

BIOLOGICAL CHARACTERISTICS OF *PLESISPA REICHEI* AND THE EXOTIC PARASITOID *TETRASTICHUS BRONTISPAE* FOR POTENTIAL BIOCONTROL

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The accidentally introduced, *Plesispa reichei* (Coleoptera: Chrysomelidae) is a pest of coconut seedlings and young palms. Its feeding damage causes growth retardation. Biological control using the exotic parasitoid, *Tetrastichus brontispae* (Hymenoptera: Eulophidae) has been recognized as the best and most sustainable management option for the pest. A laboratory mass rearing method for *P. reichei* was developed during this study. Aspects of biology of the pest and the parasitoid were examined and the effectiveness of *T. brontispae* as a potential biocontrol agent was evaluated, for prospective biocontrol.

For mass rearing of *P. reichei*, first opened coconut leaf was found to be best substrate for oviposition. Single eggs placed on leaflets incubated at 28°C in the laboratory gave the highest hatchability of 82%. Duration of development and body size *P. reichei* determined at temperatures of 22, 25, 28 and 30°C showed that at higher temperatures, duration of development is significantly shorter and body size smaller, the optimum being 25-28 °C for both *P. reichei* and *T. brontispae*. The threshold temperature for *P. reichei* and *T. brontispae* development ranged from 14.7-33.9 and 10.0-27.7 °C while the thermal constants were 543 and 303 day degrees respectively.

The parasitoid, *T. brontispae* when reared at 22, 25, 28 and 30 °C took 29.2, 19.7, 15.9 and 18.4 days respectively to complete development. Rearing temperatures did not affect parasitism rate, but significantly affected the emergence of parasitoids. Percent emergence of parasitoids varied from 86.8, 88.5, 95.5 to 50 when reared at 22, 25, 28 and 30 °C respectively. Exposure of host pupae to parasitoids in the ratio of 1:1 for a period of 24, 48 or >48 h or at the ratio of 1:2 for 24 and 48 h period were more suitable for mass rearing of the parasitoid in the laboratory. Longevity of female parasitoids fed on honey, sugar, pollen and water varied from 7.6, 7.3, 6.3 to 4.2 days respectively. Host pupal weight and length positively correlated with number of progeny produced in *T. brontispae* as well as the number of female progeny per host. Percent parasitism significantly varied with the host stage. When 1, 2, 3 and 4 day old host pupae were parasitized, parasitism levels of 90, 71, 47 and 34 % respectively were obtained. Unmated female parasitoids produced male progeny only while mated females produced both male and female progeny. Hence, *T. brontispae* is an arrhenotokous species. *T. brontispae* is also able to discriminate previously parasitized hosts.

Adult parasitoid emerged between 7.00- 9.00h and mated immediately. In laboratory containers with host pupae and in field cages containing infested coconut seedlings, parasitism levels of 90% and 75% respectively were achieved. The findings suggest that *T. brontispae* is a promising biological control agent of *P. reichei*. Its effectiveness under field conditions needed to be investigated in future studies.