DETERMINATION OF INSTARS OF COFFEE LEAFMINER (*LEUCOPTERA COFFEELLA*) USING MIXTURE MODELS

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The coffee leafminer is the main insect pest of the coffee plantations in Puerto Rico. As part of a study to understand the biology of this insect, samples of larvae were randomly taken from coffee plants taken during the months of January and August in 2006 and 2007. The head capsule width was measured for each larva. This width is used to determine the larval stage (instar), although there may be overlapping (for example some larvae from instar 1 could have wider head capsules than some larvae in instar 2). In this paper we use a normal mixture model to study the distribution of head capsule widths (HCW) under field conditions. For this model it is assumed that HCW's for larvae in a given instar follow a normal distribution whose parameters are of main interest. The mixing proportions are considered nuisance parameters. Different models were fitted using maximum likelihood to determine the number of instars that this insect shows under field conditions in Puerto Rico and to study the effect of year and season on the parameters of interest. The final model was then used to find optimal discrimination limits for each instar.