

# TEMPERATURE TOLERANCES OF *STURMIOPSIS PARASITICA* (DIPTERA: TACHINIDAE)

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*Sturmiopsis parasitica* Curram (Diptera: Tachinidae) was collected from *Eldana saccharina* Walker (Lepidoptera: Pyralidae) in Benin. A colony was established at the South African Sugar Association Experiment Station (SASEX) in 1997. It has been released into *E. saccharina* infested sugarcane fields in the South African sugarbelt. Recoveries have been made in Entumeni, Umfolozi, Melmoth and Compensation.

As insect development is dependent on temperature, biological control release strategies and laboratory rearing can be made more effective by determining lower development thresholds and calculating day degrees. Fifth to sixth instar *E. saccharina* larvae were inoculated with *S. parasitica* first instar maggots at SASEX. They were then subjected to constant temperatures of 10, 18.2, 22.1, 25.0, 30.9 and 35.9 °C. *S. parasitica* maggots and subsequently pupae did not survive at 10 and 35.9 °C. No adult emergence occurred at 18.2 °C. Significant increase in development rate occurred with increasing temperature from 18.2 to 30.9 °C ( $P < 0.001$ ) for both the maggot and pupal stage. Estimated lower development thresholds for maggot and pupal stages were 12.8 and 17.4 °C respectively. These values were used to calculate day degrees. Day degrees were  $230.7 \pm 5.3$  and  $157.9 \pm 5.2$  for the maggot and pupal stage respectively. An average of

388.6 day degrees are required to complete development to adulthood. There was no significant effect of temperature on adult longevity (between the temperatures 25.0 and 35.9 °C).

The lower development threshold of 17.4 °C for the pupal stage is the most limiting in terms of survival in KwaZulu-Natal. Some areas of the South African sugar industry experience temperatures below the lower development threshold (such as the KwaZulu-Natal Midlands). Therefore *S. parasitica* releases should be confined to those sugar areas falling between Malelane in Mpumalanga and Swaziland in the north and the Umzimkulu River in the south during the summer months. In the winter months there are fewer areas of sugarcane where mean temperatures are still above 17.4 °C. Releases should therefore be restricted to Mkuze, Umfolozi and Richards Bay regions so that continuous development of *S. parasitica* can take place. Using the day degree calculations, surveys after release can take place after approximately 230 and 380 day degrees in order to enhance the chances of *S. parasitica* pupal recoveries. In terms of laboratory rearing, the optimal temperature is 30 °C for maggot development and 25 °C for pupal development.