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SHORT COMMUNICATION

Insect Pests of Cowpea and Groundnut in Girei Local Government Area, Adamawa State, Nigeria.

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INTRODUCTION

Girei Local Government Area is one of the 21 Local Government Areas in Adamawa State; Adamawa State is located in the Northeastern part of Nigeria (9° 11'N, 11° 14' E) (Adebayo, 1999). The State also covers a land area of about 38,741 km with a population of 2,102,053 people (National Population Commission, 1991). Cowpea, *Vigna unguiculata* (L.) Walp (Leguminosae) groundnut *Arachis hypogea* L Papilionidae and bambara groundnut are important leguminous crops widely cultivated in Adamawa State as cash crops, as well as for local consumption.

Cowpea is widely cultivated in the tropics and sub-tropics, particularly Africa (Sellchop, 1962). It is a major staple crop containing protein (23 – 38%), carbohydrate (60 – 66%), fibre (3.4%), ash (3.7%) and oil (1.1 – 3%) (Bressani, 1985). It is a major source of fodder for livestock, green manure as well as a cover crop. Of the total world production of 10,500,000t in 1974, about 80% came from Nigeria alone (Kochhar, 1986). The leaves and young pulses are eaten as vegetable, the dried seeds are used for making coffee beans, eaten cooked with rice, yam, potatoes etc. and prepared in various local forms as *kosai*, *moimoi* and in various other local forms.

Yield loss in cowpea due to insects in Nigerian farms was estimated to be above 80% according to Oparaeke, *et al* (2000) and yield has continued to decline especially on unsprayed farms with insecticides thereby causing serious economic loss to farmers (Dike, 1998). The major field insect pests of cowpea found in Nigeria include *Aphis craccivora* Koch., *Megalurothrips sjostedi* Trybom, *Maruca vitrata, Clavigralla tomentosicollis Stal.*,

Mylabris spp., *Leptoglossus australis* (F.) and *Ootheca mutabilis* Salhib. While the minor pests include *Empoasca dolichi* Paoli, *Piezotrachelus varium* Wagner, *Euchrysops malathena* Biosduval, *Aegrocera rectilear* Biosduval, *Zonocerus variegatus* Fab., *Asparvia armigera* Fab., *Nezara viridula* Linn., *Callosobruchus* spp. and *Microtermes* spp. (Booker, 1965; Taylor, 1995; Anon, 1996; Degri and Hadi, 2000; Okoronkwo, 2000 and Oparaeke *et al.*, 2000).

Groundnuts is one of the world's major oil legume presently cultivated in over 80 countries from Latitude 40°N and 40°S in tropical and warm temperature regions of the world (Rao and Murthy, 1994). Nigeria produces up to 600,000 tons annually (Kochhar, 1986) and between 1981 and 1990 Africa cultivated 30% of world's average groundnut acreage, contributed 21% of total production and her yield per unit area was 70% average world value (Egwurube and Onu, 2000). The crop, which traditionally constituted an important component of Nigeria's export, has shown a decline from 18% in 1968 to virtually no exports in 1975 (Anonymous 1979). Groundnut is important in Nigerian diets, as it is a rich source of protein (25%) and oil (40 – 45%). The seeds are eaten raw, roasted or boiled or made into groundnut flour, cooked in soups and milked for porridge. The oil is used in cooking and in the manufacture of margarines and cosmetics. The haulms of groundnut plants are important as livestock feed (Riba, 1975; Egwurube and Onu, 2000).

Several insect pests are known to attack groundnuts. Misari *et al* (1980) pointed out that the Nigerian groundnut farmer experiences up to 40% damage to his crops annually caused by up to 10 field insect pests of groundnuts. They include, *Aphis craccivora* Koch, *Empoasca* spp., *Microtermes* spp., *Megalurothrips sjostedti* Trybom, *Frankliniella schultzei* Trybom, a millipede *Peridontopyne* spp., and several other grasshoppers (Taylor, 1971; Anonymous, 1996; Egwurube and Onu, 2000).

Adamawa State has a lot of potential for production of leguminous crops, which has been on the increase recently. There is hardly any farm in Adamawa State that cowpea or groundnut are not found as sole or in mixture with cereals (Olorunju, personal communication). This makes it one of the largest groundnut producers in Nigeria and yet a record of this has not been properly documented. Records of insect pests on cowpea and groundnut have not also been properly documented.

This paper discusses the insect pests of cowpea and groundnuts found in one of the Local Government Area in Adamawa State. The study has considered the pest status, pest stage, host plants and the type of damage caused by some of the important insect pests.

MATERIALS AND METHODS

This research was carried out in Girei Local Government Area of Adamawa State, Nigeria, in 2000 and 2001 cropping seasons. Twenty farms were surveyed in Vinikilang, Bajabure, Sabon-gari, Sangere, Federal University of Technology research and personal farms, Girei, Dekeri, Batare, and Jabi Lamba.

About 10 plants per farm were sampled at random from seedling stage, vegetative stage, flowering stage, pod production stage and at harvest of cowpea and groundnuts. Materials used for sampling insects included sweep nets for flying insects, aspirators for tiny insects, forceps and hand for slow moving insects, polythene bags, specimen tubes, rearing jars, alcohol were used to transfer the insects and preserve them for identification. Immature stages like the larvae were reared to adult stage before identification. The insects collected were identified at Institute for Agricultural Research (I.A.R.) Samaru Insect Museum. The pest status was determined and ranked on a scale of 1 – 3, where 1 = little or not important; 2 = causes little and occasional damage and 3 = common and causes serious damage (Adamu *et al.*, 2000).

RESULTS AND DISCUSSION

There were 49 insects found on both cowpea and groundnuts in Girei Local Government Area. Not all the 49 species were pests; some were predators, while the status of some could not be determined. Most of the insects found agreed with the earlier findings of Booker (1965), Taylor (1971), Okoronkwo (2000), and Adamu *et al* (2000). Insects attack virtually every part of cowpea and groundnut, right from seedling stage to maturity, which agrees with Raheja (1976) and Apeji (1988). The results are presented in Table 1. The pest stage, pest status, host plant, parts of plants found and the type of damage they caused are all tabulated.

a) Seedling, Soil-Insects and Root Pests

The most important insect pests that fall within these groups are termites (*Odontotermes* spp. *Microtermes* spp. and *Macrotermes* spp.). Both nymphs and adults attack cowpea and groundnuts at seedling stage by cutting the roots and stems. The termites, particularly around the University, caused very serious damage at seedling and at maturity stages particularly on groundnuts. They attacked the groundnut pegs and pods by cutting the pegs and scrapping the pods or groundnut shells. After eating the seeds, they fill in the pods with sand or create entry points for other pests such as millipedes, snails and mould fungus. The population of termites around Sangere is very alarming. You could

hardly harvest groundnut and other crops and leave it for a night without severe termite attack. Any short drought spell before the seedlings get established, there was usually severe damage due to termites. Egwurube and Onu (2000) made similar observations in Samaru, Zaria in North central Nigeria. Similarly, crickets (*Gryllotalpa* spp. and *Brachytrupes* spp.), the maize beetle, *Heteronychus licas* and ants, *Messor* spp. caused similar damage to cowpea and groundnuts but the damage caused was more serious by the later (Table 1). Serious damage is noticed when groundnuts and cowpea over stay on farm after maturity or after harvesting.

(b) Foliar, Flower and Stem-Feeders

Some insects fall within this group, which cause little or no serious damage such as the foliar beetles – *Syagrus calcaratus, Aulacophora africana, Nisotra dilecta, Lema* sp and *Aspidomarpha* spp. While *Ootheca mutabilis* and *O. bifrons* cause occasional and o serious damage to cowpea most especially. Grasshoppers caused little and occasiona damage. The most important foliar feeders were *Aphis craccivora* and *Bemisia tabac* which suck sap on all parts of cowpea and groundnuts, which agrees with Misari *et a* (1980), Anonymous (1986) and Okoronkwo (2000). Their feeding further compounded th damage they caused by curling the leaves. They also transmit viral infections, which ma lead to complete defoliation or wilting of plants when the attack or when infestation i early. Their damage also affected the flowers and pods of cowpea, by sucking sap an when it occurs early it leads to drying of pods pre-maturely and eventual shedding. Whe infestation is severe it often leads to 100 percent yield loss. The other group of flower an pollen feeders includes *Coryna* spp., *Mylabris* spp and *Psalydolytta flavicornis* (Table 1 They attack mostly cowpea severely which often leads to aborted flowers and reduction i yield. Thrips were found on groundnuts, but their population is of little or no importance i Girei Local Government Area. Another important stem-feeder is *Pseudoprotaet burmeisteri* adults on twigs of groundnuts, which results to decaying of the portion affecte The decaying could probably be due to some chemicals exuded by the beetles. Th particular beetle have not been documented as a serious pest of groundnut elsewhere, but has been identified as an insect found in Nigeria at I.A.R. insect museum.

(c) Early/Late Maturity and Post-harvest Feeders

Aphis craccivora, are among the insect pests that caused a lot of damage on cowp pods and stems, which could also lead to total yield loss when infestation is very severe on unsprayed cowpea. The foliage of susceptible groundnut varieties is also attacked. Mo of the hemipterous bugs (*Clavigralla* spp., *Anoplocnemis curvipes, Homoeocerus palle Riptortus dentipes* and *Mirperus jaculus* were found attacking cowpea and groundnuts, b

Table 1: Insect Pests of Cowpea and Groundnut in Girei Local Government, Adamawa State.

Common Name	Scientific Name (Order/Family)	Pest Stage	Pest Status	Host Plant	Part of Plant found and damage
Termites	*Odontotermes* spp., *Microtermes* spp.,and *Macrotermes* spp. (Isoptera :Termitidae)	Nymphs & adults	2/3	Cowpea, groundnut and other cereal, legumes etc.	Cut down seedling below soil surface including stems, eat foliage and pick untreated planted seeds.
Mole crickets	*Gryllotalpa africana* (Orthoptera:Gryllotalpidae)	Nymphs & adults	2	Same as above.	Same as above.
Common crickets	*Bracchytrupes membranaceus* (Orthoptera: Gryllidae)	Nymphs & adults	2	Same as above.	Same as above.
Black Maize beetle	*Heteronychus licas* (Coleoptera: Scarabaeidae)	Larvae & adults	1	Same as above.	Same as above, but does not feed on seeds.
Harvester ants	*Messor* spp (Hymenoptera: Formicidae)	Adults	2	Same as above.	Same as above, but in addition at harvest they pack harvested grains to their shelter and even untreated seeds that were planted.
Variegated grasshoppers	*Zonocerus variegatus* (F.) Orthoptera:Pyrgomorphidae	Nymphs & adults	2	Same as above but are more	They are foliar feeders. They

Other grasshoppers	*Chrotogonus senegalensis* (Krauss) *Pyrgomorpha vignaudi* (Guer) Orthoptera:Pyrgomorphidae		2	serious pests of rice	feed on seedlings and cut holes in leaves thereby reducing the active area of photosynthesis. Yield could be drastically reduced in the year of outbreaks
Krauss grasshopper	*Kraussaria anguilifera* (Fab.) [Orthoptera : Acrididae]	Nymphs & adults	2	Groundnut, cowpea and cereals	*K. anguilifera* are serious in cowpea the other hosts. They feed on foliage and yield can be drastically reduced in year of outbreak. the acrididae are feeders.
Senegalese locust	*Oedaleus senegalensis* [Orthoptera: Acrididae]	Nymphs & adults	2	Same as above	Same as above
African common grasshopper	*Catantops axillaries* (Thunb.) [Orthoptera: Acrididae]	Nymphs & adults	2	Same as above	Same as above
Short-horn grasshopper	*Gastrimargus africanus* (Sauss) [Orthoptera: Acrididae]	Nymphs & adults	2	Same as above	Same as above
African army worm	*Spodoptera exampta* *S. littoralis* (Lepidoptera: Noctuidae)	Larvae "	2	groundnut, all cereals and green vegetation	Attack all seedling stage of groundnut, cereals. They are sporadic especially in years erratic rainfall can cause a complete loss of seedlings. In Adamawa state, for the past seasons, *S. exampta* have always

					around with erratic outbreaks
Aphids	*Aphis craccivora* Koch. (Homoptera: Aphididae)	Nymphs & adults	3	Groundnut & cowpea	They suck sap from the adaxial (under surface) of leaves. Excessive feeding leads to pre-mature leaf and flower fall. In cowpea, they also feed on green pods and twigs. They are known vectors of cowpea mottle mosaic virus and groundnut rosette virus. Aphids secrete honeydew, which sticks and binds foliage, flowers, and pods, which encourage mould growth (Anon., 1996).
White-flies	*Bemisia tabaci* (Germ) (Homoptera:Aleyroididae)	Nymphs & adults	3	Cowpea, groundnut and vegetable crops.	Same as aphids but are mosaic virus transmitters of all vegetable crops & vectors of cowpea mottle virus and cowpea golden mosaic virus (Anon., 1996).
Leaf-eating beetles	*Ootheca mutabilis* *O. bifrons* (Labois) *Syagrus calcaratus* (F.) *Aulacophora africana*Weise *Nisotra dilecta* (Dalm) *Lema cephalotes* (Lac.) *Aspidomarpha cincta* (Fab.) (Coleoptera:Chrysomelidae)	Adults " " " " " "	2 2/3 1 1 1 1 1	Cowpea, G/nut, and a few of cereals and vegetable crops.	Cut holes in leaves, particularly *Ootheca* spp. Larvae feed on root of cowpea, and are vectors of cowpea mosaic and mottle virus (Anon., 1996). All others cause less damage to groundnuts and cowpea.

Leaf-hoppers	*Empoasca* spp (Homoptera : Cicadellidae)	Nymphs & adults	2	Cowpea, G/nut, & cotton.	Suck sap from foliage and transmitters of virus diseases (Anon., 1996).
Flower & pollen beetles	*Coryna apicornis* *C. chevrolati* (Blair) *Mylabris* spp. *Psalydolytta flavicornis* (Coleoptera: Meloidae)	Adult " " "	2 2 2 2	Cowpea, G/nuts & cereal crops	Feed on flowers and pollen grains. Flowers abort and drop off thereby preventing pod or seed formation.
Thrips	*Megalurothrips sjostedti*, *Frankiniella* spp. (Thysanoptera: Thripidae)	Adult & nymphs	2	Cowpea, G/nuts & cereal crops more serious on groundnuts	Same as above
Pod feeders Legume pod borer	*Maruca vitrata* (Lepidoptera: Pyralidae)	Larvae	3	Serious pest of cowpea, but also attack groundnuts, rice etc.	Larvae bore into young pods and feed on its content. They also feed on flowers of cowpea and groundnuts. Anon. (1996) reported that it could cause as much as 60% yield loss in cowpea.
Spiny brown bug	*Clavigralla shadabi* (Dolling) *C.tomentosicollis* (Heteroptera: Coreidae	Nymphs & adult "	3 3	Serious pest of cowpea	They suck pods and causes dimpling of coats, pod abscission, abortion, wrinkling of seed coat, and
Giant pod bug	*Anoplocnemis curvipes* (Fabr.) *Homoeocerus pallens* (Fab.) (Heteroptera: Coreidae)	" "	3 1	Cowpea, G/nut, cotton.	deformation through pre-mature drying or shriveling. Also opens entry to fungal infection.

Lady bird beetles	*Cheilomenes sulphurea* (Oliv.) *C. vicina* (Muls.) (Coleoptera:Coccinellidae)	Adult "	P& 1 "	Cowpea, sorghum, cotton.	They were observed feeding on foliage but are known as predators (Hills, 1983 and Bwala, 1986).
Soil-insect pests (beetles)	*Diplognatha gagates* (Frost.) *Rhabdotis sobrina* (G.P) (Coleoptera: Scarabaeidae)	Larvae & Adult	1	Roots of most plants	Found around the roots of all cultivated crops. Feeders on all grasses and cut parts of the roots and cultivated plants stem (polyphagous)
Wasp	*Liris diabolica* (Sm) (Hymenoptera: Sphecidae)	Adult	P (?)	Cowpea, groundnut and cotton	Flowers and anthers. Not exactly sure of its significance but could be a pollinator.
Cowpea Bruchid	*Callosobruchus maculatus* (Fab.) (Coleoptera: Bruchidae)	Larvae		Cowpea	Very serious pests of cowpea from field to store, feeding on the seeds contents, it could give up to 100% loss in stored produce.
Groundnut Bruchid	*Caryedon serratus* (Coleoptera: Bruchidae)	"	3	Groundnut	Very serious pest of groundnuts and feeds on the seed contents and punctures hole on groundnut pods thereby opening entry to secondary pest which causes decay and total yield loss could occur in stores. It is a serious pest in Song LGA around Dumne (Edan, 2000).

Key 1 = **Little or no importance**
2 = **Cause little and occasional damage**
3 = **Common and causes serious damage**
P = **Predator.**

the damage was more severe on cowpea than on groundnuts. They suck sap on pods and cause dimpling of coats, pod abscission, abortion and wrinkling of seed coats on cowpea. which agrees with Anonymous (1996) (Table 1). *Maruca vitrata* also attacked unsprayed cowpea pods and was less on groundnuts. They also feed on flowers and developing pods of cowpea. One of the most notorious post-harvest field pests of groundnuts is *Rhyparochromus littoralis*. Both nymphs and adults cause serious damage on harvested groundnuts before drying in Girei Local Government Area. The detailed life history of this pest is not known, but they were found in large chambers, in large numbers under harvested groundnuts. Such groundnuts, when left after harvesting for a week, turns out to have small, shrunken seeds, the testa often turning yellow. The seeds usually taste bitter. No detailed research on the oil content and nutritive value has been carried out. However, from the physical appearance of seeds, the nutrient and oil content most have been affected. The seeds were found smaller and lighter in weight. *R. littoralis* is a serious threat to groundnut production in Adamawa State and farmers are looking up to researchers to come up with a permanent solution on personal interview with farmers. *Caryedon serratus* are storage insect pests of groundnuts. In an experiment conducted in the laboratory, if groundnuts is infested and allowed to be stored for six months, 100% of the groundnut will be destroyed (Edan, 2000). Late insect pests of cowpea include, *Piezotraphelus pullus* and *Callosobruchus maculates* whose larvae feed on soft seeds in the pods. *C. maculatus* is a field to storage pest, where they continue their damage when storage conditions are favourable. It was observed that up to 100% yield loss could be obtained within 6 months. This also confirmed the early research by Booker (1965), Raheja (1976) and Lale (2002).

A lot of research has been conducted on these pests and their control; these include Misari *et al* (1980); Dike (1998); Degri and Hadi (2000); Egwurube and Onu (2000); Egwurube and Dike (2000); Oparaeke *et al* (2000) which have built on the earlier findings of Booker (1965) and Taylor (1971). However, most of them need to be evaluated elsewhere. Adamawa State, Nigeria needs to be considered for this study since its one of the largest area that produces groundnut and cowpea.

However, it is important to know that, the insect pests that cause serious damage on cowpea and on or groundnuts include termites, *Aphis craccivora*, *Bemisia tabaci*, *Ootheca mutabilis*, *Clavigralla* spp., *A. curvipes*, *M. vitrata*, *R. littoralis* and *C. serratus* (on groundnuts only), and *C. maculatus* (on cowpea only). Those that cause little and occasional damage include, crickets, *Messor* sp., grasshoppers, *Spodoptera* spp., *O. varicornis*, *Coryna* spp., *Mylabris* spp., thrips, *P. burmeisteri*, and *Piezotraphelus pullus*. Those **that are of little importance as pests include, *Cheilomenes* spp even though known as predators, *M. jaculus*, *H. pallens*, and other *chrysomelids* as stated in Table 1.**

Notwithstanding, more research needs to be carried out on those that are common and cause little or no damage to these important leguminous crops. This research has also contributed to the list of insect pests of groundnut, which are notably R. littoralis, and much work has to be done in this area. *C. serratus* has to be re-addressed in Adamawa State, and *P. burmeisteri* could be an important pest of groundnut, which has not been earlier addressed.

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