

#48: Immune response of Tobacco Hornworms (*Manduca sexta*) following consumption of
Horsenettle (*Solanum carolinense*)
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Botanists have at least 18 words to describe plant hairs, including trichomes. These common features of leaves are divided into two distinct categories: glandular trichomes contain defensive compounds that have been shown to deter herbivores, while non-glandular trichomes do not possess specialized structures for storage of defensive chemicals. Non-glandular leaf hairs have been shown to play a variety of roles, however their role in plant defense is only implicated. Some evidence shows that insects develop more slowly on plants with trichomes when compared to conspecifics that have reduced trichome numbers, but this could be due to other differences in leaf defensive chemistry or leaf microbiome. This study seeks to define the isolated function of stellate trichomes of horsenettle in anti-herbivore defenses. Specifically, we predicted and found that trichomes adversely affect larval growth and survival of *Manduca sexta* (Sphingidae). These effects were determined by measuring consumption rates, growth rates, and survivorship after feeding on artificial diet with and without (control) trichomes. Additionally, larval hemolymph was analyzed using disk diffusion assays and spectroanalysis to determine antibiotic strength, total protein, and phenyloxidase immune response. Larvae consuming a trichome-laced diet consumed less and grew less than larvae on the control diet. Moreover, we found that trichomes damaged the peritrophic membrane of the guts of 4th instar larvae using SEM imaging. Consequently, we hypothesize that a diet with horsenettle trichomes causes internal gut damage and poses a serious challenge to the immune system of the moth larvae.