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Survey of The Abundance of 'Offa' The Groundnut Sucking Bug (*Rhyparochromus Littoralis* Dist) An Emerging Field Insect Pest of Groundnut in Adamawa Central Senatorial District, Adamawa State Nigeria

*Samaila, A. E., Malgwi, A. M. and Oaya, C. S.
Department of Crop Protection, Modibbo Adama University of Technology, Yola,
P. M. B. 2076, Yola Adamawa State – Nigeria
*Corresponding Authors Email: akewetaes@gmail.com

Abstract
An intensive survey to determine the abundance of the groundnut sucking bug locally referred to as 'offa' an emerging post harvest field insect pest of groundnut was carried out in groundnut growing areas in the Adamawa Central Senatorial District of Adamawa State in the North Eastern region of Nigeria during the 2009, 2010 and 2011 cropping seasons. Agronomic and socio-economic details of approximately 100 farms were collected simultaneously. The insect survey concentrated on the sucking bug as well as other insects that pose threat for groundnut production in the study area. The Groundnut Sucking bug 'offa' (*R. littoralis*) was the predominant taxon and considerably cause reductions in crop yield. Pod borers (elaterids, tenebrionoids, doryline ants and millipedes) were generally present but rarely at sufficient densities to warrant concern. *Hilda patruelis* was encountered in high densities in areas where the crops had been sown early. Foliage feeders were apparently of no economic importance except where insecticides had been applied. The survey indicated that groundnut crops are devasted by the groundnut sucking bug at harvest, especially when it is left too long on the field which could result to 100% loss in yield (zero harvest).
Key Words:- Emerging, abundance, sucking bug, density, insecticide, insect pest, post harvest

Introduction

Groundnut (*Arachis hypogea* L.) is one of the most widely cultivated legume crop in Adamawa Central Senatorial District comprising of seven (7) Local Government Areas, namely; Fufore, Girei, Gombi, Hong, Song, Yola North and Yola South. Because of its adaptation to climatic conditions and its ability to grow relatively well on poor soils (Samaila and Malgwi, 2012a; Adebayo, 1996; Gascho and Davis, 1995; Kaleem, 1993). Groundnut is a major source of protein in human diets and haulms are important components of livestock feed. Edible oil is also extracted from groundnut seed and is used for local consumption. Groundnut is effective in rotation with corn and other cereals due to biological nitrogen fixation by groundnut (Wood and Ambridge, 1996; Gascho and Davis, 1995 and Kaleem, 1993).

Groundnut production in the savanna ecology is of great potential in the West African region. However, *R. littoralis* infestation is a major constraint to optimum production especially during harvest, which requires considerable investigation in order to minimise negative impact on pod yield and quality (Samaila and Malgwi, 2012a; Malgwi and Onu, 2004). Yield loss due to invasion by the groundnut sucking bug (*R. littoralis)* in the Yola area is estimated to be 50 to 80% (Samaila and Malgwi, 2012a). In the field, the females lay their eggs on the haulms of groundnut and also on the soil (Samaila and Malgwi, 2012b). All growth stages of this insect cause dmage to pods and kernels (Samaila and Malgwi, 2012a; ICRISAT, 2008; Malgwi and Onu, 2004). Although groundnut is susceptible to many insect pests, that of the groundnut sucking bug is more devastating.

The most damaging post-harvest insect pests of groundnut include the groundnut brunchid (*Caryedon serratus* Olivier) almond moth (*Ephestia cautella*), Indian meal moth (*Plodia interpunctella),* khapra beetle (*Togoderma granarium* Everts), *Elasmolomus sordidus* (Fabricius) in Africa and Asia (Dick, 1987), and *Rhyparochromus littoralis* (Malgwi, *et al.,* 2013). *R. littoralis* commonly known as Lygaeid bug, is a pod sucking bug that, belongs

to the order Heteroptera and family Lygaeidae which occurs in all groundnut growing areas in India (ICRISAT, 2008). The bug is popularly known in the Northern part of Nigeria as *'shamai'* by the Hausa speaking people while the Yungur speaking people of Adamawa State refer to it as *'offa'*.

There is paucity of details on the history of *R. littoralis* but they were found in large chambers, under harvested groundnuts left to dry before picking (decorting) on the field. Such groundnuts, when left after harvesting for a week turns out to have small, shrunken seeds, the testa often turning yellow (Samaila and Malgwi, 2012a). Despite importance of groundnut to the economy of Nigeria, current information on the pest management constraints is limited especially on the groundnut sucking bug. In order to formulate and transfer effective and sustainable insect pest management strategies in groundnut, documentation of the distribution of the groundnut sucking bug and its characteristics are needed. The objectives of this study were to:-

1. Document the distribution and density of the groundnut sucking bug in groundnut cropping systems.
2. Assess farmers response to the new pest of groundnut in the study area in terms of pest management strategies.

Materials and Methods

Prior to sampling each field, a short survey questionnaire was administered to farmers to document information on method of land preparation, groundnut cultivar, date of planting, timing and harvesting method/practices. Cropping systems implemented were also documented. The survey was conducted in 100 farmer fields during 2009, 2010 and 2011 cropping seasons between the months of late September and November by randomly evaluating four (4) $1m^{-2}$ quadrants per field in the study area. Groundnut haulm production and pod yield were recorded based on the $1m^{-2}$ quadrants. Average insect pest occurrence in farms were calculated using the summed dominance ration (SDR) approach (Dangol, 1991).

$$SDR\% = \frac{1\sum F}{\sum\sum F + \sum\sum D} \times 100 \qquad (1)$$

Where:

F = Frequency of Occurrence of the insect pest within a field
D = Density of occurrence within a field

Results

Characteristics of Groundnut Cropping Systems

The surface soil texture of the survey area generally consisted of silt loam (38%). Sandy loam (58%) and silty clay loam (4%). Thirty (30) per cent of farmers prepared land with tractor, while 35% used livestock to plough fields and 35% used traditional hoeing to prepare land for planting. Seventeen (17%) of farmers planted groundnut in May, while 53% planted in June and 30% planted in early July. Planting coincided with the stability of rainfall and temperatures suitable or optimum germination and seedling establishment.

Forty-two (42) percent of farmers weeded only once, which is less than recommended to optimize groundnut yield. Thirty-seven (37) percent of the farmers weeded their fields twice at 4 and 8 Weeks after Harvest (WAS), while only 2% weeded three times. Herbicides were applied by 19% of farmers in the study area. Generally, cereals such as maize or sorghum preceded groundnut, but groundnut following groundnut was also practiced. Few farmers planted groundnut cultivars with bunch or erect morphological characteristics, primarily most farmers planted locally-derived cultivars known as "gargajiya". Intercropping groundnut with cereals was common but mono-cropping of groundnut for several years prior to rotation with cereals was also practiced. Although pod yield was the primary criteria for cultivar selection, cultivars were selected by farmers based on their suppressive ability against weeds; the runner morphology of the improved cultivar 'zebra' was preferred on these farms.

Groundnut sucking bug 'Offa' (*R. littoralis*) species associated with groundnut fields have become a serious insect pest of groundnut especially at harvest time with highly diversified in species composition and density in Adamawa Central Senatorial District of Adamawa State in Nigeria. Generally, these species are known to cause great post harvest field damage to harvested groundnuts Samaila and Malgwi, 2012; Malgwi and Onu, 2004).

Average insect pest occurrence is at least 5% SDR for the three (3) years. Good insect pest management is associated with higher groundnut pod yield than those with higher insect pest infestation with *R. littoralis*. Due to

their rapid proliferation, just within a few days after uprooting the groundnut in the field to dry (Samaila and Malgwi, 2012). *R. littoralis*, have been identified by the farmers as very difficult to manage while some refer to it as mysterious insect because it only surfaces during groundnut harvest time late September to Late November and disappears according to many farmers.

Other insects found in groundnut fields in Adamawa Central

The groundnut sucking bug 'Offa' (*R. littoralis)* occurs in all groundnut producing areas in Adamawa Central, the bug is dark brown. The bug feeds on the pods left in the field to dry by perforating the pod with their rostrum. This causes the seeds to shrivel and increases the free fatty acid content of the oil while producing a rancid flavour (Malgwi, *et al.,* 2013).

Groundnut pod production in farmer fields exhibited significant variation among locations in each of the three (3) years. Generally, pod production was highest in Fufore, Hong and the Northern part of Yola South Local Government Areas, which gave the highest yield in 2009 due likely to better production environment as a result of low incidence or prevalence of the sucking bug and perhaps by the harvesting practice of the farmers, which could be attributed to their farm size.

Pod borers (elaterids, tenebrionids, doryline ants and millipedes) were generally present but rarely at sufficient densities to warrant concern. *Hilda patruelis* was encountered in high densities in areas where the crop was sown early. Blister beetles (*Mylabris* spp and *Coryna* spp (Coleoptera: meloidae), several blister beetles feed on groundnut and other crops in the fields. In spite of different types of field insect pests, their damage is little threat compared to that which is caused by the *R. littoralis.*

Conclusion

High density of approximately 10 insect/uprooted groundnut resulted in a yield loss of 32 to 45%. The dominance of the insect pest in these areas confers serious threat to quality and healthy pods at harvest. However, prolonged period of leaving un picked groundnut on the field most likely was responsible for the high level of incidence of the insect pest and infestation on the pod, in which case the insect causes the kernel to shrivel and increases the free fatty acid content of the oil, producing a rancid flavour and the pods becomes very light (Samaila and Malgwi, 2012; Malgwi and Onu, 2004). Groundnut cultivars with high haulm production also could offer some measure of increasing the prevalence rate of the insect pest in the field, because the groundnut haulm appears to be the best breeding spot for the insect pest. Furthermore, additional research should include greater capacity building of farmers and Agricultural Extension agents in integration of proven and alternative insect pest management tactics including the use of insecticides which will reduce the infestation of the insect in the field during harvesting of groundnut in Adamawa Central Senatorial District in Adamawa State, North-eastern Nigeria.

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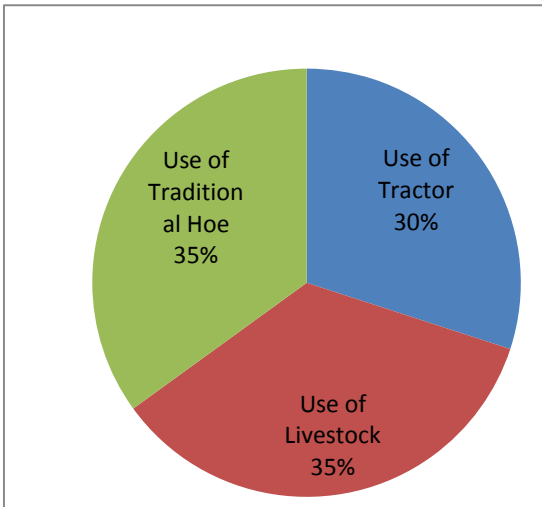

Figure 1: Land Preparation

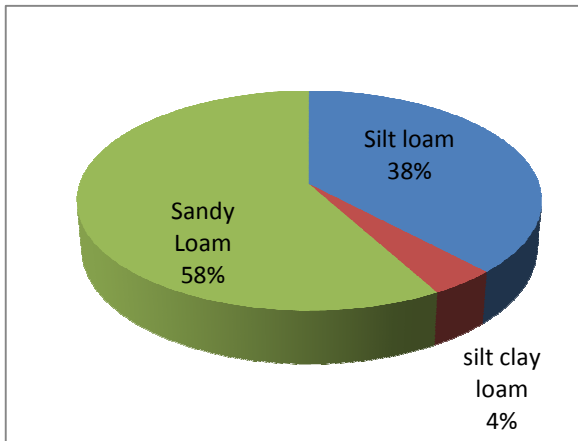

Figure 2: Soil Type Characteristics

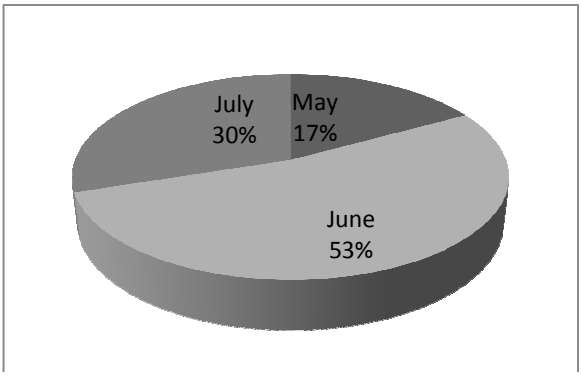

Figure 3: Farmers Planting Date

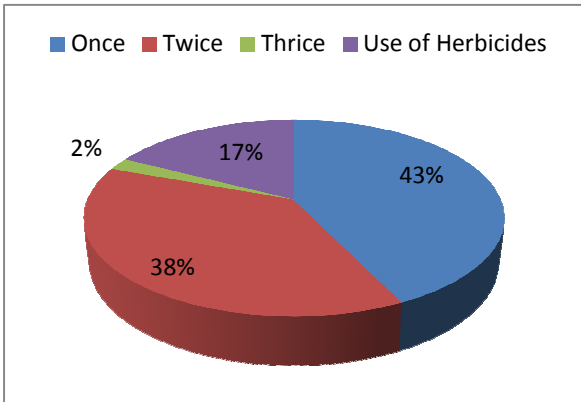

Figure 4: Respondents Weed Management Practices

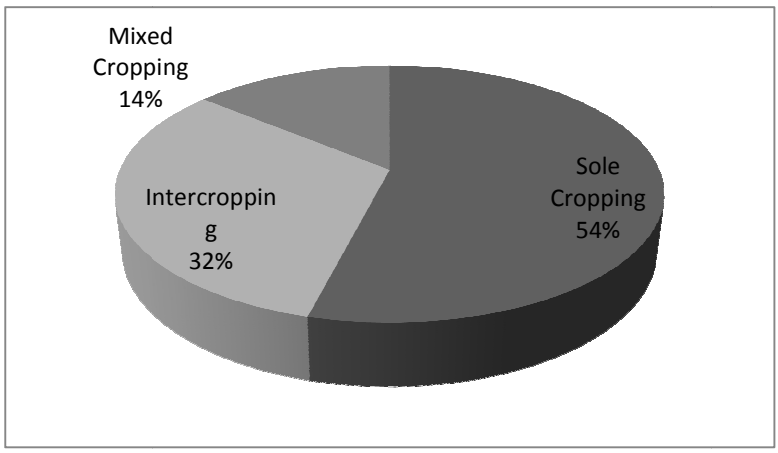

Figure 5: Cropping System practiced by Farmers

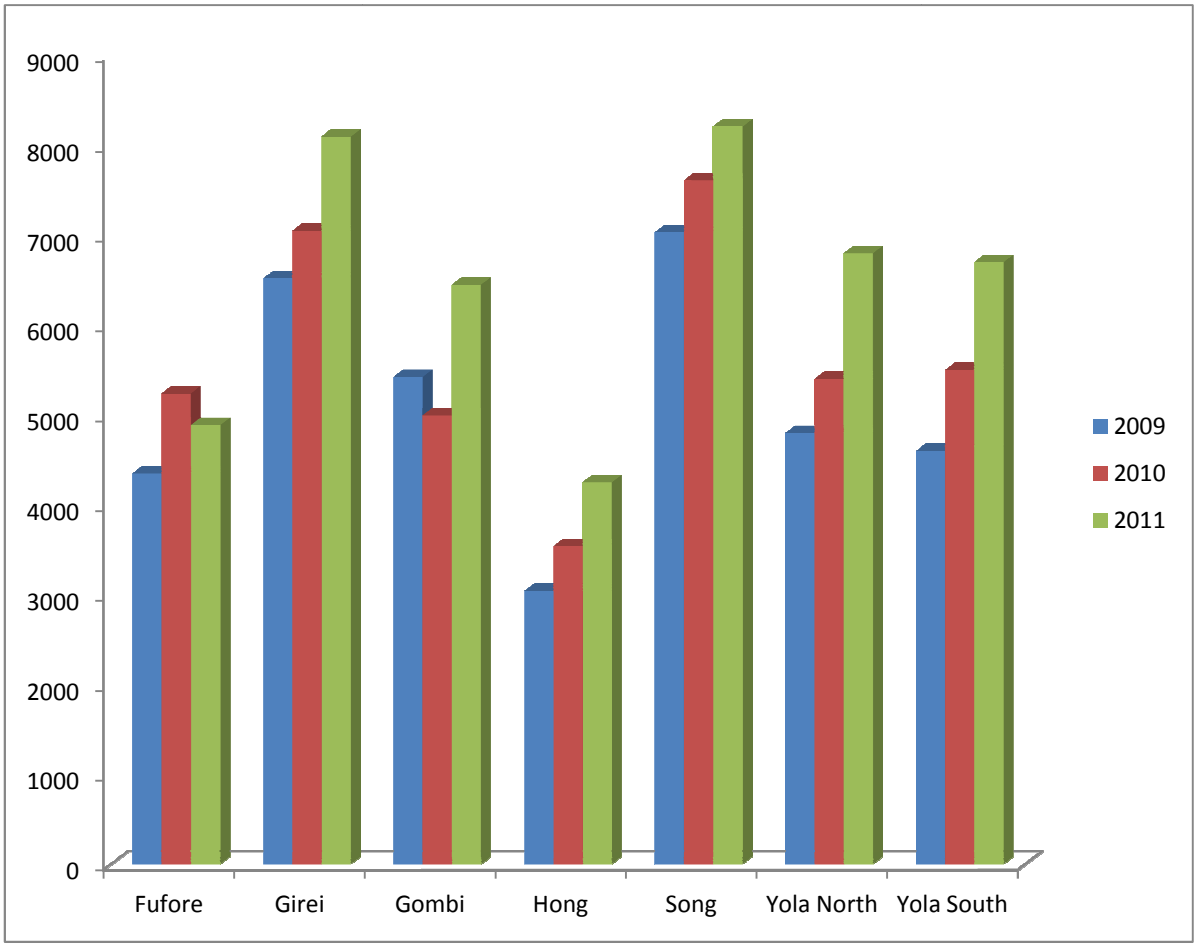

Figure 6: Mean Average Population of the Groundnut Sucking Bugs found in the Study area