



Scholars Research Library

Annals of Biological Research, 2010, 1 (2) :204-209
(<http://scholarsresearchlibrary.com/archive.html>)



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

EBENEZER OGHENEWORO EGHO

Department of Agronomy, Faculty of Agriculture, Asaba Campus,
Delta State University, Nigeria

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>Oothea bennigseni</i> Weise | <i>Oothea bennigseni</i> Weise | Chrysomelidae | Coleoptera |
| „ | Chrysomelidae | <i>Oothea mutabilis</i> Sahlberg | <i>Oothea 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 virudula</i> (L) | <i>Nezara virudula</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>Oothea bennigseni</i> Weise | <i>Oothea bennigseni</i> Weise | Chrysomelidae | Coleoptera |
| „ | Chrysomelidae | <i>Oothea mutabilis</i> Sahlberg | <i>Oothea 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 viridula</i> (L) | <i>Nezara viridula</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 viridula*, *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.

Acknowledgements

The author is grateful to the curators at the International Institute of Tropical Agriculture (IITA), Ibadan, Nigeria and Institute of Agricultural Research and Training (IART), Ahmadu Bello University, Zaria, Nigeria, who identified the insect species of cowpea from the study area.

REFERENCES

- [1] Okaka, J.C. and Potter, N.N. *J. Food Sci.* **1979**, 44, 1539.
- [2] McWatters, K.H., and Chinnan, M. S. *J. Food Sci.* **1985**, 50:444.
- [3] IITA Research highlights. Ibadan, Nigeria, IITA, **1984**
- [4] Singh, S.R. Insect pests of tropical food legumes. John Wiley and Sons. New York, **1990**. 235.
- [5] Rachie, K.O. Introduction. P. xxi xxviii. In: S.R. Singh and K.O. Rachie (eds). Cowpea research, production and utilization. Wiley New York, **1985**
- [6] Emosairue, S.O., G.E. Nwofia, S.B.A. Umuetok. *J. Sustain. Agric. Environ.* **2004** 6(1):38-43.
- [7] Ejiga, N.O., *Savannah* **1979**, Dec., 8 (2), 70-83
- [8] FOS Annual Abstract of statistics, Lagos, Nigeria, **1995**.
- [9] Taylor, T.A., *Grower Producer* 3 (2), **1964**.
- [10] Jackai, L.E.N., J.M.F. Roberts and S.R. Singh. *Crop Protection* **1988** 7, December 1988, 384-390.
- [11] Jackai, L.E.N. and Daoust, R.A. *Annual Review of Entomology* **1986**, 31, 95-119.
- [12] Singh, S.R. and Allen, D.J. Pests, diseases, resistance and protection in cowpea. In summerfield, R.J., and Bunting, A.H., eds., *Advances in legume Science*. London, UK, Her Majesty's Stationery office, **1980**, 419-443.
- [13] IITA Research highlights. Ibadan, Nigeria, IITA, **1983**.
- [14] Remison, S.U. Cowpea agronomy works at National Cereals Research Institute. Paper presented at the 1st National meeting. On development of package. Recommendations for legume crops at N.C.R.I, Ibadan, **1978e**, 7-8 February.
- [15] Libby, J.L. *Res. Bull.* No. 269:69pp. **1968**
- [16] Singh, S.R. Singh, B.S., Jackai, L.E.N. and Mtare, B.R. Cowpea Research at IITA, *IITA Inf. Ser.* No. 14:20, **1983**.
- [17] Ogunwola, E.O. and Ekefan, E.J. *JAT* Vol. 4 No. 2, 1-9. **1991**