POTENTIAL OF RESISTANT CORN TO REDUCE CORN EARWORM PRODUCTION—(Note). Resistance in corn, Zea mays L., to corn earworm, Heliothis zea (Boddie), has been known for many years (W. W. McMillian and B. R. Wiseman, Fla. Agr. Exp. Sta. Monogr. Ser. 2, 1972, 131 p). Wiseman et al. (J. Econ. Ent. 1972, 65:835-7) described one of the mechanisms of resistance in 2 corns ('Dixie 10' and '471-LF × 81-1') to be tolerance. They also reported (Fla. Ent., 1976, 59:305-8) that the resistance of 'Zapalote Chico #2451' was either antibiosis and/or nonpreference. Wiseman et al. (Fla. Ent., 1977, 60:97-103) delineated the physical characteristics of the 3 resistant corns and later studied the behavior of the corn earworm larvae on the resistant and susceptible corns (Wiseman et al., in press).

Dahms (M. G. Jotwani and W. R. Young (Eds.) Control of the Shootfly, 1972, p. 152-167) explained the theoretical role of host plant resistance in an integrated insect control program, demonstrating the direct and indirect value of all 3 mechanisms of resistance (nonpreference, antibiosis, and tolerance), and giving examples of how resistant varieties reduced insect populations. Schalk and Ratcliffe (Bull. Ent. Soc. Amer., 1976, 22:7-10) recently reported an evaluation of programs of the Science and Education Administration (USDA) that the use of insect-resistant cultivars has been successful in controlling insect pests and in reducing the use of insecticide. They were unable to find evidence showing reduction of earworms when resistant corn cultivars were used. Hence this study involves a resistant corn, Zapalote Chico #2451 and its impact on the potential population buildup of corn earworm.

Two corn entries, Zapalote Chico #2451 (resistant) and White Cross Bantam sweet corn (susceptible), were planted alternately in halves of three 30 × 100-ft cages for each of 2 years, 1975-76, and in 2 cages in 1977. At full silk (2 days past initial silk), 1 corn earworm first-instar larva was placed on each silk, and the number of emergence holes was counted 21 days later to indicate the survival or impact of each corn entry on earworm buildup. An average of 780 and 1060 plants of Zapalote Chico #2451 and White Cross Bantam, respectively, were infested each year.

In 1975, emergence holes were found in 91% of the White Cross Bantam sweet corn ears and in 27% of the Zapalote Chico #2451 ears. In 1976, even though the apparent corn earworm establishment was low for White Cross Bantam, it still produced 3 times as many corn earworms as Zapalote Chico #2451. In 1977, however, emergence holes were found in 77% of the White Cross Bantam ears and in only 12% of the Zapalote Chico #2451. Only 16% of the ears of Zapalote Chico #2451 produced corn earworms over the 3-year period, whereas 66% of the White Cross Bantam ears had emergence holes. This finding agrees with earlier data by the authors (J. Econ. Ent. 1972, 65:835-7) in which ca. 70% of the susceptible 'Ioana' and intermediate '409 × 20' ears were infested with corn earworms. Therefore, the resistance of Zapalote Chico #2451 did affect the establishment and the sustained level of the corn earworm. If we can approach this level of resistance in the commercial corn hybrids, corn earworm problems may be greatly decreased. —B. R. Wiseman, W. W. McMillan, and N. W. Widstrom, Science and Education Administration, USDA, Tifton, GA.