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Monitoring Insect Complex of Cowpea (*Vigna Unguiculata* (L) Walp in Asaba, a Non-Cowpea Growing Area, Southern Nigeria

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Abstract

The cultivation of cowpea (Vigna unguiculata (L.) Walp extended recently from northern Nigeria, its main production region, to the eastern and western states of southern Nigeria. As a crop largely depended upon for food in Nigeria, its growth and yield have become a focus and all factors that have adverse effect on it wherever it is grown, have to be studied. Asaba Campus, Delta State University, formerly Bendel State College of Agriculture, is well known for crop production. Cowpea is presently in cultivation in this new non-cowpea producing region. Studies were conducted in the early and late planting seasons of 2005, to determine the insect complex of cowpea and their relative abundance, in Asaba. The results showed that there were 10 insect orders, 34 families and 50 species in the early season. Coleoptera were the most abundant with 13 species (26.0%), while the thysanoptera and demaptera were each one species (2.0%) to constitute the least. In the late season, 10 orders, 24 families and 39 insect species were encountered. Heteroptera had the highest species (11) with 28.2% relative abundance, while thysanoptera and dermaptera, 1 species each with relative abundance of 2.6% were the least. Ootheca mutabilis Sahl, Aphis craccivora Koch, Megalurothrips sjostedti Trybom, Maruca vitrata Fab and coreid bugs such as Cravigralla tomentosicollis Stal, Anoplocnemis curvipes Fab, C. shadabi, Aspavia armigara Fab, Nezara virudula L, Mirperus jaculus were the commonest major insect pests on cowpea at Asaba. There were more insect species in the early than late season in the study area.

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

INTRODUCTION

Cowpea (*Vigna unguiculata* (L.) Walp) has become well known as a legume of great economic importance to man. Grown in the tropical and subtropical regions of the world, its grains can be prepared in various forms and consumed by man [1-2]. The grains are rich sources of cheap plant proteins [3], fats and vitamins. The green young pods serve as vegetable to some African communities. The plant is used as cover crop to check soil erosion in farms [4] to restore soil fertility. It is also known as fibre yielding crop [5].

Large scale cowpea production has been a business in the drier Northern state of Nigeria [6]. However, the cultivation in recent years is rapidly extending from the major zones of cultivation to the West and East of Southern Nigeria [7-8]. Though humanly appreciated, its production is often slowed down and sometimes halted by the activities of insect pests and diseases which attack and damage the crop in the field, resulting in low yield [9]. At every growth stage, the crop suffers from injuries inflicted on it [10] by a number of insect pests [11]. Major insect pests of cowpea are the foliage beetle, *Ootheca mutabilis* Sahl, cowpea aphid, *Aphis craccivora* Koch, the flower bud thrips, *Megalurothrips sjostedti* Trybom, the legume pod borer, *Maruca vitrata* Fab and a complex of pod sucking bugs which include *Clavigralla tomentosicollis* Stal, *Anoplonemmis curvipes* Fab, etc. These insect pests have been reported to occur and cause serious damage in regions where the crop is cultivated on large scale [12-13] and to have good yield, the pests must be controlled [11].

Information on the occurrence of cowpea pests and pest status in any region where cowpea is to be cultivated is therefore necessary to assist cowpea growers to plan adequately for appropriate control and management of their menace. Asaba Campus, Delta State University (formerly College of Agriculture) is known for crop production since 1947 when the Campus began as Rural Training Centre (RTC) and information of insect pests on this crop is lacking. This study was conducted to report for the first time the insect species (insect complex) associated with cowpea in Asaba, which has not been a cowpea growing area.

It is hoped that the study shall provide a baseline information and guide to future research work on insect pests of cowpea in this ecological zone.

MATERIALS AND METHODS

The study was carried out in the Teaching and Research Farms of the Agronomy Department, Delta State University, Asaba Campus in the early and late cropping seasons of 2005. The land was ploughed and harrowed with a tractor in the early season while it was manually prepared with local implements in the late season. The experimental plot size at both seasons was 5m x 3m with 1.5m between plots. Cowpea seeds (Ife brown - a highly susceptible variety to insect pests attack) were used for the experiment. For the early cropping season experiment, the plots were planted on 29th May, 2005 and 17th September, 2005 for the late cropping season study.

Three seeds were planted per hole and the planting space was 60cm x 30cm [14]. Seeds that did not sprout were replaced four days after planting. Thinning of seedlings to two stands per hole was done a week and half, after emergence. Each plot consisted of 6 rows of 36 cowpea stands per row. Insects were collected from cowpea weekly between 8.00 and 10.00 am, two weeks after planting, with the aid of sweep net (30cm diameter and 75cm deep). Insects were also hand picked. Insects were collected up to harvest time. The plots were regularly weeded. The insects were preserved and despatched to the International Institute of Tropical Agriculture (IITA) Ibadan and Institute for Agricultural Research and Training, Ahmadu Bello University, Zaria Nigeria for identification.

RESULTS AND DISCUSSION

A list of the insect complex of cowpea in the early and late seasons, at Asaba is presented in Table 1. There were 10 insect orders, 34 families and 50 species in the early season. The coleopterans were the most dominant species (13) with relative abundance of 26.0%. The thysanopterans and dermapterans had 1 species each to constitute the least dominant with relative abundance of 2.0%. Other insect orders with their species, were in between (Table 2). The list of insect complex showed that in the early season, certain insect species such as *Clavigralla tomentosicollis* Stal *C.*

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

CROPPING SEASON					
Early season			Late season		
Order	Family	Insect Species	Insect Species	Family	Order
Coleoptera	Chrysomelidae	<i>Ootheca bennigseni</i> Weise	<i>Ootheca bennigseni</i> Weise	Chrysomelidae	Coleoptera
„	Chrysomelidae	<i>Ootheca mutabilis</i> Sahlberg	<i>Ootheca mutabilis</i> Sahlberg	Chrysomelidae	Coleoptera
„	Chrysomelidae	<i>Medythia quarterna</i> Fair	<i>Medythia quarterna</i> Fair	Chrysomelidae	Coleoptera
„	Chrysomelidae	<i>Cryptocephalus gladiatorius</i> Suff	<i>Cryptocephalus gladiatorius</i> Suff	Chrysomelidae	Coleoptera
„	Curculionidae	<i>Platyomicus</i> sp	-	-	-
„	Curculionidae	<i>Piezotrachelus</i> sp	<i>Piezotrachelus</i> sp	Curculionidae	Coleoptera
„	Scarabacidae	<i>Hoplostomus fulgineus</i> (Oliv)	-	-	-
„	Lycidae	<i>Lycus nr foliaceus</i> Palm	-	-	-
„	Bruchidae	<i>Callosobruchus maculatus</i> F	<i>Callosobruchus maculatus</i> F	Bruchidae	Coleoptera
„	Ichneumonidae	<i>Nematocerus acerbus</i> (Fst) (Brulle)	<i>Nematocerus acerbus</i> (Fst) (Brulle)	Ichneumonidae	Coleoptera
„	Lagridae	<i>Lagria villosa</i> Fab	<i>Lagria villosa</i> Fab	Lagridae	Coleoptera
„	Coccinellidae	<i>Cheilomenes lunata</i> Fab	<i>Cheilomenes lunata</i> Fab	Coccinellidae	Coleoptera
„	Meloidae	<i>Mylabris</i> sp	<i>Mylabris</i> sp	Meliodae	Coleoptera
Heteroptera	Miridae	<i>Deraeocoris martina</i> (Puton)	-	-	-
„	Lygacidae	<i>Geocoris</i> sp	-	-	-
„	Plataspidae	<i>Coptosoma stali</i> Mort	-	-	-
„	Plataspidae	<i>Brachyplatys</i> sp	-	-	-
„	Plataspidae	<i>Coptosoma nubila</i> Germ	<i>Coptosoma nubila</i> Germ	Plataspidae	Heteroptera
„	Pyrhocoridae	<i>Dysdercus superstiosus</i> F	<i>Dysdercus superstiosus</i> F	Plataspidae	Heteroptera
„	Coreidae	<i>Cletomorpha lanciger</i> Fab.	<i>Cletomorpha lanciger</i> Fab.	Coreidae	Heteroptera
„	Coreidae	<i>Riptortus dentipes</i> Fab.	<i>Riptortus dentipes</i> Fab.	Coreidae	Heteroptera
„	-	-	<i>Clavigralla tomentosicollis</i> Stal.	Coreidae	Heteroptera
„	-	-	<i>Clavigralla shadabi</i> Dolling	Coreidae	Heteroptera
„	-	-	<i>Anoplocnemis curvipes</i> Fab	Pentatomidae	Heteroptera
„	Pentatomidae	<i>Aspavia armigara</i> Fab	<i>Aspavia armigara</i> Fab	Pentatomidae	Heteroptera
„	Pentatomidae	<i>Nezara viridula</i> (L)	<i>Nezara viridula</i> L	Pentatomidae	Heteroptera

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

CROPPING SEASON					
Early season			Late season		
Order	Family	Insect species	Insect species	Family	Order
Coleoptera	Chrysomelidae	<i>Ootheca bennigseni</i> Weise	<i>Ootheca bennigseni</i> Weise	Chrysomelidae	Coleoptera
„	Chrysomelidae	<i>Ootheca mutabilis</i> Sahlberg	<i>Ootheca mutabilis</i> Sahlberg	Chrysomelidae	Coleoptera
„	Chrysomelidae	<i>Medythia quarterna</i> Fair	<i>Medythia quarterna</i> Fair	Chrysomelidae	Coleoptera
„	Chrysomelidae	<i>Cryptocephalus gladiatorius</i> Suff	<i>Cryptocephalus gladiatorius</i> Suff	Chrysomelidae	Coleoptera
„	Curculionidae	<i>Platyomicus</i> sp	-	-	-
„	Curculionidae	<i>Piezotrachelus</i> sp	<i>Piezotrachelus</i> sp	Curculionidae	Coleoptera
„	Scarabacidae	<i>Hoplostomus fulgineus</i> (Oliv)	-	-	-
„	Lycidae	<i>Lycus nr foliaceus</i> Palm	-	-	-
„	Bruchidae	<i>Callosobruchus maculatus</i> F	<i>Callosobruchus maculatus</i> F	Bruchidae	Coleoptera
„	Ichneumonidae	<i>Nematocerus acerbus</i> (Fst) (Brulle)	<i>Nematocerus acerbus</i> (Fst) (Brulle)	Ichneumonidae	Coleoptera
„	Lagridae	<i>Lagria villosa</i> Fab	<i>Lagria villosa</i> Fab	Lagridae	Coleoptera
„	Coccinellidae	<i>Cheilomenes lunata</i> Fab	<i>Cheilomenes lunata</i> Fab	Coccinellidae	Coleoptera
„	Meloidae	<i>Mylabris</i> sp	<i>Mylabris</i> sp	Meliodae	Coleoptera
Heteroptera	Miridae	<i>Deraeocoris martina</i> (Puton)	-	-	-
„	Lygacidae	<i>Geocoris</i> sp	-	-	-
„	Plataspidae	<i>Coptosoma stali</i> Mort	-	-	-
„	Plataspidae	<i>Brachyplatys</i> sp	-	-	-
„	Plataspidae	<i>Coptosoma nubila</i> Germ	<i>Coptosoma nubila</i> Germ	Plataspidae	Heteroptera
„	Pyrrhocoridae	<i>Dysdercus supersticiosus</i> F	<i>Dysdercus supersticiosus</i> F	Plataspidae	Heteroptera
„	Coreidae	<i>Cletomorpha lanciger</i> Fab.	<i>Cletomorpha lanciger</i> Fab.	Coreidae	Heteroptera
„	Coreidae	<i>Riptortus dentipes</i> Fab.	<i>Riptortus dentipes</i> Fab.	Coreidae	Heteroptera
„	-	-	<i>Clavigralla tomentosicollis</i> Stal.	Coreidae	Heteroptera
„	-	-	<i>Clavigralla shadabi</i> Dolling	Coreidae	Heteroptera
„	-	-	<i>Anoplocnemis curvipes</i> Fab	Pentatomidae	Heteroptera
„	Pentatomidae	<i>Aspavia armigara</i> Fab	<i>Aspavia armigara</i> Fab	Pentatomidae	Heteroptera
„	Pentatomidae	<i>Nezara virudula</i> (L)	<i>Nezara virudula</i> L	Pentatomidae	Heteroptera

- indicates insect's absence

shadabi Dolling, *Anoplocnemis curvipes* Fab. (all bugs) and *Marsamia trapezalis* Guence, did not occur in the early season when compared with late season insect species. In the late season, there were 10 orders, 24 families and 39 insect species. Table 3 gives the insect orders, number of species and relative abundance of the species encountered. The heteropterans were the most dominant with 11 insect species and relative abundance of 28.2%. This was closely followed by the coleopterans (10 species) and relative abundance of 25.6%. The thysanopterans and dermapterans were least with 1 species and relative abundance of 2.6% each. Insect species such as *Platyomicus sp.*, *Hoplostomus fulgineus*, *lycus nr foliaceus* (Palm), *Deraeocoris martina*, *Geocoris sp.*, *Coptosoma stali* Mort, *Brachryplatys sp.*, *Scymmus scapuliferus* Muls, *Locris maculata mucalata* Fab. *Ocnerioxa pennata* Specier, *Opius sp.*, *Borbo zazzau* Norman and *Mylothris chloris* F were absent when compared with early season species. The study showed that there were more insect species in the early season than late at Asaba.

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

Insect order	Number of species	Relative abundance (%)
Coleoptera	13	26.0
Heteroptera/Hemiptera	11	22.0
Homoptera/Hemiptera	6	12.0
Diptera	5	10.0
Hymemoptera	5	10.0
Lepidoptera	4	8.0
Orthoptera	2	4.0
Dictyoptera	2	4.0
Thysanoptera	1	2.0
Dermaptera	1	2.0

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

Insect order	Number of species	Relative abundance (%)
Heteroptera/Hemiptera	11	28.2
Coleoptera	10	25.6
Homoptera/Hemiptera	4	10.3
Diptera	4	10.3
Hymemoptera	2	5.1
Lepidoptera	2	5.1
Orthoptera	2	5.1
Dictyoptera	2	5.1
Thysonoptera	1	2.6
Dermaptera	1	2.6

Major insect pests of cowpea such as the flower thrips, *Megalurothrips sjostedti* Trybom, the legume pod borer, *Maruca vitrata* Fab. and pod sucking bugs (PSBS) namely *Clavigralla tomentosicollis*, *C. shadabi*, *Anoplocnemis curvipes*, *Riptorus dentipes*, *Mirperus jaculus*, *Aspavia armigera* and *Nezera viridula* have been reported to occur in the main cowpea growing zones in Nigeria [15-17]. Reporting from Umudike, Emosairue *et al.* [6] observed these major insect pests, though the area is not a main cowpea growing region. The major insect pests listed above occurred in the study area and the study reports for the first time their occurrence. Pod sucking bug

population mainly *C. tomentosicollis* was high in the late cropping season (not quantified) when compared with the early population. This could be indicative of high level of cowpea damage due to pod sucking bugs in the second cropping season. This study informs would-be cowpea growers and researchers that control measures of PSBS would be necessary as uncontrolled infestation of the pod sucking bugs results in losses in the magnitude of 80% and 95% for pod and seed yield respectively [17].

CONCLUSION

The major insect pests prevalent in the study area, were *Oothea mutabilis*, *Aphis craccivora*, *Megalurothrips sjostedti*, *Maruca vitrata* and coreid bugs such as *Cravigralla tomentosicollis*, *Anoplocnemis curvipes*, *C. shadabi*, *Aspavia armigara*, *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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