World Journal of Advanced Research and Reviews
eISSN: 2581-9615 CODEN (USA): WJARAI
Cross Ref DOI: 10.30574/wjarr
Journal homepage: https://wjarr.com/

(RESEARCH ARTICLE)

Check for updates

Incidence of *Leucinodes orbonalis*, Guenée (Lepidoptera: Crambidea) in Eggplant Crops in Côte d'Ivoire

OBODJI Adagba [1,*], ASSI Apie Nadège Marina [1], YAO N'guessan [2] and N' GUESSAN Ehipka Naomie Melinand [1]

[1] *Department of Science and Technology, Alassane Ouattara University of Bouaké, BPV 18 Bouaké 01, Côte d'Ivoire.*
[2] *Department of Agronomy and Forestry, Jean Lorougnon Guédé University of Daloa, BP 150 Daloa, Côte d'Ivoire.*

World Journal of Advanced Research and Reviews, 2026, 30(01), 1291-1296

Publication history: Received on 03 March 2026; revised on 09 April 2026; accepted on 11 April 2026

Article DOI: https://doi.org/10.30574/wjarr.2026.30.1.0924

Abstract

African eggplant, *Solanum aethiopicum* is a most important vegetable in Côte d'Ivoire. It is commercially very accessible and profitable for farmers. It is attacked by several insect pests, including *Leucinodes orbonalis*. A study was carried out in the locality of Azaguié Ahoua located in the southern of Côte d'Ivoire, to determine the incidence of *L. orbonalis* on eggplant crops. Four elementary plots, each containing 48 plants, constituted the experimental field. Sampling consisted of randomly selecting 24 plants and counting infested and uninfested shoots. During the fruiting phase, in addition to counting the shoots, infested and uninfested fruits were also counted. Infestation rates of shoots and fruits were calculated. The average infestation rate of shoots, low at the beginning of pre-flowering (7.43 ± 1.2%), gradually increased to a peak of 65.34 ± 3.27 % at full fruiting phase. The average infestation rate of fruits at the beginning of fruiting phase (21.72 ± 1.48 %) also increased, reaching a peak of 83.15 ± 2.24 % at full fruiting. Then, average infestation rates of shoots and fruits decreased to reach low average infestation rates at the end of the cycle of brinjal plants with 14.43 ± 1.36 % and 16.83 ± 1.54 % respectively.

Keywords: Incidence; *Leucinodes orbonalis*; Eggplant; *Solanum aethiopicum*; Average infestation rate

1. Introduction

Eggplant cultivation in Côte d'Ivoire is an important vegetable crop for the food security of the population [1,2,3]. Eggplant is cultivated in several regions of Côte d'Ivoire and this helps to fight poverty because it is a source of income for producers through its marketing [4,5]. Unfortunately, eggplant cultivation is attacked by several insect pests, including *Leucinodes orbonalis* causes significant damage [6]. This is a Lepidopteran of the family Crambidea or Pyralidea . The adult of this insect is nocturnal butterfly, and the adult female lays eggs at night on the upper surface of young leaves, flower buds, or fruit calyxes. The number of eggs laid per female varies on average between 80 and 253 [7,8]. Shortly after hatching, the larva penetrates the shoot, bud flower, flower and fruit. It consumes the inside of the organ, causing the destruction of internal tissues and thus hindering plant growth [9]. In Côte d'Ivoire, with a view to effective control of *L. orbonalis*, the present study aims to assess the incidence of this insect's larvae according to the phenological phases of plant.

* Corresponding author: OBODJI Adagba

2. Materials and methods

2.1. Study area

The study was conducted in Azaguié Ahoua , located in southern of Côte d'Ivoire with a latitude: 5°37' N and a longitude 4°02'W. The climate is subequatorial characterized by four seasons: two annual rainy seasons from April to mid- July and September to November and two dry seasons from mid-July to August and December to March [10,11].

2.2. Experimental field

The plants transplanted to the experimental field were the african eggplant, *Solanum aethiopicum.* The experimental field covered an area of 120 m^2 and was divided into four subplots, each 3 meters apart. Each subplot consisted of four rows of 12 plants each. The spacing between rows was 1 meter. Within the same row, plants were separated by 0.8 meters. The total number of plants per subplot was 48, and the total number of plants in the experimental plot was 192. The plants in the experimental field were not treated with insecticide.

2.3. Counting of uninfested and infested shoots and fruits

Sampling consisted of randomly selecting 24 brinjal plants from each subplot and counting infested and uninfested shoots and fruits. Observations for shoot counting were carried out regularly, at weekly intervals, starting at 23 days after transplanting. During the pre-flowering and flowering phases, infested and uninfested shoots were counted. During the fruiting phase, in addition to counting the shoots, infested and uninfested fruits were also counted after harvest. Infestation rates of shoots and fruits were calculated using the following formulas :

$$\text{Infestation rate of shoots} = \frac{\text{Number of infested shoots}}{\text{Total number of shoots}} \times 100$$

$$\text{Infestation rate of fruits} = \frac{\text{Number of infested fruits}}{\text{Total number of fruits}} \times 100$$

2.4. Statistical analysis

All data recorded were subjected to Analysis of Variance (ANOVA) using Statistica version 7.1 software. The means were compared using Tukey's HSD test at a 5% significance level ($p < 0.05$).

3. Results and discussion

3.1. Description of the damage caused by *L. orbonalis* larvae

The larvae of *L. orbonalis* cause damage to shoots during three phenological phases of the plant. During fruiting phase, in addition to attacking the shoots, they infest the fruit. The larvae penetrate the young shoots by boring into them. Once inside the shoots, they develop by consuming the pith parenchyma. They progress through the shoots and eventually cause their death, thus slowing the plant's growth (Figure 1a).

Damage of the fruit is characterized by internal infestation. After hatching, the larvae penetrate the fruit where they develop, partially or completely consuming the interior. Galleries containing larval excrement are then observed within the fruit. The fruit rots from the inside and thus becomes unfit for consumption (Figure 1b). Similar observations were made by [9] who indicated that within one hour of hatching, *L. orbonalis* larvae bore into the nearest tender shoot, flower, or fruit and penetrate these organs to feed and develop. Fruit infestation is followed by a secondary fungal infestation that further reduces fruit quality, as reported by [12]. This renders the fruit inedible. The consumption of internal tissues leads to stunted growth and a reduction in the number and size of the fruit [13].

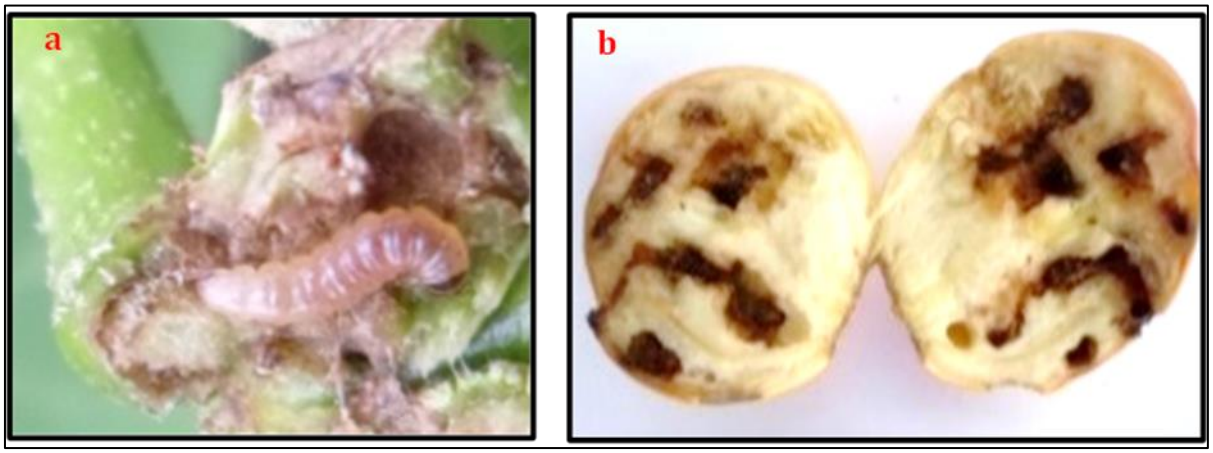

Figure 1 Shoot (a) and fruit (b) infested by the larva of *L. orbonalis.*

3.2. Assessment of damage caused by *L. orbonalis* larvae to shoots and fruits

3.2.1. Infestation of shoots during the pre-flowering phase (phase before flowering) and flowering phase

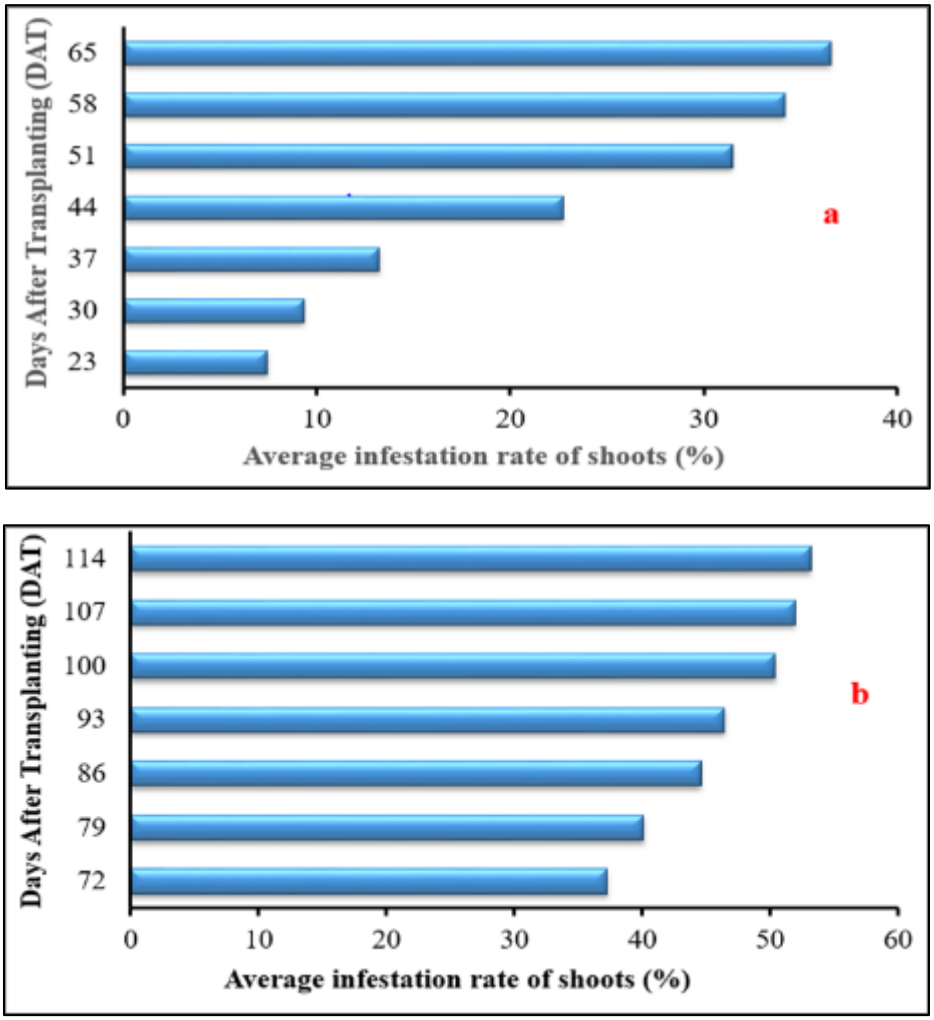

Figure 2 Infestation rate of shoots in the pre-flowering (a) and at the flowering(b) phases

During the pre-flowering phase, in the first week of sampling which at 23th days after transplanting (DAT), average infestation rate of shoots was low at 7.43 ± 1.2%. This average rate gradually increased to 36.54 ± 2.38% at the end of pre-flowering (65 DAT) (Figure 2a). At the beginning of flowering (72 DAT), the average infestation rate of shoots, which

was 37.28 ± 1.23%, increased to a high average infestation rate of 53.18 ± 2.52 % at the end of flowering (114 DAT) (Figure 2b).

The first infestations were observed in the first week of sampling (23 DAT) and the low average infestation rate would be due to the fact that the plants had a small number of shoots that became infested. [14] reported in their work that the first infestations were observed from 35 DAT and [15] who mentioned the first infestations from 30 DAT. Progressive increase the average infestation rate during the pre-flowering and flowering phases could be explained by the fact that, as the plant develops, the new tender shoots that appear are infested by *L. orbonalis* larvae. Our results are close to those of [16] who reported a progressive increase in the rate of infestation of shoots from January to July after transplanting of brinjal plants.

3.2.2. Infestation of shoots and fruits during the fruiting phase

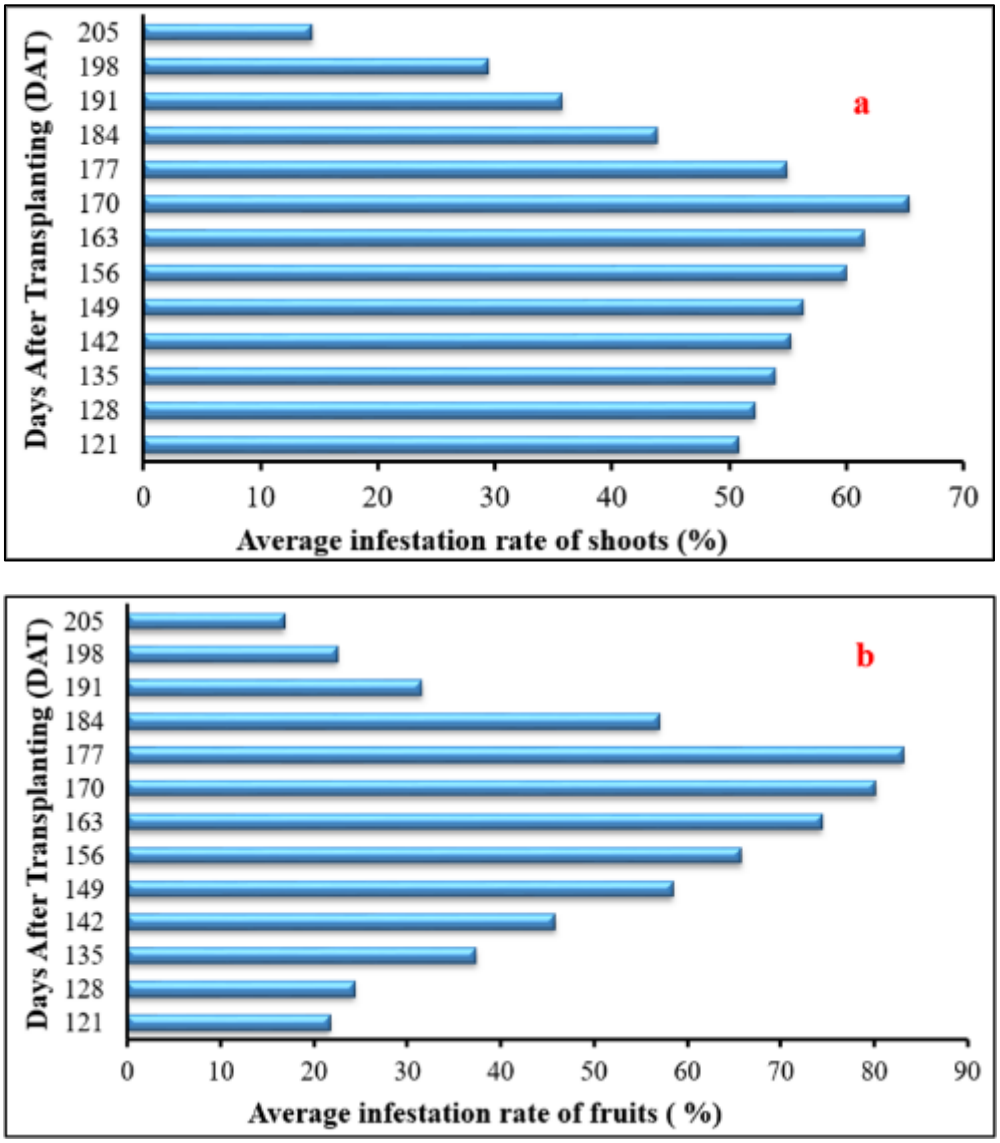

Figure 3 Infestation rate of shoots (a) and fruits (b) at the fruiting phase

At the beginning of fruiting (121 DAT), the average infestation rate of shoots, which was 50.85±1.41%, increased to 65.34 ± 3.27 % at full fruiting (170 DAT). This average rate decreased to 14.43 ± 1.36 % at the end of the plant cycle (205 DAT). (Figure 3a).

The average infestation rates of fruits varied between 16.83 ± 1.54 % and 83.15 ± 2.24 %. The infestation rate, which was 21.72 ± 1.48 % at 121th DAT, increased progressively until reaching a peak of 83.15 ± 2.24 % at full fruiting (177 DAT). This average rate gradually decreased to 16.83 ± 1.54 % at the end of fruits harvest (205 DAT) (Figure 3b).

Progressive increase the average infestation rates of shoots and fruits, reaching peaks during full fruiting, is thought to be due to the fact that well developed brinjal plants attract a large number of female *L. orbonalis.* After laying numerous eggs, these eggs hatch, and the larvae penetrate the shoots and numerous fruits to consume the internal organs, as reported by [9]. The increase of average infestation rates could also be due to abiotic factors that promote infestation of shoots and fruits by *L. orbonalis* larvae. This hypothesis was confirmed by [17] and then by [18] who reported that the damage caused by *L. orbonalis* larvae varies according to the seasons, as high temperatures and humidity favor the development of populations of this borer of eggplant shoots and fruits.

The gradual decrease of average infestation rates until the end of the cycle is thought to be due to the aging of the brinjal plants, whose number of tender shoots and fruits has decreased. The brinjal plants would no longer be attractive to female *L. orbonalis.* Consequently, egg-laying rates have decreased, and infestations have also declined. This decrease is also attributed to abiotic factors. [19] in their work in India reported that the decrease in fruit infestation rates during the dry season was linked to increased temperature and decreased rainfall, while during the rainy season the decrease in infestation rates was due to decreased temperature and increased rainfall.

4. Conclusion

The study showed that the larvae of *L. orbonalis* cause damage to shoots and fruits. Average infestation rates of shoots increased progressively from pre-flowering until they peaked during full fruiting. Average infestation rates of fruits also increased from the beginning of fruiting, reaching their peak during full fruiting. Then average infestation rates of shoots and fruits decreased, reaching low levels at the end of the brinjal plant's cycle. The fruiting phase is the most affected by *L. orbonalis* larvae because both shoots and fruits are infested. Therefore, be necessary to emphasize to this fruiting phase of the plant when controlling this pest.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

References

[1] N'Tamon NG. Caractérisation agromorphologique de quelques cultivars d'aubergine (*Solanum ssp*) collectés dans diverses zones ecologique de Côte d'Ivoire. Mémoire de fin de cycle d'ingenieur de l'IPR / IFRA de Katibougou (Mali). 2007 ; 69 p.

[2] Fondio L., N'tamon L.N., Hala F.N., Djidji A H. Evaluation agronomique de six cultivars d'aubergine africaine (*Solanum* spp.) de la nouvelle collection des plantes légumières du CNRA, Agronomie Africaine. 2008 ; 20 (1) : 69 -79.

[3] Coulibaly ND, Fondio L, N'gbesso MF. Évaluation des performancesagromorphologiques de neuf cultivars d'aubergine en station au Centre de la Côte d'Ivoire. Afrique Science. 2021 ; 18 (1) : 1-11.

[4] Fondio L, Kouamé C, N'zi JC, Mahyao A, Agbo E, Djidji AH. Survey of Indigenous Leafy Vegetable in the Urban and Peri-urban Areas of Côte d'Ivoire. In : M. L. Chadha *et al*. (Eds.). Indigenous Vegetables and Legumes: prospects forfighting Poverty, Hunger and Malnutrition. Proceedings of the 1st International Conference, ICRISAT Campus, Patancheru Hyderabad, India, December 12-15, 2006 , Drukkerij Geers, Gent, Belgium. 2007 ; 287-289.

[5] Ducroquet H, Tillie P, Louhichi K, Gomez SP. L'agriculture de la Côte d'Ivoire à la loupe. Etat des lieux des filières de production végétales et animales et revue des politiques agricoles ». EUR 28754 FR, Publications Office of the European Union, Luxembourg, 2017; 34-37.

[6] [6] Obodji A, Aboua LRN, Tano DKC, Seri-Kouassi BP. Inventory of entomofaune associated with African eggplant (*Solanum aethiopicum* L.) according to the phonological stages assessment of damages caused by insect pests. Journal of Advanced Studies in Agricultural and Environmental Sciences. 2016; 3 (2) : 14-21.

[7] Taley YM, Nighut US, Rajurkar BS. Bionomics of brinjal fruit and shoot borer, (*Leucinodes orbonalis* Guénee). Punjabrao Krishi Vidyapeeth Research Journal. 1984 ; 8 (1) : 29-39.

[8] Alpuerto AB. Ecological studies and management of brinjal fruit and shoot borer, *Leucinodes orbonalis* Guenee. Indian Journal of Agricultural Sciences. 1994 ; 52 **(**6) : 391- 395.

[9] Alam SN, Hossain MI, Rouf FMA, Jhala RC, Patel MG.Implementation and promotion of an IPM strategy for control of eggplant fruit and shoot borer in South Asia. Technical Bulletin No. 36. AVRDC publication number 06-672. AVRDC-The World Vegetable Center, Shanhua,Taiwan. 2006 ; 74 p.

[10] Vennetier P, Laclavère C. Atlas de la Côte d'Ivoire. Ed. Jeune Afrique. 1978 ; 72p.

[11] Anonymous. Le climat de la Côte d'Ivoire - Service météorologique-Abidjan. 1979; 74p.

[12] Islam MN, Karim MA. Management of the brinjal shoot and fruit borer, *Leucinodes orbonalis* Guen, (Lepidoptera: Pyralidae) in field. In: Annual Research Report 1990-91. Entomology Division, Bangladesh Agriculture Research Institute Joydebpur, Gazipur. 1991 ; 44-46.

[13] Atwal AS, Dhaliwal GS. Agricultural Pests of South Asia and Their Management. Kalyani Publisher, New Delhi. 2007; 312-313.

[14] Tiwari G, Prasad CS, Kumar A, Nath L. Influence of Weather Factors on Population Fluctuation of Pest Complex on Brinjal. Annals of Plant Protection Sciences. 2012 ; 20 (1) : 68-71.

[15] Kaur P, Yadav GS, Wargantiwar RK. Burange PS.Population dynamics of brinjal shoot and fruit borer, *Leucinodes orbonalis* Guenee (Lepidoptera: Crambidae) under agroclimatic conditions of Hisar, Haryana, India. The Ecoscan. 2014 ; 8 (1&2) : 1-5.

[16] Mannan MA, Islam KS, Jahan M. Brinjal shoot and fruit borer infestation in relation to plant age and season. Bangladesh J. Agril. Res. 2015; 40 (3) : 399-407.

[17] Shukla A, Khatri SN. **I**ncidence and abundance of brinjal shoot and fruit borer *Leucinodes orbonalis* Guenee. The Bioscan. 2010 ; 5(2) : 305-308.

[18] Bhushan S, Chaurasia HK, Shanker R. Efficacy and economics of pest management modules against brinjal shoot and fruit borer (*Leucinodes orbonalis*). The Bioscan. 2011; 6 (4) : 639-642.

[19] Kariyanna B, Prabhuraj A, Bheemanna M, Mohan M, Basavaraj K, Pampanna Y, Diwan JR. Influence of cultivars on population dynamics of brinjal shoot and fruit borer *Leucinodes orbonalis*. Indian Journal of Entomology. 2021; 83 (1) : 99-102.