Supplementary File:

Life table analysis

The l_x and m_x were estimated by eq. 1 and 2:

$$l_x = \sum_{j=1}^{k} s_{xj} \tag{1}$$

$$m_x = \frac{\sum_{j=1}^{k} s_{xj} f_{xj}}{\sum_{j=1}^{k} s_{xj}} \tag{2}$$

where s_{xj} shows the probability of a newly-born larvae surviving to age x and stage j. k shows stages number and f_{xj} is the age-stage specific fecundity of the individual at age x and stage j.

The O_d represents the number of days that females laid eggs and was estimated by eq. 3:

$$O_d = \frac{\sum_{x=1}^{N_f} D_x}{N_f} \tag{3}$$

Where N_f shows the number of female adults and D_x represent the number of days that a female produced offspring.

The r shows population growth rate as the time approaches infinity and population reaches the stable age-stage distribution. The population would rise at a rate of per unit of time. The r was calculated using the interactive bisection method and corrected with the Euler–Lotka equation with age indexed from 0 [1]:

$$\sum_{x=0}^{\infty} e^{-r(x+1)} l_x m_x = 1 \tag{4}$$

The λ represents the rate of population growth as the time approaches infinity, and the population reaches the stable age stage distribution. The population size will increase at the rate of λ per time unit. The λ was estimated by eq. 5:

$$\lambda = e^{r} \tag{5}$$

The R_0 shows the cumulative number of eggs laid by a single female throughout her life. The R_0 was calculated using eq. 6:

$$R_0 = \sum_{x=0}^{\infty} l_x m_x \tag{6}$$

The T represents the period needed by a population to increase to R_0-fold its current size when the stable rate of increase is reached. The T was estimated by eq. 7:

$$T = \frac{\ln R_0}{r} \tag{7}$$

The life expentancy (e_{xj}) shows the expected duration that an individual of age x and stage j will survive. The e_{xj} was estimated according to Chi and Su [2] using eq. 8:

$$e_{xj} = \sum_{i=x}^{\infty} \sum_{y=j}^{k} s'_{iy} \tag{8}$$

Where s'_{iy} represents the probability that an individual of age x and stage j will survive to age i and stage y by assuming $s' = 1$.

v_{xj} shows the dedication to future offspring at age x and stage j. The v_{xj} was estimated by eq. 9 [3,4]:

$$v_{xj} = \frac{e^{r(x+1)}}{s_{xj}} \sum_{i=x}^{\infty} e^{-r(i+1)} \sum_{y=j}^{\beta} s'_{iy} f_{iy} \tag{9}$$

References

1. Goodman, D. Optimal life histories, optimal notation, and the value of reproductive value. *The American Naturalist* **1982**, *119*, 803-823.

2. Chi, H.; Su, H.-Y. Age-stage, two-sex life tables of *Aphidius gifuensis* (Ashmead)(Hymenoptera: Braconidae) and its host *Myzus persicae* (Sulzer) (Homoptera: Aphididae) with mathematical proof of the relationship between female fecundity and the net reproductive rate. *Environ Entomol* **2006**, *35*, 10-21.

3. Tuan, S.J.; Lee, C.C.; Chi, H. Population and damage projection of *Spodoptera litura* (F.) on peanuts (*Arachis hypogaea* L.) under different conditions using the age-stage, two-sex life table. *Pest Manag Sci* **2014**, *70*, 805-813.

4. Tuan, S.J.; Lee, C.C.; Chi, H. Erratum: Population and damage projection of *Spodoptera litura* (F.) on peanuts (*Arachis hypogaea* L.) under different conditions using the age-stage, two-sex life table. Pest Manag. Sci. **2014**, 70, 1936.