

PERFORMANCE OF HONEYBEE (*Apis cerana*) COLONIES REARED IN FABRICATED CLAY-BASED BEEHIVES IN ANURADHAPURA, SRI LANKA

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Absconding of honeybees reared in wooden hives is frequent during dearth period in the dry zone of Sri Lanka. However, bees kept in clay pots apparently stay for longer durations. The objectives of this study were to design, construct, and evaluate user-friendly clay hives. Clay-based beehives were constructed with terracotta tiles, and burnt clay plates with 1% rice husk ash, with brood chambers, honey supers, floorboards, and crown boards being identical to those of eight-framed wooden beehives. The treatments were the construction materials: wood, clay, and terracotta. Four bee colonies per treatment were introduced and their performance was measured using the Colony Performance Index (CPI), comb area growth rate (G_{ca}), brood area (A_b), pollen area (A_p), honey area (A_h), and number of dead bees (N_{db}). Temperature and humidity were recorded both inside and outside each hive from 15 September to 14 October. The average day and night temperatures on sunny days were significantly lower in clay and terracotta hives relative to the outside temperature ($p < 0.05$). Moreover, on rainy days daytime temperatures were significantly lower in clay and terracotta ($p < 0.05$) hives though night temperatures were not significantly different. The RH during the night inside in the hives was significantly lower compared to outside on both sunny and rainy days ($p < 0.05$). Furthermore, daytime RH on rainy days was not significantly different for all treatments ($p > 0.05$) while RH on sunny days was significantly higher compared to the RH outside ($p < 0.05$) in all treatments. A_h ($23.5 \pm 1.7 \text{ cm}^2$) and A_p ($2.1 \pm 0.5 \text{ cm}^2$) were significantly higher in wooden hives than other treatments ($p < 0.05$). But CPI (2.39 ± 0.31) and G_{ca} (5.12 ± 10.82) were significantly higher in terracotta hives ($p < 0.05$) indicating a higher performance. The clay hives had the highest N_{db} ($p < 0.05$). Overall, terracotta hives indicate better thermal control than wooden and clay hives. Continuous monitoring of colony performance and honey production through the dry season is recommended for further improvements.

Keywords: Absconding of honeybees, Clay-based bee hives, Colony Performance Index