

Survey on Status of Key Coffee Insect Pests in Major Coffee Growing Areas of Ethiopia

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ABSTRACT

Ethiopia is the source of several economically important cultivated crops around the world. Insect pests are among the number of factors considered to limit coffee production. Survey on major coffee insect pests; Antestia bug *Antestiopsis intricata* and blotch miner *Leucoptera coffeina* was carried out. From the survey result the maximum mean number of Antestia bug (0.92) was recorded at Mettu and the highest (35.11%) and lowest (1.99%) mean percent infestation of blotch leaf miner was recorded at Bebeke and Nedjo respectively. Currently the status of major coffee insect pests increased in damage level. This indicates that there may be due to current climatic factor that created existence of favorable environmental condition and cultural practice changed.

Keywords: Survey, *Antestiopsis intricata*, *Leucoptera coffeina*, Status.

INTRODUCTION

Ethiopia is the source of several economically important cultivated crops around the world. Among these crops, the most important gift of Ethiopia is coffee known as *Coffea arabica* L., which had and still has a tremendous economic, social and spiritual impact on many people of different geographical locations, cultural backgrounds and psychological behaviors (Arega, 2006 and Getachew, 2010). Coffee is by far the number one export crop and contributes decisively to the country's foreign currency income (Workafes and Kassu, 2000).

Insect pests are among the number of factors considered to limit coffee production both in quality and in quantity (Million and Bayissa, 1986). Over 47 species of insect pests are recorded on coffee (Million and Bayissa, 1986; Crowe and Tadesse, 1984.) .But there is no sufficient recent information about the distribution and status of major coffee insect pests in south western and western parts of the country. Survey of insect pests on coffee is important to determine the level of damage and facilitate effective control strategies. To ascertain the the status of key coffee insect pests infesting in major coffee growing regions ,field survey was conducted in major coffee growing

areas of south western and western Ethiopia with objective of study the status of major coffee insect pests in major coffee growing areas of Ethiopia (south western and western parts).

METHODOLOGY

Surveyed Sites

Survey was conducted in south western (Illubabor zone :-Gore ,Hurumu, Mettu and Yayo; Jimma zone:-Agaro, Beshasha , Dambigabana ,Gera, Haro, Limu Kosa and Melko, and Sheka zone:- Bonga, Gimbo ,Tepi and Yeki) and western part (Ayrira, Haru and Nedjo;Anfilo ,Homa, Manasibu , Mendi , Mugi and Sayo) of major coffee growing areas of Ethiopia for antestia intricata and GomaII and Bebeke estate farm was surveyed for blotch leaf miner.

Tree Sample Selecting and Insects Assessment

As a sample district three woreds from each zone three Kebeles from each weredas and five farmers from each kebeles and 30 trees/ farmer was selected for major coffee insect pests' survey study. Hand collection of Antestia per sampled trees were done to determine number of the insect per sampled trees and for coffee

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blotch leaf miner systematically sampled trees were selected in employing the zigzag sampling method and sample trees were stratified in to three-canopy layer and the total number of leaves on each sampled branches with Leaf minor damage was recorded. And incidence was computed from the cumulative number of damaged against the total number of leaves for each canopy layer.

RESULTS AND DISCUSSION

Survey was carried out to study the current status of major coffee insect pests (blotch leaf miner and Antestia bug) in south western and western parts of the country. From the surveyed areas maximum mean number of Antestia bug was recorded at Mettu (0.92) followed by Hurumu (0.85) as compared to other surveyed localities. While the lowest mean number of antestia was recorded at Gimbo (0.03) woredas. In western part the maximum mean number of antestia was recorded at Ayira (0.76) followed by Haru (0.26). The mean infestation of antestia bug at Anfilo ,Homa, Manasibu ,Mendi , Mugi and Sayo were 0.16, 0.02, 0.03, 0.02, 0.13 and 0.076 respectively .Which equivalent to below economic injury level and the maximum number of this pest recorded in those areas were three per tree. The highest mean infestation 0.92 ,0.85,0.76,0.75,0.65 and 0.56 of antsita bug per sampled trees were recorded at Mettu , Hurumu ,Ayira ,Dambigabana , Haro and Gore respectively ,which was almost more than economic injury level was recorded at those locations per single tree.

A coffee insect pest occurs in almost all assessed coffee fields under garden, and plantation coffee production systems in the surveyed areas. The percent infestation and damage caused varies among coffee fields, shade types and shade levels, management practices used and surveyed localities. The infestation of coffee insect (antestia and blotch leaf minor) was high in plantation as compared to small scale farmer's field.

From this survey result the status of coffee insect pests increased. In the year of 2015/16 seventeen (17) antestia nymphs and adults per tree were recorded in Jimma zone (at Mana). The *Antestiopsis* spp are major coffee pests with density of 1-2 bugs per tree considered as the economic threshold level that requires insecticide spraying so as to avoid economical crop loss (Coffee Research Foundation, 1989).

However, in 2017 forty (40) antestia adults per tree were recorded in Jimma zone (Goma II) in intensive coffee production system at flowering stage. Badly infesting coffee flowers and coffee branches and recorded above economic threshold level. Mekasha (1993) reported that branches of coffee trees infested with four pairs of the bug caused the highest number of damaged Coffee flower bud (1.2), 54.1% of berry fall, 90.2% of bean damage, and the lowest yield (0.41kg/tree) of red cherry (Esayas *et al.*, 2008). Based up on this survey result twenty pair of antestia bug highly infested the coffee flower and bud at Goma II. This may be climatic factor and cultural practices used have contribution for this insect pest's abundance.



Figure1. Maximum severity of antestia bug recorded per this trees.

A crop loss of 15-27% in total bean weight has been associated with infestation of 2-4 Antestia bugs per tree (Wanjala, 1979).In major coffee growing areas of Ethiopia the severity of antestia highly damaged different coffee parts

with varies infestation level and recorded above economic thresh hold level.

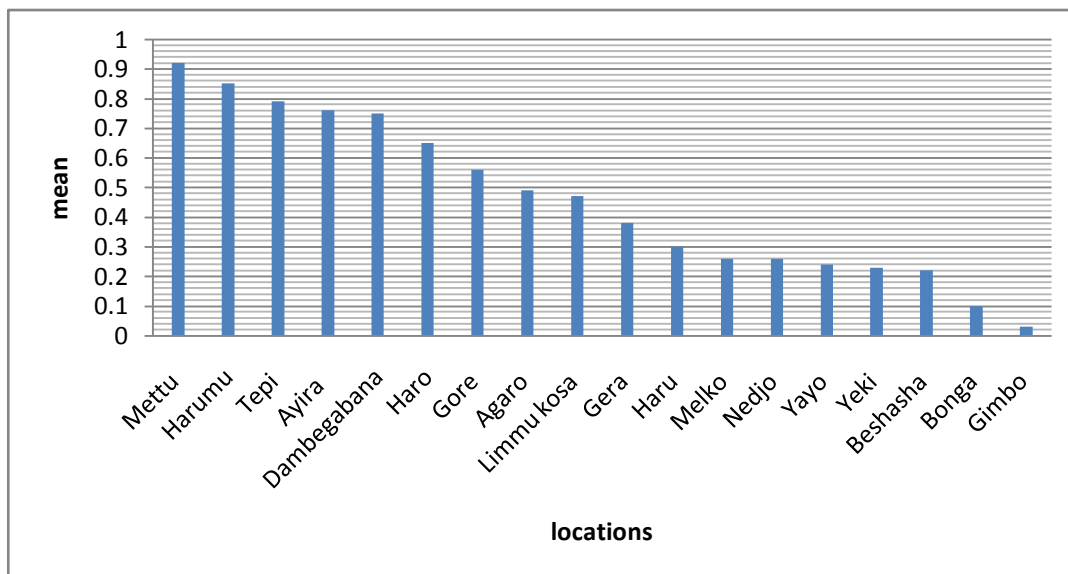


Figure2. Infestation level of antestia bug at different surveyed localities.

Similarly, for *Leucoptera coffeana* survey was carried out at different locations including intensive coffee production system (Goma II, and Bebeke). From the survey result the average infestation of coffee blotch leaf miner at Bebeke, Goma II, Agaro, Haru, Haro, Melko and Tepi 22.50%-35.7% and at Ayira, Yayo, Gera and at Mettu 11.40% -18.28% whereas at Gore, Gera, Chora, Beshasha and Nedjo the average infestation of 1.99%-6.94%. The higher mean percent infestation was recorded at Bebeke estate farm which ranged from 2.25%-86.26% with average infestation of 35.11% in different coffee genotypes and agronomic practices.

The mean percent of blotch leaf miner at Agaro was ranged from 18.78-55.56% with average

infestation of 28.3%. This survey result was correlated with finding conducted at Agaro blotch leaf miner percentage leaf damage ranged from 2.2-55 with average infestation of 13% (IAR, 1984; 1986). From this survey result the status of coffee insect pest (blotch leaf miner) increased and becoming the most common coffee pest in intensive production system. The highest mean percent infestation level (>20%) of blotch was recorded at Bebeke, Gomma II estate farm and Haro, Agaro, Tepi, Malko and Haru areas (Fig 3). The infestation of *Leucoptera coffeina* was highly recorded in plantation coffee production system as compared to other surveyed areas.

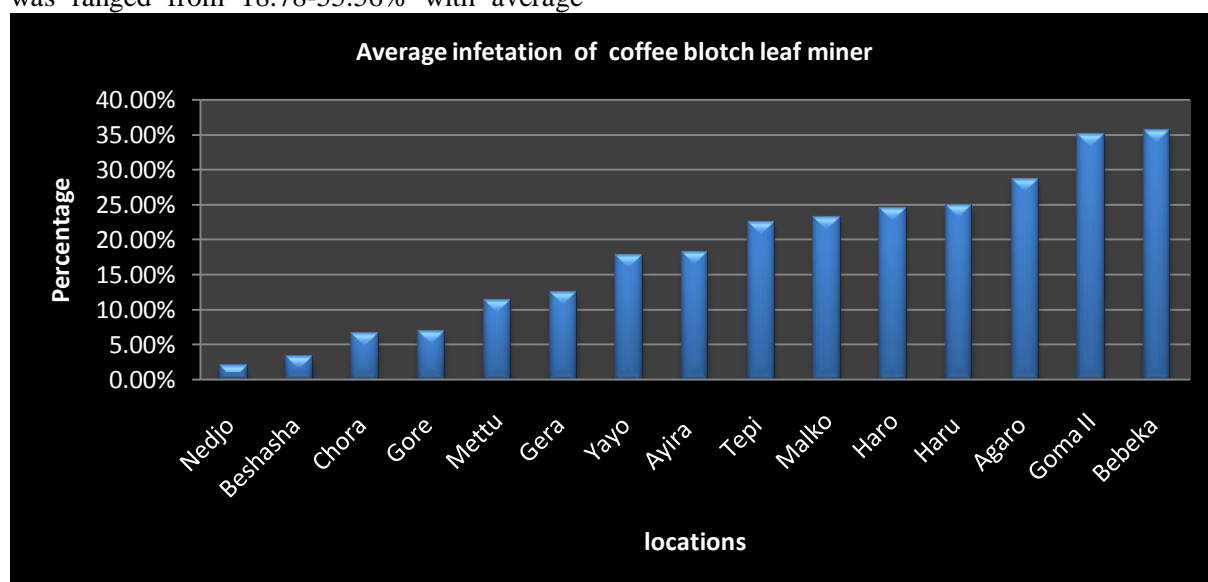


Figure3. Mean infestation of blotch miner.

Currently Coffee blotch leaf miner, occurrence and attack trained changed in extensive coffee

producing areas for long period of time, and also highly observed on different coffee growing

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altitudes with varied infestation ranges. This indicates that there may be due to current climatic change. Coffee blotch leaf miner is also one of the major leaf defoliating insect at nursery sites, even the infestation of this pest highly damaged the coffee leaves in green house condition with maximum percent infestation (96.4%) ranged between 2.25-96.4% per coffee seedling average infestation of 52.10% coffee seedling in green house (fig.4a). Coffee thrips,

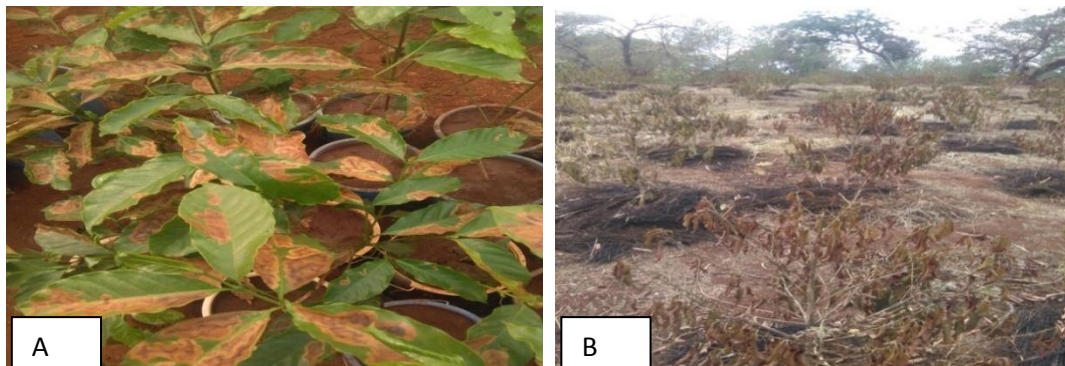


Figure4. A=blotch leaf miner infestation, B= coffee thrips outbreaks.

Other coffee insect pests also observed during survey time which are considered as miner pests but may become major pests of coffee and from miner coffee insect pests coffee leaf skeletonizer 2.7%-31.76 % in different locations and coffee stem borer >13% (in western Ethiopia) was recorded during survey time. Besides; termite, biting ant, coffee berry borer and coffee leaf skeletonizer also become challenging coffee pests in different coffee growing areas with varied infestation level and which need strong attention.

CONCLUSION AND RECOMMENDATION

In Ethiopia currently the status of major coffee insect pests increased in damaged infestation with varied damage level .In addition to major coffee pests the status of other miner and potentially important coffee insect pests also become increased in some surveyed localities. Future emphasis should be given due concern for the development of appropriate management method for control of those important coffee insect pests.

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Diarthrothrips coffeae also become a challenging pest of coffee damaged coffee farms badly in different coffee growing areas of the Ethiopia .In some coffee growing areas the infestation of coffee thrips was above economic injury level (4-28) thrips per leaf and 0.04%-100% damaged coffee field was observed as outbreak (fig 4b). However damage proportion was different among different coffee varieties, management methods and shade levels.

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