Tropentag, October 6-8, 2009, Hamburg

"Biophysical and Socio-economic Frame Conditions
for the Sustainable Management
of Natural Resources"

Development of a Species Distribution Model for Lepidopteran Stem Borers and Associated Parasitoids in Kenya

Klaus Mithöfer[1], George Otieno Ongamo[1], Bruno Leru[2,1]

[1]*International Center of Insect Physiology and Ecology (ICIPE), Environmental Health, Kenya*
[2]*Institut de Recherche pour le Dévelopment (IRD), France*

Abstract

Maize [*Zea mays* L.] and sorghum [*Sorghum bicolor* (L.) Moench] are among the most important cereal crops in Africa and any factor affecting their production is considered a threat to food security in the continent. In Kenya, these crops are grown mainly by small scale farmers under rain fed farming system. However, the produce rarely meets the mean annual demands and with the projected climate change, food deficit and associated implications may worsen as demand to feed the growing population rises.

There is therefore need to identify sustainable options that would enhance cereal production without compromising the quality of the environment of which reducing losses associated with field insect pests have been given serious consideration. Lepidopteran stem borers are the major field insect pests with yield losses estimated between 10 and 21 % in different climatic zones in Kenya. Integrated pest management (IPM) approach has used in different occasions as a measure to minimise pest associated losses. However, development of pest management strategies requires a profound understanding of the ecology of the target species and associated natural enemies.

Over the last two decades, icipe has made considerable contributions to improve understanding on ecology of the pest species and the role of wild habitats on their dynamics. In their studies, icipe scientists have examined the spatial distribution of indigenous and invasive stem borers and their parasitoids. New approaches based on environmental data, Geographic Information Systems (GIS) and ecological niche modelling offer new opportunities to study and explain the geographical distribution of species. They also allow the development of prediction models, an important tool to develop pest management strategies and research based on climate change scenarios. This is of foremost importance to evaluate the future spread of invasive species and their control through related parasitoids.

The study presents the development of species distribution model (niche model) for stem borer species and parasitoids based on bioclimatic envelopes. The results will be discussed regarding IPM development and its application for climate change based studies with focus on invasive stem borer species and their parasitoids.

Keywords: Climate change, GIS, species distribution model, stem borer

Contact Address: Klaus Mithöfer, International Center of Insect Physiology and Ecology (ICIPE), Environmental Health, P.O. Box 30772, 00100 Nairobi, Kenya, e-mail: kmithoefer@icipe.org