## *Research Note*

### *SMALL PLOT SPRAYER USEFUL IN SUGARCANE RESEARCH*[1]

An allotment was obtained in 1972 to produce sugarcane in the Lower Rio Grande Valley of Texas. Since essentially nothing had been done prior to this time on controlling insect pests of sugarcane in the area, research on the subject was urgently needed. Research on chemical control of these insects was necessary to test the effectiveness of presently existing compounds, and to evaluate new compounds for controlling several pests, as well as to establish an economic threshold for the area.

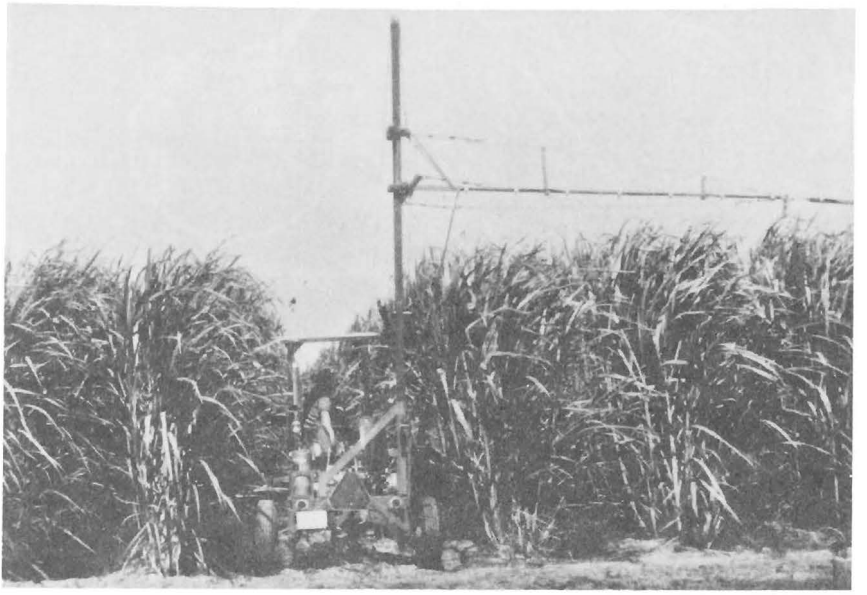

FIG. 1. – Sugarcane sprayer shown in sugarcane field.

Most commercial applications of insecticides on sugarcane are made by airplane; however, this method is excessively expensive for research purposes when many treatments must be evaluated in replicated tests. Interplot variation also confounds results in large plots. Application by ground equipment presents unique problems, since the plants grow to a height of 3.7 to 4.6 m, and the width between rows is variable. A need existed for a ground applicator that would work satisfactorily within a

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vertical range of 0.7 to 5 m and with a maximum horizontal range of approximately 6.7 m. It was anticipated that, for ground application, it would be necessary to mow a row of sugarcane at regular intervals to provide a travel way for the sprayer. To insure that a minimum number of rows would be removed a boom length of 6.7 m was selected. This boom length allows 4 rows on 26 cm centers to be treated in one pass. An 8-row plot could be treated with one pass from either side of the plot, requiring only that every ninth row be mowed.

It was also essential that the spray machine be easy to handle by two men, have ample under-the-frame clearance, meet standards specified

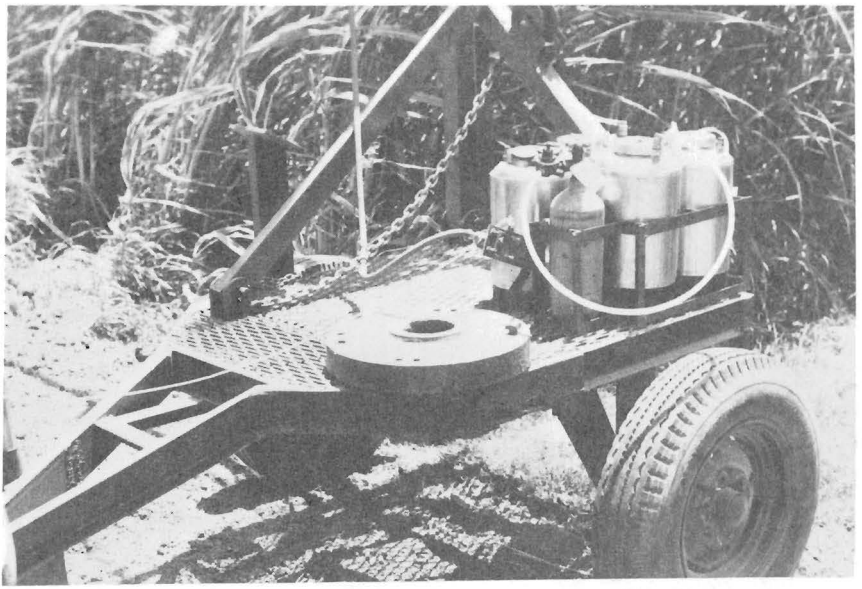

FIG. 2. – The 2-wheel carrier and rear-mounted square mast.

for highway travel, and be safe through its operating ranges. Ideally, the sprayer should be able to apply spray in a broadcast manner, simulating aerial application or be easily plumbed for side or basal treatments for small sugarcane plants.

A sprayer was constructed (fig. 1) based on the requirements outlined above. It utilized a two-wheel carrier with a pivoting, right rear-mounted square mast (fig. 2). The mast which locked positively for operation provided nonflexing, stable positioning of the boom perpendicular to the direction of travel. The cantilevered 7 m long cable and square tube truss spray boom (fig. 3) was supported and positioned by a

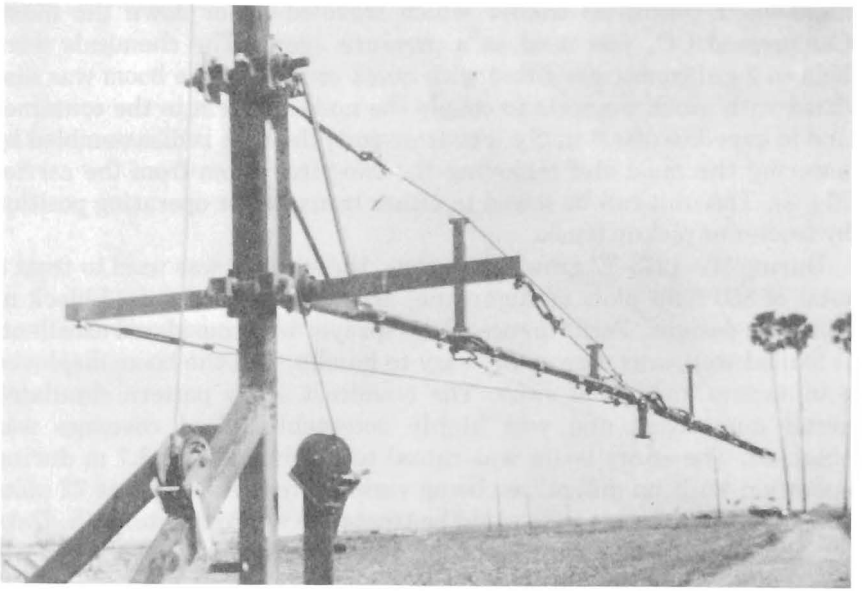

FIG. 3. – Sprayer mast, winch-controlled carrier, and boom.

FIG. 4. – Unit shown disassembled and in transport position.

hand-winch-controlled carrier which traveled up or down the mast. Compressed $CO_2$ was used as a pressure agent. The chemicals were held in 3-gal containers fitted with quick connects. The boom was also fitted with quick connects to couple the nozzle system to the container and to expedite disassembly. For transport, the unit is disassembled by lowering the mast and removing the two-piece boom from the carrier (fig. 4). The unit can be towed in either transport or operating position by tractor or pickup truck.

During the 1973–77 growing seasons, the sprayer was used to treat a total of 650 field plots of sugarcane, arranged in randomized block or split-plot designs. Performance of the sprayer was considered excellent. It trailed well, was reasonably easy to handle, and the boom displayed a minimum amount of sway. The broadcast spray pattern simulated aerial application and was highly acceptable. Good coverage was obtained. The spray boom was raised to heights of 3 to 3.7 m during operation with no difficulties being encountered. As many as 72 plots 10.7 m long by 3 rows wide could be treated in approximately 6 h. Data for the experiments in which the sprayer was used confirmed its acceptability and reliability.

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