Journal of Entomology and Zoology Studies

Available online at www.entomoljournal.com

E-ISSN: 2320-7078
P-ISSN: 2349-6800
www.entomoljournal.com
JEZS 2022; 10(2): 48-50
© 2022 JEZS
Received: 09-01-2022
Accepted: 10-02-2022

M Mahbubur Rahman
Regional Agricultural Research Station, Bangladesh Agricultural Research Institute, Rahmatpur, Barisal, Bangladesh

MA Rahman
Regional Agricultural Research Station, Bangladesh Agricultural Research Institute, Rahmatpur, Barishal, Bangladesh

MR Islam
Regional Agricultural Research Station, Bangladesh Agricultural Research Institute, Rahmatpur, Barishal, Bangladesh

GN Hasan
On farm Research Division, Bangladesh Agricultural Research Institute, Bhola, Bangladesh

MA Sarker
Entomology Division, Bangladesh Agricultural Research Institute, Gazipur, Bangladesh

NK Dutta
Entomology Division, Bangladesh Agricultural Research Institute, Gazipur, Bangladesh

Corresponding Author:
M Mahbubur Rahman
Regional Agricultural Research Station, Bangladesh Agricultural Research Institute, Rahmatpur, Barishal, Bangladesh

First record of inflorescence caterpillar: *Tirathaba rufivena* (Lepidoptera: Pyralidae) on betel nut in Bangladesh

M Mahbubur Rahman, MA Rahman, MR Islam, GN Hasan, MA Sarker and NK Dutta

DOI: https://doi.org/10.22271/j.ento.2022.v10.i2a.8974

Abstract
Betel nut (*Areca catechu*) is an important cash crop in Bangladesh and several insect pests' causes severe damage but study related to insect pests of betel nut is scanty in the country. Then the study was carried out scientifically to document the information of insect pests attacking betel nut in southern region of Bangladesh. The productivity of these palms is affected by number of insect pests. Among them a new pest Inflorescence caterpillar or Oil palm bunch moth or Coconut spike moth: *Tirathaba rufivena* (Lepidoptera: Pyralidae) is first recorded in Bangladesh during 2020 which causes damage to inflorescence and developing nuts resulting considerably yield loss. Inflorescence caterpillar *T. rufivena* is differentiated from other species based on the front wing color. The front wing color of *T. rufivena* is grayish other species like *T. mundella* is greenish. It is also recorded that the seasonal average percent infestation of developing nuts was 19.44-21.45% in southern part of Bangladesh. Therefore more research should be undertaken to assess crop loss by this pest and to develop appropriate management option. This is the first record of *Tirathaba rufivena* on betel nut in Bangladesh.

Keywords: Areca nut, inflorescence caterpillar, *supari*, first, record

Introduction
Betel nut (*Areca catechu*) is an important cash crop in Bangladesh especially southern part of the country. It is the masticatory nut used with betel leaf and locally known as "supari" in Bangladesh and some other Asian countries. Betel nut grows more in India, Sri Lanka, Bangladesh, Malaysia, Indonesia and Philippines. Among the world leading betel nut producing countries Bangladesh is one of them. Betel nut is commercially cultivated over an area and production in Bangladesh is 39249 hectare and the total production 328610 metric tons, respectively [1]. Betel nut grows well in the coastal region of Bangladesh like Laxmipur, Barishal, Bhola, Pirojpur, Coxes bazaar, Noakhali, Khulna, Bagerhat, Satkhira, and some other districts. The area and production of these crops is increasing day by day. It plays a vital role in agriculture as well as in the economy of the country. Among the total production area of Bangladesh, betel nut grown more than 25% covered in the southern part of the country. Even though it has tremendous potential, betel nut cultivation is highly risky because of several pests and disease infestation. Around 102 insects are reported to be major to areca nut or betel nut [2]. However, only a few of them are economically important. Mites, scales, spindle bug, pentatomidae bug, root grubs, inflorescence caterpillar and nut borer are reported earlier in the world. Among them Inflorescence caterpillar or Oil palm bunch moth or coconut spike moth: *Tirathaba rufivena* (Lepidoptera: Pyralidae), is the most economically important. *Tirathaba rufivena* is a major pest of several palm trees such as coconut (*Cocos nucifera* L.), betel nut (*Areca catechu L.*) and oil palm (*Elaeis guineensis*) [3-4]. It is already recorded in different countries of the world like India, China, Malaysia, the Cook Islands, the Philippines and the tropical region of Queensland [3]. The productivity of several palm trees is affected by the *T. rufivena* infestation. Previous studies found that it can cause damage to some extent in betel nut and betel blooms, fruit and fringe [5-6]. The Inflorescence caterpillar *T. rufivena* was previously known as *Tirathaba mundella,* which is an occasional pest of oil palm and causes a yield of 30-50% reduction [7-8]. Both *T. rufivena* and *T. mundella* have been recorded in Malaysia and Indonesia, but *T. rufivena* was recorded in India [3].

These two species are differentiated based on the front wing color front wing color of *T. rufivena* is grayish other species like *T. mundella* are greenish [3]. Infestation occurred by the larval stage of *Tirathaba* starting with the male and female flower, then bunch surface and shoot of the frond. The nut and the whole bunch becomes rotten due to severe infestation [9]. It is recorded that the inflorescence caterpillar, *T. rufivena* causes a 30% average loss of the palms with an attack more than (60%) in older plantings [10], but *T. Mundella* infest the new plantation and bunches [11]. Usually both the species larvae attack male flowers. Due to heavy infestation abortion of young, underdeveloped fruits may occurred. Even though betel nut is an important cash crop in Bangladesh and inflorescence caterpillar causes severe damage, but there is no study was done to document insect pests of betel nut in the country. Therefore, the present study was conducted to document scientific information of the inflorescence caterpillar or oil palm bunch moth of Bangladesh.

Materials and Methods

In the study of 'Survey, monitoring, and documentation of major insect pests of betel nut in the southern region of Bangladesh' nuts from the tree and damaged fallen nuts were randomly collected fthe rom research field of Regional Agricultural Research Station (RARS), Bangladesh Agricultural Research Institute (BARI), Rahmatpur, Barishal and farmers field of Bhola district during 2020-21. The damaged nuts were collected from the betel nut orchard and brought into the laboratory. Larvae were collected from damaged nuts and reared in the laboratory by providing small pieces of tender nuts as a food sources. After the emergence of adult, their morphology was studied. The infestation percentage is calculated by:

% Infestation = (Infested nuts/ Total nut) X 100

Results and Discussion

A new pest, Inflorescence caterpillar or Oil palm bunch moth or Coconut spike moth: *Tirathaba rufivena* (Lepidoptera: Pyralidae) is first recorded in Bangladesh during 2020 which is a significant pest of betel nut in the southern part of the country. Inflorescence caterpillar causes considerable economic loss to the crop by direct damaging economic parts i.e. inflorescence and developing nuts. It causes damage from September to February, but higher infestation was recorded during December to January. The insect pest was first observed on 03 October 2020 at Bhola district and 15 October 2020 at RARS, BARI, Rahmatpur, and Barishal. Only the larval stage of *T. rufivena* were damaged the nuts. It has biting and chewing type of mouth part. Larvae bore into the nuts by making galleries leaving the excreta behind tunnel. Excreta and oozing gummy substances are found on affected nuts. Generally, single larva cause damage in every nut but in rare case more than one larva can be seen. Several studies reported that female moth deposits eggs into the spadix through punctures made on the spathe by slugs or snails. The caterpillars on emergence bore to the spathe. They move towards tip of the inflorescence and commence feeding on tender rachilla, male flowers and destroy them [12]. The tender branches of inflorescence are webbed together with galleries of silk and frass within the spike.

Damage status

It is found that seasonal average percent infestation of developing nut was 19.44% and 21.45% at RARS, Rahmatpur, Barishal and Bhola district of Bangladesh, respectively. Previously, it is reported that it can cause 10-67% damage in betel nut and 30-50% in oil palm [7, 8, 10]. Similarly, current study found that *T. rufivena* has the potentiality to cause 20% or more damage on developing nuts so more attention should be taken to proper management the pest in betel nut.

Biological Characteristics of Inflorescence caterpillar *Tirathaba rufivena*

Adult

It is an ash colored moth measures about 25-30 mm in wing expanse (Fig. 1). The front wing color is grayish. The adult moth can be found during the day or night, flying in a rapid and haphazard fashion. Previous study reported that Inflorescence caterpillar or Oil palm bunch moth has two species *T. rufivena* and *T. mundella* and these two species are differentiated based on the front wing color. Front wing color of *T. rufivena* is grayish and other species like *T. mundella* is greenish [3]. This identifying character is used in current study to identify *T. rufivena* species.

Egg

Eggs are laid on unopened spathe/ mechanically damaged portion of the spadices.

Caterpillar

Larvae complete their development within the fruit. The full grown larvae were 20-25 mm long. Dirty yellow or white in color with brown colored head. Usually larval period were 22-25 days at room temperature.

Pupa

Generally, it pupates within the larval galleries and pupal period were 10-12 days at room temperature.

Based on the front wing color of inflorescence caterpillar, the identity of the Inflorescence caterpillar species infesting betel nut plants in southern part of Bangladesh was confirmed to be *T. rufivena*. The morphology and biology of adult, larvae and pupae of *T. rufivena* from our study were found matching with those previously illustrated [3, 14, 15, 16].

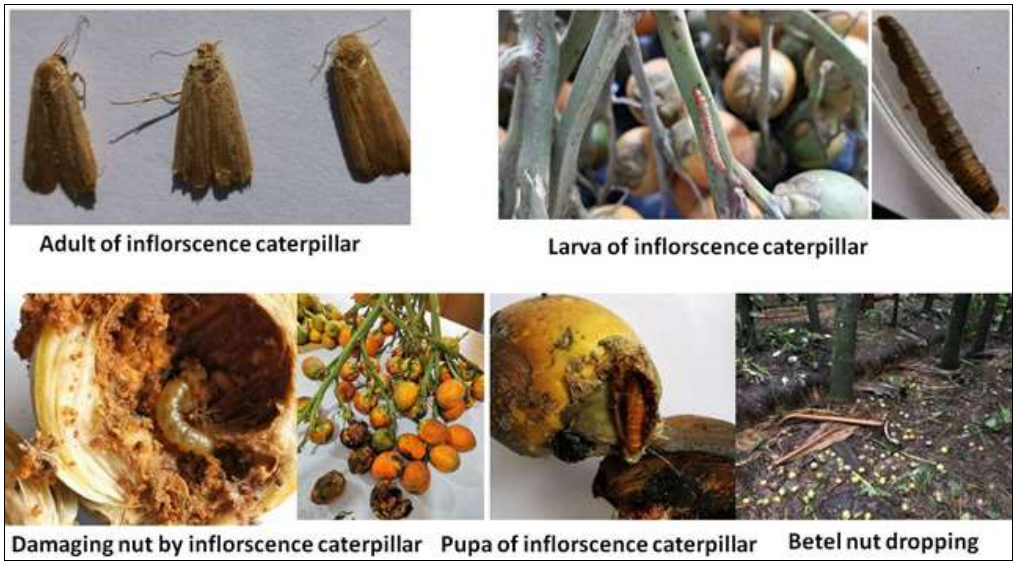

Fig 1: Different life stages of Inflorescence caterpillar: *Tirathaba rufivena* recorded in betel nut

Conclusion

A new pest Inflorescence caterpillar or Oil palm bunch moth or coconut spike moth: *Tirathaba rufivena* is first recorded in Bangladesh as major pest of betel nut which cause severe damage to inflorescence and developing nuts and reduce considerably yield. Therefore more research should be undertaken to assess crop loss by this pest and to develop appropriate management option.

Acknowledgments

The experiment had been carried out with the financial support under research scheme namely "Documentation of Insect Pests, Development and Dissemination of Integrated Pest Management Technology for Cultivating Important Fruits, Betel Leaf, Betel Nut and Pulse Crops through Safe Food Production in Southern Region of Bangladesh" Ministry of Agriculture, Government of the people's Republic of Bangladesh.

References

1. BBS. Bangladesh Bureau of Statistics (BBS). 2020, 194pp.
2. Nair CPR, Daniel M. Pests of arecanut. In: The Arecanut Palm (*Areca catechu* Linn.). (Eds.) Bavappa, KVA, Nair MK and Prem kumar, T. CPCRI, Kasargod, India. 1982, 162-184pp.
3. Patel RK, Salam PK. Singh B. new record of coconut spike moth (*Tirathaba rufivena* Walker) from Bastar tribal belt of Chhattisgarh. J. Entomol. Zool. Stud. 2018;6(1):1117-1118.
4. Yew NK. Talk on the studies on insect parasitism of *Tirathaba rufivena* on oil palm. General Meeting of the Malaysian Plant Protection Society. 1980, 414pp.
5. Fan Y, Gan BC, Chen SL, Du CG, Yang CQ. The biological characteristics and control of *Tirathaba rufivena*. Entomol Knowl. 1991;28(3):146-148.
6. Susanto AS, Perdana RTA. Organization Pengangu Tanaman Penggerek tandan kelapa sawit *Tirathaba mundella* Walker," Pusat Penelitian Kelapa Sawit. 2011;0004:1-4.
7. Lim KH. Integrated pest management of Tirathaba bunch moth on oil palm planted on peat. The Planter. 2012;88(1031):97-104.
8. Zulkefli M, Norman K, Ramle M, Basri MW. Integrated pest management of termite and bunch moth in oil palm planted on peat in Malaysia. In Proceeding of the Fourth MPOB-IOPRI International Seminar: Existing and Emerging Pests and Diseases of Oil Palm Advances in Research and Management. Bandung, Indonesia. 2011.
9. Alouw JC, Morallo-Rejesus B, Ocampo VR. Biology of the coconut spike moth, *Thirathaba frubctivora* (Meyr.) (Lepidoptera: Pyralidae),"Philipp. Entomol. 2005;19(1):84-93.
10. IRHO. Rapport d'Activité. Institut de Recherches pour les Huiles Oléagineux, Numéro special. 1991;47(6):220.
11. Wood BJ. Insect pests in Southeast Asia. Oilpalm Research (Corley, Hardon RHV, JJ Wood, B. J. eds.) Elseveir, Amsterdam. 1976, 347-367.
12. Saneera EK, Mohan C, Santhosh S, Thube SH. First report of two chalcidoids parasitizing arecanut inflorescence caterpillar, *Tirathaba mundella* Walker (Lepidoptera: Pyralidae) from Karnataka, India. J Plant. Crops. 2019;47(2):124-127.
13. Sharanabasappa. Seasonal Incidence of inflorescence caterpillar, *Tirathaba sp.nr. Rufivena* (Walker) (Lepidoptera: Pyralidae) on arecanut. Insect Environ. 2012;17(4):179-181.13.
14. Agus F, Gunarso P, Sahardjo BH, Joseph KT, Rashid A, Hamzah K. Reducing greenhouse gas emissions from land use changes for oil palm development". In Presentation to plenary session, RSPO RT9, 2011.
15. Idrus, SM, Hassan, AA, Hafiz, AA M, Hanis, JA, Chuan, ST, Rizuan, ZACM. *Tirathaba rufivena* (Lepidoptera: Pyralidae) larval population in different female oil palm inflorescence phenology. Serangga. 2018;23(3):29-37.
16. Lorenza B, de Pedro, Dely P, Gapasin, Lucia M, Maramara. Biology of the Greater Spike Moth. Tirathaba rulivena Walker. Annals of Tropical Research. 1982;4:208-214.