

# TEF *Epilachna*, *Chnootriba Similis*, Thunberg; (Coleopteran:Coccinellidae) Recently Discovered Insect Pest of Maize (*Zea Mays*) in Arusha Region, Northern Tanzania

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**Abstract-** Proper identification of a pest (being it an invasive or native in an area) is a cornerstone to sustainable pest management. Of recent (July to December 2015) we identified a phytophagous species of coccinellidae feeding on lower epidermis and the mesophyll cells in maize leaves, leaving the upper epidermis and the veins intact. In the survey, three maize fields of approximately an acre were selected based on the presence of the insect pest; in a cross-section pattern 100 plants were examined for the presence of the pest and signs of plant damages by the insect pest. Data on insects counts (larva, pupa and adult) were recorded right in the field, plant damages were scored as a percent of damaged against undamaged plants. 50 Adult were collected to TPRI- Insect collection reference centre for identification. Data on insect counts and damage scores were analyzed using Genstat software. The identification results showed that, the pest was Tef *Epilachna* or Tef Ladybird Beetle, *Chnootriba similis*, Thunberg; (Coleopteran:Coccinellidae), formally *Epilachna similis*, Thunberg; (Coleopteran:Coccinellidae). The mean percent plant damages in all the three fields were scored to field I = 37%, field II = 41% and field III = 34%. The highest mean insect counts obtained in every 100 plants were larva=512, pupa= 308 and adult= 702. This information therefore serves as a first record of the presence of the pest in the area against maize (*Zea mays*. L).

**Index Terms-** *Epilachna*, *chnootriba*, *similis*, maize

## I. INTRODUCTION

Tef *Epilachna* or Tef Ladybird Beetle, *Chnootriba similis*, Thunberg; (Coleopteran:Coccinellidae), formally *Epilachna similis*, Thunberg; (Coleopteran:Coccinellidae). Belong to the sub family *Epilachna* a small group of coccinellidae, the members of which are phytophagous. *Chnootriba similis* is known to attack Tef, Maize, Barley, Wheat, Grasses and Several other graminoseous plants in many African countries such as Ethiopia, Sudan, Ghana and South Africa (Beyene, 2006). Larvae and adults feed on the leaves, leaving one epidermis and the veins intact. This type of damage is called "windowing". Heavily attacked leaves are skeletonized and dry up (Beyene, 2007). During the process of feeding on the leaf tissue, it transmits one of the most economically damaging diseases of

rice in sub-Saharan Africa, the rice yellow mottle virus (RYMV), (Abo et al., 2001; Nwilene, 1999).

The eggs are pale yellow, elongate oval, about 0.5 mm long and have a hexagonal sculpturing. They are laid in clusters of 20-50 eggs usually on the underside of the leaves in a vertical position. Young larvae are pale yellow and covered with delicate spines. While feeding they make rows of small windows in the leaves. Mature larvae are dark yellow in colour. They are broad, with a dark head and strong branched spines. They are 6-7 mm long. The larval period takes about 16 days. The pupa is dark yellow. It is found on the leaves of the host plant. Adults are oval, hemispherical beetles of about 6-8 mm length. They are reddish to brownish yellow, but the color is very variable. The elytra are marked with black spots. These beetles are very good fliers. They look like typical Ladybird Beetles but *Epilachna* species are the only phytophagous representatives of this family. Other Ladybird Beetles are very beneficial insects because they are predators of aphids and other soft bodied insect pests. Often the adults of predatory Ladybirds are shiny, while *C. similis* has a rather dull appearance (Beyene, 2007).

## II. MATERIALS AND METHODS

### Study sites,

The investigation was carried out in Ngaramtoni area of Arumeru district, Arusha region- Northern Tanzania, The location was chosen based on the presence of the pest as reported by farming communities in the area Latitude: -3°-19'-49" , Longitude: 36° 36' 57" and Altitude 1438.83 Meters Above Sea Level).

### Sampling description.

Three maize fields of approximately an acre were selected based on the presence of the insect pest (**Plate 1**). In a cross-section pattern 100 plants were assessed for larva, pupa and adults and insect counts were recorded accordingly. Further to that plant damages were recorded as a percentage of damaged plants against the total number of plants assessed: % Plant damage = No. of damaged plants \*100/Total No. of plants assessed (**Plate 2**).

Ten samples of Larva, Pupa and adult specimens were handpicked using camel blush, put in vials and transferred to TPRI insect collection reference centre for identification (**plate 3**).



**Plate 1: Maize Leaf damage by *C. similis* in one of the farms in Ngaramtoni.**



**Plate 2: Leaf damage severity by *C. similis***

### Data analysis

Descriptive statistics were achieved using GEN-Stat software, 10<sup>th</sup> Edition (VSN International) where means of insect counts and percent plant damages were determined and presented accordingly.

### III. RESULTS AND DISCUSSION

From the samples obtained from the fields and with the aid of the bisecting microscope in TPRI insect collection reference centre and the expertise of Dr. Muniappan Rangaswan (Entomologist and the director of IPM Innovation Lab. Virginia tech) the insect species was identified as *Chnootriba similis*,

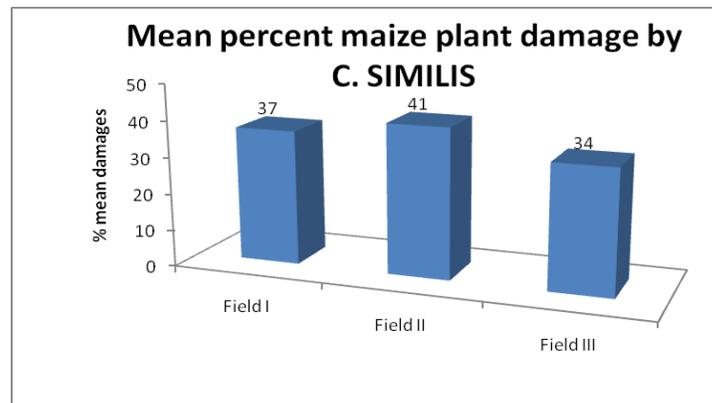
Thunberg; (Coleopteran:Coccinellidae), formally *Epilachna similis*, Thunberg; (Coleopteran:Coccinellidae). Sub family Epilachnae, Family Coccinellidae, order Coleoptera, Class Insecta, sub phylum Hexapoda, Phylum arthropoda and kingdom animalia.

The mean percent damage inflicted by *C. similis* were 37%, 41% and 34% for the three fields while the maximum percent damage was as higher as 41% in these fields (figure 1). Most of plants leaves were severely damage in the lower part (**plate 3**). It is evidence of how serious the pest is if left unchecked.



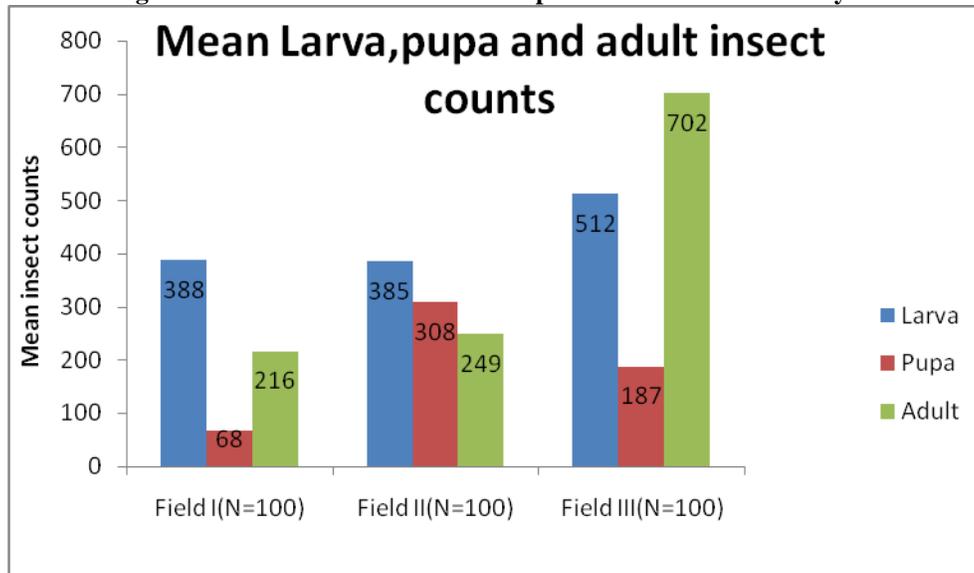
Plate 3: Lower leaf damage by *C. similis*

Figure 1: Mean percent plant damages in the three maize farms:



The highest means of insect counts obtained from 100 maize plants in the three fields surveyed were for (field I: larva 388, pupa 68 and adult 216, field II: larva 385, pupa 308 and adult 249, field III: larva 512, pupa 187 and adult 702) (**Figure 2**).

Figure 2: Mean Insect counts for 100 plants in three fields surveyed.



#### IV. CONCLUSION AND RECOMMENDATIONS

The presence of a species in an area which it has never been there before can bring some ecological and or economical consequences to the native organisms and their ecosystem. *Chnootriba similis* is unknown pest of maize in Tanzania, neither a minor nor a major pest. Its presence is very important to note for the foreseen outcomes. their damage in maize is detrimental to the country food security as maize is a staple food to Tanzanians population. In addition, the ability of *C. similis* to transmit important viral diseases such as yellow mottle virus in rice (*Oryza sativa*) exaggerate the importance of the pest in the country. Not to withstand this, *C. similis* has an appetite to other graminoseous plants such as Tef and other wild plants which are important livestock fodder. The information from this paper will bring to the attention of many scientists and agricultural stakeholders to note the presence of this phytophagous coccinellidae pest of maize in the country.

#### ACKNOWLEDGEMENTS

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#### REFERENCES

- [1] Abo, M.E., Alegbijo, M.D., Sy, A.A., Misari, S.M., 2001. An overview of the mode of transmission, host plants and methods of detection of rice yellow mottle virus. *J. Sustain. Agric.* 17, 19–36.
- [2] Beyene, Y., Hofsvang, T., Azerefege, F., 2007. Population dynamics of tef epilachna (*Chnootriba similis* Thunberg) (Coleoptera, Coccinellidae) in Ethiopia. *Crop Protection* 26 (2007) 1634–1643.
- [3] Beyene, Y., Hofsvang, T., Azerefege, F., Berg, T., 2006. Geographical distribution, abundance and host plants of tef epilachna (*Chnootriba similis* Thunberg, Coleoptera, Coccinellidae) in Ethiopia. *Int. J. Trop. Insect Sci.* 26, 183–189.
- [4] Nwilene, F.E., 1999. Current status and management of insect vectors of rice yellow mottle virus (RYMV) in Africa. *Insect Sci. Appl.* 19, 179–185.

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