The Tree Hugger Nesting Box: Designing and Field-Testing the World's First Concave Backed Tree Nesting Box Which Utilises the Thermoregulatory Properties of Trees

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Traditional nesting boxes fail to replicate the stable microclimate of natural tree hollows crucial for mature tree species, due to offset designs causing large temperature fluctuations, leading to heat stress and increased mortality of native animals. This investigation explores the applicability of a novel nesting box design with a concave back, that fits neatly into the curved shape of a tree. There is no record, visual or written, that mentions such a design being produced, so the Tree Hugger nesting box is a world first! With trees being on average 50% water, with a large percentage of this water being stored or transferred in the xylem vessels below the bark layer, trees are a great regulator of temperature due to water's high heat capacity. By positioning a nesting box neatly against the outer layer of a tree, this investigation shows conclusively that a curved thin plywood-backed nesting box is highly significantly cooler ($p = 1.67 \times 10^{-7}$) than an identical nesting box offset from the tree during summer and correspondingly warmer ($p = 3.77 \times 10^{-17}$) in winter. Fieldwork involved the extensive comparative testing of nesting boxes with differing conductive material used for the concave-shaped back of the nesting box. Temperature readings were recorded for 41 consecutive days on smooth bark, Eucalyptus tereticornis, in summer and 32 days on smooth bark and 21 days on rough bark, Eucalyptus microcorys, in winter. The concave thin plywood-backed nesting box provides a revolutionary approach for native animal conservation amidst increasing environmental thermal challenges.

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