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Status of Major Coffee Insect Pests in Major Coffee Growing Areas of Eastern Ethiopia

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Introduction

- Hararghe is located in eastern Ethiopia, where known for production of best quality Ethiopian coffee.
- Hararghe coffee is a sundried coffee usually grown near dwellings at an altitude range from 1600-2100m.
- The Hararghe coffee zone usually receives far less total RF than all other coffee areas (800–1200 mm).
- Thus, in the area, farmers usually complain an increase in the frequency and severity of droughts and gradual low reduction in rainfall over several decades

Introduction ... Cont'd

- Coffee plants show climate-related stress through the increased occurrence, and intensity of pest attacks.
- Thus, the yield and quality of coffee are significantly reduced by biotic factors (diseases, insects, weeds etc.) and abiotic factors (temperature, drought & RF pattern).
- The major coffee pests to occur in Ethiopia are antestia bug, coffee berry & stem borer, leaf minor & scale insects.
- Globally, an estimated crop loss by insect pests is about 13%, but it can be higher up to 96% in Africa.

Introduction ... Cont'd

- The antestia bug is a major coffee pest feed on all vegetative and fruiting parts of the coffee tree leading to yield reduction and poor quality of coffee beans (Ahmed *et al.*, 2016).
- The density of antestia bug ranged from 2-4 bugs per tree can causes a crop loss of 15-27% in total bean weight (Mugo et al., 2013).
- The problem of these pests is higher in the more intensively managed coffee farming systems like home gardens coffee of Hararghe.

Introduction ... Cont'd

- Hararghe coffee is prone to several insect pests among others antestia bug, blotch leaf miner and green scale are the three major insect pests in the areas
- Antesia bug (*C. alpinus* De Lotto) species is a potentially important pests commonly found in many parts of Hararghe coffee growing areas causing the death of bearing branches (Million, 2000).
- Green scale is a common and serious problem in coffee which suck the plant resulting in reduced growth and yield and requires constant attention particularly in dry areas like Hararghe.

Introduction ... Cont'd

- Blotch Leaf Miner (BLM) feeds on the palisade parenchyma cells of the leaves (Ramiro *et al.*, 2004)
- Hence, farmers sometimes might be grateful to consider uses of chemical pesticides (Tadesse, 2015).
- Therefore; as an essential prerequisite in the effective management of major coffee insect pests, there was a need to ascertain the current infestation of those pests.
- Hence, the survey the survey was conducted for the objective to identify major coffee insect pest distribution, infestation and severity in major coffee growing areas of eastern Ethiopia.

Materials and Methods

- Four major coffee producing districts from west (D/Labu, Habro & Boke) and east (Beden) Hararghe zones based on their coffee production potential were selected.
- Each district was classified based on coffee growing agroecology into highland, lowland and midland.
- From each agro-ecology 4 farmers farms were sampled at an interval of 3-5 km.
- The pest assessment was done using developed methods of insect data collection procedures.

Methods of insect pest assessment

- From each sampled farm 50 trees were diagonally assessed for the presence or absence of Antestia bug, green scale and blotch leaf miners (BLM).
- The infestation in percentage was computed as total infected tree to the total assessed tree.
- Severity of BLM & green scale: a sample of 10 trees with relatively uniform age was selected and each tree was classified into top, middle & bottom branch strata.
- A pair of branch per stratum was selected and pest damaged & healthy berries/leaves were counted and the infected percentage was computed.

Antestia bug (AnB) severity assessment

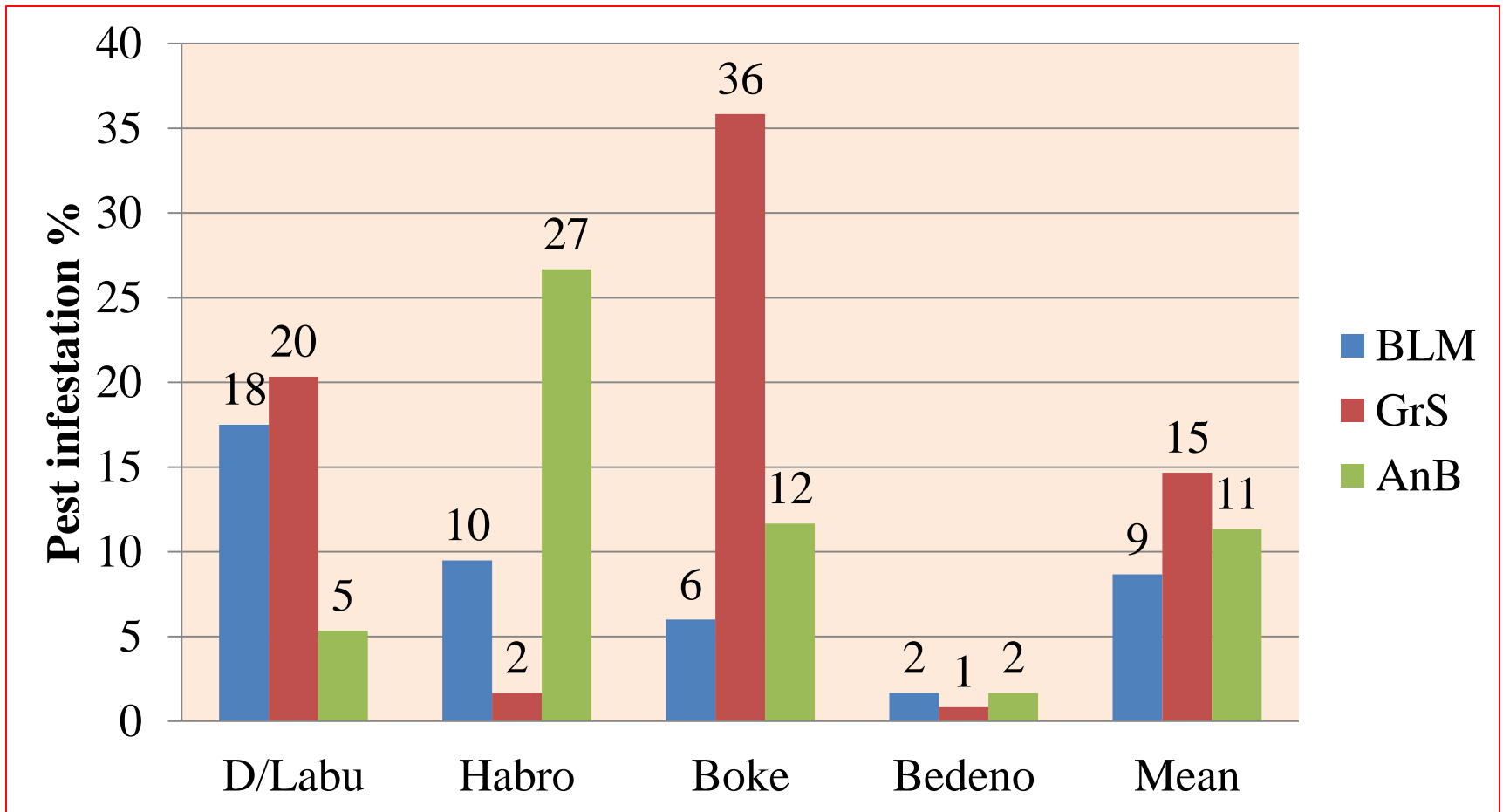
- For antestia bug 10 trees were randomly selected with in sampled farm, each sampled trees with muslin cloth underneath.
- A few minutes later the trees were shaken and number of Antestia (AnB) was counted.
- Alternatively, hand collection of antestia per sample trees was done to determine number of the insect per tree.

Results and Discussion

Status of insect pest infestation

- The infestation of antestia bug was highly observed in all lowland areas of all districts where up to 15 Antestia bugs per tree with a range from 0-100% were recorded (Figure 1).
- This indicates that, highly severe infestation for coffee in the areas than before which required attention.
- Similarly, the infestation of green scale insect (15%) and blotch leaf miner (9%) were identified as the major pests of coffee which are becoming a big threat for coffee production in the areas (Figure 1).

Figure 1. The infestation status of major insect pests in major coffee growing districts of Hararghe zones



Results and Discussion ... Cont'd

Status of insect pest Severity

- The severity of all insect pests were significantly varied between the districts.
- The highest (19.5%) green scale severity was recorded in Boke followed by Daro Labu and lowest in Bedeno with overall mean of 7.2% in range 0-91% (Table 1).
- However the highest severity infection of BLM and antestia bug was observed in Habro followed by Boke with over location mean of 0.81% and 1.04%, respectively (Table 1).

Table 1. Mean severity of insect pests under different Hararghe coffee growing districts

District	Severity of Insect pests (%)		
	BLM	GrS	AnB
D/Labu	0.59	9.26	0.78
Habro	0.85	0.02	2.22
Boke	1.20	19.48	1.17
Bedeno	0.59	0.00	0.00
Mean	0.81	7.18	1.04
Range	0-4	0-91	0-12

Key: BLM = blotch leaf miner; Grs = green scale; AnB = Antestia bug

Results and Discussion ... Cont'd

Status of insect pests infection across different agro-ecologies

Table 2. Mean incidence and severity of insect pests under different coffee growing agro-ecologies of Hararghe zones

Agro-ecology	Infestation (%)			Severity (%)		
	BLM	GrS	AnB	BLM	GrS	AnB
Highland	6.00	4.38	1.25	0.81	0.91	0.00
Midland	7.13	33.13	0.63	0.4	19.2	0.13
Lowland	12.88	6.50	32.13	1.21	1.44	3.00
Mean	8.67	14.67	11.33	0.81	7.18	1.04
Range	0-70	0-100	0-100	0-4	0-91	0-12
Std. Dev.	13.31	29.13	26.75	1.11	20.05	2.65

Key: BLM = blotch leaf miner; Grs = green scale; AnB = Antestia bug

Results and Discussion ... Cont'd

Shade tree *vs* Occurrence of insect pests

- In all locations the infestation and severity of all pests were higher under un-shaded coffee farms except at Habro where both high infestation (24%) and severity (4%) of BLM was recorded under shaded farm.
- The infestation distribution was significantly different across location and types of pest where the mean highest GrS (36%) and AnB (29%) at Boke and Habro, respectively under un-shaded farm (Table 3).

Table 4. Mean incidence and severity of insect pest under different coffee farm shade status and districts

District	Shade type	Infestation (%)			Severity (%)		
		BLM	GrS	AnB	BLM	GrS	AnB
D/Labu	Shaded	7.2	8.0	0.0	0.7	3.0	0.0
	Un-shaded	20.9	29.1	9.1	0.5	13.8	1.3
Habro	Shaded	24.0	0.0	0.0	4.1	0.0	0.0
	Un-shaded	8.6	1.8	29.1	0.8	0.0	2.4
Boke	Shaded	na	na	na	na	na	na
	Un-shaded	6.0	35.8	11.7	1.2	19.5	1.2
Bedenno	Shaded	2.5	1.3	0.0	0.9	0.0	0.0
	Un-shaded	0.0	0.0	5.0	0.0	0.0	0.0
Mean	Shaded	11.2	3.1	0.0	1.9	1.0	0.0
	Un-shaded	8.8	16.7	13.7	0.6	8.3	1.2

BLM=blotch leaf miner; GrS=Green scale; AnB=Antestia bug; na=not available

Results and Discussion ... Cont'd

Effect of agronomic practice on status of insect pests

- Different agronomic practice in coffee growing area was differ within the types of agronomic practices as well as insect types.
- The result indicates except infestation of BLM all other insect pests were less in slashing practice and high in intercropping practice in whci highest GrS and AnB were recorded (Table 4).

Table 4. Effect of agronomic practices on the infestation and severity of insect pests

Agronomic practices	Infestation (%)			Severity (%)		
	BLM	GrS	AnB	BLM	GrS	AnB
Slashing	13.33	3.33	3.33	2.04	0.00	0.00
Cultivation	6.73	15.18	4.91	0.41	7.16	0.67
Intercropping	8.45	18.61	15.16	1.09	9.88	1.37
Mean	8.67	14.67	11.33	1.18	5.68	1.04

BLM=blotch leaf miner; GrS=Green scale; AnB=Antestia bug

Conclusion and Recommendations

- The finding confirmed that currently they antestia bug, leaf miner & green scale were critical problems which is increasingly a big threat for the production coffee in Hararghe areas.
- Their infestation and severity varied among and within the districts depending on environmental conditions and management practices applied.
- The use of shade has direct relationship with reducing infestation and severity of the insect pests.
- Agronomic practices like cultivation and slashing can be options in cultural control of the insect pests.

Conclusion and Recommendation ... Cont'd

- A field experiment that leads to the development of integrated pest management strategy should be designed to confirm the results of this findings.
- Research should be strengthened in coffee insect pest protection through location specific insect pests resistant/tolerant cultivars developing as long-term solution.
- The research should also be focus on the integration of pest management options that are environmentally friendly and economically effective.



THANK YOU



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