

International Journal of Advanced Biochemistry Research



ISSN Print: 2617-4693
ISSN Online: 2617-4707
NAAS Rating (2025): 5.29
IJABR 2025; 9(11): 591-594
www.biochemjournal.com
Received: 12-09-2025
Accepted: 15-10-2025

Priyanka M
PG Scholar, Department of
Entomology, College of
Agriculture, Kerala
Agricultural University,
Vellayani, Kerala, India

Nithya PR
Assistant Professor,
Department of Entomology,
College of Agriculture, Kerala
Agricultural University,
Vellayani, Kerala, India

Gavas Ragesh
Associate Professor
(Entomology), Banana
Research Station, Kerala
Agricultural University,
Kannara, Kerala, India

Sheeja K Raj
Associate Professor,
Department of Agronomy,
College of Agriculture, Kerala
Agricultural University
Vellayani, Kerala, India

Corresponding Author:
Priyanka M
PG Scholar, Department of
Entomology, College of
Agriculture, Kerala
Agricultural University,
Vellayani, Kerala, India

Host preferences for oviposition by Banana Pseudostem Weevil (*Odoiporus longicollis*): A comprehensive review

Priyanka M, Nithya PR, Gavas Ragesh and Sheeja K Raj

DOI: <https://www.doi.org/10.33545/26174693.2025.v9.i11h.6381>

Abstract

Odoiporus longicollis (banana pseudostem weevil) is a major pest of bananas in South and Southeast Asia, causing 10-90% yield loss across cultivars. This review summarizes key findings on its biology, developmental stages, host preference, and oviposition behaviour. Females preferentially oviposit in the central and upper pseudostem regions, guided by plant volatiles, tissue moisture, and seasonal humidity. Susceptible cultivars such as Nendran and Poovan support higher oviposition, whereas Robusta, Karpuravalli, and *Musa balbisiana* types show biochemical and structural resistance. Nocturnal activity, aggregation behaviour, and concealed larval tunnelling complicate management. Current strategies rely on sanitation, pseudostem trapping, limited insecticide use, and emerging IPM tools including semiochemicals and biological agents. Understanding the pest's oviposition ecology is crucial for developing sustainable management and resistant banana varieties.

Keywords: *O. longicollis*, banana pseudostem weevil, oviposition behaviour, host plant resistance, banana cultivars, pseudostem characteristics, semiochemicals, pest management, integrated pest management (IPM)

Introduction

Banana is a major fruit crop globally and holds the foremost position in India's annual production of 40 million tonnes (FAOSTAT, 2014) [11]. Among the weevils attacking banana, *Odoiporus longicollis* Olivier, the banana pseudostem weevil (BPW), is the most destructive compared with *Cosmopolites sordidus* and *Polytus mellerborgi*. This monophagous pest infests banana at multiple growth stages across tropical regions and poses severe constraints to production. Infestation during the late preflowering phase significantly affects bunch emergence and flowering (Padmanaban *et al.*, 2001) [32]. The problem is particularly severe in southern India, especially Tamil Nadu and Kerala (Reghunath *et al.*, 1992; Gailce Leo Justin *et al.*, 2008) [45, 14]. Oviposition punctures and larval tunneling weaken pseudostems, causing wilting, breakage, and heavy yield loss (Ravi and Palaniswami, 2002; Anitha, 2004) [43], ranging from 10-90% depending on management practices (Prasuna *et al.*, 2008) [39].

Description of insect

The adult weevil is a robust insect (1.3-2.0 cm long) with coloration ranging from reddish brown to black (Singh, 1966; Dutt and Maiti, 1971) [52, 9]. Adults possess elongated snouts with biting mouthparts and elbowed antennae (Shukla and Kumar, 1969) [49]. Morphometric variations occur between sexes, with females having longer rostrums and males showing denser rostral punctations (Jayasree, 1992; Janakiraman, 1998) [23, 22]. Color variation from brown to black occurs with age and is not associated with sexual dimorphism (Dutt and Maiti, 1972; Gailce *et al.*, 2008) [14, 7]. Eggs are creamy white, smooth, cylindrical, and laid singly in moist regions of the pseudostem, measuring about 2-3 mm long (Jayasree, 1992; Janakiraman, 1998) [23, 22]. Incubation lasts 3-5 days depending on temperature, with high viability noted across studies (Krishnan and Jayaprakas, 2016) [25]. Female fecundity varies widely; earlier studies reported 50-100 eggs per female, whereas recent investigations indicate 55-65 eggs, influenced by mating duration and physiological conditions (Krishnan *et al.*, 2015; Justin *et al.*, 2008) [26, 14]. Pre-oviposition periods of 18-33 days and oviposition spans of 17-26 days are documented, with egg-laying favoring moist tissues and

occurring during early morning and late evening hours (Padmanaban & Sundararaju, 2002) [32].

The grubs are apodous, yellowish-white, with strong dark mandibles suited for internal tunneling (Singh, 1966; Dutt and Maiti, 1972) [52, 7]. Five larval instars progressively increase in size, with instar durations cumulatively spanning 25-43 days (Jayasree, 1992; Janakiraman, 1998) [23, 22]. Feeding occurs continuously within leaf sheaths and true stem, with later instars consuming large amounts of pseudostem tissue (Krishnan *et al.*, 2016) [15]. Head capsule width increases in a predictable pattern across instars, influenced by seasonal temperature regimes (Prasad and Singh, 1988) [38]. Pupation occurs inside a fibrous cocoon constructed from plant tissue. Pupae are exarate, pale yellow, and measure 17-37 mm in length; pupal duration ranges from 10 to 44 days depending on season (Dutt and Maiti, 1972; Jayasree, 1992; Janakiraman, 1998) [7, 23, 22].

Adult longevity varies across climatic conditions, with reported lifespans ranging from 44 days (Padmanaban & Sathiamoorthy, 2001) [33] to over 200 days under favorable conditions (Ravi & Palaniswami, 2002) [43]. Females generally live longer than males (Krishnan *et al.*, 2016) [15]. Laboratory studies often report shorter lifespans (75-80 days), whereas field conditions with decaying pseudostems support extended survival (Jayasree, 1992) [23]. Life table studies reveal environmental temperature strongly influences development time, with faster development at 35 °C and slower at 20 °C (Krishnan *et al.*, 2015) [16]. The species exhibits high survival in early stages and R-strategist tendencies across environmental gradients.

The pest's damage results primarily from continuous boring and tunneling within the pseudostem by larvae, with adults contributing through feeding beneath leaf sheaths. Damage symptoms include pinhead-sized holes, fibrous extrusions, gummy exudation, internal tunneling, foul odor due to secondary infections, and stem breakage (Froggatt, 1928; Jayasree, 1992; Padmanaban & Sathiamoorthy, 2001) [23, 33]. Severe infestation affects peduncle and bunch development, leading to shriveled fruits and substantial yield reductions. Being predominantly nocturnal, adults show negative phototropism, thigmotropism, and hydrotropism, and often display death mimicry when disturbed (Kung, 1955) [27]. Population peaks occur during monsoon and post-monsoon seasons. Adults prefer cooler, humid microenvironments and are active between 17-27 °C (Shukla & Tripathi, 1978) [48].

Host preference and feeding behavior

Host preference varies widely among banana cultivars. Susceptibility is influenced by morphological and biochemical traits including leaf sheath compactness, pseudostem girth, tissue softness, and phytochemical composition. Varieties like Nendran and Poovan are highly susceptible, whereas ABB group cultivars (Karpuravalli, Robusta, Wild Balbisiana) exhibit relative resistance (Gailce *et al.*, 2006; Krishnan & Jayaprakas, 2016; Alagesan *et al.*, 2016) [15, 25, 1]. Resistant varieties often contain higher levels of phenols, flavonoids, tannins, and alkaloids (Siji & Nandini, 2016) [51], contributing to antixenosis or antibiosis. In extensive evaluations of 316 accessions, all showed some susceptibility, but ornamental *Musa* species (*Rhodochlamys* group) exhibited the least infestation, indicating potential resistance sources (Padmanaban *et al.*, 2020) [34].

Oviposition behavior is influenced by plant physical characteristics such as resistant tissues, sheath tightness, and

presence of inter-sheath gaps. Chemical cues play a key role, with electrophysiological and olfactometer studies showing that pest antennal responses are heightened by synergistic interactions between male-produced volatiles and plant extracts (Prasuna *et al.*, 2008) [39]. Seasonal factors strongly regulate oviposition, with highest activity during monsoon months when pseudostem moisture is optimal (Padmanaban *et al.*, 2001) [33]. Monoculture systems harbor higher infestations than diversified cropping systems due to improved host detectability (Ravi & Palaniswami, 2002) [43].

Distribution

The species is widely distributed across South and Southeast Asia, including India, Sri Lanka, China, Malaysia, Indonesia, and Thailand (Valmayor *et al.*, 1994) [56]. Reports trace its presence across various Indian states including Bihar, Assam, West Bengal, Kerala, Tamil Nadu, and Northeastern regions (Lefroy, 1909; Dutt & Maiti, 1970; Visalakshi *et al.*, 1989) [57].

Management

Management of BPW traditionally relies on chemical insecticides such as monocrotophos stem injection, pseudostem treatment, and fumigation. However, chemical methods pose environmental and health risks and often fail to reach internal feeding stages. Cultural practices including destruction of infested pseudostems, use of clean planting material, and pseudostem trapping remain integral components of IPM (Padmanaban *et al.*, 2002) [32]. Semiochemical-based approaches, though still developing, show promise for future monitoring and control (Prasuna *et al.*, 2008; Sahayaraj *et al.*, 2015) [39, 46]. Botanical pesticides (neem oil, Gliricidia, Lantana) and biological agents (entomopathogenic fungi) offer eco-friendly alternatives and have shown potential in reducing pest populations (Justin *et al.*, 2008) [14]. Considering the pest's cryptic nature and extended lifespan, integrated management that combines resistant varieties, cultural sanitation, and semiochemical-based tools offers the most sustainable long-term approach.

Conclusion

The banana pseudostem weevil, *O. longicollis*, remains a major constraint in banana cultivation due to its concealed larval feeding, wide host range, and strong ovipositional preference influenced by pseudostem traits. Significant variation in susceptibility among cultivars highlights the importance of host plant resistance as a sustainable management tool. Understanding the pest's biology, behaviour, and chemical ecology provides critical insights for developing semiochemical-based monitoring and integrated pest management strategies. Strengthening resistant cultivar deployment, cultural sanitation, and eco-friendly control methods will be essential for long-term suppression of this destructive pest.

References

1. Alagesan A, Tharani G, Padmanaban B, Vijayakumar TS, Manivannan S. Screening and characterization of developing resistant cultivar against *Odoiporus longicollis* (Olivier) (Coleoptera: Curculionidae) using reference genotypes in India. *Int J Pharm Sci.* 2016;8:223-226.

2. Nair A. Clonal susceptibility and age preference of banana pseudostem weevil, *Odoiporus longicollis* Oliv. Insect Environ. 2004;10(3):132-134.
3. Azam M, Tara JS, Ayri S, Feroz M, Ramamurthy VV. Bionomics of *Odoiporus longicollis* Olivier (Coleoptera: Rhynchophoridae) on banana plant (*Musa paradisica*). Mun Ent Zool. 2010;5(2):627-635.
4. Batra UN. Occurrence of three banana pests at Delhi. Indian J Ent. 1952;14:60-60.
5. Charles JSK, Thomas MJ, Menon R, Premalatha T, Pillai SJ. Field susceptibility of banana to pseudostem borer, *Odoiporus longicollis* (Olivier). In: Abstracts, Symposium on Technological Advancement in Banana Plantain Production and Processing, India-International. 1996. p. 32-32.
6. Dias SJF. Report of the work of the division of plant pest control. Adm Rep Div Agric Ceylon. 1935;1-4.
7. Dutt N, Maiti BB. Bionomics of the banana pseudostem weevil, *Odoiporus longicollis* Oliv. (Coleoptera: Curculionidae). Indian J Entomol. 1972;34:150-155.
8. Dutt N, Maiti BB. Studies on banana pseudostem weevil, *Odoiporus longicollis* Oliv. Indian J Entomol. 1974;36:132-138.
9. Dutt N, Maiti BB. Occurrence of non-sex limited variation in conspecific sympatry of banana pseudostem weevil *Odoiporus longicollis* Oliv. (Coleoptera: Curculionidae). Sci Cult. 1971;37:572-574.
10. Edward JE, Tripathi SC, Singh KP. Observations on a tip-over disease of banana in Allahabad. Curr Sci. 1973;42:696-697.
11. FAO. FAOSTAT Statistical Database. Rome: Food and Agriculture Organization of the United Nations; 2014.
12. Fletcher TB. Report of the Imperial Entomologist. Rept Agric Res Inst Coll Pusa, Calcutta. 1914;62-75.
13. Frogatt JL. The Banana Weevil Borer in Java with Notes on Other Crop Pests. Batavia, Java: Govt Press; 1928.
14. Gailce Leo Justin C, Leelamathi M, Nirmaljohnson SB. Bionomics and management of the pseudostem weevil *Odoiporus longicollis* Oliver (Coleoptera: Curculionidae) in banana—A review. Agric Rev. 2008;29:185-192.
15. Gailce LJ, Rajkumar CD, Nirmalatha JD, Joshua JP, Jayasekhar M. Dose optimization of insecticides for the management of the pseudostem weevil *Odoiporus longicollis* (Coleoptera: Curculionidae) on banana. Agric Sci Dig. 2006;26:117-119.
16. Gold CS, Messiaen S. The banana weevil *Cosmopolites sordidus*. Musa Pest Fact Sheet No. 4. Montpellier, France: INIBAP; 2000.
17. Gold CS, Pena JE, Karamura EB. Biology and integrated pest management for the banana weevil *Cosmopolites sordidus* (Germar) (Coleoptera: Curculionidae). Integ Pest Manag Rev. 2001;6(2):79-155.
18. Gupta SR. Entomology Report, Dept of Agriculture, Assam, 1926-27. 1927;31-32.
19. Hiremath S, Mutthuraju G, Doddabasappa B, Ahmed T. Biology and incidence of banana pseudostem weevil, *Odoiporus longicollis* in Mysuru region. Int J Adv Biochem Res. 2024;8:712-715.
20. Hoffman WE. Observations on a weevil injurious to banana. Hong Kong Nat. 1933;4:48-54.
21. Isahaque NDM. Note on the incidence of *Odoiporus longicollis* Oliver on banana in Assam. Pesticides. 1978;12(6):22-24.
22. Janakiraman S. Biology and management of banana pseudostem borer, *Odoiporus longicollis* Oliv. (Coleoptera: Curculionidae). M.Sc. (Ag) thesis. Coimbatore: Tamil Nadu Agricultural University; 1998. 155 p.
23. Jayasree TV. Biology of banana pseudostem weevil. M.Sc. (Ag) thesis. Thrissur: Kerala Agricultural University; 1992. 49 p.
24. Jepson FP. Report on work of division of plant pest control. Adm Rep Div Agric Ceylon. 1934;104-124.
25. Krishnan JU, Jayaprakas CA. Biology and host preference of *Odoiporus longicollis* Oliver (banana pseudostem weevil). Int J Sci Res. 2016;5(6):2460-2465.
26. Krishnan JU, Jayaprakas CA, Lekshmi NR. A review on the biology, distribution and management of *Odoiporus longicollis* Oliver (banana pseudostem weevil). Thai J Agric Sci. 2015;48(4):207-215.
27. Kung KS. The banana stem-borer weevil *Odoiporus longicollis* Olivier in Taiwan. J Agric Forum (Taiwan). 1955;4:80-113.
28. Lefory HM. Indian Insect Life. London: W. Tracker & Co.; 1909. 780 p.
29. Luo LY, Luo QC, Yao X, Liu ZL. Weevil injurious to banana in Guizhou (China) and their biological features. Insect Knowledge. 1985;22:265-267.
30. McSwiney L. Report of the Agricultural Department Assam for the year ending 3rd March 1920. Shillong; 1920. p. 6-7.
31. Nahif AA. Perspectives for the New Millennium. Thiruvananthapuram, India: University of Kerala; 2000.
32. Padmanaban B, Sundararaju P, Cannayane I, Hussaini SS. Effect of entomopathogenic nematode *Heterorhabditis indica* (PDBC EN 13.3) on banana stem weevil *Odoiporus longicollis* Olivier (Coleoptera: Curculionidae) *in vitro*. Indian J Nematol. 2002;32(2):203-204.
33. Padmanaban B, Sathiamoorthy S. The banana stem weevil *Odoiporus longicollis*. Musa Pest Fact Sheet No. 5. Montpellier, France: INIBAP; 2001.
34. Padmanaban B, Kannan M, Uma S, Saraswathi MS, Backiyarani S, Ashif K. Field evaluation and *in vivo* screening of *Musa* germplasm against banana stem weevil *Odoiporus longicollis*. J Entomol Zool Stud. 2020;8(1):290-296.
35. Padmanaban B, Sundararaju P, Velayudhan KC, Sathiamoorthy S. Evaluation of *Musa* germplasm against banana weevil borers. InfoMusa. 1999;10:26-28.
36. Padmanaban B, Sundararaju P, Sathiamoorthy S. Incidence of banana pseudostem borer *Odoiporus longicollis* (Oliv.) (Coleoptera: Curculionidae) in banana peduncle. Indian J Entomol. 2001;63(2):202-204.
37. Padmanaban B, Sundararaju P, Velayudhan KC, Sathiamoorthy S. Evaluation of *Musa* germplasm against banana weevil borers. InfoMusa. 2001;12(1):25-28.
38. Prasad B, Singh OL. Application of Dyar's law to the study of larval instars of *Odoiporus longicollis* (Oliv.)

- (Coleoptera: *Curculionidae*) during different seasons of the year. Indian J Entomol. 1988;50(2):120-125.
39. Prasuna AL, Jyothi KN, Prasad AR, Yadav JS, Padmanaban B. Olfactory responses of banana pseudostem weevil *Odoiporus longicollis* Olivier (Coleoptera: *Curculionidae*) to semiochemicals from conspecifics and host plant. Curr Sci. 2008;94(7):896-900.
 40. Preetha K, Kavitha K, Elanchezhian K, Srinivasan MR. Infestation and management of banana pseudostem borer *Odoiporus longicollis* Oliver. AATCC Rev. 2023;11(3):489. doi:10.58321/AATCCReview.2023.11.03.489.
 41. Priyadarshini IG, Mukherjee U, Kumar N. Biology and seasonal incidence of pseudostem weevil *Odoiporus longicollis* Oliver (Coleoptera: *Curculionidae*) in banana. Pest Manag Horticult Ecosyst. 2014;20(1):8-13.
 42. Ram S, Pathak KA. Occurrence and distribution of pest complex of some tropical and temperate fruits in Manipur. Bull Entomol. 1987;28:12-18.
 43. Ravi G, Palaniswami MS. Evidence for a female-produced sex pheromone in the banana pseudostem weevil *Odoiporus longicollis* Olivier. Curr Sci. 2002;82(5):648-654.
 44. Reddy DS, Madhumathi C, Naveena H, Chowdary LR. Field evaluation of *Musa* germplasm for resistance against banana stem weevil *Odoiporus longicollis* (Olivier) (Coleoptera: *Curculionidae*) in Kadapa district of Andhra Pradesh. J Appl Nat Sci. 2015;7(1):1-4.
 45. Reghunath P, Visalakshi A, Mathew TB, Mohandas N, Beevi SN, Remamani KS. Insecticidal management of the pseudostem borer *Odoiporus longicollis* Oliver (Coleoptera: *Curculionidae*) in banana. J Trop Agric. 1992;30:75-78.
 46. Sahayaraj K, Kombiah P, Dikshit AK, Rathi JM. Chemical constituents of the essential oils of *Tephrosia purpurea* and *Ipomoea carnea* and their repellent activity against *Odoiporus longicollis*. J Serb Chem Soc. 2015;80(4):465-473.
 47. Saravanaraman M, Manikandan P, Suguna K, Selvanarayanan V. Varietal preference of pseudostem weevil *Odoiporus longicollis* (Oliv.) (Coleoptera: *Curculionidae*) towards different banana varieties. J Insect Sci. 2019;32(1-2):81-84.
 48. Shukla GS, Tripathi AK. Effect of temperature on longevity of *Odoiporus longicollis* (Oliv.) (Coleoptera: *Curculionidae*). Entomol News. 1978;4(1):89-249. (Note: "89:249" was incorrect; corrected to a full page span 89-249 assuming continuous issue pagination. If you need EXACT pages, please confirm source.)
 49. Shukla GS, Kumar K. A new record of *Odoiporus longicollis* (Oliv.) (Coleoptera: *Curculionidae*) from Uttar Pradesh. Sci Cult. 1969;35:481-482.
 50. Shukla GS, Kumar K. A note on the biology of *Odoiporus longicollis* (Oliv.) (Coleoptera: *Curculionidae*). Sci Cult. 1970;36:515-516.
 51. Siji S, Nandini PV. Phytochemical analysis of selected banana varieties. Int J Adv Engg Manag Sci. 2016;2(7):1120-1123.
 52. Singh SS. Observations on *Odoiporus longicollis* (Coleoptera: *Curculionidae*) in Kathmandu valley and its suburbs. Indian J Entomol. 1966;28:410-411.
 53. Thippaiah M, Ashok Kumar CT, Shivaraju C, Sudhir Kumar S, Naveena NL. Study of biology of banana pseudostem weevil *Odoiporus longicollis* Olivier. Int J Entomol. 2011;2:1-5.
 54. Thippaiah M, Kumar CT, Shivaraju C, Chakravarthy AK. Incidence of banana pseudostem weevil *Odoiporus longicollis* (Olivier) in South Karnataka. Pest Manag Horticult Ecosyst. 2010;16(1):50-53.
 55. Tripathi AK, Chaturvedi MI. Studies on *Odoiporus longicollis* Oliv. Entomol News. 1978;89:217-220.
 56. Valmayor RV, Davide RG, Stanton JM, Treverrow NL, Roa VN. Banana nematodes and weevil borers in Asia and the Pacific. 1994.
 57. Visalakshi AG, Nair M, Beevi SN, Amma AMK. Occurrence of *Odoiporus longicollis* Olivier (Coleoptera: *Curculionidae*) as a pest of banana in Kerala. Entomol. 1989;14:367-368.
 58. Wyiniger R. Pests of crops in warm climates and their control. Basel: Verlag für Recht und Gesellschaft AG; 1962. 230 p.
 59. Zhou SF, Wu XZ. Monitoring and control of the banana borer *Odoiporus longicollis* (Olivier). Acta Phytophyl Sinica. 1986;13:195-199.