A Novel Procedure to Predict a Hypothetical-Population Growth Using an Evolved Diet Strain of Spodoptera frugiperda (Lepidoptera: Noctuidae) and Its Potential Application to Other Pests of Genetically Modified Organisms

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Genetically modified crops (GMO) have become the primary source of agricultural yield. Due to interrogation of potential adaptation of insect pests, GMOs' field vitality have become questioned; particularly, the resistance of Spodoptera frugiperda (FAW), who feeds on the most globally demanding crop, maize. In order to further understand FAW's population growth and its effects on corn, life tables were constructed using a novel procedure to study the demographic parameters. A life table demonstrates the statistical probability of how species will produce in their natural environment. Life tables are constructed using death and births within a population on a daily basis, from the time that the first egg of an FAW is born, to the time that all the FAW, regardless of developmental stage, die. A series of nineteen bioassays replicated three time were evaluated to complete the statistical analysis of Bt-cry-1F and traditional corn, in two vegetative stages. The rejection of the diet strain of FAW to its natural host was observed in young tissues of both varieties. Growth disruptions were found from third to sixth instars. The intrinsic and finite rates of increase were higher in insects reared on artificial diet which give estimations on how this pest duplicates its population, example: If a colony of FAW reared on artificial diet has a net reproductive rate of 720 females/female its population will be 1480 females in 3 days while for individuals reproduced in Non-Bt or Bt-corn will be 174 in 5 days and 25 females in 9 days, respectively.

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