# DESIGNING, FABRICATION AND EVALUATION OF A PHEROMONE TRAP FOR *Tribolium castaneum* ADULTS

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The red flour beetle, *Tribolium castaneum*, is a serious cosmopolitan pest of stored-products. The traps baited with the synthetic form of its aggregation pheromone 4,8-dimethyldecanal and food-based kairomone are effective in the detection of *T. castaneum* adults, but the efficiency is low. These traps have natural convection of air. However, it has been found that the air flow significantly affects the trapping efficiency of *T. castaneum* adults. Hence, this research was conducted to design, fabricate and evaluate new monitoring traps having forced air convection. Three triangular-shaped traps, a square-shaped trap and a hexagonal-shaped trap having an exhaust fan driven by a motor at the center were prepared using abrasive papers. The efficiencies of the traps having either the pheromone only or both pheromone and kairomone were compared with that of the commercial Dome trap by releasing 200 *T. castaneum* adults inside a 60 cm circle on a cement floor. Trapping percentage significantly differed among the different designs ($p=0.001$) ($p=0.001$) when tested with either the pheromone alone or both pheromone and kairomone. All the five traps designed had higher significant trapping percentages than the commercial Dome trap. Triangular trap with "the pheromone above and kairomone below" had the highest significant trapping percentage and was approximately four times the trapping efficiency of Dome trap. The same triangular-shaped trap ($p=0.0029$), Dome trap ($p=0.0023$) and square-shaped trap ($p=0.0041$) had significantly higher trapping percentages with pheromone+kairomone than the pheromone alone. The triangular trap with the pheromone above and kairomone below can effectively be used for the detection of *T. castaneum* adults. This study reveals that the trapping efficiency of *T. castaneum* adults varies with the trap design, and is increased when the trap has an exhaust fan inside.

***Keywords:*** Exhaust fan, Pheromone trap, Trap designs, Triangular trap