



FIRST REPORT OF INFESTATION OF DATE PALM FRUITS BY *Loxostege nudalis* HÜBNER IN KATSINA STATE, NIGERIA: A SHORT COMMUNICATION

¹Muhammad, A., ²Onu, I., and ³Malgwi, A. M.

¹Department of Crop Production and Protection, Federal University Dutsin-ma, Katsina State, Nigeria

²Department of Crop Protection, Faculty of Agriculture/Institute for Agricultural Research, Ahmadu Bello University, Zaria, Kaduna State

³ Department of Crop Protection, School of Agriculture and Agricultural Technology, Modibbo Adama University of Technology, Yola, Adamawa State

*Correspondence: amuhammad1@fudutsinma.edu.ng (+234 8024776111)

ABSTRACT

An investigation was carried out with the objective for the identification of the adults of an insect infesting date fruits in Katsina State (Latitude 11° 07' 49" to 13° 22' 57" N and Longitude 6° 52' 03" to 9.9° 02' 40" E) in the Sudan savanna. The study was carried out on fifty date fruits each of "Dan-Mali", "Digila" and "Targal" cultivars. The fruits were sliced open and examined for larval presence on 1 and 0 scales for presence and absence, respectively. Larva found in "Targal" cultivar was cultured in the Biology laboratory, Federal University Dutsinma, Katsina State. The adult moth of the insect was identified at the Insect Museum, Department of Crop Protection, Faculty of Agriculture/Institute for Agricultural Research, Ahmadu Bello University, Zaria, Nigeria. The result of the identification clearly indicated the moth to be an insect species belonging to the genus *Loxostege* and species *nudalis*. Adult moth has a body length (from anterior to posterior) up to 10 mm. The wing spans the same as the body length. The forewings are distinctly yellow while the hind wings were silver coloured. The wings were covered with flattened setae (scales) with clothing hair-like setae at the tips. The eyes were conspicuous and bulged. The antenna is filiform (thread like) type with up to fifty segments.

Key words: Infestation, date fruits, *Loxostege nudalis*, Katsina. © Copy Right, JBA Publishing. All rights reserved.

1. INTRODUCTION

Date palm, *Phoenix dactylifera* (L.) is one of the oldest fruit trees in the world (Kader and Hussain, 2009). It is one of the plants that played a role in the lives of some notable personalities in the Holy Moslem and Christian Scriptures (Al-Saoud and Ajlan, 2013; Zaid and Wet, 2007; Al-Ajlan *et al.*, 2007). It belongs to the Family Areaceae. The origin of date palm is uncertain. However, Al-Ajlan *et al.* (2007) reported that date palm was believed to have originated in the Arab world (in the Middle East) where it is extensively cultivated. Kader and Hussain (2009) reported the actual centre of origin of date palm to be in Mesopotamia now (Iraq). Its cultivation has now spread the Arabian Peninsula. The Middle East and the North Africa are the major producers of date palm in the world (Kader and Hussain, 2009). The palm is widely cultivated for its edible fruits called date. It is a staple food for most people in the Arab world (Al-Ajlan *et al.*, 2007). Ait-Qubahou and Yassia (1999) described the fruit of date palm as high energy food for both humans and animals due to its carbohydrates and minerals content. Djerbi (2000) stated that date

fruits are a complete diet as it contained all the essential nutrients required by the human body. Saeed and Yousof (2014) identified sugars as the most important dominant nutrient in dates. Omamor (2000) reported the utilization of date palm fruits at its different stages of ripening for the manufacture of date-butter, date-jam and date syrup. In Nigeria, date palm was believed to have been introduced through Trans-Sahara trade route from North Africa and the Middle East by traders and Muslims on pilgrimage to the Holy cities (NIFOR, 2000). It has existed in northern Nigeria since early 17th Century. The trees are commonly found in homesteads and in few orchards (Muhammad *et al.*, 2014). The fruits are of high commercial value in northern States of Nigeria. The fruits were sold majorly in mosques, markets and motor parks (Muhammad *et al.*, 2014). Like all other crops, the fruits of date palm are attacked by many insects particularly, those belonging to the order Lepidoptera and Coleoptera. Aisagbonhi (1988), Dhouibi and Saoud (2007) and Muhammad *et al.* (2014) reported infestation of date fruits by *Ephestia cautella* Walker (Lepidoptera: Pyralidae), *Batrachedra amydraula* Meryrick

(Lepidoptera: Cosmopterygidae) and *Loxostege massalis* Walker (Lepidoptera: Crambidae) respectively. The immature stages of these insects constitute the major storage pests of date fruits causing different damage. Signs of damage caused by these moths are manifested in the form of frass and exuvial deposits, tunneling the soft internal mesocarp and webbing. These defects consequently lead to decrease in fruit weight and associated rejection by consumers. No investigation has been done on the infestation of date palm by *L. nudalis* in northern Nigeria. This paper therefore, serves as first formal report on *L. nudalis* infestation on date fruits in Katsina State.

2. MATERIALS AND METHODS

This investigation was carried out in the Biology laboratory, Federal University Dutsin-ma with the objective of identifying the infective stage of the moth infesting date fruits in the study area. Fifty dry date fruits each of "Dan-Mali", "Digila" and "Targal" cultivars were randomly sampled in some locations in Katsina Local Government area (Latitude 11° 07' 49" to 13° 22' 57" N and between Longitude 6° 52' 03" to 9.9° 02' 40" E in the Sudan savanna ecological zone). The fruits were cut open one after the other and observed for insect. Sign of insect presence was scored on 1 and 0 scale. Presence of life or dead insect, life or dead larva, exuvia/pupal skin, frass deposit, cocoon/webbing signifies incidence and was scored 1. Absence of any of these defects was scored 0. Any life larva found in the examined date fruits was left within the date fruit and kept in a plastic cup measuring 8.80 cm in diameter (Plate 1). The lid was cut open at the centre (5.80 cm diameter) and covered with a tissue paper for free circulation of air and also to prevent the adult insect from escaping. The cup was kept in the laboratory under ambient temperature (22°C) until completion of metamorphosis. The emerged adult moth was identified at the Insect Museum, Department of Crop Protection, Faculty of Agriculture/Institute for Agricultural Research, Ahmadu Bello University, Zaria, Nigeria.

3. RESULTS

3.1 Insect's morphology

Adult moth has a body length (anterior to posterior) of up to 10 mm. The wing spans

almost the same as the body length. The forewings were distinctly yellow while the hind wings were silver coloured. The wings were covered with flattened, clothing hair-like setae (scales) at the tips. The eyes were conspicuous and bulged. The adult moth has filiform (thread-like) type of antenna with up to fifty segments.

3.2 Nature of damage of *L. nudalis* on date fruits

The larva (Plate 2) of the insect was the most destructive stage of the insect life cycle. The insect is a field-to-store pest. Eggs were laid while dates were still on the tree. The newly hatched larva bore through the mesocarp into the fruit. The larva Lived and fed within the fruit. Signs of damage were manifested in form of frass deposit (Plate 3). The larva tunneled by chewing out the internal fruit walls, deposits cocoon/webbing, casted pupal skin (exuviae) while passing through instar stages. Presence of life or dead larva of *L. nudalis* (Plate 4) was often found within. Pupation occurred within the date fruit embedded inside cocoon (Plate 5). Free living adult emerged at the end of the life cycle (Plate 6). The identified insect was collected from "Targal" date cultivar. The result in figure 1 indicated that "Danmali" had recorded 4 and 96%, "Digila" 26 and 74% while "Targal recorded 18 and 82% for infested and un-infested fruits, respectively.

4. DISCUSSION

In an earlier report on date palm infestation, only one insect (*Loxostege massalis*, Lepidoptera: Crambidae) was implicated (Muhammad *et al.*, 2014). With the present report, another species of *Loxostege* (*L. nudalis*) has been found as a pest causing damage to date palm fruits. The present study has also revealed that these two insect larvae exhibit similar pattern of infestation and damage as well as mode of metamorphosis. The highest percentage (26) of dates attacked by *L. nudalis* was recorded in "Digila" while the least percentage (4) was in Dan-Mali cultivar respectively. This could be that the larva of *L. nudalis* is likely showing preference to "Digila" owing due to its high sugar content than to other dates (Muhammad *et al.*, 2015). The least percentage of attacked was recorded by "Dan-Mali" cultivar may be due to the fact that its flesh thickness is

higher than those of the other date cultivars. This corroborate the findings of Muhammad *et al.* (2015) that larval infestation of date fruits decreased with increasing fruit mesocarp thickness, while the level of infestation increased with increase in sugar level of the fruit. Such fruits are rejected by consumers and severe infestation could lead to economic loss by date fruit sellers.

5. CONCLUSION AND RECOMMENDATION

The findings above have clearly identified an additional specy in the genus *Loxostege* of the order Lepidoptera infesting date fruits in the study area. Although, the level of infestation is low, management strategy for its control should be followed to avoid the pest causing economic damage. Further research on detailed biology of the insect can equally be undertaken.

REFERENCES

Al Saoud, A. and Ajlan, A. (2013). Effect of date fruit quality on the number of red palm weevils, *Rhynchophorus ferrugineus* (Oliver), captured in aggregation pheromone traps. *Agriculture and Biological Journal of North America*, 4(4): 496-503.

Aisagbonhi, C. I. (1988). Pest incidence in marketed date palm fruits in Dutse, Kano State, Nigeria. *Date Palm Journal*, 6(1): 287-298.

Aisagbonhi, C. I., Ene, J. C. and Agwu, S. I. (1988). Research note on the incidence of pest infestation in dry and semi dry types of date fruits samples kept for thirteen months. *Nigeria Journal of Palms and Oil Seeds*, 9: 09-115.

Ait-Oubahou, A. and Yahia, E. M. (1999). Review article: Postharvest handling of dates. *Postharvest News and Information*, 10(6): 67-74.

Al-Ajlan, A., Al-Abdulsalm, K. and Al-hudaib, K. (2007). Diseases and pest of palm, insect attack date palm, <http://www.redpalmweevil.com/Arabicpage/Arabic.htm>. Sourced on 02/02/2011.

Djerbi, M. (2000). Present status and future prospects to control two serious enemies of the date palm: bayoud disease

(*Fusarium oxysporium f. sp. albedinis* (Killian et maire, Gordon) and the red palm weevil pest (*Rhynchophorus ferrugineus* Oliv.). In: Aaouint, M., Hughes, H., Kaola, S., Hamon, A. & Pasternak, D.(Eds.). *Proceedings of the Date Palm International Symposium*, Windhoek, Namibia, 22-25 February, 2000, FAO, Windhoek, Namibia, p 178-187.

Dhouibi, M. H. and Saoud, H. E. (2007). Biological Control of the Lesser Date Moth, *Batrachedra amydraula* Meryack (Cosmopteridae Batrachedridae) on date palm trees. In: Zaid, A., Hegarty, V. and Al-Kaabi, H.H.S. (Eds.), *Proceedings of the IIIrd International Date Conference, Abu Dhabi, United Arab Emirate*, from February 19-21, 2006, ISHS, Belgium, p 504-517.

Kader, A. A. and Hussain, A M. (2009). Harvesting and postharvest handling of dates. International Centre for Agricultural Research in the Dry Areas (ICARD), Aleppo, Syria. 15 pp.

NIFOR, (2000). Nigerian Institute for Oil Palm Research, Date Palm: Research Highlights, Cultivation and Utilization, 12 pp.

Muhammad, A., Ahmed, B. I., Yusuf, S. R. and Mohammed, A. B. (2014). Incidence of webworm, *Loxostege massalis* (Walker) [Lepidoptera: Crambidae] on date palm fruits, *Phoenix dactylifera* (L.) marketed in some northern states of Nigeria. *FUTA Journal of Research in Sciences*, 10(2): 198-206.

Muhammad, A., Mohammed, I. and Bawa, J. A. (2015). Effect of infestation on fruit characteristics of some stored date palm [*Phoenix dactylifera* (L.)] cultivars in Katsina, Katsina State, Nigeria. *Journal of Biopesticides and Environment*, 1: 7-14.

Saeed, I. K. and Yousof, D. E. (2014). Nutritional changes in date fruits Barakawi c.v. infested by date palm dust mite, *Oligonychus afrisiaticus* Meg., measured by physical and chemical parameters. *Persian Gulf Crop Protection*, 3(1): 46-51.

Zaid, A. and Wet, de P.F. (2007). Chapter II: Origin, Geographical, Distribution and Nutritional values of Date Palm. In: Date

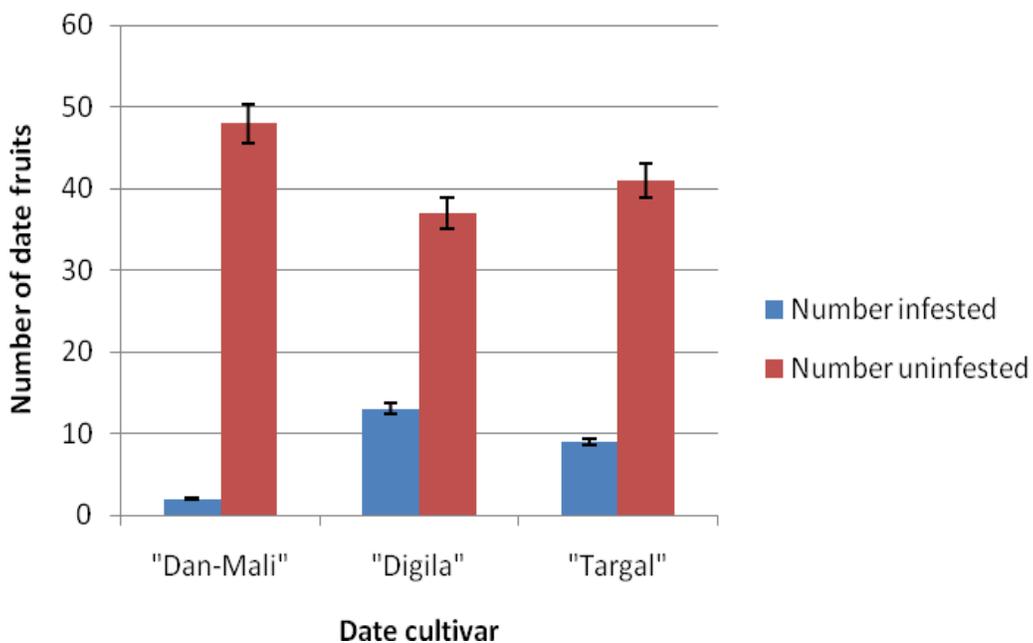


Fig.1: Incidence of *L. nudalis* sampled on dried date fruits in Katsina



Plate 1: Plastic cup used in culturing Larva *L. nudalis*



Plate 2: Larva of *L. nudalis* feeding on date fruit (A)



Plate 3: Frass deposited on date fruit by *L. nudalis* larva (B)

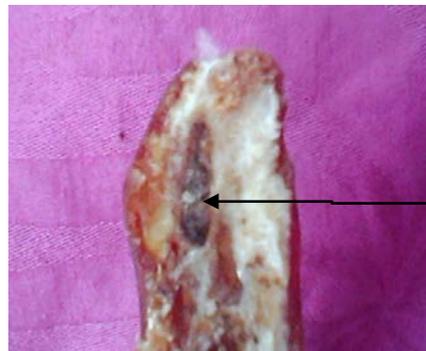


Plate 4: Dead larva of *L. nudalis* in date fruit (C)



Plate 5: Pupal stage of *L. nudalis* embedded in
a



Plate 6: Adult moth of *L. nudalis*
cocoon

(D)