

ULTRALOW VOLUME GROUND AEROSOLS OF NALED FOR CONTROL OF *Aedes taeniorhynchus* (WIEDEMANN) IN THE FLORIDA KEYS¹

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ABSTRACT. Field tests were conducted to determine the feasibility of using ultralow volume ground aerosols of naled for control of adult *Aedes taeniorhynchus* (Wiedemann). Good reductions (81–94%) were obtained in three tests with a dose of 0.02 pound per acre. Also, in five

of seven tests doses of 0.015 and 0.01 pound per acre gave 73–94% reductions. Applications made in the early morning gave more satisfactory control than applications made at night because of rapid reinfestation of mosquitoes during the night following treatment.

The use of adulticides has been the method of choice for controlling mosquitoes in the Florida Keys (Monroe County) because larvicides and permanent control have not been feasible on a large scale basis. However, the compounds have usually been applied with aircraft, a method that is expensive and that probably causes resistance to develop more rapidly than ground methods because of extended coverage which greatly increases the selection for resistance. Thus, we conducted field tests to determine the practicability of using ultralow volume (ULV) ground aerosols as a control method for *Aedes taeniorhynchus* (Wiedemann) which is the prevailing species of pestiferous mosquitoes in the Florida Keys.

TEST PROCEDURES. Three residential sections on Sugarloaf Key (about 17 miles north of Key West) were selected as test areas. These areas ranged in size from approximately 120 to 350 acres and contained road networks that allowed adequate coverage with the ground aerosol method.

Naled, formulated as 10% Dibrom® 14 in heavy aromatic naphtha (HAN), was selected as the adulticide to be tested because of its rapid knockdown characteristic which allowed evaluation soon after application. Also, naled was used in these tests because of observed resistance to

malathion in the native population of *A. taeniorhynchus* (12.5 fold; unpublished data). Naled was applied at doses of 0.01, 0.015, and 0.02 pound per acre of active ingredient with a Leco® Model HD ULV aerosol generator operated at an air pressure of 1.5 psi. A pressure of 1.5 psi was determined to be optimum for 10% Dibrom 14 in HAN in previous tests by Mount and Pierce (1972). The instrument panel of the aerosol generator was mounted in the cab of the truck (½ ton) on which the generator was carried so that the air pressure and the rate of flow could easily be monitored during applications. Previous calibrations with 10% Dibrom 14 in HAN at our laboratory indicated that flowmeter corrections were unnecessary to maintain a constant liquid flow within a 75 to 95° F temperature range. Aerosol applications were made either at night (8–9:30 pm) or during the morning (7–10:00 am).

The effectiveness of the aerosols was determined by making pre- and posttreatment landing counts just before and 30–45 minutes after each application at 8–10 counting stations within each plot. The average pretreatment count of mosquitoes at each station was 10.6 (total count on two observers), indicating a moderate infestation of *A. taeniorhynchus*.

RESULTS AND DISCUSSION. The data (Table 1) indicated reductions of 81 to 94% of adult *A. taeniorhynchus* with the 0.02 pound per acre dose of naled. These results agree closely with the LD₉₀ of 0.019 pound per acre for caged mosquitoes of

¹ This paper reflects the results of research only. Mention of a pesticide or a commercial or proprietary product in this paper does not constitute a recommendation or an endorsement by the USDA.

TABLE I. Effectiveness of ULV ground aerosols of naled (10% Dibrom 14 in HAN) against native infestations of *Aedes taeniorhynchus* in the Florida Keys.

Dose (lb/acre)	Flow rate (fl oz/min)	Truck speed (MPH)	No. of tests	Percentage reduction after 30-45 min ^a	
				Average	Range
0.01	6	10	4	72	42-94
0.015	12	15	3	73	52-89
0.02	12	10	3	86	81-94

^a Adjusted by Abbott's formula for fluctuations in the untreated populations, which ranged from a 20% reduction to a 14% increase.

the same species exposed in screen wire cages (Mount and Pierce 1972) and with the high degree of control of native infestations of *Psorophora confinnis* (Lynch Arribáizaga) in Arkansas with doses of 0.02 pound per acre of naled (Mount *et al.* 1972). The doses of 0.01 and 0.015 pound per acre also produced reductions of 73 to 94% in five of seven tests; the other two tests gave reductions of 42 and 52%. Thus, the average reductions were 72 and 73% for doses of 0.01 and 0.015, respectively.

However, the posttreatment landing counts at either 12 or 24 hours, depending on the time of application usually showed a high rate of mosquito reinfestation. Therefore, repetitive applications are necessary to maintain satisfactory control in small residential areas that are subject to heavy reinfestation of migratory mosquitoes such as *A. taeniorhynchus*. Nevertheless, we observed that applications made in the early morning produced more satisfactory control than applications made at night. *Aedes taeniorhynchus* feeds during daylight in shaded areas around homes

and is particularly active on cool, overcast days. Also, the species does not normally migrate during the day. Thus, our early morning treatments which gave lower densities during the day when residents were in the yards, provided satisfactory protection from biting. The two successful nighttime treatments (94 and 89% reductions at 0.02 and 0.015 pound per acre, respectively) provided little decrease in mosquito density (only 26% reduction) in the test plots the next day because of rapid reinfestation.

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Literature Cited

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