



Research Article

Preference of lesser date moth (*Batrachedra amydraula* Meyr) – A Case study at Date Palm Research Institute of Shah Abdul Latif University, Khairpur

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Abstract | The smaller date moth, *B. amydraula* is a very serious insect pest of date palm fruits. The Lesser date moth *B. amydraula* attacked on new developing fruits and causes more than 75% losses to date palm. Therefore, the study on varietal preference of lesser date moth on different date palm varieties. The initial population recorded in the second week of April on different date palm varieties i.e., Aseel, Karblai, Kupro, Heman and Gajar was 3.33 ± 1.76 , 2.33 ± 1.45 , 0.33 ± 0.33 , 0.0 and 0.33 ± 0.33 *B. amydraula* per plant, respectively. Afterwards, population showed a rapid increase in various treatments that gradually showed decreasing trend towards the maturity of the crop. Thus, the highest mean population in an observation was recorded on Aseel variety (27.33 ± 2.33 per plant) on 29th June 2020. Moreover, the maximum population on Kupro, Gajar, Karblai and, Heman varieties was recorded as 6.67 ± 0.88 , 6.67 ± 2.33 , 6.33 ± 2.40 and 5.33 ± 1.45 per plant, respectively. Overall, results indicated that maximum and minimum population of *B. amydraula* was recorded on Aseel (7.470 ± 1.488 per plant) and Heman (1.076 ± 0.313 per plant) varieties, whereas the population recorded on Kupro, Gajar and Karblai varieties were 1.379 ± 0.334 per plant, 1.257 ± 0.360 and 1.666 ± 0.390 per plant. The all-weather parameters i.e., maximum, and minimum, temperature, relative humidity and wind velocity indicated that their effect on the infestation of Lesser date moth *B. amydraula* on different date palm varieties during the entire duration of study. According to results, the data indicated that negative effect of minimum temperature ($r = 0.9851$; $P < 0.001$) and highly significant impact of maximum temperature ($r = 0.0010$; $P < 0.001$) and wind velocity ($r = 0.0864$; $P < 0.001$) was recorded positive effect on infestation. The Aseel variety of date palm showed susceptible whereas Heman showed comparatively resistance against lesser date moth *B. Amydraula* respectively.

Keywords | Date palm; lesser moth; Temperature; Khajoor

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1. Introduction

Date palm (*Phoenix dactylifera* L.) belongs to Arecaceae family locally known as khajoor, main source of income of many peoples and it is also known as the tree of divine providence. During the excavation of Mohenjo Daro (an Archaeological place at Larkana, Sindh) theseeds of date palm were found in the store and go down, that is indicates that date palm cultivated as early on as 5,000 years older in Sindh (Ahmad and Smead, 2005). The date palm fruits considered as ideal food for peoples and provide wide range of essential nutrients. The date palm fruits contain have a maximum nutrition value of carbohydrate (44-88%), protein (2.3-5.6%), fat (0.2-0.5%), pectin (0.5- 3.9%), dietary fibre (6.4-11.5%), vitamins, minerals. The flesh of date palm fruit consists of 0.2-0.5% oil, while in seed it is 7.7-9.7% and fatty acids. Furthermore, the seeds of date palm contain aluminum, chloride, sulphur and oleic acid in numerous amounts. The fruit of date palm has ability to improve significantly the food quantity of citizens in the area where fruits of the dates palm are eat as a delicacy food (Al-Shahib and Marshall, 2003; Saafi *et al.*, 2011; Hamad *et al.*, 2015; Nadeem *et al.*, 2019). The date palm considered as third most important fruit trees after the mango and citrus in Pakistan. The date palm fruit tree cultivated in Pakistan in 90,000 ha all provinces and the fabrication of round about 600,000 mtyr⁻¹. The Pakistan occupying seventh largest date producing and exporter in country in the world. The Sindh and Balochistan contribute more than 90% production of date in Pakistan. The Khairpur Mirs in Sindh is the centre of biodiversity of date palm having more than 300 varieties of date palm. (Markhand *et al.*, 2010; Abul-Soad *et al.*, 2015).

The insect pest number were found on date palm tree which cause significant losses. The major insect pests of date palm such as red date palm weevil (*Rhynchophorous ferrugineus*), old world mite of date (*Oligonychus afrasiaticus*), lesser date moth (*Batrachedra amydraula*), Dubas bug date palm (*Ommatissus binotatus*), green pit scale of date palm (*Palmopsis phoenicis*), carob moth (*Ectomyelois ceratoniae*), longhorn date palm stem borer (*Jebusaea hamerschmidtii*), rhinoceros beetle (*Oryctes gamemnon*), fruit stalk borer (*Orycteselegans*) and almond moth (*Cadracautella*) reported as serious insect pests of date palm (El-Shafie 2012; Al-Deeb 2012; Al Dhafer and Alayeid 2014; Khan *et al.*, 2018). Among these insect pests the lesser date moth, *B. Amydraula* considered is a serious insect pest of date palm. The heavy losses of date fruits noticed due to attacks lesser date moth, *B. amydraula* (Kakar *et al.*, 2010). The high infestation of this insect was observed from date producing countries of world such as Pakistan, Saudi Arabia, Iraq, United Arab Emirates (UAE), Oman and Yemen. The infestation of Lesser date moth *B. amydraula* on developing young fruits which causes more than 75% losses to fruit of date palm (Elwan 2000; Levi-Zada *et al.*, 2011). The lesser date moth *B. amydraula* Larvae start feeding from the florescence and damage continue till to fruit setting. The infested fruits of date palm become dry and red in colour. Most of fruits dried and drop down which causing significant losses in yield. The infestation of lesser date moth *B. amydraula* intensity was different according to the region and environmental factors (Aziz 2005; Blumberg 2008; Muhammed 2011).

2. Materials and Methods

The experiment was executed at date palm orchard at Date Palm Research Institute of Shah Abdul Latif University, District Khairpur Mirs during summer season 2020-21. The trial was carried out in Randomized Complete from the Block Design (RCBD) with three replications. The size of trial field was one acre whereas five date palm varieties were used in study to gauge the infestation of insect and the abiotic effect on infested fruit, Aseel, Karblai, Kupro, Heman and Gajar. Percentage of infested fruits were recorded from the three randomly selected tree of each variety based on healthy and infested fruit. Fifty (50) date fruits from each tree were collected to sort out the healthy and infested fruits. Data on weather parameter was collected from local Metrological Station. The data was analyses using ANOVA and LSD use Statix 8.0 computer software along with Correlation with infestation lesser date moth on date palm varieties.

Appendix-I: Analysis of variance for lessar date moth in date palm during season 2020-21.

Source	DF	SS	MS	F	P
Rep	2	23.10	11.548		
Treatment	4	2000.58	500.144	108.72	0.0000
Date	21	1849.76	88.084	19.15	0.0000
Treatment*date	84	1994.09	23.739	5.16	0.0000
Error	218	1002.90	4.600		
Total	329	6870.42			

*Grand Mean 2.4848 CV 86.32

Appendix-II: Homogeneous groups for population of lesser date moth.

Treatment	Mean	Homogeneous Groups
Aseel	7.3939	A
Karbalae	1.6061	B
Kupro	1.2727	B
Gajar	1.0758	B
Heman	1.0758	B

Table 4.1 Weekly mean population of lesser date moth on different varieties of date palm

Date	Aseel	Karblai	Kupro	Heman	Gajar	Min: Temp:	Max: Temp:
13.04.20	3.33±1.76	2.33±1.45	0.33±0.33	0.0	0.33±0.33	16.62	29.69
20.04.20	9.00±3.06	1.00±1.00	1.00±0.58	0.0	0.67±0.67	15.65	29.48
27.04.20	5.33±2.73	0.67±0.67	1.67±1.67	0.67±0.67	1.00±1.00	15.48	32.07
04.05.20	4.33±1.45	0.67±0.67	2.00±1.53	0.67±0.67	1.33±0.88	16.65	33.65
11.05.20	5.67±0.67	1.00±1.00	1.67±1.67	5.33±1.45	1.67±1.20	17.36	33.07
18.05.20	12.00±2.08	3.00±1.53	1.00±1.00	0.67±0.67	2.00±1.15	14.52	33.13
25.05.20	9.00±2.08	2.33±1.45	0.67±0.67	2.00±2.00	4.33±2.60	19.28	34.76
01.06.20	16.00±2.52	4.67±0.67	0.67±0.67	1.67±0.88	0.33±0.33	16.91	34.71
08.06.20	13.33±3.84	3.33±2.08	3.00±2.08	1.67±0.88	1.33±1.33	12.86	34.51
15.06.20	17.33±3.18	6.33±2.40	3.67±1.86	2.33±0.88	1.00±1.00	15.48	36.82
22.06.20	15.67±2.33	1.67±1.20	2.00±1.00	4.33±1.45	2.33±1.45	16.39	37.01
29.06.20	27.33±2.33	5.33±1.45	6.67±0.88	1.67±1.20	6.67±2.33	14.36	37.31
06.07.20	8.00±1.73	1.00±1.00	2.33±1.45	2.00±1.53	3.33±1.33	13.58	37.71
13.07.20	4.67±1.20	1.33±1.33	1.33±0.88	0.67±0.67	1.33±0.88	11.90	36.92
20.07.20	3.00±1.00	1.00±0.33	1.00±1.00	0.0	0.0	11.44	37.10
27.07.20	4.67±1.20	0.33±0.33	1.33±1.33	0.0	0.0	11.40	36.82
03.08.20	0.33±0.33	0.67±0.67	0.0	0.0	0.0	12.64	37.10
10.08.20	1.00±1.00	0.0	0.0	0.0	0.0	11.23	36.82
17.08.20	1.67±1.20	0.0	0.0	0.0	0.0	11.52	35.99
24.08.20	2.67±1.76	0.0	0.0	0.0	0.0	11.04	36.47
Overall mean ± S.E	7.470±1.488a	1.666±0.390b	1.379±0.334b	1.076±0.313b	1.257±0.360b	14.19±0.52	35.06±0.53

Overall, results indicated that maximum and minimum population of *B. amydracula* was recorded on Asel (7.470±1.488 per plant) and Heman (1.076 ±0.313 per plant) varieties, whereas the population recorded on Kupro, Gajar and Karblai varieties were 1.379 ±0.334 per plant, 1.257±0.360 and 1.666±0.390 per plant, respectively. The correlation results indicated that all the weather parameters *i.e.*, minimum, and maximum temperature, relative humidity and wind velocity showed their influence on the infestation of *B. amydracula*

on different date palm varieties during the entire duration of study (Table 4.2). According to results, negative effect of minimum temperature ($r = 0.1367$; $P < 0.0129$), maximum temperature ($r = 0.1907$; $P < 0.0005$) and wind velocity ($r = 0.0864$; $P < 0.1170$) was highly significantly positive effect on infestation.

Table 4.2 Correlation of weather parameters on the infestation of *B. amydraula* on different varieties of date palm Sindh, Pakistan

Weather parameter	<i>B. amydraula</i> population
Minimum temperature	$r = 0.1367$; $P < 0.0129$
Maximum temperature	$r = 0.1907$; $P < 0.0005$
Relative humidity	$r = -0.0995$; $P < 0.0712$
Wind velocity	$r = 0.0864$; $P < 0.1170$

4. Recommendations

Based on the findings of the studies, it is suggested that regular monitoring of date palm orchards should be carried out to determine the availability of lesser date moth. Accordingly, management strategies should be planned carefully to manage pest.

5. Conclusions

All the date palm varieties were infested by lesser date moth. Heman variety of date palm suffered the lowest infestation of lesser date moth, whereas highest infestation was recorded on Aseel variety. Significant impact of extreme temperature and wind was recorded on the infestation of lesser date moth on date palm varieties.

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