

Supplementary materials

**Intergenerational sublethal effects of flonicamid on cotton aphid, *Aphis gossypii*: An age-stage, two-sex life table study**

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## Life Table Analysis

The  $l_x$  and  $m_x$  were determined using Eq. 1 and 2:

$$l_x = \sum_{j=1}^{\beta} s_{xj} \quad (1)$$

$$m_x = \frac{\sum_{j=1}^{\beta} s_{xj} f_{xj}}{\sum_{j=1}^k s_{xj}} \quad (2)$$

where  $s_{xj}$  represents the possibility that a newly born nymph will survive to age  $x$  and stage  $j$ .  $\beta$  shows number of stages, while  $f_{xj}$  represents age–stage-specific fecundity of the individual at age  $x$  and stage  $j$ .

The  $RP_d$  shows days of reproduction and was estimated using Eq. 3:

$$RP_d = \frac{\sum_{x=1}^{N_f} D_x}{N_f} \quad (3)$$

where  $N_f$  represents number of female adults and  $D_x$  shows number of days that a female produced offspring [1].

$r$  shows population growth rate when the time reaches infinity, and the population achieves a stable age–stage distribution. The insect's population might be increased at a rate 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 [2]:

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

$\lambda$  represents population growth rate when time reaches infinity and population attains stable age–stage distribution. The population size will increase at the rate of  $\lambda$  per time unit. The  $\lambda$  was estimated using Eq. 5:

$$\lambda = e^r \quad (5)$$

$R_0$  indicates the total number of nymphs laid by a single female until death. The  $R_0$  was calculated using Eq. 6:

$$R_0 = \sum_{x=0}^{\infty} l_x m_x \quad (6)$$

$T$  represents the time required for a population to increase to  $R_0$ -fold its current size at a stable rate of increase. The  $T$  was calculated using Eq. 7:

$$T = \frac{\ln R_0}{r} \quad (7)$$

$e_{xj}$  shows the predicted duration that an individual of age  $x$  and stage  $j$  will survive. The  $e_{xj}$  was calculated according to Chi and Su [3] using Eq. 8:

$$e_{xj} = \sum_{i=x}^{\infty} \sum_{y=j}^{\beta} s'_{iy} \quad (8)$$

where  $s'_{iy}$  indicates the probability that an individual aphid 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 calculated using Eq. 9 according to [4]

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

## References

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