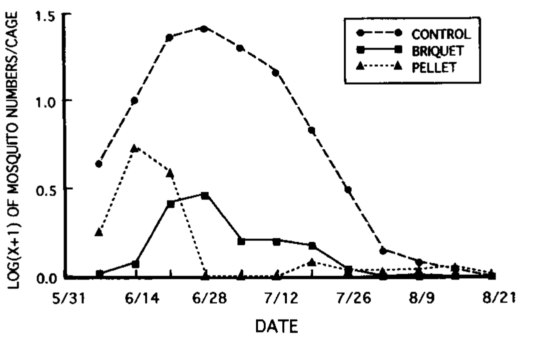

Fig. 1. *Coquillettidia perturbans* mosquitoes collected per 1-m² emergence cage per week in untreated control sites, methoprene briquet-treated sites, and methoprene pellet-treated sites. Seven wetlands were sampled for each treatment with 6 cages per wetland.

untreated site data). Apparently, pellet treatments did not control many mosquitoes emerging soon after May 28 applications. In addition, after pellets dissipated 4–5 wk later, other mosquitoes could emerge. Pellets probably should have been applied before May 28 to achieve optimal control levels.

This study indicates that Altosid pellets effectively control *Cq. perturbans*. However, with this formulation, prior knowledge of emergence patterns in sites will be required to optimize control (see Allan et al. 1981, Lounibos and Escher 1983). If such data are unavailable, the longer-duration 150-day briquets require less precise timing to achieve a high level of control.

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