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Effective control of insect pests' population in stored rice using LED attractants

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Abstract

Stored grain products are prone to insect infestations especially in tropical environments where traditional storage systems are commonly used by farmers and rice processors. Physical attractants such as light emitting diodes (LEDs, 5mm 5VDC) have been tested to effectively decrease insect population in rice storage by naturally luring the insects into a trap. A 1-ton GrainSafeTM storage system (replicated 3 times) filled with rice paddy (MC: 12%±1 %) that is heavily infested with storage insect pests such as *Rhyzopertha dominica*, *Sitophilus oryzae* and *Tribolium castaneum*, with population densities (no. of adult insects/ton) of 101,444; 27,777; and 11,666, respectively, were used to deploy the two-coloured LEDs (blue and red) and a control treatment. A Completely Randomised Design (CRD) experimental set-up was implemented to capture storage insect pests on a daily basis through an improvised trap fitted with the LED attractant device and manually counting and identifying the number of insects trapped per day with the aid of a magnifying lens (LUMENO Lupenleuchte 8245-PRO). The blue LED effectively lured the major insect pests and the mean capture rates (insects trapped per day/total density, %) were determined at 0.33, 0.11, and 0.11, that are equivalent to 354, 9 and 33 average insects trapped per day, respectively, for *R. dominica*, *S. oryzae*, and *T. castaneum*. The red LED recorded capture rates of 0.03, 0.08, and 0.02, respectively for each insect, are equivalent to 27, 7 and 5 insects trapped per day. On the other hand, the control treatment exhibited capture rates of 0.0, 0.02, and 0.04, respectively for each insect are equivalent to 2, 4 and 10 insects trapped per day. The number of insects lured and capture rates are significantly different (at =5 %) in the two LEDs attractants and the control treatment (p-value=0.0000). The use of blue and red LEDs can significantly reduce storage insect populations by effectively luring the insects into a trap which is a sustainable method to eradicate insect pests in stored grains because these are chemical-free attractants.

Keywords: Chemical-free attractants, insect pests, LED, stored rice

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