Peak Journal of Food Science and Technology Vol.1 (1):1-5, February, 2013
www.peakjournals.org/sub-journals-PJFST.html

Full Length Research Paper

Effect of varying population and feeding preferences of *Helopeltis schuotedeni* Reuter (*Hemiptera: Meridae*) on parts of tea shoot (*Camellia sinensis* Kuntze*)* in Kenya

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Accepted 8 Febuary, 2013

Tea (*Camellia sinensis* Kuntze) is a very important cash crop in Kenya. Several insect pests, however, have been recorded on tea affecting production and prominent among which is the tea mosquito, *Helopeltis schoutedeni* Reuter. The tea mosquito bug is assumed to damage the pluck able shoots and can cause up to 60% crop loss by denying the farmer any plucking shoots. This study was conducted to determine the effect of varying population on puncture numbers and the most preferred part of the tea shoot by the tea mosquito bug (*Helopeltis schuotedeni* Reuter) in a greenhouse at Tea Research Foundation of Kenya. Five population levels of pests were used as treatments and replicated three times in a completely random design. Data on the punctures were collected on different parts of the leaves. The result showed that punctures made by the insects increased significantly (p=0.01) with the increase in the insect population. Punctures made by one to three tea mosquito bugs were significantly less than punctures made by four and five pests on shoots. There was also a significantly (p<0.01) lower number of punctures on internodes made by three pests than those made by five pests but there was no significant difference of punctures on different internodes. There were significant (p<0.01) effect to puncture distribution on the shoot. Feeding preference was concentrated on first and second leaves of the shoot than the other parts. This study showed that the bug prefers the pluckable parts of the bush and that the threshold population that would cause significant damage to tea shoot are three bugs and above.

Key words: *Helopeltis schoudoteni*, tea mosquito bug, feeding preference, threshold population, Kenya.

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INTRODUCTION

The tea Mosquito bug (*Helopeltis schuotedeni* Reuter) is a sap sucking hemiptera bug belonging to the family of *Meridae*. The hosts of the pest are cotton, cocoa, castor, cashew mango, avocado, paper, guavas, sweet potato, and tea. It is a sporadic pest of cotton especially in Africa and affected fields may be severely damaged with adjacent fields almost untouched (Hill, 1975). The *Helopeltis* species very destructive to tea (*Camelia sinensis*) are; *H. theivora* in South East Asia (Richard and Davies, 1977); *H. schuotedeni* in Malawi (Ratan, 1987) and now it is becoming a serious pest in Kenya (Anon, 2006).

The mosquito bug has been reported (Otieno et al., 2002) to be a serious pest on tea bushes as it damages the pluckable shoots causing farmers to lose directly accruing through inability to pluck the tea for manufacture (Rao and Murthy, 1976; Mkwaila, 1981; Ratan, 1987; Otieno et al., 2002). The mosquito bug is a common

Plate 1. Adult Mosquito bug(*Helopeltis schuotedeni* Reuter).

problem in parts of Momul Tea Factory catchments in Kericho district, Kapkoros Tea Factory catchment in Bomet district and Kiamakoma Factory catchment in Kisii District of Kenya (TRFK, 2009).

Tea varieties PMC series are the only ones so far reported to be susceptible to the bug attack in Kenya (Otieno et al., 2002). Eggs of the bug are white, elongated and laterally compressed, and have respiratory filaments on their anterior ends. They are laid either singly or in groups into the plant tissue. They hatch in about 1- 1 ½ weeks (CABI, 2004). Nymphs look similar to the adults but they are wingless, orange-brown, and with black and spindly legs. They undergo 5 developmental changes for about 3 weeks (CABI, 2004). Adults are dark-brown in color with a red thorax, white and black abdomen, brownish-yellow legs, and brown wings (Plate 1). They are very active early in the morning or later in the afternoon. The females can lay up to 50 eggs per lifespan. Life span could last for several weeks (CABI, 2004; Dwomoh et al., 2008). All stages of the mosquito bug except the egg are capable of damaging shoots and leaves of tea. They feed on the young, green plants by piercing the tissue with their proboscis and sucking sap. Feeding on the sap results in leaves showing symptoms of irregular spots of 1 to 3 mm in diameter. Initially, the lesions are pale green but gradually become darker brown (Plate 2). Many feeding spots on the leaves result in leaf curling, blackened, wrinkled and finally drying and die-back of leaves may result. Severe damage may be caused on young stems, which become cankered later on (Hill, 1975; Muraleedharan, 1998). Several studies have been conducted on the economics of this bug on tea(Rao and Murty, 1976; Mauraleedharan et al., 1997). However, no study has ever been undertaken to determine the effect of varying population on puncture numbers for use in scouting and the feeding preference on tea shoot and there by necessitating the present study of determining threshold population.

MATERIALS AND METHODS

The study was undertaken within the months of May, June and July, 2006 in a greenhouse at Tea Research Foundation of Kenya, Kericho which has an altitude of 2178 m above sea level and co-ordinates 0°22'S 35°21'E. The experiment was laid in a complete randomized design replicated three times. The experiment was laid out in a complete random design pests population being the treatments. Five population levels (1, 2, 3, 4 and 5) of the pest were used. The pests were collected from affected fields at Momul Kenya Tea Development Agency (KTDA) Tea Factory catchments and caged in a controlled condition and exposed to shoots of the tea plant to feed on. Feeding punctures distributed on mature shoots were observed and scoring per bud, first, second and third leaf and also on first and second internodes population level were assessed to find the preferred portion of the shoot and population number limit. Data was analyzed using MSTAT-C Statistical package for analysis of variance with shoots parts as the first variable and pest population as the second variable.

RESULTS

The number of punctures on the shoot was significantly depended on the number of insects that fed on it. The trend showed that punctures made by the insects increased significantly ($p=0.01$) with the increase in the insect population (Figure 1). Punctures made by one to three tea mosquito bugs were significantly less than

Plate 2. Dark brown feeding spots as a result of the Mosquito bug feeding on the Leaves.

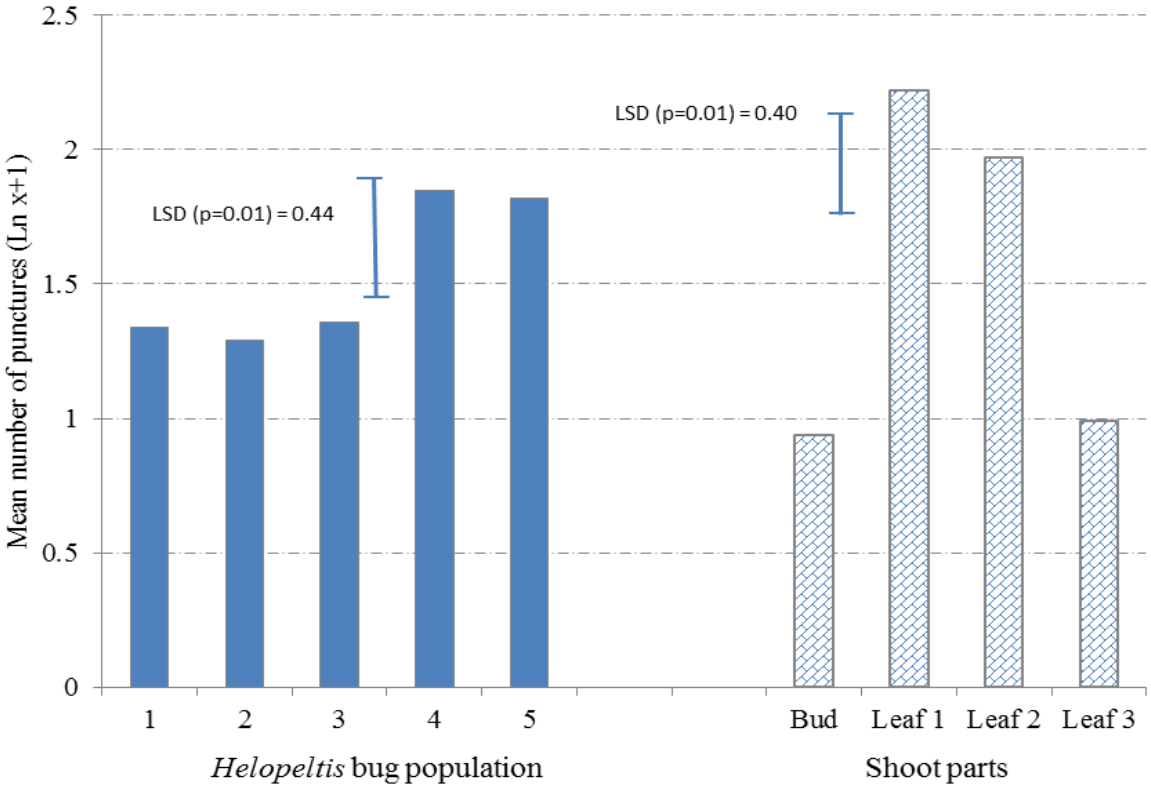

Figure 1. Mean number of punctures on different parts of the shoot with varying population levels of *H. schuotedeni*.

punctures made by four and five pests on shoots. Population of the pest did not have a significant

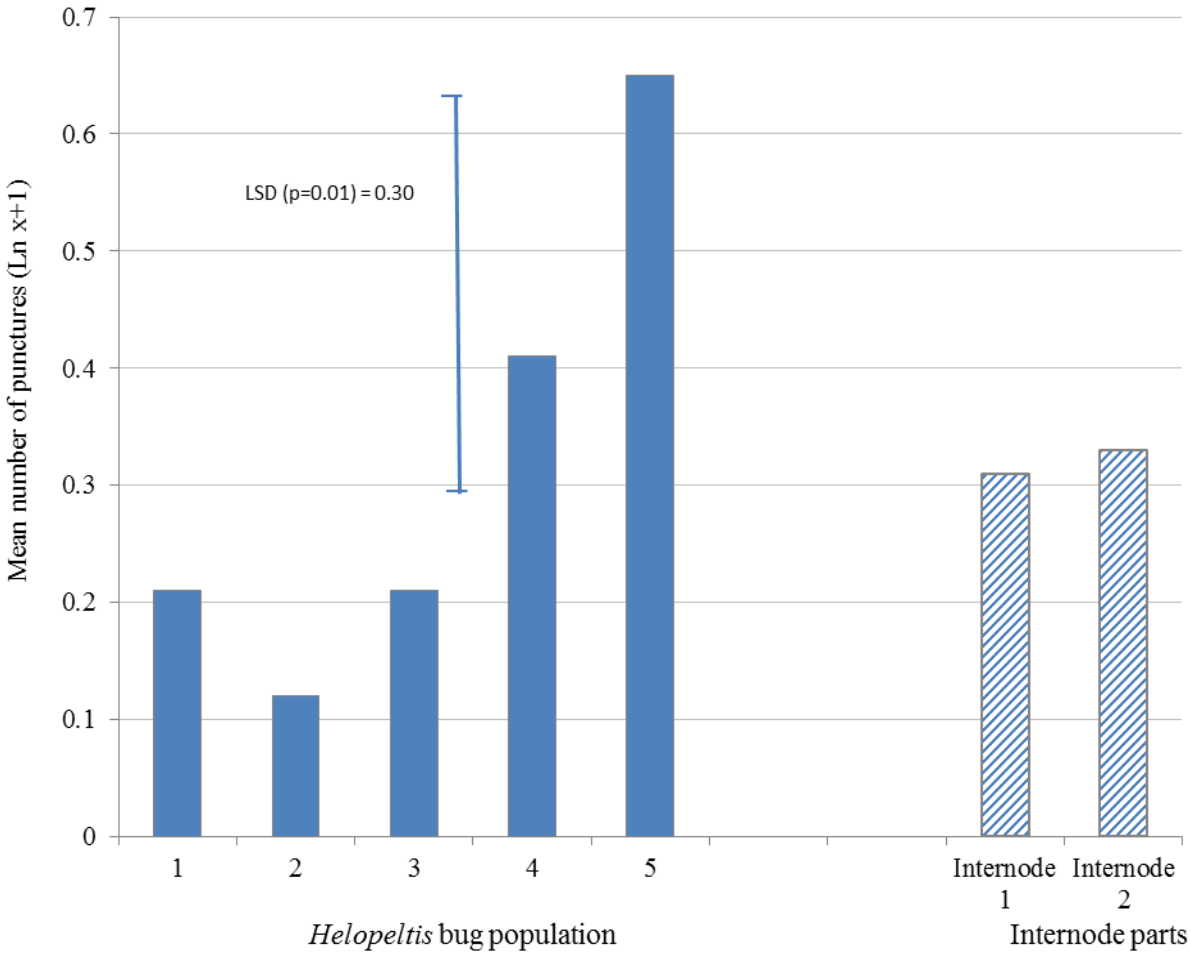

Figure 2. Mean number of punctures on the internodes of the tea shoot with varying population levels of *H. schuotedeni*.

difference on the number of punctures they made on leaf one and two but varied significantly from those made on the bud and the third leaf (Figure 1). The results also indicated that the first and the second leaf were the most preferred parts of the shoot.

Other parts of the shoot; the internodes, were also attacked by the pest. The number of punctures varied significantly with population increase of the pest. The number of punctures made by one to four pests were significantly less than punctures made by more than five pests but no significant preference were observed on internodes (Figure 2).

DISCUSSION AND CONCLUSION

The results showed that the most preferred portion of the shoot was the first and second leaf while the bud and third leaf was least preferred. This can be attributed to the fact that accumulation of the rich nutrients at the first and second leaves is high compared to other parts of the shoot and the leaf tissue here also are soft and tender (Mauraleedharam, 1998). The bud may also seem less preferred since it has a small surface area which can be exhausted by a few punctures. As regards to population levels, the number of the feeding spots on the shoot parts with those made by one to three pests differed significantly from those made by four and five pests. It was confirmed that the mosquito bug prefers the pluckable parts of the bush, and leaf punctures can be used to monitor/scout infestation in tea and associated threshold level. This imply that the threshold population that would cause significant damage on tea shoot are three bugs and above. The results confirmed the recommendation of short plucking interval (TRFK, 2004), so as to deny the bug the most preferred shoots, thus minimizing the bug damage and associated crop loss. The study on the feeding spot distribution on the first two internodes of the shoot portrays that the stem of the tea plant is least preferred by the pest even though the pest population showed a significant influence on the puncture distribution between less than four *Helopeltis* bugs compared to five bugs. The punctures on other parts of the shoot cannot be used to monitor or scout the

infestation and determination of threshold level.

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