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TRAP-NEST DESIGN FOR SMALL TRAP-NESTING HYMENOPTERA

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Many solitary bees and wasps construct brood cells in pre-existing natural cavities such as beetle borings or in excavations of pithy stems and twigs like *Sambucus* and *Juglans*. Artificial nesting materials are also acceptable and provide a convenient approach to study nest architecture, nesting activity, provisions and parasites. Artificial nesting materials have included bamboo, glass tubes, plastic straws, cuttings of twigs and stems, and trap-nests. However, use of many of these materials have significant drawbacks. Condensation in glass tubes and plastic straws make these materials ineffective. Bamboo has a varying bore diameter and cuttings of twigs and stems are split with great difficulty. Trap-nests, small rectangular wooden blocks with holes drilled into their longitudinal axes, eliminate or greatly reduce all of these problems. Trap-nest bores can be varied in depth and diameter and are analogous to natural cavities used as nesting sites. Trap-nests of clear straight-grain pine can be split in half lengthwise to expose nest contents with relative ease, especially if bore diameters are greater than 3.2 mm.

Initial trap-nest construction techniques for my studies were derived from Fye (1965) and Krombein (1967). Pine boards were cut into trap-nests (19 × 19 × 140 mm) with bores drilled to depths of 60 and 120 mm. Bore diameters and bore depths varied seasonally, dependent upon prior experience and current study focus.

Several problems encountered in early studies were resolved with modifications of trap-nest construction techniques. Small bore trap-nests (1.6 mm–3.2 mm) are split with much difficulty. The splitting plane frequently did not intercept the bore, since the axis of the bore was seldom parallel to the long axis of the wood grain. These problems were solved by the use of pre-split trap-nests. Stages in the construction of pre-split trap-nests are illustrated in Figure 1. Several steps were required for their construction. A band saw was used to cut trap-nest blocks length-wise into two sections with dimensions nominally 6.4 × 19 × 140 mm and 12.6 × 19 × 140 mm. A drill-guide channel was routed in a longitudinal face of the larger section. trap-nest sections were bound together with masking tape and drilled to selected depths and diameters with high speed twist-steel bits.

Pre-split trap-nest sections did not fit well together. Irregularities across split surfaces admitted light and excess moisture, both detrimental to trap-nest use. These difficulties were eliminated by modifying a technique from Krombein (1967). Pre-split trap-nests were coated with melted paraffin and then re-drilled to their appropriate bore diameter and depths. Paraffin provided water-proof seal across split surfaces and re-drilling removed paraffin that blocked the bore and produced exceptionally smooth bore surfaces. Completed trap-nests were bound together into trap-nest bundles of nine (3 × 3), twelve (3 × 4), or twenty (4 × 5) trap-nests. Cotton cord, rubber bands and plastic strapping were used to secure individual trap-nests in bundles. Fye's (1965) design for a bundle carrier was used to place bundles in the field and fence staples were used to attach bundles to the trunks of trees in the study area. A typical trap-nest bundle is illustrated in Figure 2.

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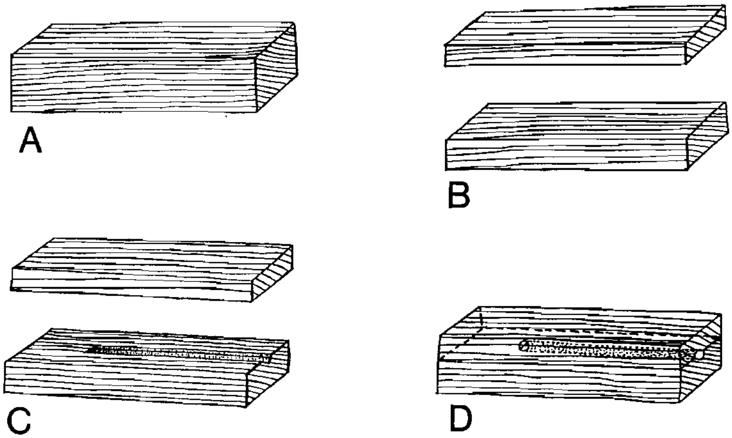

Figure 1. Construction of pre-split trap-nests: A—pine trap-nest block; B—a 6.4 mm section removed from side of trap-nest; C—60° channel routed in trap-nest face; D—pre-split trap-nest with bore drilled out.

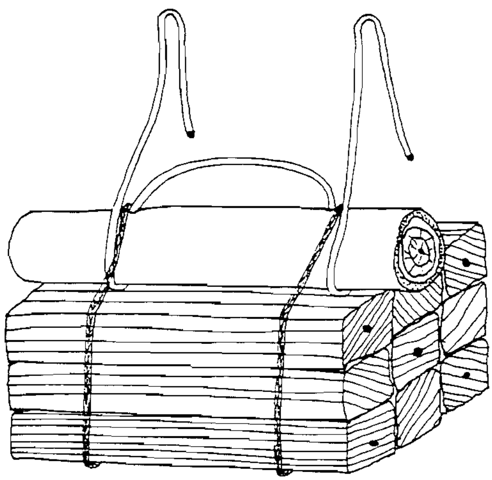

Figure 2. A 3 by 3 bundle of trap-nests ready for placement in the field.

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