Female bias in an immigratory population of *Cnaphalocrocis medinalis* moths based on field surveys and laboratory tests

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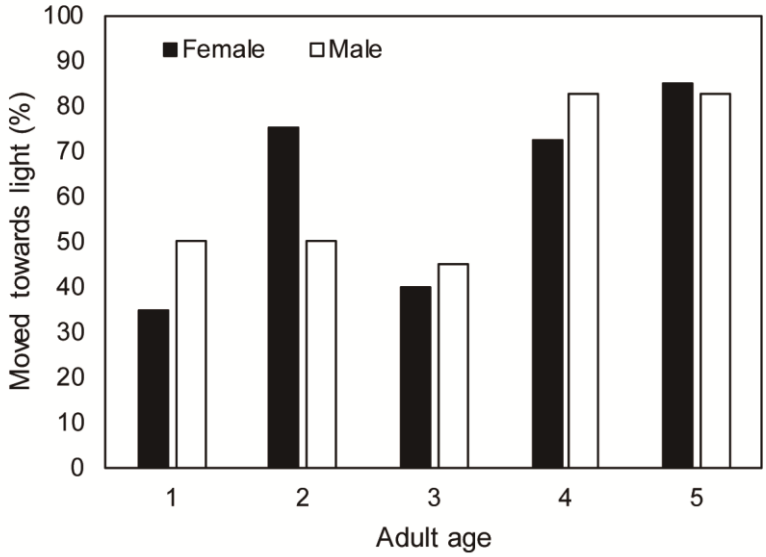
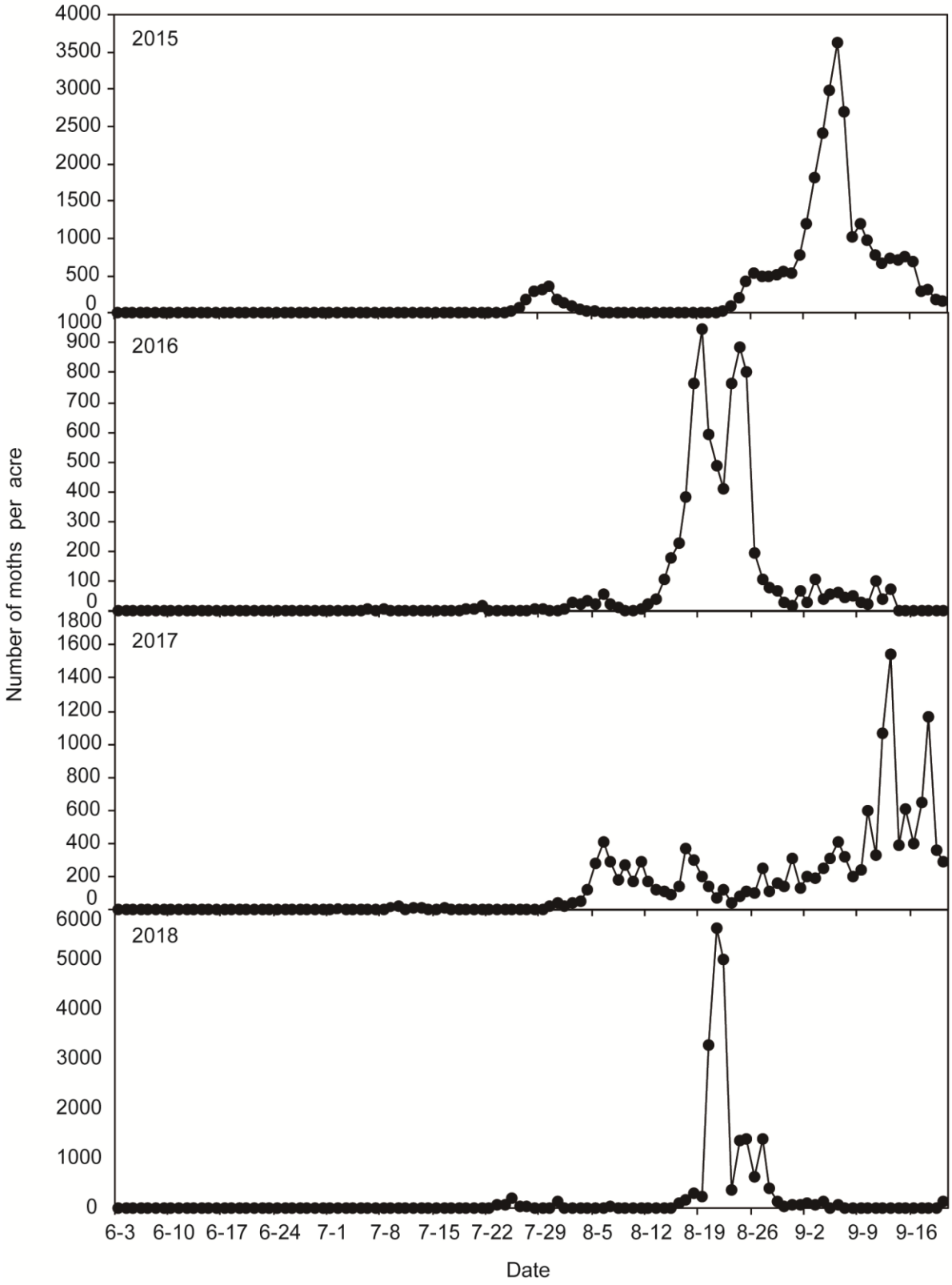


Supplementary Fig. S1. The percentage of adult *C. medinalis* moths that first moved towards the light. A total of 280 healthy moths were selected and tested. The equipment used to study phototaxis was similar to a positive phototaxis experimental apparatus used in a previous experiment, with slight modifications [1]. Newly emerged unpaired female and male moths were transferred daily to an experimental cup on the left side of an opaque test channel (containing a cotton ball soaked with a 5% honey solution). The light source consisted of a trap light (PS-15II type, Jiaduo Science, Industry and Trade Co., Ltd., Hebi, Henan, China) commonly used for pest monitoring and control (15 W; lλ=320-680 nm). The lights were turned on for 12 hours (from 19:00 to 7:00) each day. Once the light was turned off, the number of adults moving towards the right observation cup in each treatment was recorded. The experiment was carried out at 26 ± 1 °C. One- to five-day-old *C. medinalis* showed no sex differences in phototaxis (1-day-old: χ^2=0.921, df=1, P=0.337; 2-day-old: χ^2=2.667, df=1, P=0.102; 3-day-old: χ^2=0.102, df=1, P=0.749; 4-day-old: χ^2=1.147, df=1, P=0.284; 5-day-old: χ^2=0.092, df=1, P=0.762).



Supplementary Fig. S2. Population dynamics of *C. medinalis* moths in Jiangyan, China. The abundance of moths was recorded by using a survey carried out at 6 am (BJT), with a method based on that described by Wang *et al*. [2].

Supplementary Table S1. Abundance and female ovarian development of *C. medinalis* moths in Jiangyan, China.

Year	Period	No. of moths per acre	No. of moths dissected	Population size of moths in each stage of ovarian development			Population characteristics
				Level I	Level II	≥ Level III	
2017	27 July 15 Aug	1150	91	3.30	13.19	83.52	Mostly immigrants
2018	27 July 12 Aug	51	26	0	19.23	80.77	Mostly immigrants

Female moths of *C. medinalis* were collected from rice fields and dissected once every two days to determine their ovarian developmental stages according to the criteria described by Zhang *et al*. [3]. Before August 12, the *C. medinalis* moths in the field in Jiangyan, China, were the immigratory population.

References

1. Wan, G. J. *et al.* Reduced geomagnetic field may affect positive phototaxis and flight capacity of a migratory rice planthopper. *Anim. Behav.* **121**, 107-116, doi:10.1016/j.anbehav.2016.08.024 (2016).
2. Wang, F. Y. *et al.* Determining the migration duration of rice leaf folder (*Cnaphalocrocis medinalis* (Guenée)) moths using a trajectory analytical approach. *Sci. Rep.* **7**, 39853, doi:10.1038/srep39853 (2017).
3. Zhang, X. X., Lu, Z. Q. & Geng, J. G. Application of ovarian dissection of female *Cnaphalocrocis medinalis* moths in prediction and forecasting system. *Entomological Knowledge* **16**, 97-99 (1979).