

Characterization of New Sources of Maize (*Zea mays* L.) Resistance to *Sitophilus zeamais* (Coleoptera: Curculionidae) Infestation in Stored Maize

Authors : L. C. Nwosu, C. O. Adedire, M. O. Ashamo, E. O. Ogunwolu

Abstract : The maize weevil, *Sitophilus zeamais* Motschulsky is a notorious pest of stored maize (*Zea mays* L.). The development of resistant maize varieties to manage weevils is a major breeding objective. The study investigated the parameters and mechanisms that confer resistance on a maize variety to *S. zeamais* infestation using twenty elite maize varieties. Detailed morphological, physical and chemical studies were conducted on whole-maize grain and the grain pericarp. Resistance was assessed at 33, 56, and 90 days post infestation using weevil mortality rate, weevil survival rate, percent grain damage, percent grain weight loss, weight of grain powder, oviposition rate and index of susceptibility as indices rated on a scale developed by the present study and on Dobie's modified scale. Linear regression models that can predict maize grain damage in relation to the duration of storage were developed and applied. The resistant varieties identified particularly 2000 SYNEE-WSTR and TZBRELD3C5 with very high degree of resistance should be used singly or best in an integrated pest management system for the control of *S. zeamais* infestation in stored maize. Though increases in the physical properties of grain hardness, weight, length, and width increased varietal resistance, it was found that the bases of resistance were increased chemical attributes of phenolic acid, trypsin inhibitor and crude fibre while the bases of susceptibility were increased protein, starch, magnesium, calcium, sodium, phosphorus, manganese, iron, cobalt and zinc, the role of potassium requiring further investigation. Characters that conferred resistance on the test varieties were found distributed in the pericarp and the endosperm of the grains. Increases in grain phenolic acid, crude fibre, and trypsin inhibitor adversely and significantly affected the bionomics of the weevil on further assessment. The flat side of a maize grain at the point of penetration was significantly preferred by the weevil. Why the south area of the flattened side of a maize grain was significantly preferred by the weevil is clearly unknown, even though grain-face-type seemed to be a contributor in the study. The preference shown to the south area of the grain flat side has implications for seed viability. The study identified antibiosis, preference, antixenosis, and host evasion as the mechanisms of maize post harvest resistance to *Sitophilus zeamais* infestation.

Keywords : maize weevil, resistant, parameters, mechanisms, preference

Conference Title : ICE 2014 : International Conference on Entomology

Conference Location : Penang, Malaysia

Conference Dates : December 04-05, 2014