

7.3 PHENOLOGY MODELS AND LIFE-TABLE PARAMETERS OF PESTS

7.3.1 *Phthorimaea operculella* (Kroschel et al.)

1. Development Time

Stage: Eggs	Stage: Larvae	Stage: Pupae	Stage: Female	Stage: Male
Model: probit	Model: logit	Model: logit	Model: cloglog	Model: cloglog
Slope: 16.84	Slope: 14.63	Slope: 14.8	Slope: 2.75	Slope: 2.8

2. Development Rate

Stage: Eggs Model 46: Janish 1 Parameters: Dmin=3.03 Topt=33.791 K=0.119 Formula: $y \sim 2 / (Dmin * (e^{K * (x - T_{opt})} + e^{(-K) * (x - T_{opt})}))$
Stage: Larvae Model 12: SharpeDeMichelle 12 Parameters: p=0.07 TI=2457529.455 Th=308.514 Ha=377.203 HI=53293.828 Hh=20705.762 Formula: $y \sim (p * (x / 298.16) * e^{(Ha / 1.987) * ((1 / 298.16) - (1 / x))}) / (1 + e^{(HI / 1.987) * ((1 / TI) - (1 / x))} + e^{(Hh / 1.987) * ((1 / Th) - (1 / x))})$
Stage: Pupae Model 12: SharpeDeMichelle 12 Parameters: p=0.123 TI=399374.751 Th=308.872 Ha=324.21 HI=56218.342 Hh=17388.922 Formula: $y \sim (p * (x / 298.16) * e^{(Ha / 1.987) * ((1 / 298.16) - (1 / x))}) / (1 + e^{(HI / 1.987) * ((1 / TI) - (1 / x))} + e^{(Hh / 1.987) * ((1 / Th) - (1 / x))})$

3. Senescence

Stage: Female Model 25: Exponential Simple Parameters: b1=0.008 b2=0.096 Formula: $y \sim b1 * e^{(b2 * x)}$
Stage: Male Model 56: Hilbert and Logan 3 Parameters: trid=55741.302 Tmax=76.168 Tmin=0.075 D=532395032.698 Dt=0.002 Smin=0.009 Formula: $y \sim trid * (((x - Tmin)^2) / ((x - Tmin)^2 + D) - e^{-(Tmax - (x - Tmin)) / Dt}) + Smin$

4. Mortality

Stage: Eggs Model 26: Wang 1 Parameters: Topt=27.338 B=10.107 H=0.032 Formula: $y \sim 1 - 1 / (e^{(1 + e^{-(x - T_{opt}) / B})} * (1 + e^{-(T_{opt} - x) / B})^H)$
Stage: Larvae Model 24: Taylor 1 Parameters: rm=0.808 Topt=25.696 Troh=8.83 Formula: $y \sim 1 - rm * e^{(-0.5) * ((x - T_{opt}) / Troh)^2}$

Stage: Pupae

Model 26: Wang 1

Parameters: $T_{opt}=23.839$ $B=3.92$ $H=0.0179$

Formula: $y \sim 1 - 1 / (e^{(1+e^{-(x-T_{opt})/B})} + (1+e^{-(T_{opt}-x)/B}) + H)$

5. Total Oviposition

Stage: Female

Model 24: Taylor 1

Parameters: $rm=-177.466$ $T_{opt}=20.566$ $T_{roh}=7.762$

Formula: $y \sim 1 - rm * e^{(-0.5) * (-(x-T_{opt})/T_{roh})^2}$

6. Relative Oviposition

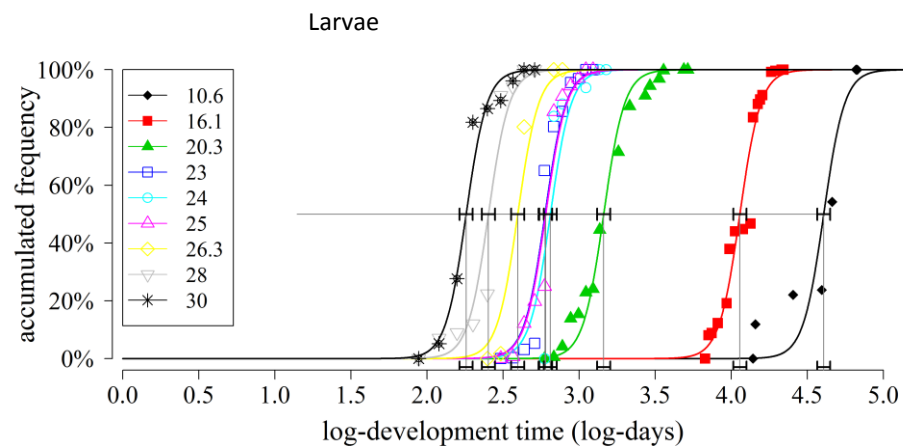
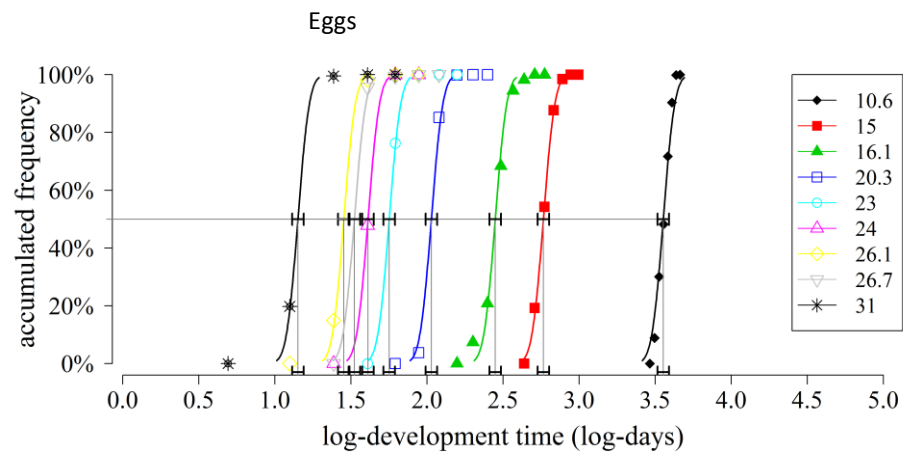
Stage: Female

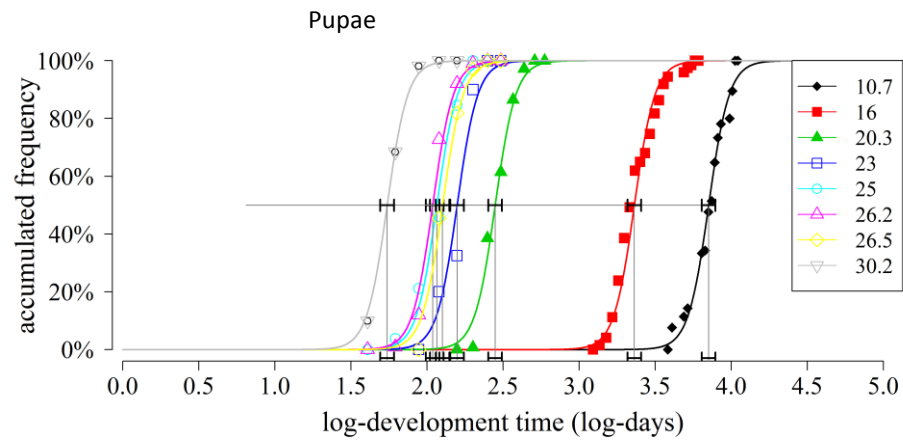
Model 2: Gamma

Parameters: $a=1.122$ $b=4.146$

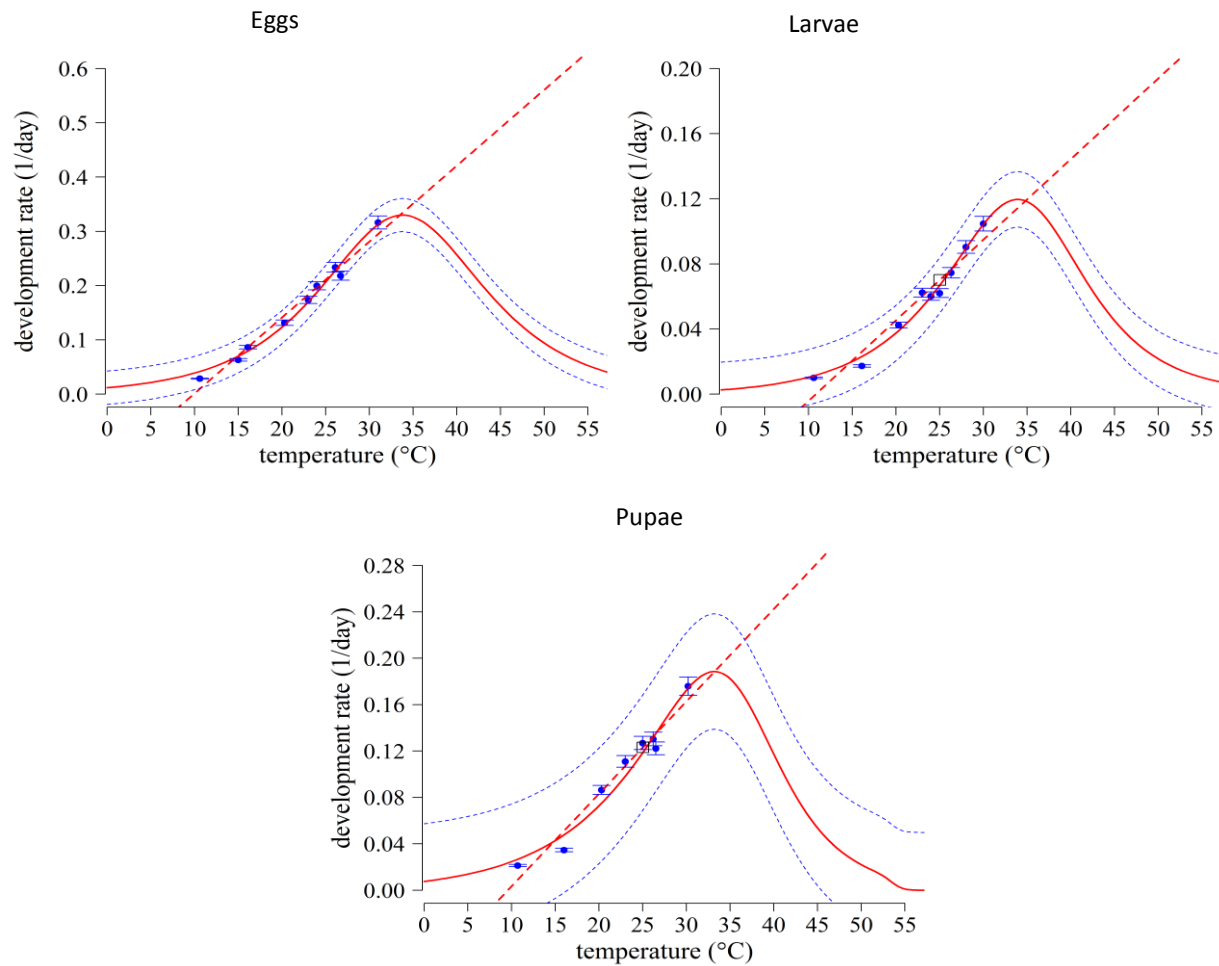
Formula: $y \sim pgamma(x, a, b)$

7. Development Time

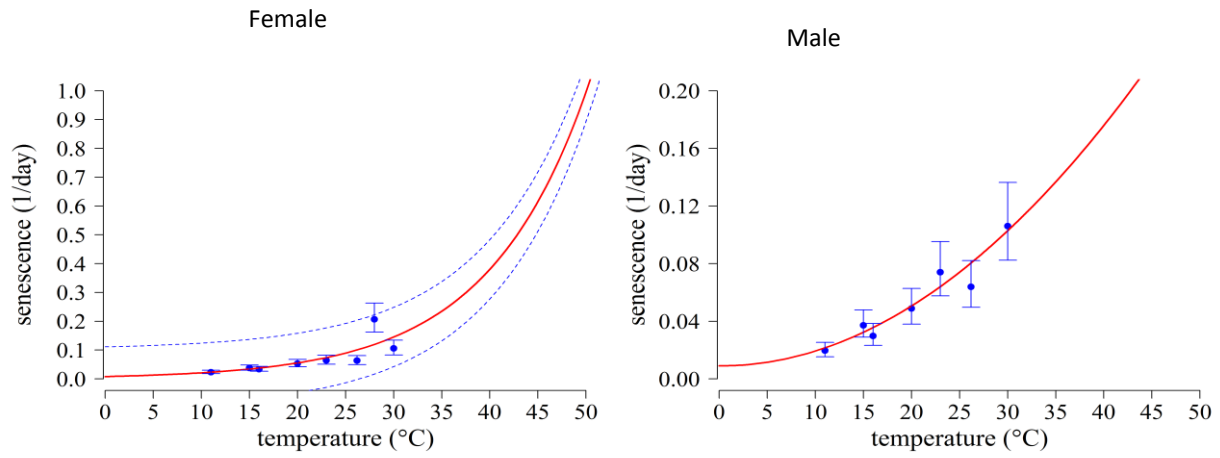




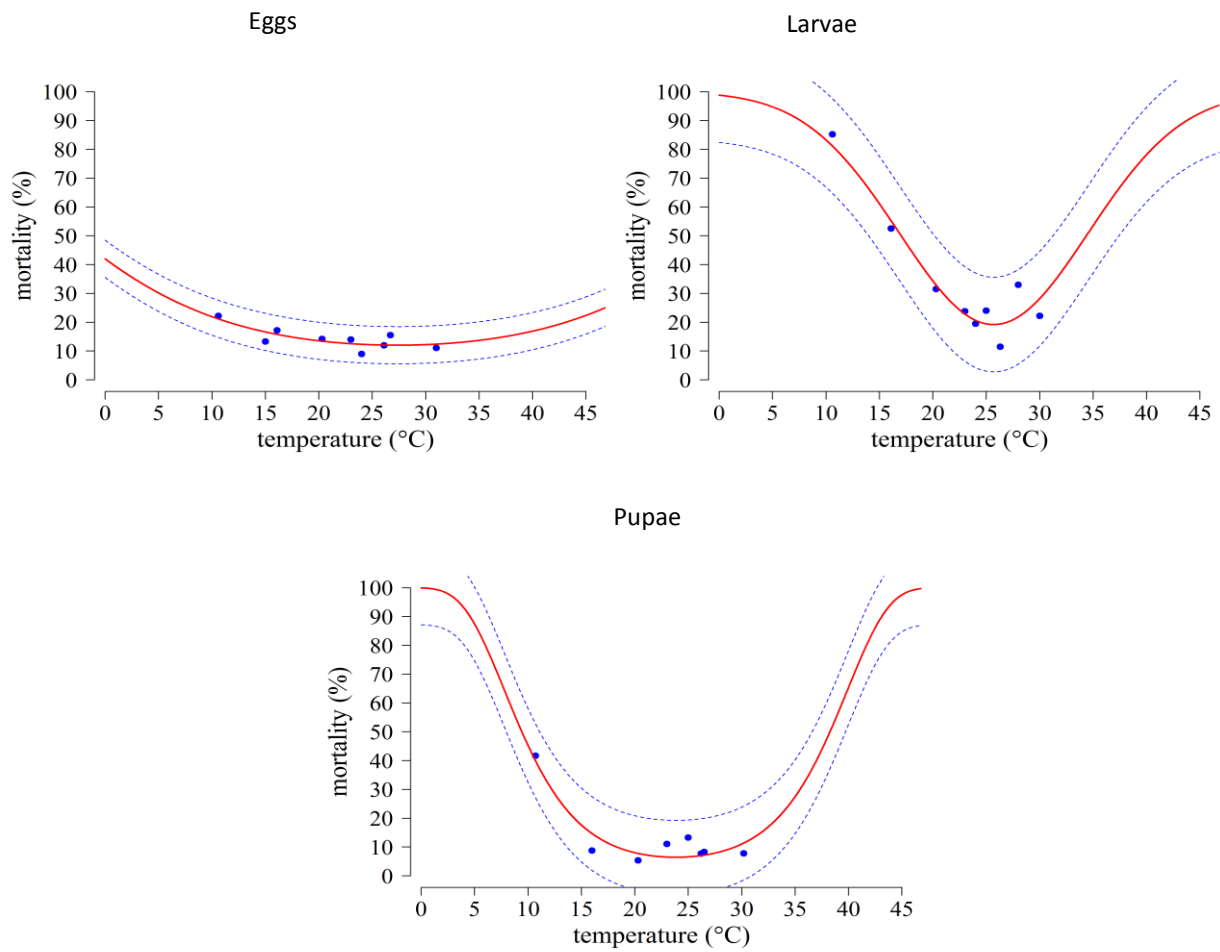
8. Development Rate



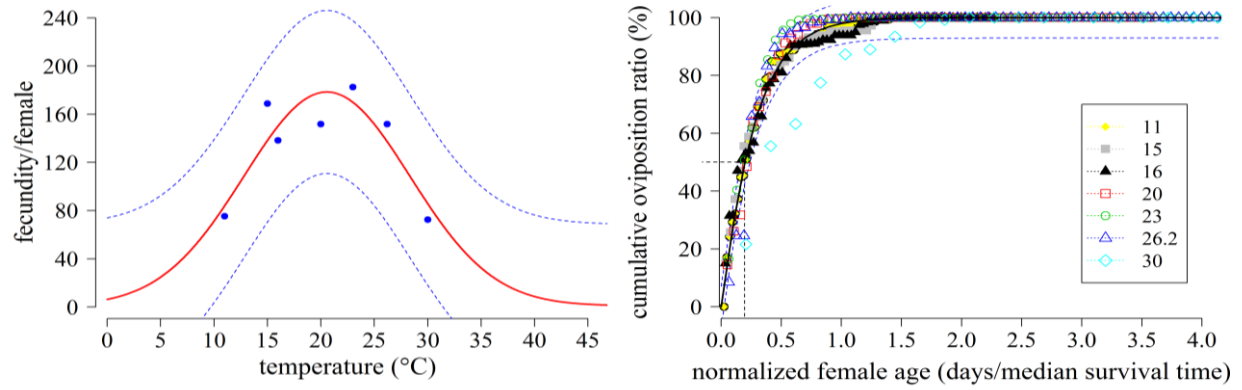
9. Senescence



10. Mortality



11. Total and Relative Oviposition



12. Estimated life table parameters using deterministic simulation

