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Alternative methods for the control of *Tuta absoluta*

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ABSTRACT: This article reviews the work done on the life history, damage symptoms, distribution, resistance and management of *Tuta absoluta* (*T. absoluta*). It also gives an account of chemical control, biological control, and recent techniques of control. In addition, an experimental trials were carried out to evaluate the effectiveness of entamopathogenic fungi (*Beauveria bassiana*, *Trichoderma album*), toxicity units of *Bacillus thuringiensis var. kurstaki*, *Alpha-Cypermethrin*, Electrochemical activated water (EAW) and Nano-particles of scilica (SNPs) as well as their combinations for controlling *T. absoluta*. In adults *T. absoluta*, 10 % mortality was occurred in the control group within of the test durations. *T. album* was more virulent (70%, mortality) than those of *B. bassiana* (60%, mortality), killing the treated larvae relatively quickly (LT50: 3.5-5 days), in comparison with the *B. bassiana* (50 %, mortality) that began to affect the larvae only after 6 days (LT50: 5.5.6.5 days). The larval mortality percentage of *T. absoluta* treated as newly hatched larvae with EAW + α -cyper + SNPs and *B. thuringiensis var. hsrstciki* + EAW + α -cyper. reached 90 %, followed by EAW + α -cyper. treatment 70 %) , while the value was 10% in the control. Percentages of hatchability of *T. absoluta* treated with EAW + α -cyper and EAW+ α -cyper.+ SNPs were 30 % for each. Meanwhile, the other treatments of *B. bassiana* , *Bacillus thuringiensis* and *T. album* were 80,72 and 50 %,respectively. On the other hand, percentage of hatchability of *T. absoluta* reduced to 25% in EAW+ α -cyper + SNPs.,while the value was 92% in the control. It is common knowledge that intensive chemical

treatment leads to the development of resistance, and therefore alternative methods should be considered.

Keywords: Alternative methods, *T.absoluta*, Control..