Influence of the Photoperiod and Temperature on Larval Developmental Periods of the Great Mormon Butterfly Papilio memnon L. inaeus

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Abstract: The growth and development of larval of Papilio memnon were investigated under different photoperiods and temperatures which could be controlled in the climate-box. The effects of photoperiod and temperature on larval developmental periods of Papilio memnon were very remarkable. At same temperature, larval developmental periods had significant difference. At 20 °C and during daylength of 12 h, the larval developmental periods were in the scope of 39. 3 ± 4.8 days, and the margin between of the longest and shortest periods was 9.2 days. At 25 °C and during daylength of 11 h 15 h, larval developmental periods were in the scope of 25. 4 ± 36 days, and the margin between of the longest and shortest periods was 10.6 days. At 30 °C and during daylength of 11 h 15 h, larval developmental periods were in the scope of 19. 6 ± 29. 0 days, and the margin between of the longest and shortest periods was 9.6 days. At the same daylength, larval developmental periods became shorter when the temperature was rising. Under daylengths of 12. 0, 12. 5, 13. 0, 13. 5 and 14. 0 h, the developmental threshold temperature of larva were 13. 6, 13. 3, 9. 2, 12. 2, and 7. 5 °C, the temperature effective thermal sum were 332. 7, 340. 5, 372. 1, 350. 9 and 475. 4 degree-days. At certain extent, the developmental threshold temperature and temperature effective thermal sum of larva were affected by photoperiod.

Key words: Papilio memnon; photoperiod; temperature; developmental periods; larval
表1 20°C下不同光照天数对斑蝶发育的影响

<table>
<thead>
<tr>
<th>光照时长/h</th>
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<th>2</th>
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<th>4</th>
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<th>成虫期/周</th>
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说明：* p < 0.05 与对照组相比 * 表示显著性差异。
2. 1. 2\[25 \, ^\circ \text{C}\] 照

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<th>4/</th>
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2. 1. 3\[30 \, ^\circ \text{C}\] 照

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2. 2\[25 \, ^\circ \text{C}\] 照

3. 3\[30 \, ^\circ \text{C}\] 照

4. 4\[20 \, ^\circ \text{C}\] 照

5. 5\[12 \, ^\circ \text{C}\] 照

6. 6\[30 \, ^\circ \text{C}\] 照

7. 7\[20 \, ^\circ \text{C}\] 照

8. 8\[15 \, ^\circ \text{C}\] 照

9. 9\[10 \, ^\circ \text{C}\] 照

10. 10\[5 \, ^\circ \text{C}\] 照

11. 11\[0 \, ^\circ \text{C}\] 照

12. 12\[14 \, ^\circ \text{C}\] 照

13. 13\[19 \, ^\circ \text{C}\] 照

14. 14\[24 \, ^\circ \text{C}\] 照

15. 15\[29 \, ^\circ \text{C}\] 照

16. 16\[34 \, ^\circ \text{C}\] 照

17. 17\[39 \, ^\circ \text{C}\] 照
第3.2节

3.2 光周期对羽化的影响（photoperiodic clock）

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3.1 光周期对羽化的影响

1. I. 各种昆虫的光周期反应

2. J. 光周期对羽化的调节

3. K. 光周期对羽化的抑制

4. L. 光周期对羽化的促进

5. M. 光周期对羽化的适应

6. N. 光周期对羽化的遗传

7. O. 光周期对羽化的生理

8. P. 光周期对羽化的生态

9. Q. 光周期对羽化的环境

10. R. 光周期对羽化的社会

11. S. 光周期对羽化的经济

12. T. 光周期对羽化的文化

13. U. 光周期对羽化的宗教

14. V. 光周期对羽化的科学

15. W. 光周期对羽化的艺术

16. X. 光周期对羽化的教育

17. Y. 光周期对羽化的体育

18. Z. 光周期对羽化的健康

19. A. 光周期对羽化的安全

20. B. 光周期对羽化的环保

21. C. 光周期对羽化的科技