A REFINEMENT IN AERIAL APPLICATIONS OF PARIS GREEN GRANULES

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Mosquito control workers, particularly in the southeastern United States, have been using paris green granular formulations as developed by the Florida State Board of Health since the formulations were introduced as a control for certain mosquito larvae (Rogers and Rathburn, 1958). Apparently, the granules have solved some resistance problems associated with organic insecticides, have met wildlife requirements with outstanding safety, and have very effectively controlled certain mosquitoes, particularly some salt-marsh species.

The bulkiness of paris green granules has been one of the limitations found in their use because of dispersal problems. Large volumes of the granules are necessary when treating large areas at 15 lbs./acre because the heavy formulation of 7½ percent granules weighs only 31 pounds per cubic foot. The most feasible method found for applying the granules is by airplane which further compounds the volume problem (Rogers and Rathburn, 1960). The availability of aircraft with large volume capacities has aided the larger control programs but the operational cost for such aircraft limits them to the abatement programs with large acreage responsibilities.

The salt-marsh mosquito species compose approximately 80 percent of the Chatham County mosquito problem and control efforts have been made with emphasis on their control. Paris green granules have been employed as the primary larvicide.

In 1959, the Mosquito Control Commission purchased a new Piper PA–18A, Super Cub, and equipped it with a Transland hopper and a Super Cub Swathmaster distributor with 24-inch extensions for applying the paris green granules to the breeding areas. During the years 1959 through 1966, the aircraft applied 855,498 pounds of 7½ percent paris green granules at the rate of 15 lbs./acre. An effective 60-foot operational swath was realized with the aircraft flying at 80 m.p.h. and at an altitude of 35 feet (Fig. 1). The direct operational cost of $1.36 average per acre for this unit was extremely favorable; however, the problem of capacity continued to limit the aircraft's accomplishments during intervals of heavy and widespread mosquito breeding. In 1967, a new Piper PA–25–235,

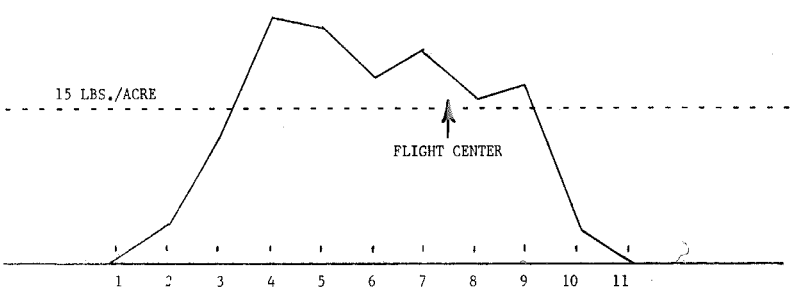

FIG. 1.—PA–18A with Super Cub Swathmaster and extensions: wind speed, *2–8 M.P.H.*; wind direction, *cross to downwind; altitude, 35 ft.*; average of 5 runs.

Pawnee C was purchased to replace the older Piper PA–18A.

The new aircraft was equipped with a 24 cu. ft. capacity Transland hopper which has a 16.6 percent greater capacity than the 20 cu. ft. hopper standard for a PA–25 (Fig. 2). The hopper was ployed in treating 11,800 acres of mosquito breeding. Comparatively the result was a decrease from an average of $1.36 for the PA–18 to $1.26 for the PA–25, in the direct cost of treatment per acre.

The dispersal equipment and the hopper were designed for general applications of

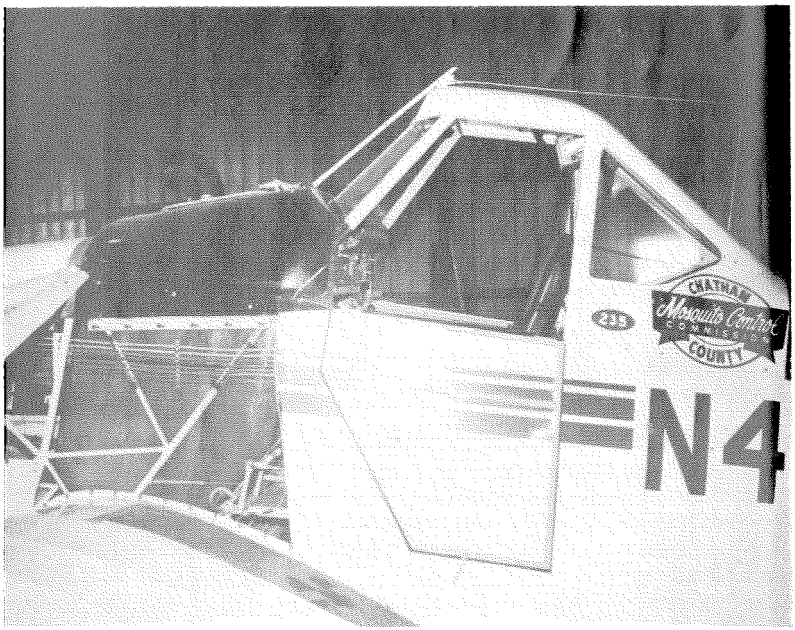

FIG. 2.—Over sized hopper (24 cu. ft.) replacing original hopper (20 cu. ft.) for use with paris green granules.

mated with a 1401 Swathmaster distributor with 24-inch extensions (Fig. 3). The hopper advantages were obvious; however, no previous record was found of the equipment being used in this combination for application of paris green granules.

In field calibrations, it was found that an effective 80 ft. operational swath was possible by flying at an altitude of 50 feet and at 80 m.p.h. Further detailed and replicated tests have confirmed the effective 80 ft. swath (Fig. 4).

In 1967, the PA–25 fitted with the equipment described was successfully em- dry materials which necessitated certain modifications to achieve proper deployment of paris green granules.

1. The baffle in the hopper apparently had some negative effects on the free flowing of the paris green granules down to the hopper gate and was removed. The removal of the baffle resulted in better distribution of the granules until the hopper was completely empty.

2. The agitator available on the 1401 Swathmaster is not desirable when using paris green granules and was not installed. The agitator damages paris green granules and reduces their effectiveness.

3. Pressure from air entering the hopper

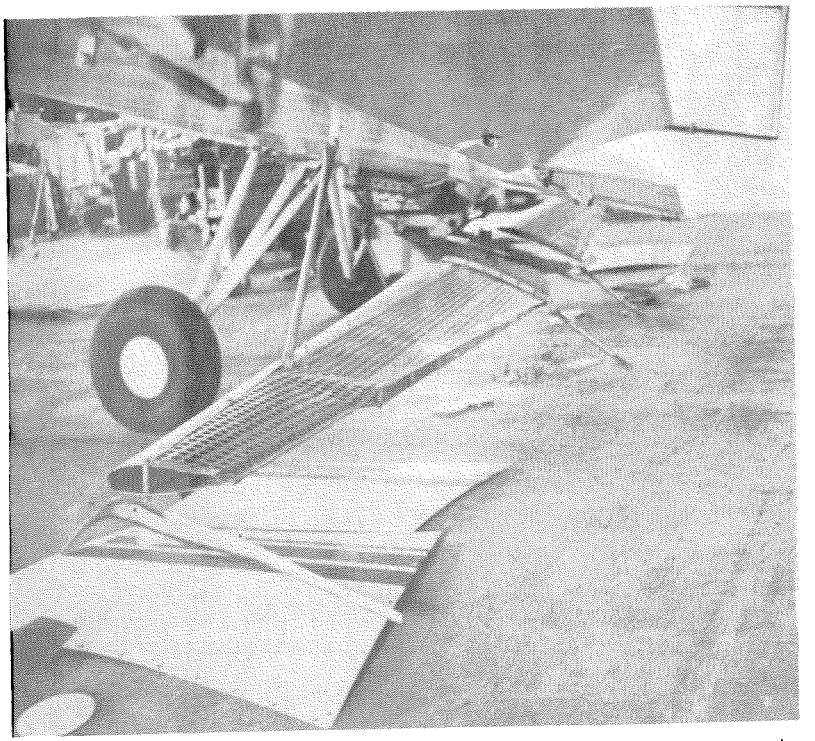

FIG. 3.—Paris green granule distributor with 24" extensions installed on the Chatham County Mosquito Control Commission PA-25 aircraft.

through the gate opening presented the most difficult problem. As the hopper was emptied in flight air pressure apparently overcame the gravity flow of the light paris green granules and erratic distribution occurred as the last few hundred pounds of granules were applied. An air scoop was installed on the hopper loading door to introduce a counter air pressure into the top portion of the hopper to correct this prob-

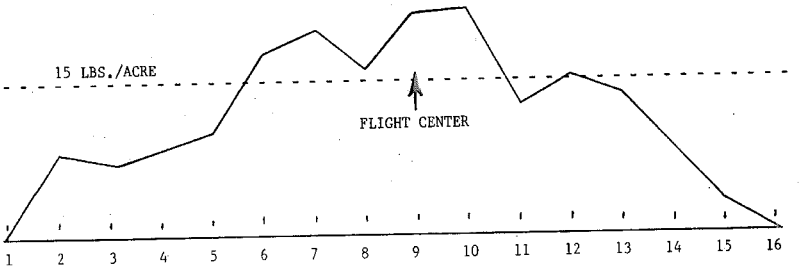

FIG. 4.—PA–25–235 with 1401 Swathmaster and extensions: wind speed, *no wind;* wind direction, (*no wind*) plane speed, *80 M.P.H.; altitude 50 ft.;* average of 5 runs.
Comparative calibrations of aircraft deploying paris green granules for the Chatham County Mosquito Control Commission.

lem. Several experimental air scoops were tried; a field improvisation proved to be the most efficient. A six-inch stovepipe elbow was attached with sheet metal screws to the plywood hopper loading door and directed forward into the wind flow. An adjustable air scoop replacement for the stovepipe was not successful and the stovepipe has been retained.

4. The wing portion of the distributor was installed horizontally and presented some problems by contacting vegetation on the field landing strip. A slight dihedral at the wing base corrected the problem and did not change the calibration.

Other calibration adjustments were made at the manufacturer's designated controls for such adjustments. Calibration procedures follow those recommended by the Florida State Board of Health.

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