

OBSERVATIONS OF THE INSECT COMPLEX OF COWPEA (*VIGNA UNGUICULATA* (WALP) IN ABRAKA, A NON-COWPEA GROWING AREA, SOUTHERN NIGERIA.

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ABSTRACT

The Sudan Savannah, the drier northern Nigeria is the major belt for the cultivation of cowpea (*Vigna unguiculata* (L) Walp. The West and East of southern Nigeria, however, began its cultivation recently. The crop constitutes a main food for many Nigerians and because of this, the crop performance and all factors which are constraints to its production are being studied. Cowpea was cultivated in Abraka, a non-major cowpea cultivation region, during the early and late planting seasons of 2005 to study the insect pests spectrum (insect complex) which decimate the crop. Their relative abundance were also determined. The results indicated that in the early season, there were 8 insect orders; 25 families and 37 species. Coleoptera had the highest species 11, with relative abundance of 29.6%. Others were heteroptera, 8 species (21.6%), diptera, 5 species (13.5%), homoptera, 4 species (10.8%), orthoptera, 3 species (8.1%), hymenoptera, 3 species (8.1%), lepidoptera, 2 species (5.4%) and thysanoptera, 1 specie (2.7%). During the late season, coleoptera were the highest, 10 species (28.6%). Others were heteroptera, 9 species (25.7%), diptera, 4 species (11.4%), homoptera, 4 species (11.1%), orthoptera, 3 species (8.6%), hymenoptera, 2 species (5.7%), lepidoptera, 2 species (5.7%) and thysanoptera, 1 specie (2.9%). *Ootheca mutabilis* Sahl, *Aphis craccivora* Koch, *Megalurothrips sjostedti* Trybom, *Maruca vitrata* Fab and coreid bugs such as *Clavigralla tomentosicollis* Stal, *Anoplocnemis curvipes* Fab, *C. shadabi*, *Aspavia armigera* Fab, *Nezara viridula* L, *Mirperus jaculus* Thunb were the commonest major insect pests on cowpea at Abraka. More insect species occurred in the early season than late in the study area.

Keywords: Cowpea, insect pests, early/late seasons, Abraka, southern Nigeria.

INTRODUCTION

Cowpea (*Vigna unguiculata* (L.) Walp) has assumed a prominent position among the food crops cultivated in Africa and in particular in Nigeria. The grains are alternative source of cheap plant protein (Anderson, 1985; Alabi *et al.*, 2003) for the low income group with the rising cost of fish, meat, eggs and milk. In some African communities, especially Nigeria, cowpea is consumed in various forms (Adams, 1984) by man when boiled with other food materials such as rice, corn and yam. Its other uses are in erosion control where it serves as cover crop (Okigbo, 1978), in soil fertility enhancement and fibre production (Rachie, 1985).

The large scale production of cowpea has been in the drier Northern Nigeria (Singh and Rachie, 1985; Emosairue *et al.*, 2004). Recently however, its large-scale cultivation has extended to Southern Nigeria in the West and East (Ejiga, 1979; Federal Office of Statistics (FOS), 1995). Cowpea yield is how-

ever, low in Africa (Olatunde *et al.*, 1991), especially in regions where no pest control measures are carried out (Singh and Jackai, 1985, Afun *et al.*, 1991). The low yields have been attributed to losses from insect pests (Taylor, 1964) and diseases which attack and damage the crop in the field and storage. At every growth stage, the crop is attacked by several insect pests (Jackai *et al.*, 1988). At the seedling stage, by the foliage beetle, *Ootheca mutabilis* Sahl. and cowpea aphid, *Aphis craccivora* Koch; at the early reproductive stage by the flower and flower bud thrips, *Megalurothrips sjostedti* Trybom; at the late reproductive stage by the legume pod borer, *Maruca vitrata* Fab and a spectrum of pod sucking bugs which include *Anoplocnemis curvipes*, *Clavigralla tomentosicollis* (Jackai and Daoust, 1986). To obtain good yield, cowpea farmers use various control measures. The application of insecticides for insect pests control has been the most reliable tool against cowpea pests in the field (Ayoade, 1975;

Jackai, 1983). However, problems such as adverse effect on non-target organisms, hazards to users and environmental pollution has been reported (Alabi *et al.*, 2003) but yields have been reported to increase several folds (Jackai, 1993).

Information on the insect pest complex of cowpea at Abraka, an agricultural area in Delta State, Southern Nigeria, is not available to guide farmers intending to go into large scale production on the precautionary measures to take especially pest control measures. The study here aims at documenting the insect species associated with cowpea in this locality during the early and late planting seasons. It is hoped that this pioneer work would be useful to those intending to cultivate the crop in this region.

MATERIALS AND METHODS

The study was undertaken on a piece of land located close to Campus one of the Delta State University, Abraka during the early and late cropping seasons of 2005. The land was manually prepared in both seasons. The experimental plot size was 5m x 3m with 1.5m in-between plots. The cowpea variety planted was Ife brown, a short duration and erect variety developed at the Obafemi Awolowo University, Ile-Ife, Nigeria. For the early cropping season, the plots were planted on 14th June,

2005 and 29th September, 2005 for the late cropping. Three seeds were planted per hole at planting space of 60cm x 30cm (Remison, 1978e). Seeds that failed to sprout were replaced. Seedlings were thinned to two stands per hole, ten days after emergence. There were 6 rows of 36 cowpea stands per row, in each plot. Weeding of the farm was done regularly with hoes. The collection of insect species commenced, two weeks after planting, between 8.00 a.m. and 10.00 a.m. with the aid of a sweep net (30cm diameter and 75cm deep). To collect insects, five double sweeps was done with the net. Another way insects were collected was by hand-picking especially pre-imago stages like larvae and then reared in the laboratory to adults. Insect collection continued to harvest. All insects collected were preserved and despatched to the curators at the International Institute of Tropical Agriculture (IITA) Ibadan and Institute for Agricultural Research Ahmadu Bello University Zaria, Nigeria for identification.

RESULTS AND DISCUSSION

A list of the insect pest complex of cowpea during the early and late seasons at Abraka, is presented in Table 1. The collection consisted of 8 insect orders, 25 families and 37 species in the early season while there were 8 insect orders, 23 families with 35 species in the late

TABLE 1: Insect species on cowpea in the early and late cropping seasons in Abraka.

CROPPING SEASON					
Early season			Late season		
Order	Family	Insect Species	Insect Species	Family	Order
Coleoptera	Chrysomelidae	<i>Ootheca mutabilis</i> Sahl	<i>Ootheca mutabilis</i> Sahl	Chrysomelidae	Coleoptera
"	Chrysomelidae	<i>Ootheca bennigseni</i> Weise	<i>Ootheca bennigseni</i> Weise	Chrysomelidae	Coleoptera
"	Chrysomelidae	<i>Crytocephalus gladiatorius</i> Suff	-	-	-
"	Chrysomelidae	<i>Medythia quarterna</i> Fair	<i>Medythia quarterna</i> Fair	Chrysomelidae	Coleoptera
"	Chrysomelidae	<i>Lema coelestina</i>	<i>Lema coelestina</i>	Chrysomelidae	Coleoptera
"	Curculionidae	<i>Piezotrachelus sp</i>	<i>Piezotrachelus sp</i>	Curculionidae	Coleoptera
"	Ichneumonidae	<i>Nematocerus acerbus</i> (Fst) (Brulle)	<i>Nematocerus acerbus</i> (Fst) (Brulle)	Ichneumonidae	Coleoptera
"	Coccinellidae	<i>Cheilomenes lunata</i> Fab	<i>Cheilomenes lunata</i> Fab	Coccinellidae	Coleoptera
"	Bruchidae	<i>Callosobruchus maculatus</i> F	<i>Callosobruchus maculatus</i> F	Bruchidae	Coleoptera
"	Meloidae	<i>Mylabris sp</i>	<i>Mylabris sp</i>	Meloidae	Coleoptera
"	Lagridae	<i>Lagria villosa</i> Fab	<i>Lagria villosa</i> Fab	Lagridae	Coleoptera
Heteroptera	Pentatomidae	<i>Nezara viridula</i> (L)	<i>Nezara viridula</i> L	Pentatomidae	Heteroptera
"	Pentatomidae	<i>Aspavia armigara</i> Fab	<i>Aspavia armigara</i> Fab	Pentatomidae	Heteroptera
"	Pentatomidae	<i>Seponia nitreas</i> Lv	-	-	-
"	Miridae	<i>Deraeocoris martini</i> (Puton)	<i>Deraeocoris martini</i> (Puton)	Pentatomidae	Heteroptera
"	Alydidae	<i>Mirperus jaculus</i> Thunb	<i>Mirperus jaculus</i> Thunb	Alydidae	Heteroptera
"	Pyrhocoridae	<i>Dysdercus supersticiosus</i> F.	<i>Dysdercus supersticiosus</i> F	Pyrhocoridae	Heteroptera
"	Coreidae	<i>Clavigralla shadabi</i> Dolling.	<i>Clavigralla shadabi</i> Dolling.	Coreidae	Heteroptera
"	Coreidae	<i>Riptortus dentipes</i> Fab.	<i>Riptortus dentipes</i> Fab.	Coreidae	Heteroptera
"	-	-	<i>Clavigralla tomentosicollis</i> Stal.	Coreidae	Heteroptera
"	-	-	<i>Anoplocnemis curvipes</i> Fab	Pentatomidae	Heteroptera
"	-	-	<i>Riptortus dentipes</i>	Coreidae	Heteroptera

Table 1 Continues Insect species on cowpea in the early and late cropping seasons in Abraka

Order	Family	CROPPING SEASON		Family	Order
		Early season	Late season		
Homoptera	Cicadellidae	<i>Tettigellin sp</i>	<i>Tettigellin sp</i>	Cicadellidae	Homoptera
„	Cicadellidae	<i>Hiltus sp</i>	<i>Hiltus sp</i>	Cicadellidae	Homoptera
„	Cicadellidae	<i>Selenocephalus varius</i> Sign	<i>Selenocephalus varius</i> Sign	Cicadellidae	Homoptera
„	Aphidae	<i>Aphis craccivora</i> Koch	<i>Aphis craccivora</i> Koch	Aphidae	Homoptera
Diptera	Muscidae	<i>Atherigona sp</i>	<i>Atherigona sp</i>	Muscidae	Diptera
„	Asilidae	<i>lewinella sp</i>	<i>lewinella sp</i>	Asilidae	Diptera
„	Platysromatidae	<i>Plagiosterno pterina westermanni</i> (H)	<i>Plagiosterno pterina westermanni</i> (H)	Platysromatidae	Diptera
„	Diopsidae	<i>Diopsis collaris</i> WSTW	<i>Diopsis collaris</i> WSTW	Diopsidae	Diptera
„	Tephiridae	<i>Ocnerioxa pennata</i> (Speiser)	-	-	-
Orthoptera	Pyrgomorphidae	<i>Zonocerus variegatus</i> L	<i>Zonocerus variegatus</i> L	Pyrgomorphidae	Orthoptera
„	Pyrgomorphidae	<i>Pyrgomorpha vignaudi</i> Guer	<i>Pyrgomorpha vignaudi</i> Guer	Pyrgomorphidae	Orthoptera
„	Tettigonidae	<i>Phaneroptera nana sparsa</i> Stal	<i>Phaneroptera nana sparsa</i> Stal	Pyrgomorphidae	Orthoptera
Lepidoptera	Pyralidae	<i>Mylothris chloris</i> F	-	-	Lepidoptera
„	Pyralidae	<i>Maruca vitrata</i> Fab	<i>Maruca vitrata</i> Fab.	Pyralidae	Lepidoptera
„	-	-	<i>Hymenota recurvalis</i> Fab	-	-
Hymenoptera	Ichneumonidea	<i>Orientostenaracus tripatitus</i>	-	-	-
„	Apidae	<i>Xylocopa olivacca</i> Fab	<i>Xylocopa olivacca</i> Fab	Formidae	Hymenoptera
„	Hymenopodidae	<i>Pseudocrebobra ocellata</i> Pal	<i>Pseudocrebobra ocellata</i>	Hymenopodidae	Hymenoptera
Thysanoptera	Thripidae	<i>Megalurothrips sjostedti</i> Trb	<i>Megalurothrips sjostedti</i> Trb	Thripidae	Thysanoptera

- indicates insect's absence

Table 2: Insect orders, number of species and relative abundance (%) in the early season at Abraka

Insect order	Number of species	Relative abundance (%)
Coleoptera	11	29.7
Heteroptera/Hemiptera	8	21.6
Diptera	5	13.5
Homoptera/Hemiptera	4	10.8
Orthoptera	3	8.1
Hymemoptera	3	8.1
Lepidoptera	2	5.4
Thysanoptera	1	2.7

Table 3: Insect orders, number of species and relative abundance (%) in the late season at Abraka

Insect order	Number of species	Relative abundance (%)
Coleoptera	10	28.6
Heteroptera/Hemiptera	9	25.7
Homoptera/Hemiptera	4	11.4
Diptera	4	11.4
Orthoptera	3	8.6
Lepidoptera	2	5.7
Hymemoptera	2	5.7
Thysonoptera	1	2.9

season. The insect order, number of species and their relative abundance (%) are given in Tables 2 and 3. For the early season, the coleopterans had the highest species (11) with relative abundance of 29.7% while *Ootheca mutabilis* found mainly on young leaves were the commonest coleopterans, encountered. The least were thysanopterans with 1 specie with relative abundance of 2.7%. Other insect orders were in-between the highest and lowest

relative abundance (Table 1). The insect complex revealed that some insect species were absent in the early season when compared with the late season insect complex. These were *C. tomentosicollis* Stall, *A. curvipes* Fab. and *H. recurvalis* Fab. In the late season, the coleopterans were the most abundant similar to the early season with 10 insect species with relative abundance of 28.6%. The least dominant were the thysanopterans with 1 species and relative abundance of 2.9%. Other insect orders with their species lie between the highest and lowest relative abundance (Table 3). *Cryptocephalis gladiatorius* Suff, *Ocnerioxa pennata*, Speiser *Mylothris chloris* F and *Orientostenaracus tripatitus* were absent during the late season whereas they were encountered during the early season. The insect complex of cowpea in Abraka showed that there were slightly more insect species in the early season than the late season. This may be due probably to more rains in the early season that may have created more favourable condition for insect breeding and availability of food (vegetation) for insect species.

The key insect pests of cowpea namely the cowpea aphid, *Aphis craccivora* Koch; the flower thrips, *Megalurothrips sjostedti* Tryb., the legume pod borer, *Maruca vitrata* Fab.

and *C. shedabi*, *Anoplocnemis curvipes*, *Mirperus species*, *Nezara virudula* and *Aspavia armigera*, reported to occur in the main cowpea producing zones of Nigeria (Libby, 1968; Singh and van Emden, 1979; Singh *et al.*, 1983; Jackai, 1985; Jackai and Dauost, 1986; Ogunwolu and Ekefan, 1991) and at Umudike, Southern Nigeria (Emosairue *et al.*, 2004) were observed in the study area. *A. craccivora* infested all the twelve plots and the population was high (over 500 per stand in the two middle cowpea rows) at both seasons. This high incidence is an indication of possible high level of damage to cowpea and this would necessitate control measures as uncontrolled infestation of *A. craccivora* have been reported to result in damage of the seedling stage of cowpea (Singh and Jackai, 1985; Atiri *et al.*, 1984; Roberts *et al.*, 1993). *Maruca vitrata* incidence was generally low at both seasons. Among the heteroptera, *C. tomentosicollis* was the most abundant (over 6 bugs/m row) and was slightly more in the late season when compared with the early season. This observation supports the reports of Dina (1982) and IITA (1983) that pod sucking bugs occur more in the late season than early season. The high population of PSBS suggests that damage to pods and seeds in the area could be high and this would require the control of PSBs, particularly in the late planting season as losses in pods and seed yield due to PSBs have been reported to be in the magnitude of 80% and 95% respectively (Ogunwolu and Ekefan, 1991).

CONCLUSION

The major insect pests prevalent in the study area, were *Ootheca mutabilis*, *Aphis craccivora*, *Megalurothrips sjostedti*, *Maruca vitrata* and coreid bugs such as *Cravigralla tomentosicollis*, *Anoplocnemis curvipes*, *C. shadabi*, *Aspavia armigera*, *Nezara virudula*, *Mirperus jaculus*. More insect species occurred in the early than late season. Pod sucking bug population was high in the late cropping season and would require control.

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