



Nest Box Construction Manual for Cavity-Nesting Pollinators



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WHY BUILD A NEST FOR NATIVE BEES?

Native bees are essential pollinators in both wild and cultivated ecosystems. While honey bees often get the spotlight, native bees and other solitary or species remain crucial for pollinating many fruits, vegetables, and seed crops. Most solitary bees nest in the ground, but some nest in tunnels, and stems (cavity-nesting bees). Natural nesting habitats are rapidly disappearing due to habitat loss and pesticide exposure, among other causes.



Cavity-nesting tubes occupied by insects

Cavity-nesting bee habitat is especially rare in agricultural landscape

This manual provides a step-by-step method for constructing a simple, ecologically-sound nesting habitat that actually supports native bees, not just a decorative box. Developed with input from entomologists and field-tested, it offers a practical solution to increase nesting habitat options for a diversity of native pollinators in agricultural landscapes.



Photo credits: G. MacInnis

A METHOD FOR INCREASING POLLINATOR DIVERSITY FOR CROP PRODUCERS & CITIZENS

For agricultural producers, this is more than a conservation gesture, it's a simple, cost-effective tool for improving on-farm pollination. Installing properly designed bee nests can increase pollinator diversity in any terrestrial ecosystem. Unlike honey bee hives, these structures support the species already adapted to the local environment and climate, often providing earlier-season, efficient, or targeted pollination.

By increasing nesting opportunities, especially when paired with nearby flowering plants, you can diversify and strengthen the pollinator community on your land, leading to more resilient yields and reduced dependency on managed bees.

What You'll Get From This Guide



Nest

Construction

- Materials List
- Build Instructions



Nesting Tubes

- Correct diameters & lengths
- Customized for local species



Location

- Proper orientation
- Optimal location conditions



Maintenance

- Timing
- Cleaning & care

Photo credit: G. MacInnis

This manual describes every component needed to build a durable cavity nesting pollinator habitat. These nests can be installed on field margins, orchard borders, or pollinator strips and even on balconies, rooftops, backyards.

MATERIALS LIST - POLLINATOR CAVITY NEST

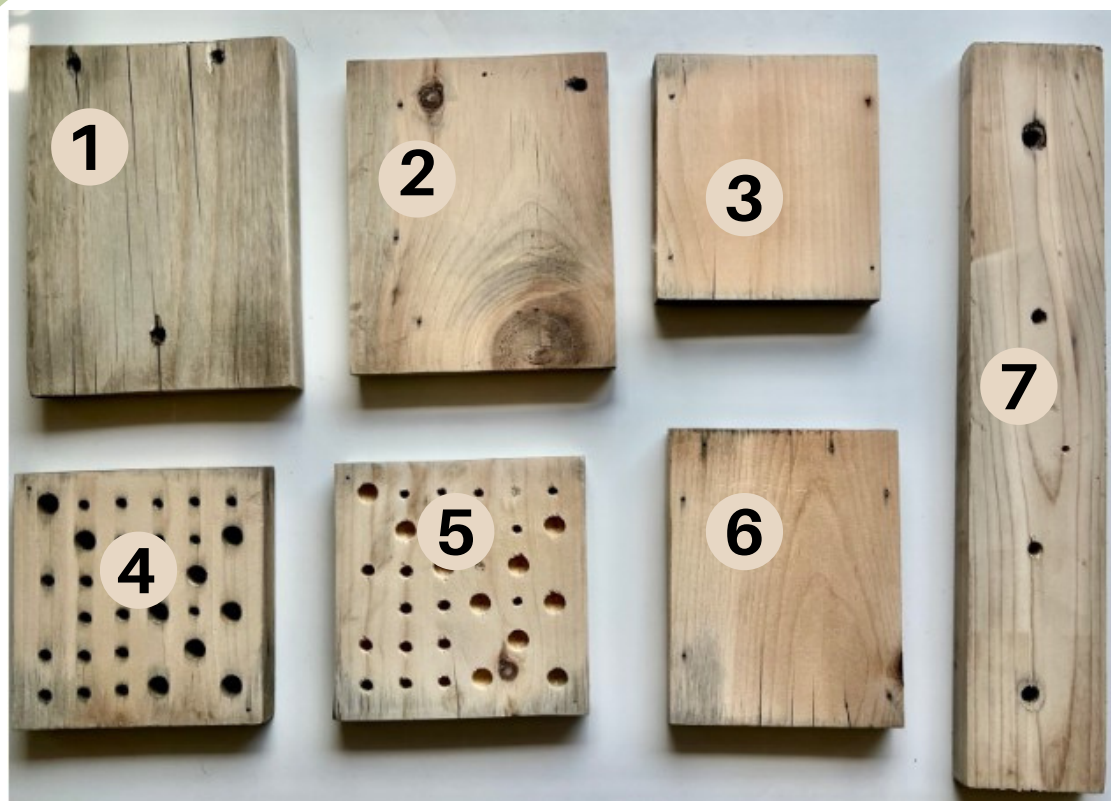


Photo credit: G. Lanni

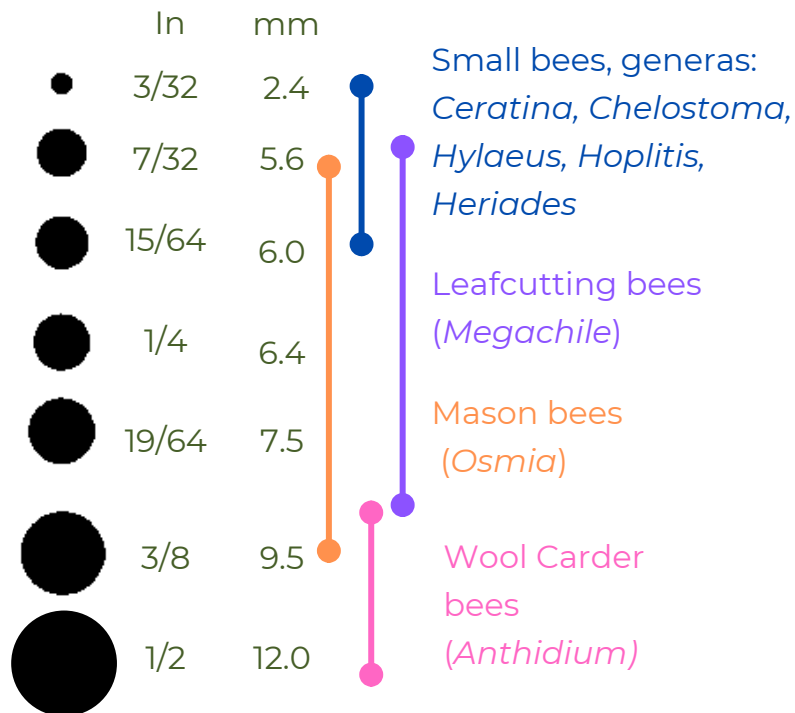
You will need the following 7 wood* pieces:

Piece #	Dimensions (inches)	Description
1	5 3/8" x 7 3/8"	Base panel
2	5 7/16" x 6 5/8"	Side wall
3	4 5/8" x 5 3/16"	Top panel (ceiling)
**4	5" x 5"	Front panel with 40 holes drilled through
**5	5" x 5"	Back panel with 40 holes drilled halfway through
6	4 5/8" x 6"	Inner support ledge (mounted 1/2" from edge of Piece 1)
7	2 1/2" x 15"	Back horizontal support bar

*It is best to use untreated, natural wood. Hardwoods like oak, cedar, or even pine are good choices, as they are durable and provide smooth nest holes. Avoid treated lumber or fresh cedar, as these can be harmful to the bees.

**** Note:** on Pieces 4 & 5 - drilling holes follow on next page

DRILLING HOLES FOR POLLINATORS TO NEST IN



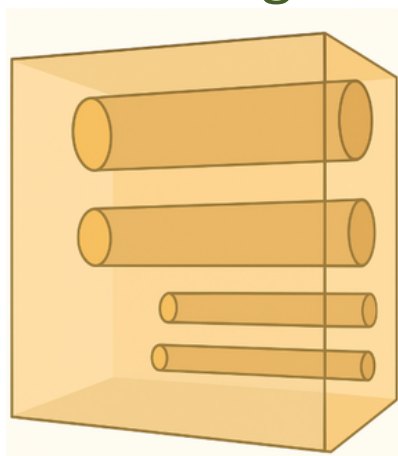
The diameter of the nesting tube influences which native bee species are more likely to use it, as certain sizes are more attractive to specific bees.

Hole Diameters - Pieces 4 & 5:

Drill holes in three sizes through both panels at the same time, ensuring perfect alignment (only drill half way through back panel, so that holes have closed-back). For this particular nest, you will need 10 holes of diameter 3 mm , 10 holes of 6mm diameter and 10 holes diameter 8.5 mm. The holes can be drilled in any pattern but leave at least 1 cm of space between each hole.

Tube lengths

- Drill 5-6" (12-15cm) deep for diameters greater than 1/4" (0.6cm).



- Drill 3-5" (7-12cm) deep for diameters 1/4" (0.6cm) or less.

ASSEMBLY INSTRUCTIONS

Step 1

Start with Piece 1 as the base.

Attach Piece 2 to Piece 1 at a 90° angle to form the side wall.



View 1



View 2



Photo credits: G. Lanni

ASSEMBLY INSTRUCTIONS

Step 2

Attach Piece 6 (the inner support ledge) **to Piece 1**, positioning it $\frac{1}{2}$ inch from the front edge (this is the roof - overhang protects from rain).

Effectively combining step 1 with piece 6.

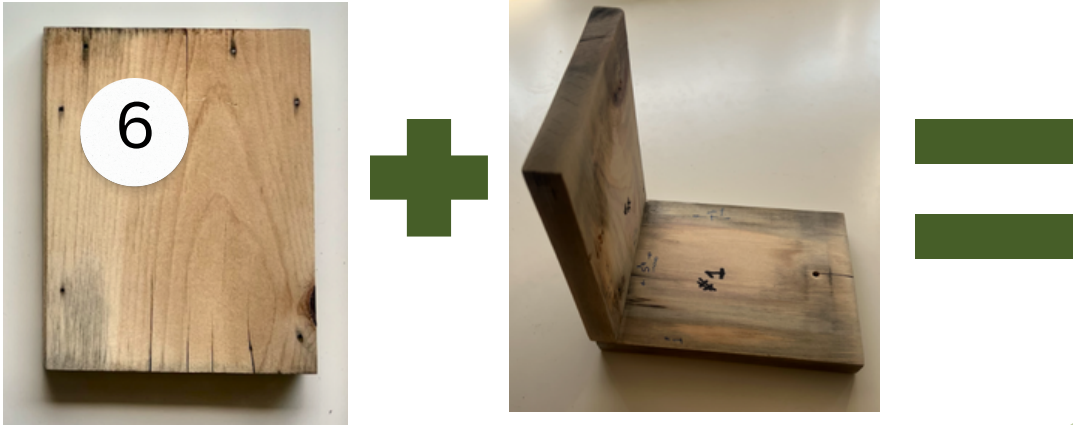


Photo credits: G. Lanni

ASSEMBLY INSTRUCTIONS

Step 3

Attach Piece 5 (the rear drilled panel) flush against the back, connecting it **to Pieces 1, 2, and 6**.
Effectively combining step 2 with piece 5.



View 1



View 2



Photo credits: G. Lanni

ASSEMBLY INSTRUCTIONS

Step 4

Attach Piece 4 (the front drilled panel) to the front, securing it to **Pieces 1, 2, and 6**.

Effectively combining step 3 with piece 4.



Photo credits: G. Lanni

ASSEMBLY INSTRUCTIONS

Step 5

Attach Piece 3 (the top panel) to enclose the nest, fastening it to **Pieces 2, 4, 5, and 6**.

Effectively combining step 4 with piece 3.



View 1



View 2



Photo credits: G. Lanni

ASSEMBLY INSTRUCTIONS

Step 6

Attach Piece 7 (the back support bar) **across the rear of the structure** for added strength.

Effectively combining step 5 with piece 7.

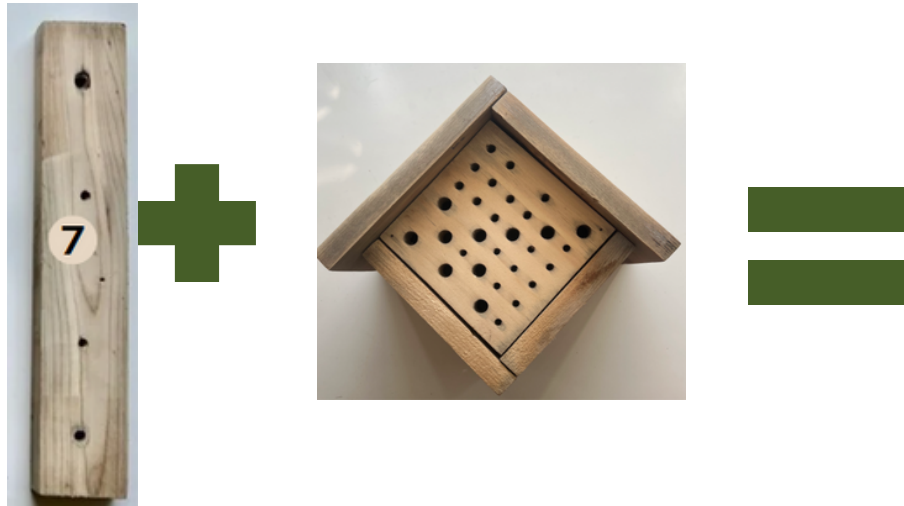


Photo credits: G. Lanni

ASSEMBLY INSTRUCTIONS

Step 7

Place the nesting tubes in the drilled holes. Kraft Paper straws make great, durable nesting tubes and come in a variety of sizes. **For this particular nest, you will need 10 tubes of diameter 2.5mm , 10 tubes 5.5 diameter and 10 tubes diameter 8 mm,**



Photo credits: G. MacInnis

ASSEMBLY INSTRUCTIONS

Step 8 (final)

Photo credits: G. Lanni

Find a suitable location and mount your completed nest securely (location information pg.14).



Photo credits: G. MacInnis

BUILD THE NEST & FEED THE BEES

A bee nest is only one part of the equation. For native bees to thrive and reproduce, they need access to reliable, diverse floral resources throughout their active season. Without nearby food sources, nectar and pollen, even the best-designed nest won't be occupied or successful.

On farms, this means thinking about more than just where the bee nest goes. It means integrating blooming plants into your cropping system and landscape in a way that supports bees before, during, and after the main crop blooms.



Image credit: Sarah O'Driscoll

Where to place your nest

- **Proper siting and south/southeast orientation** for warmth and sun
 - **Establish pollinator strips or hedgerows** along field margins, fencerows, or drainage areas with native, pesticide-free flowering plants
 - **Use flowering cover crops** like clover, vetch, or phacelia in rotation or between cash crops.
 - **Stagger bloom times** by selecting a mix of early, mid-, and late-season flowers, to support bees from spring emergence through fall.
 - **Reduce mowing frequency** in non-production zones to allow wildflowers to flower fully.
 - **Avoid broad-spectrum insecticides**, especially during bloom periods when pollinators are active.
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HOW TO MAINTAIN YOUR NEST

Neglecting nest maintenance can turn a bee hotel into a breeding ground for pests, mold, and disease. But with just a little annual care, your nesting site can remain a healthy, productive space for years.



Image credit: Pixabay

Maintain & Manage

1. Inspect the Nesting Tubes Regularly

- Early spring (before emergence): Check for signs of mold, bird damage, or plugged entrances.
- Late summer/fall (after bees have emerged): Most nesting tubes will be empty and can be removed or replaced.

2. Replace Used Tubes Annually

- Tubes should never be reused, as they can harbor mites, fungal spores, or pathogens.
- Use paper liners or removable inserts if possible, to make clean-up easier.
- Dispose of old tubes in the compost or trash — do not leave them in the structure.

3. Clean the Structure

- Wipe down the frame with a damp cloth and mild soap once a year.
- Remove any debris, spider webs, or insect carcasses.
- If the structure has removable trays or blocks, clean and sun-dry them before reinstalling.

4. Store or Protect in Winter (Optional)

- In regions with harsh winters or high moisture, you may store the bee hotel in a dry, unheated shed after all bees have emerged (typically by late fall).
- Alternatively, add a small overhang or weather shield to protect from rain and snow.