Egypt. J. Agric. Res., 77 (4), 1999

LIFE CYCLE OF DUBAS BUG, *OMMATISSUS BINOTATUS LYBICUS* DE BERG. (HOMOPTERA-TROPIDUCHIDAE) IN SULTANATE OF OMAN

AL-SAYED A.ELWAN AND SALIM S. AL-TAMIEMI

Jimmah Research Station (JRS), Al-Dakhlyia Region, Ministry of Agriculture & Fisheries, Sultanate of Oman.

(Manuscript received 14 May, 1998)

Abstract

Biological studies on Dubas bug, *Ommatissus binotatus lybicus* DeBerg. were carried out for two successive years (1995/1996). The insect was successfully reared on date palm seedlings cultivated in plastic pots under laboratory conditions in Jimmah Research Station (JRS) Al-Dakhlyia Region, Oman. The results obtained showed that the pest had two annual generations per year (spring and autumn generations) and the adult passed through five nymphal instars before maturity. The spring generation lasted 155.6-161.9 days, while autumn generation lasted 149.4-155.1 days in both years (1995 and 1996). The nymphal stage lasted 43-48.6 days in spring generation and 32.7-34.8 days in autumn generation. Adult female lived 40.4-49.7 days and 53.7-58.5 days in spring and autumn generations, respectively. The respective figures for males were 45.7-56.6 and 62.7-66.8 days. The number of deposited eggs ranged 98.5-119.6 eggs/female in spring generation and 113-128.6 eggs/female in autumn generation. The incubation period of the egg stage 97.9-101.8 days and 103.4-109.9 days in spring and autumn generation, respectively.

INTRODUCTION

Dubas bug, *O.lybicus* is an economic important insect pest in Oman. It attacks date palm trees, causing considerable damage to the leaves by sucking the sap and excreting a large amount of honey-dew that covers the leaves and fruits and encourages the growth of sooty mould. The pest was first collected from date palm trees in Siya in 1977 and identified as *Ommatissus binotatus lybicus* (DeBerg.) [Greathead, 1977] through it was observed in Oman in early sixties. According to the latest surveys organized by the Ministry of Agriculture & Fisheries, Saaidi (1992) mentioned that, *O.lybicus* occurred in almost all the date-growing regions of country at varying population densities.

Biological studies of Dubas bug is very necessary to get information to enable the proper plant protection measure at critical stage of the life cycle of the pest. So, the present work was planned to study the life cycle of the pest in the spring and autumn generations under laboratory conditions in Jimmah Research Station (JRS), Al-Dakhlyia Region, Oman.

MATERIALS AND METHODS

Biological studies for the spring and autumn generations of Dubas bug were carried out for two successive years (1995/1996) on date palm seedlings cultivated in plastic pots (6 inch diameter x 14 cm. height) under laboratory conditions. Samples of date palm leaves having dubas bug eggs were collected from the date palm orchards at the beginning of each generation and transferred to the laboratory, in late February (spring generation) and late August (autumn generation) for the first year, 1995, and early March (spring generation) and early September (autumn generation) for the second year 1996.

The leaflets were removed and the midribs were cut to small pieces (10-15 cm.), then cleaned with water from the hatched nymphs. The midrib pieces were examined under stereoscopic-microscope to be sure that the pieces were free from any hatched nymphs of Dubas bug. They were put in plastic cages (11.5 cm. diameter and 23 cm. height) covered with agryl from the two sides. In the following day, the midrib pieces and the cages were examined carefully and the newly hatched nymphs were transferred to plastic cages (one nymph/cage) and provided with date palm seedlings as food. The duration of the nymphal instars, as well as the sex ratio were determined.

The newly emerged adults (males & females) were caged (one pair/cage) and provided with date palm seedling. The adults inspected daily until death. The pre-oviposition, ovi-position and post-oviposition periods, longevity of adults (males & females) and number of deposited eggs/female were estimated. The depositing eggs were left until hatching and the incubation period was determined.

RESULTS AND DISCUSSION

The results obtained revealed that *O.lybicus* had two annual generations per year (spring and autumn generations) and the adults passed through five nymphal instars before maturity.

1. First year (1995)

A. Spring generation: As presented in Table 1, the nymphal stage lasted 45-52 days with a mean of 48.6 ± 0.39 days at laboratory conditions of 26.1°C and 53.4%. R.H. The sex ratio was found to be 1:1 (49.2% males: 50.8 females). The adult female started egg laying in the fourth week of April and continued depositing eggs until the second week of June. The pre-oviposition averaged 11.5 days at 29.5°C and 44% R.H, oviposition period averaged 24.9 days at 31.5°C and 42% R.H. and post-oviposition period averaged 4 days at 32.9°C & 40% R.H.

The adult longevity averaged 40.4 days in females at 31.3°C & 42% R.H. and 45.7 days in males at 32.2°C & 45% R.H. The number of deposited eggs ranged 25-205 eggs with an average of 119.6 ggs/female. The deposited eggs started hatching in the third week of July and continued until mid September and the incubation period was 87-139 days with an average of 101.8 days at 31.9°C and 56% R.H. The generation period ranged 147-198 days with an average of 161.9 days at 29.2°C and 51.1% relative humidity.

B. Autumn generation: As mentioned in Table 1, the nymphal stage ranged 30-36 days with an average of 32.7 days at 30.8°C and 52.2% R.H. The emerged adults were 43, out of them 23 males (53.5%) and 20 females (46.5%) giving a sex ratio of almost 1:1.

The adult female started egg laying in the second week of October and continued depositing eggs until mid-December. The pre-oviposition period averaged 12.5 days at 29.1°C and 50% R.H., the oviposition period averaged 35.1 days at 27.9°C and 51% R.H. and the post-oviposition period was 6.1 days at 26.4°C and 57% R.H. The longevity of adult female was 14-117 days at 27.8°C & 52.7% R.H., whereas the longevity of adult male was 19-100 at 27.5°C and 54.4% R.H. The number of deposited eggs averaged 128.6 eggs/female. The deposited eggs started hatching in the third week of December and continued until late February, 1996. The incubation period averaged 109.9 days at 25°C and 58% R.H. The generation duration lasted 110-179 days with an average of 155.1 days at 28.3oC & 53.4% R.H.

2. Second year 1996

A. Spring generation: The results in table 1 showed that, the nymphal stage lasted 39-50 days with a mean of 43 ± 0.38 days at laboratory conditions of 27.7°C and 50.8% R.H. The sex ratio was found to be 1:1 (48.4% males : 51.6% females).

Table 1. Duration of the different stages of Dubas bug, *O.lybicus* in spring and autumn generations during two successive years 1995 and 1996.

Year	1995						1996					
Genration	Spring generation			Autumn generation			Spring generation			Autumn generation		
Insect stage	Duration/day	Mean laboratory conditions		Duration/day	Mean laboratory conditions		Duration/day	Mean laboratory conditions		Duration/day	Mean laboratory conditions	
	Mean±S.E.	Temp. °C	R.H. %	Mean±S.E.	Temp. °C	R.H. %	Mean±S.E.	Temp. °C	R.H. %	Mean±S.E.	Temp. °C	R.H. %
Nymphal stage:												
1st instar nymph	9.6±0.183 (8-11)	24	58	5.1±0.094 (5-7)	31.5	53	9.2±0.156 (7-13)	26	50	6.1±0.132 (5-8)	30.8	63
2nd instar nymph	10.6±0.294 (7-12)	24.6	65	6.1±0.098 (5-7)	31.2	51	8.5±0.181 (6-11)	26.8	58	5.9±0.153 (4-9)	31.3	62
3rd instar nymph	8.5±0.246 (7-10)	25.8	60	5.5±0.133 (5-8)	30.6	55	7.2±0.147 (6-10)	27.3	53	5.4±0.102 (5-8)	31	60
4th instar nymph	9.1±0.266 (7-12)	27.6	44	6.9±0.166 (5-10)	30.2	52	8.3±0.195 (6-12)	28.5	46	7.5±0.162 (6-11)	30	57
5th instar nymph	10.8±0.332 (9-15)	28.5	40	9.1±0.191 (6-11)	30.4	50	9.8±0.147 (8-12)	29.8	47	9.9±0.194 (7-12)	29.5	55
Nymphal stage (total)	48.6±0.394 (45-52)	26.1	53.4	32.7±0.332 (30-36)	30.8	52.2	43±0.381 (39-50)	27.7	50.8	34.8±0.364 (32-43)	30.5	59.4
Adult stage:												
Pre-oviposition period	11.5±0.396 (7-16)	29.5	44	12.5±0.410 (8-16)	29.1	50	14.7±0.587 (9-18)	26.5	48	11.2±0.271 (9-15)	29.6	52
Oviposiion period	24.9±2.21 (5-50)	31.5	42	35.1±3.73 (3-62)	27.9	51	30.6±2.58 (11-59)	30	45	39.1±2.45 (6-63)	24	50
Post-oviposition priod	4.0±0.427 (1-10)	32.9	40	6.1±2.35 (2-16)	26.4	57	4.4±0.666 (2-13)	31.7	48	8.2±0.838 (4-18)	23.5	51
Adult female longevity	40.4±2.37 (17-72)	31.3	42	53.7±5.75 (14-117)	27.8	52.7	49.7±3.265 (24-80)	29.4	47	58.5±3.12 (17-93)	25.7	51
Adult male longevity	45.7±3.8 (24-87)	32.2	45	62.7±4.48 (19-100)	27.5	54.4	56.6±4.25 (21-74)	27.9	44	66.8±5.26 (19-133)	24.1	48.4
No. of deposited eggs/ female	119.6±11.3 (25-205)	-	-	128.6±5.42 (28-216)	-	-	98.5±9.96 (17-190)	-	-	133±16.41 (11-208)	-	-
Egg stage:												
Incubation period	101.8±11.72 (87-139)	31.9	56	109.9±6.26 (68-142)	25	58	97.9±6.17 (80-133)	32.2	55	103.4±7.26 (76-137)	26	57
Generation period	161.9±9.61 (147-198)	29.2	51.1	155.1±8.52 (110-179)	28.3	53.4	155.6±8.32 (128-186)	28.8	51.3	149.4±7.67 (116-181)	28.7	56.1

The adult female started egg laying in late April and and continued depositing eggs until the third week of June. The pre-oviposition period averaged 14.7 days at 26.5°C and 48% R.H, oviposition period averaged 30.6 days at 30°C and 45% R.H. and the post-oviposition period averaged 4.4 days at 31.7°C & 48% R.H. The adult longevity averaged 49.7 days in females at 29.4°C & 47%. R.H. and 56.6 days in males at 27.9°C & 44% R.H.

The number of deposited eggs ranged 17-190 eggs with an average of 98.5 eggs/female. The deposited eggs started hatching during the second week of July and continued until the first week of September and the incubation period was 80-133 days with an average of 97.9 days at 32.2°C and 55% R.H. The generation period ranged 128-186 days with an average of 155.6 days at 28.8°C and 51.3% R.H.

B. Autumn generation: The results in table 1, revealed that, the nymphal stage lasted 32-43 days with a mean of 34.8 ± 0.36 days at 30.5°C and 59.4% R.H. The sex ratio was found to be 1:1 (47.4% males : 52.6% females).

The adult female started laying eggs in the third week of October and continued depositing eggs until mid-December. The pre-oviposition period averaged 11.2 days at 29.6°C & 52% R.H., the oviposition period averaged 39.1 days at 24°C and 50% R.H. and the post-oviposition period averaged 8.2 days at 23.5°C and 51% R.H. The adult longevity averaged 58.5 days in females at 25.7°C and 51% R.H. and 66.8 days in males at 24.1°C and 48.4% R.H. The number of deposited eggs ranged 11-208 egg with an average of 113 eggs/ female. The deposited eggs started hatching in late December and continued until early March, the incubation period ranged 76-137 days with an average of 103.4 days at 26°C and 57% relative humidity.

Hussain (1963), In Iraq, mentioned that, the nymphal stage of the overwintering generation (spring generation) of Dubas bug, lasted 47 days and the adult survived for 15 days. The adult started depositing eggs from the second week of June and hatching started in the first week of August to end in the third week of September. The nymphal stage of the summer generation lasted 50 days and the adult survived for 13 days. The adult started depositing eggs in the second week of November and hatching started in the first week of April to end in the second week of June. The sex ratio was 1:1.

Talhouk (1991), In Arabian Peninsula, found that, Dubas bug eggs hatched in early September (autumn generation) and the nymphs passed into five instars and completed their development in October-November.

REFERENCES

1 . Greathead, D.J. 1977. Commonwealth Institute of Biological Control. Report on a visit to the Sultanate of Oman. (insect collected by Greathead & Mansour Alam and Mohyudin) c.f Oman Agri. Res. Rpt. 1992: 171-179.

2 . Hussain, A.A. 1963. Biology and control of the dubas bug, *Ommatissus binotatus lybicus* DeBerg. (Homoptera-Tropiduchidae) infesting date palm in Iraq. Bull. entomol. Res., 53: 737-754.

3 . Saaidi, M. 1992. Report for Date palm protection and training activites. Ministry of Agriculture & Fisheries, Sultanate of Oman & FAO Project. OMA /88/06. 121 pp. c.f. Oman Agri. Res. Rpt. 1992 : 233-235.

4 . Talhouk, A.S. 1991. On the management of the date palm and its arthropod enemies in Arabian Peninsula. J. Appl. Ent. 3 (5): 514-520.

دودة حياة دوباس النخيل *Ommatissus binotatus lybicus* DeBerg. في سلطنة عمان

السيد عبد الحميد علوان ، سالم بن سيف التميمي

محطة البحوث الزراعية (جماح) – المنطقة الداخلية – وزارة الزراعة والثروة السمكية – سلطنة عمان.

أجريت دراسات بيولوجية علي حشرة دوباس النخيل ***Ommatissus binotatus lyb icus*** **DeBerg**. في سلطنة عمان لمدة عامين متتاليين (١٩٩٥ / ١٩٩٦). تم تربية الآفة بنجاح علي بادرات نخيل صغيرة نامية في أصص من البلاستيك تحت الظروف المعملية. أوضحت النتائج أن للحشرة جيلين في العالم وان طور الحورية يمر بخمسة أعمار قبل وصوله إلي طور الحشرة الكاملة. تبين من الدراسة أن متوسط مدة جيل الربيع تتراوح بين ١٥٥,٦ – ١٦١,٩ يوما، ومتوسط مدة جيل الخريف ١٤٩,٤ – ١٥٥,١ يوما في كلا العامين. بلغ متوسط مدة طور الحورية في جيل الربيع ٤٣ – ٤٨,٦ يوما، ٣٢,٧ – ٣٤,٨ يوما في جيل الخريف. وبلغ متوسط عمر الحشرة الكاملة (الأنثي) ٤٠,٤ – ٤٩,٧ يوما في جيل الربيع و ٥٣,٧ – ٥٨,٥ يوما في جيل الخريف، بينما بلغ متوسط عمر الحشرة الكاملة (الذكر) ٤٥,٧ – ٥٦,٦ يوما في جيل الربيع و ٦٢,٧ – ٦٦,٨ يوما في جيل الخريف في كلا العامين. بلغ متوسط عدد البيض في جيل الربيع ٩٨,٥ – ١١٩,٦ بيضة/أنثي بينما تراوح متوسط عدد البيض في جيل الخريف ١١٣ – ١٢٨,٦ بيضة / أنثي. تبين من الدراسة أيضا أن فترة حضانة طور البيضة بلغ ٩٧,٩ – ١٠١,٨ يوما في جيل الربيع بينما كانت ١٠٣,٤ – ١٠٩,٩ يوما في جيل الخريف.