

Differential effects of nitrogen fertilization of three corn genotypes on biomass and nitrogen utilization by the southern armyworm, *Spodoptera eridania*

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Abstract

Maize varieties with different mechanisms of leaf-feeding resistance to the European corn borer, *Ostrinia nubilalis* (Hubner), were evaluated for resistance to feeding of the southern armyworm, *Spodoptera eridania* (Cramer) under 4 different levels of nitrogen fertilization in controlled environment conditions. Armyworm feeding bioassays were conducted with the U.S. inbred, B49, which has high tissue concentrations of DIMBOA (2,4-dihydroxy-7-methoxy(2H)-1,4-benzoxazin-3(4H)one) and a Caribbean genotype (San Juan × Antigua, with mechanisms of borer leaf-feeding resistance different from the DIMBOA type) in comparison with the borer-susceptible DIMBOA-less mutant (bxbx).

The growth rate of 5th-instar larvae generally increased as plant nitrogen content increased. However, the physiological mechanism involved for the larvae varied between corn genotypes. For example, slow larval growth on low nitrogen treatments and on the San Juan genotype were due to low consumption rate while on B49 slow growth occurred in spite of high consumption rates. Different homeostatic mechanisms are used by larvae on each maize genotype to stabilize growth rates in the final (6th) instar. The effect of nitrogen fertilization upon the cyclic hydroxamate (e.g., DIMBOA) concentrations in B49 plants was minimal in this study.