IOSR Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT)
e-ISSN: 2319-2402, p- ISSN: 2319-2399.Volume 19, Issue 2 Ser. 1 (February 2025), PP 01-08
www.iosrjournals.org

Screening Of Two Varieties Of Eggplants For Their Responses To Insect Pest Load And Identification Of Insect Pests And Natural Enemies Associated With Eggplant In Asaba Ecological Zone, Delta State, Nigeria.

Ogbinaka, E.J.A[1]., Edema, I.O., And Tobih F.O[3]
[1-3] *(Department Of Agronomy, Delta State University, Abraka, Delta State, Nigeria)*

Abstract:
Background*: Field studies were carried out in Asaba to screen two varieties of eggplants (Solanum spp), for insect pest attack and pest population. Collected pests were identified, classified, with their relative abundance calculated.*
Materials and Methods*: The study was carried out in 2020 and 2021 cropping seasons at the Teaching and Research Farm of Department of Agronomy, Delta State University, Asaba Campus. Solanum aethiopicum and Solanum gilo varieties of eggplant seeds collected from National Horticultural Research Institute (NIHORT) Ibadan were planted at a spacing of 60cm x 70cm in plots of 3.0m x 3.5m in a land area of 13.5m x 20m. The field was laid out in a Randomized Complete Block Design. Insects were collected with a sweep net in the early hours of the day, demobilized, identified and categorized before storing in the departmental insect museum.*
Results*: The result of the investigation showed that during the early cropping season of 2020, a total of 27 insect pest species from 8 orders, 15 families were collected for S. aethiopicum while 20 insect pests from 5 orders, 10 families were collected for S. gilo. S. aethiopicum was attacked by more insects. During the late season of 2020, a total of 22 insect pests from 7 orders and 12 families were collected in S. aethiopicum experimental plots while18 insect pests from 6 orders, 10 families were collected from S. gilo experimental plots. The lepidopterans had the highest species (10) with relative abundance of 41% for Solanum aethiopicum, the coleopteran was next with (7) species and a relative abundance of 28% while for Solanum gilo the Lepidoptera also had the highest species of insect pests (8) with a relative abundance of 40% and was also followed by the coleopterans having (4) insect species with a relative abundance of 26%. Similar trend was observed in 2021 early and late planting seasons.*
Conclusion: *Insect pest species of the orders, lepidoptera and coleopteran were more prominent in both 2020 and 2021 cropping season. Due to the heavy presence of pests attack on these varieties, this study recommends the need for appropriate pest control measures by farmers who intend to cultivate these varieties of eggplants in the locality.*
Key Word: *Insect pest; Eggplant; Pest load; Identification; Classification.*

Date of Submission: 02-02-2025 Date of Acceptance: 12-02-2025

I. Introduction

Eggplant (*Solanum spp* L.) belongs to the family of *Solanaceae* (Danquah and Ofori, 2012). It is commonly called garden egg; it is called brijal in india and aubergine in Europe (Rajam, Mariska, Lian, Daunay, Rotino, Kashyap, Fock, and Collonnier, 2001). In Nigeria it is called by the Igbos as Anyara, Yorubas, Igba and Gauta by the Hausas. The indigenous species in Nigeria include *S. indicum, S. aculeatissimum, S. termmiale, S. erianthium, S. dasyphyllum*. Other indigenous tropical Africa species include *S. incanum S. gilo* and *S. aethiopicum* (Omodiji, 1979). Its origin is believed to be from india (Tindall, 1983). Eggplant exits in over 1,400 species and could be found around the world in mostly temperate and tropical regions (Passarakli and Dris, 2003). Production of eggplant is highly concentrated with 85% of the output coming from five (5) countries of which China is the world largest producer (56% of eggplant output), followed by India (26%), Egypt, Turkey and Indonesia (FAO, 2008). Production around the world is up to 223 million metric tonnes (Rajam *et al*., 2001).

In Nigeria, the crop is widely distributed as a garden crop (Dauda, Aliyu, & Chieziey, (2005). Eggplant is an economically important vegetable crop in many Asian and African countries. It is valued for its bitterness in several African countries and it is used in traditional medicines for treatment of several diseases. The fruits and leaves are also beneficial in lowering blood cholesterol (Grubben & Denton 2004; Okito, Alves,

Urquiaga, & Boddey 2004). It is emerging as a potential global resource for the prevention and treatment of diabetes and it also provides essential vitamins and minerals.

Eggplant is most popularly consumed in Southern part of Nigeria, particularly in Igbo land because of both cultural and traditional importance. The fruits are served alongside with Kolanuts (*Kola accumilata and Kola nitida*) in both big and small ceremonies such as marriages, festivals, traditional title taking, meetings and other events (Osei, Banful1, Osei, and Oluoch, 2010).

Eggplant production is prone to diverse insect pest infestation. Pests affect the crop by reducing total production as well as the quality of products. Shoot and fruit borers, are some major insect pests associated with the crop. Onuoha (2005) and Marizu (2007) reported that African eggplant is faced with pest and diseases and that the infestation of shoot and fruit borers could result to about 21% yield loss. To forestall the overall effect of pest infestation on eggplant production most farmers resort to the use of chemicals in controlling pests in order to secure maximum yield and quality of produce. The overall harmful effect of synthetic chemicals in the control of insect pests cannot be over emphasized. It is most disheartening when such chemicals are used in large amount on fruits that are consumed directly by man in their raw form. The use of synthetic fertilizers and pesticides are harmful to the ecosystem. Apart from causing harm to the beneficial organisms in the soil, such chemicals may also seep into the aquifer where they could also affect pest and humans.

The continuous increase in incidence of insecurity in the northern part of Nigeria has made farmers in the south to start paying attention to crops like eggplants that are mainly grown in the North and transported to south for consumption. The usefulness and high level of consumption of the eggplant in southern Nigeria therefore warrant the screening of two commonly consumed varieties in southern Nigeria, Asaba in particular to identify and classify insect pest associated with the crop varieties and also the access pest load of some of the identified insect pests.

The specific objective of the study is therefore to screen two commonly grown varieties of eggplants for their responses to insect pest load (most especially pod borers) and to identify, classify insect pests associated with eggplant in Asaba ecological zone, Delta state.

II. Material And Methods

The field researches were conducted in the early (April/May) and late (August/September) planting seasons of 2020 and 2021 at the Department of Agronomy Teaching and Research Farm of the Delta State University, Asaba. Asaba is in the tropical rain forest zone of Nigeria, located between Latitude $06^0$14ˈN and Longitude 06^0 49ˈE of the equator, which lies in the typical rainforest zone with a hot humid climate and Bimodal rainfall pattern. Rainy Season is between April and October with a mean annual rainfall of 1121mm with peak rainfall in July to September. The mean temperature is 23.3^{0c} with a maximum temperature of 37^{0c}. The mean monthly soil temperature at 100cm depth is $26.3 – 30.5^{0c}$, relative humidity varies from 61-89% and a monthly sunshine of 4.8bars (NIMET, 2019).

Study Design: Randomized Complete Block Design (RCBD).

Study Location: The field researches were conducted in the early (April/May) and late (August/September) planting seasons of 2020 and 2021 at the Department of Agronomy Teaching and Research Farm of the Delta State University, Asaba. Asaba is in the tropical rain forest zone of Nigeria,

Study Duration: April 2020 to September 2021

Sample size: 300 egg plant stand.

Nursing of Seeds

Pre-nursery

A nursery bed was prepared with rich top soil, well protected with a net covering from insects, snails and other crawling animal. Seeds were planted; germinated seedlings were allowed to stay in the pre-nursery for two weeks before they were transferred to nursery.

Nursery

Young seedlings from the pre-nursery were transferred into poly ethylene bags filled with top soil at two weeks after germination. One stands per poly ethylene bag and allowed for another four weeks to fully establish before transplanting to the field was carried out.

Land preparation, Field layout and Planting

Two plots of fallowed land measuring 13.5m x 20m each were mapped out at the teaching and research farm of Department of Agronomy, Delta State University Asaba, during the early and late planting seasons of 2020 and 2021. The experiment was laid out in a Randomized Complete Block Design (RCBD). The area was cleared of grasses, tilled manually, and divided into three replicates with a 1m pathway between replicates using the aid of pegs. Each replication was further divided into four plots of size 3.0m x 3.0m each with 1m pathway between plots. Nursed seedlings were planted at one seedling per stand at a spacing of 60cm x 70cm. 25 stands of eggplant seedlings were planted per plot. A total of 300 stands were planted.

Cultural practices

Weeding was done manually with the use of hoe and cutlass twice, at 2^{nd} and 6^{th} weeks after planting. There was a minimal application of organic manure (Poultry droppings) to enhance the fertility status of the soil.

Insect collection and Identification

Data on insect pests was collected during the early and late planting seasons of 2020 and 2021 at Asaba. Insects were collected during the early hours of the morning (7.00 – 8.00am), when they are less mobile with a sweep net, or handpicked and killed with ethyl acetate for preservation. Collected insects were sorted and identified appropriately to species levels using preserved laboratory samples and also by the use of Insect Identification Handbooks.

Statistical analysis

The identified insect pests were labeled, preserved in insect boxes in the Department of Agronomy, laboratory, Delta State University Asaba. The relative abundance of each of the insect species collected from the experiment was calculated using the formula as suggested by Levings and Window (1984)

$$Relative\ abundance\ (\%) = \frac{\text{Total number of each species}}{\text{Total number of all species}}\ X \frac{100}{1}$$

III. Result

Response of two varieties of eggplant to pest attack during early and late planting seasons of 2020 and 2021 in Asaba

In 2020 and 2021 planting seasons two varieties of eggplants planted in Asaba were attacked by various insect pests of different orders and families. Insects of 8 Orders; Lepidoptera, Coleoptera, Hemiptera, Homoptera, Heteroptera, Trombidiformes and Mantodae were identified in both planting seasons, 15 families were identified from the listed orders. Insects freely visited the experimental site because there was no form of pest control through the means of either synthetic or organic pesticides. Insects were in their numbers throughout the different growth stages of the eggplant. There were visible pest attacks at growth, vegetative and fruiting developmental stages of the crop. Eggplant is associated with many insect pests and this experiment was able to establish that it is difficult to cultivate the crop in Asaba without adequate preparation for pest control.

The two varieties cultivated in Asaba are of popular demand and a common delicacy in homes and ceremonies. The *Solanum aethiopicum* which was the target for this experiment is purchased in large quantities in sacks from the middle belt region of Nigeria and transported to Southern Nigeria; it is mainly used for commercial purposes as a traditional kolanut. The *Solanum gilo* (Green known as Ngwa large) is also widely consumed at homes. Asaba is not known for eggplant cultivation hence there was need to study their response to pest attack. The studies identified and classify insect species associated with both varieties. It was observed that *Solanum aethiopicum* was mostly attacked by insect pest in Asaba.

Insect of the orders; Coleoptera, lepidoptera and orthoptera were more prominent during both planting seasons. The coleopterans are beetles and weevils with biting mouthparts. Ladybugs and Colorado beetles were among the ones identified in this experiment. The Lepidopterans are moths and butterflies; they have a larval stage of catapillars with most species consuming plant tissues and leaves. In this experiment many larva were identified with *Luceanus orbonalis* being the most prominent as a major stem borer and fruit borer of the crop. The orthoptera comprises of grasshoppers and crickets, they have mandibulate mouthparts for biting and chewing. Grasshoppers of different colours and sizes were prominent in the study. Both nymph and adult stages were present.

Insect species associated with two varieties (*Solanum aethiopicum* and *Solanum* gilo) of Eggplant in 2020 planting seasons at Asaba.

Insects collected during the study are presented in Tables 1- 8. Results in Tables 1 shows, the list of insect pest order, families, and scientific names in both varieties during the early planting season of 2020. There were a total of 8 orders, 15 families and 27 insect species for *S. aethiopicum* while insect pests from 5 orders, 10 families and 20 insect species were collected for *S. gilo.* Insect complex associated with both varieties during the early planting of 2020 shows that *S. aethiopicum* was attacked by more insects.

In Table 2, the late season of 2020, a total of 7 orders, 12 families and 22 insect species were collected in *S. aethiopicum* experimental plots while insects from 6 orders, 10 families and 18 insect species were collected from *S. gilo* experimental plots.

Tables 3 and 4 shows the orders, number of species and relative abundance of both early and late planting seasons of 2020. In the early planting season, (Table 3) the lepidopterans had the highest species (10) with relative abundance of 41% for *Solanum aethiopicum,* the coleopteran was next with 7 species and a relative abundance of 28% while for *Solanum gilo* the Lepidoptera also had the highest species of insect pests 8 with a relative abundance of 40% and was also followed by the coleopterans having 4 insect species with a relative abundance of 26%.

Insects collected from the orders; Homoptera and Trombidiforme under *Solanum aethiopicum* during the early season of 2020, were not found from *Solanum gilo*. Insects of the order Homoptera**,** Trombidiforme and Mantodae which was collected from both variety of eggplant during the early plantings had the least number of insects. Table 4 for late season planting of 2020 had similar trend were lepidopteran had more insect pest species with relative abundance of 39% and 42% for both varieties of eggplants which was followed by the coleopterans. Insect species associated with *Solanum aethiopicum* were more that those of *Solanum gilo* for both early and late planting seasons of 2020 in Asaba.

Table 1: List of insect species associated with two varieties of eggplant during the early planting season of 2020 in Asaba

Eggplant Varieties					
S. aethiopicum			**S. gilo**		
Order	**Family**	**Insect Species**	**Order**	**Family**	**Insect Species**
Coleoptera	Coccinellidae	*Vigintiocto punctata*	Coleoptera	Coccinellidae	*Vigintiocto punctata*
	Chrysomelidae	*Leptinotarsa decemlineate*		Chrysomelidae	*Leptinotarsa decemlineate*
	Curculionidae	*Hypera postica*		Curculionidae	*Hypera postica*
	Chrysomelidae	*Altica Oleracea*		Chrysomelidae	*Altica Oleracea*
	Chrysomelidae	*Lilioceris lilii*		Chrysomelidae	*Epitrix fuscula*
	Chrysomelidae	*Epitrix fuscula*		Chrysomelidae	*Psylliodes bretitingheami*
	Chrysomelidae	*Psylliodes bretitingheami*	Hemiptera	Pentatomidae	*Nazara viridila*
Hemiptera	Pentatomidae	*Nazara viridila*		Pentatomidae	*Halyomorpha halys*
	Aphididae	*Aphis gossypii*	Lepidoptera	Noctuidae	Helithis *zea*
	Pentatomidae	*Halyomorpha halys*		Noctuidae	*Helicoverpa zea*
Lepidoptera	Noctuidae	*Selepa docilis*		Crambidae	*Leucinodes orbonalis*
	Noctuidae	Helithis *zea*		Crambidae	*Sceliodes Cordalis*
	Noctuidae	*Helicoverpa zea*		Crambidae	*Leucinodes Cordalis*
	Shingidae	*Manduca sexta*		Noctuidae	*Helicoverpa armigera*
	Crambidae	*Leucinodes orbonalis*		Noctuidae	*Helicoverpa punctigera*
	Crambidae	*Sceliodes Cordalis*		Noctuidae	*Spodoptera litura*
	Crambidae	*Leucinodes Cordalis*	Orthoptera	Pyrgomorphidae	*Zonocerus variegates*
	Noctuidae	*Helicoverpa armigera*		Gryllidae	*Gryllus bimaculatus*
	Noctuidae	*Helicoverpa punctigera*	Heteroptera	Coreidae	*Acanthocoris scabrator*
	Noctuidae	*Spodoptera litura*		Pentatomidae	*Aspavia* armigera
Orthoptera	Pyrgomorphidae	*Zonocerus variegates*			
	Gryllidae	*Gryllus bimaculatus*			
Homoptera	Aleyrodidae	*Bemisia tabaci*			
Heteroptera	Coreidae	*Acanthocoris scabrator*			
	Pentatomidae	*Aspavia* armigera			
Trombidiformes	Tetranychidae	*Teranychus urticae*			
Mantodae	Mantidae	*Mantis religiosa*			

Table 2: List of insect species associated with two varieties of eggplant during the late planting season of 2020 in Asaba

Eggplant Varieties	
S. aethiopicum	***S. gilo***

Order	Family	Insect Species	Order	Family	Insect Species
Coleoptera	Coccinellidae	*Vigintiocto punctata*	Coleoptera	Coccinellidae	*Vigintiocto punctata*
	Chrysomelidae	*Leptinotarsa decemlineate*		Chrysomelidae	*Leptinotarsa decemlineate*
	Curculionidae	*Hypera postica*		Curculionidae	*Hypera postica*
	Chrysomelidae	*Altica Oleracea*		Chrysomelidae	*Epitrix fuscula*
	Chrysomelidae	*Epitrix fuscula*		Chrysomelidae	*Psylliodes bretitingheami*
	Chrysomelidae	*Psylliodes bretitingheami*	Hemiptera	Pentatomidae	*Nazara viridila*
Hemiptera	Pentatomidae	*Nazara viridila*		Pentatomidae	*Halyomorpha halys*
	Pentatomidae	*Halyomorpha halys*	Lepidoptera	Noctuidae	Helithis *zea*
Lepidoptera	Noctuidae	Helithis *zea*		Noctuidae	*Helicoverpa zea*
	Noctuidae	*Helicoverpa zea*		Crambidae	*Leucinodes orbonalis*
	Crambidae	*Leucinodes orbonalis*		Crambidae	*Sceliodes Cordalis*
	Crambidae	*Sceliodes Cordalis*		Crambidae	*Leucinodes Cordalis*
	Crambidae	*Leucinodes Cordalis*		Noctuidae	*Helicoverpa armigera*
	Noctuidae	*Helicoverpa armigera*		Noctuidae	*Helicoverpa punctigera*
	Noctuidae	*Helicoverpa punctigera*	Orthoptera	Pyrgomorphidae	*Zonocerus variegates*
	Noctuidae	*Spodoptera litura*	Heteroptera	Coreidae	*Acanthocoris scabrator*
Orthoptera	Pyrgomorphidae	*Zonocerus variegates*		Pentatomidae	*Aspavia* armigera
	Gryllidae	*Gryllus bimaculatus*	Mantodae	Mantidae	*Mantis religiosa*
Heteroptera	Coreidae	*Acanthocoris scabrator*			
	Pentatomidae	*Aspavia* armigera			
Homoptera	Aleyrodidae	*Bemisia tabaci*			
Mantodae	Mantidae	*Mantis religiosa*			

Table 3: Insect orders. Number of species and Relative Abundance (%) for two varieties of eggplant during the early planting season of 2020 in Asaba

Eggplant Varieties				
S. aethiopicum			***S. gilo***	
Order	**Number of species**	**Relative abundance**	**Number of species**	**Relative abundance**
Coleoptera	7	28.0	4	26.2
Hemiptera	3	14.2	3	13.4
Lepidoptera	10	41.0	8	40.8
Orthoptera	2	9.4	2	11.0
Homoptera	1	1.4		
Heteroptera	2	3.4	2	6.6
Trombidiformes	1	1.4		
Mantodae	1	1.4	1	2.0

Table 4: Insect orders. Number of species and Relative Abundance (%) for two varieties of eggplant during the late planting season of 2020 in Asaba

Eggplant Varieties				
S. aethiopicum			***S. gilo***	
Order	**Number of species**	**Relative abundance**	**Number of species**	**Relative abundance**
Coleoptera	6	31.0	5	29.0
Hemiptera	2	8.2	2	10.6
Lepidoptera	8	39.0	7	42.6
Orthoptera	2	8.0	1	4.1
Homoptera	1	3.4		
Heteroptera	2	7.0	2	9.8
Mantodae	1	3.0	1	3.9

Insect species associated with two varieties (*Solanum aethiopicum* and *Solanum gilo*) of Eggplant in 2021 planting seasons at Asaba.

Tables 5 shows, the list of insect pest order, families, and scientific names in both varieties during the early planting season of 2021. There were a total of 7 orders, 13 families and 21 insect species for *S. aethiopicum* while insect pests from 5 orders, 9 families and 16 insect species were collected for *S. gilo.* Insect complex associated with both varieties during the early planting of 2021 also shows that *S. aethiopicum* was attacked by more insects.

In Table 6, during the late season of 2021, a total of 6 orders, 11 families and 19 insect species were collected in *S. aethiopicum* experimental plots while insects from 5 orders, 8 families and 14 insect species were collected from *S. gilo* experimental plots.

Tables 7 and 8 shows the orders, number of species and relative abundance of both early and late planting seasons of 2021. In the early planting season, (Table 6) the lepidopterans had the highest species (8) with relative abundance of 48% for *Solanum aethiopicum,* the coleopteran was next with 6 species and a relative abundance of 36.2% while for *Solanum gilo* the Lepidoptera also had the highest species of insect pests

7 with a relative abundance of 44.6% and was also followed by the coleopterans having 4 insect species with a relative abundance of 44.6%.

Insects collected from the orders; Homoptera and Mantodae under *Solanum aethiopicum* during the early season of 2021, were not found in *Solanum gilo*. Insects of the order Homoptera, Mantodae and Heteroptera which were collected from both variety of eggplant during the early plantings had the least number of insects. Table 8 for late season planting of 2021 had similar trend were lepidopteran had more insect pest species with relative abundance of 47.6% and 50.2% for both varieties of eggplants which was followed by the coleopterans. Insect species associated with *Solanum aethiopicum* were more that those of *Solanum gilo* for both early and late planting seasons of 2021 in Asaba.

Table 5: List of insect species associated with two varieties of eggplant during the early planting season of 2021 in Asaba

Eggplant Varieties					
S. aethiopicum			**S. *gilo***		
Order	**Family**	**Insect Species**	**Order**	**Family**	**Insect Species**
Coleoptera	Coccinellidae	*Vigintiocto punctata*	Coleoptera	Chrysomelidae	*Leptinotarsa decemlineate*
	Chrysomelidae	*Leptinotarsa decemlineate*		Curculionidae	*Hypera postica*
	Curculionidae	*Hypera postica*		Chrysomelidae	*Altica Oleracea*
	Chrysomelidae	*Altica Oleracea*		Chrysomelidae	*Epitrix fuscula*
	Chrysomelidae	*Lilioceris lilii*	Hemiptera	Pentatomidae	*Nazara viridila*
	Chrysomelidae	*Epitrix fuscula*		Pentatomidae	*Halyomorpha halys*
Hemiptera	Pentatomidae	*Nazara viridila*	Lepidoptera	Noctuidae	Helithis *zea*
	Aphididae	*Aphis gossypii*		Noctuidae	*Helicoverpa zea*
Lepidoptera	Noctuidae	*Selepa docilis*		Crambidae	*Leucinodes orbonalis*
	Noctuidae	Helithis *zea*		Cicadellidae	*Pseudaletia unipunetata*
	Noctuidae	*Helicoverpa zea*		Noctuidae	*Helicoverpa armigera*
	Crambidae	*Leucinodes orbonalis*		Noctuidae	*Helicoverpa punctigera*
	Cicadellidae	*Pseudalentia unipeinetata*		Noctuidae	*Spodoptera litura*
	Noctuidae	*Helicoverpa armigera*	Orthoptera	Pyrgomorphidae	*Zonocerus variegates*
	Noctuidae	*Helicoverpa punctigera*		Gryllidae	*Gryllus bimaculatus*
	Noctuidae	*Spodoptera litura*	Heteroptera	Pentatomidae	*Aspavia* armigera
Orthoptera	Pyrgomorphidae	*Zonocerus variegates*			
	Gryllidae	*Gryllus bimaculatus*			
Homoptera	Aleyrodidae	*Bemisia tabaci*			
Heteroptera	Pentatomidae	*Aspavia* armigera			
Mantodae	Mantidae	*Mantis religiosa*			

Table 6: List of insect species associated with two varieties of eggplant during the late planting season of 2021 in Asaba

Eggplant Varieties					
S. gilo			***S. aethiopicum***		
Order	**Family**	**Insect Species**	**Order**	**Family**	**Insect Species**
Coleoptera	Curculionidae	*Hypera postica*	Coleoptera	Coccinellidae	*Vigintiocto punctata*
	Chrysomelidae	*Altica Oleracea*		Chrysomelidae	*Leptinotarsa decemlineate*
	Chrysomelidae	*Epitrix fuscula*		Curculionidae	*Hypera postica*
Hemiptera	Pentatomidae	*Nazara viridila*		Chrysomelidae	*Altica Oleracea*
	Pentatomidae	*Halyomorpha halys*		Chrysomelidae	*Epitrix fuscula*
Lepidoptera	Noctuidae	Helithis *zea*		Chrysomelidae	*Psylliodes bretitingheami*
	Noctuidae	*Helicoverpa zea*	Hemiptera	Pentatomidae	*Nazara viridila*
	Crambidae	*Leucinodes orbonalis*		Pentatomidae	*Halyomorpha halys*
	Crambidae	*Leucinodes Cordalis*	Lepidoptera	Noctuidae	Helithis *zea*
	Noctuidae	*Helicoverpa armigera*		Noctuidae	*Helicoverpa zea*
	Noctuidae	*Helicoverpa punctigera*		Crambidae	*Leucinodes orbonalis*
Orthoptera	Pyrgomorphidae	*Zonocerus variegates*		Noctuidae	*Helicoverpa armigera*
	Gryllidae	*Gryllus bimaculatus*		Noctuidae	*Helicoverpa punctigera*
Heteroptera	Pentatomidae	*Aspavia* armigera		Noctuidae	*Spodoptera litura*
			Orthoptera	Pyrgomorphidae	*Zonocerus variegates*
				Gryllidae	*Gryllus bimaculatus*
			Heteroptera	Coreidae	*Acanthocoris scabrator*
				Pentatomidae	*Aspavia* armigera
			Mantodae	Mantidae	*Mantis religiosa*

Table 7: Insect orders. Number of species and Relative Abundance (%) for two varieties of eggplant during the early planting season of 2021 in Asaba

Eggplant Varieties				
S. aethiopicum			***S. gilo***	
Order	**Number of species**	**Relative abundance**	**Number of species**	**Relative abundance**
Coleoptera	6	36.2	4	32.2
Hemiptera	2	4.8	2	9.2
Lepidoptera	8	48.0	7	44.6
Orthoptera	2	4.6	2	10.0
Homoptera	1	2.9		
Heteroptera	1	2.5	1	4.0
Mantodae	1	1.0		

Table 8: Insect orders. Number of species and Relative Abundance (%) for two varieties of eggplant during the late planting season of 2021 in Asaba

Eggplant Varieties				
S. aethiopicum			***S. gilo***	
Order	**Number of species**	**Relative abundance**	**Number of species**	**Relative abundance**
Coleoptera	6	38.0	3	32.4
Hemiptera	2	5.0	2	10.0
Lepidoptera	7	47.6	6	50.2
Orthoptera	2	5.4	2	5.2
Heteroptera	2	3.0	1	2.2
Trombidiformes	1	1.4		
Mantodae	1	1.0		

According to Ghimire and Khatiwa, (2001), insect pest infestation had been a major threat to eggplant cultivation in Nigeria. Pests of the order Lepidoptera have been identified to be most prominent in this study and this is in line with earlier findings of (Olaniran, *et. al*. 2016). Other insect pests orders associated with the varieties of eggplant in this study had also been earlier identified in other findings in parts of Nigeria (Folorunso, et. al., 2020, Indra and Kamini, 2012).

Generally, insect pests causes significant losses in eggplant production, Srinvasan, 2009, stated that lepidopteran which are mainly eggplant fruit borers reduce yield by 70% if left unmanaged. Apart from yield, the growth, flowering and other developmental stage can also be affected. This study exposed the interference of vast number of insect pests on the crop, significant damages were caused on stems and fruits by borers (Lepidoptera), plant growth were also reduced due to severe damages caused on leaves in the apical region of the plants, this is in line with the findings of Kashyap *et al*., 2011 and Liu *et al*., 2010. On the other hand, natural enemies where also attracted to the fields, according to Krips *et al*., lepidopterans can be controlled by biological means like predators and parasitoids who serve as natural enemies. In course of this study, *leucinodes orbonalis* was the most prominent insect pest associated with the crop. Both varieties were attacked but *Solanum aethiopicum* had higher pest load. The coleopterans were also prominent in the fields, they comprises of different types of beetles that caused severe damages to the crop Lui *et al*., 2012 researched on breeding eggplant varieties that could show resistance to coleopteran pests like Epilachna beetle . Coleopteran pests could also cause damages that reduce plant growth, development and lower quality of produce. Eggplant flee beetle and a host of others had earlier been reported to be a significant pest of eggplant in Africa by Maboreke et al., (2013).

IV. Conclusion

The screening of two eggplant varieties *Solanum aethiopicum* and *Solanum gilo* for pest load revealed significant difference in their susceptibility to various insect pests, *Solanum gilo* had a lower pest load compared to *Solanum aethiopicum.* Both varieties of the crop are associated with an array of pest that requires control measures in order to guarantee meaningful production of the crop in the locality. This study thus, recommend that a well mapped out pest control measure that could adequately protect the varieties from pest attacks be put in place to mitigate against damage of plants and loss of fruits.

References

[1]. Chakraborti, S. (2001). A Biorational Approach For The Management Of Brinjal Fruit And Shoot Borer, Leucinodes Orbonalis Guen. Journal Of Entomological Research 25 (1) :73-76.

[2]. Chinedu S.N., Olasimbo, A.C., Eboji, O.K., Emiloju, O.C., Arinola, O.K., Dania, D.I. (2011). Proximate And Phytochemical Analysis Of Solanum Aethiopicum L. And Solanum Macrocarpon L. Fruits, Res. J. Chem. Sci. 1(3): 24-35.

[3]. Danquah, J.A. And K. Ofori (2012).Variation And Circulation Among Agronomic Traits In 10 Accessions Of Garden Eggplant In Ghana. International Journal Of Science And Nature. I,J,S.N, VOL. 3(2) 2012: 373-379

[4]. Dauda, S.N, Aliyu, L., & Chieziey, U.F. (2005).Effect Of Seedling Age Eggplant At Transplanting And Poultry Manure On Fruit Yield And Nutrients Of Garden Egg (Solanum Gilo .L.) Varieties. Journal Of Tropical Science, 5.(2) 38-41.

[5]. Kashyap, S., S. Kumar, S. Maji And D. Kumar. 2014. Effect Of Organic Manures And Inorganic Fertilizers On Growth, Yield And Quality Of Brinjal (Solanum Melongena L.) Cv. Pant Rituraj. Inter. J. Agric. Sci. 10(1): 305-308.
[6]. Kashyap, S., Singh, B And Kumar, V. (2011). Evaluation Of Eggplant Varieties For Resistance To Fruit Borer (Leucinodes Orbonalis). Journal Of Entomological Research,35(2), 147-152.
[7]. Kogbe, J.O.S. (1983). Effects Of Spacing In The Yield Of Local And Exotic Species Of Egg Plant. Acta Hortic. 123, 291-298.
[8]. Krips, O.E.,Witul, A., And Wackers, F.L. (2012). Spider Mite Tetranychus Urticae Population Dynamics On Different Eggplant Varieties. Experimental And Applied Acarology, 56(2), 147-155.
[9]. Levings, S.C And Window, D.M (1984). Litter Anthropods Population In A Tropical Deciduous Forest; Relationship Between Years And Anthrops Groups. Journal Of Animal Ecology, 8411: 61-68.
[10]. Liu, T.X., Kang, L., And Heinz, K.M. (2010). Aphid Population Dynamics On Different Eggplant Varieties. Journal Of Applied Entomology, 134(5), 433-440.
[11]. Maboreke, T.D., Ogola, O.N. And Ochilo, W.N 2013. Damage And Economic Loss Caused By The Eggplant Flea Beetle Epitrix Hirtipennis In Kenya. Journal Of Agricultural Science And Technology, 13(3), 419-428.
[12]. Maraizi, J.O. (2007) The Control Of Fusarium Wilt Of Eggplant Caused By Fasarium Oxysporum F. Sp Melogena In Parts Of Isiala- Ngwa Area Of Abia State. M.Sc Thesis Of Department Of Plant Health. Micheal Okpara University Of Agriculture, Umudike Umaihia Abia State Nigeria Pp 21-30.
[13]. Naranjo, S.E., Ellsworth, P.C., And Diehl, J.W. (2010), Whitefly (Bemisia Tabaci) Population Dynamics On Different Eggplant Varieties. Journal Of Economic Entomology, 103(4), 931-938.
[14]. NIMET (2019). Nigeria Meteorological Agency. Annual Report For 2017 And 2018.
[15]. Omidiji M.O. (1979). Evidence Concerning The Hybrid Origin Of The Local Garden Egg (Solanum Gilo Radi) Nigerian Journal Of Science Vol. 10 (123-135).
[16]. Onuoha, A.I. (2005) Economics Of Resource Use Among Small-Scale Eggplant Farmers In Isiala-Ngwa North Local Government Area Of Abia State, Nigeria. Journal Of Agriculture And Rural Development 8 (2) 36-43.
[17]. Osei, M.K., Banful, 1 B., Osei, C K. And Oluoch, M. O. (2010). Characterization Of African Eggplant For Morphological Characteristics., J. Agric. Sci. Technol., 4 (3), 33-37.
[18]. Pessarakli, M.M., & Dris, R. (2003). Effects Of Pruning And Spacing On The Yield And Quality Of Eggplant. Form Agriculture And Environment. 1(2): 215 – 216.
[19]. Rajam, M.V, Mariska, I.K, Lian, Y, Daunay, M.C, Rotino, G.L, Kashyap, V, Fock, I & Collonnier, C. (2001) Application Of Biotechnology In Eggplant. Plant Cell, Tissue And Organ Culture 65(2), 91-107.
[20]. Raju, S.V.S., Bar, U.K., Shankar, U. And Kumar, S. (2007). Scenario Of Infestation And Management Of Eggplant Shoot And Fruit Borer. Leucinodes Orbonalis GUEN., In: India Resistant Pest Management Newletter 16 (2): 14-16.
[21]. Srinivasan, R. (2009).Eggplant Fruit Borer (Leucinodes Orbonalis); A Review Of Its Biology And Management. Journal Of Horticultural Science And Biotechnology, 84(5), 531-538.
[22]. Tindal, H.D. (1983). Vegetables In The Tropics, Pp.370 -371. Macmillan Education Limited. Houndmaills, Basingstoke, Hampshire.
[23]. Waldrum, J.D., Brady, P.L., And Spradley, J.P. (1996). Pesticides Residues In Food: Safety Issue. Ipm.Ncsu.Edu/Safety/Factsheet
[24]. Zimmermann G. (1993) The Entomopathogenic Fungus Metarhizium Anisopliae And Its Potential As A Biocontrol Agent. Pesticide Science.; 37:375-379