Solitary Bee and Beneficial Bug Houses

Build a passive solar, backyard habitat
for native solitary bees and other bugs

NC STATE EXTENSION

Master Gardener | Stokes County
Volunteer Association

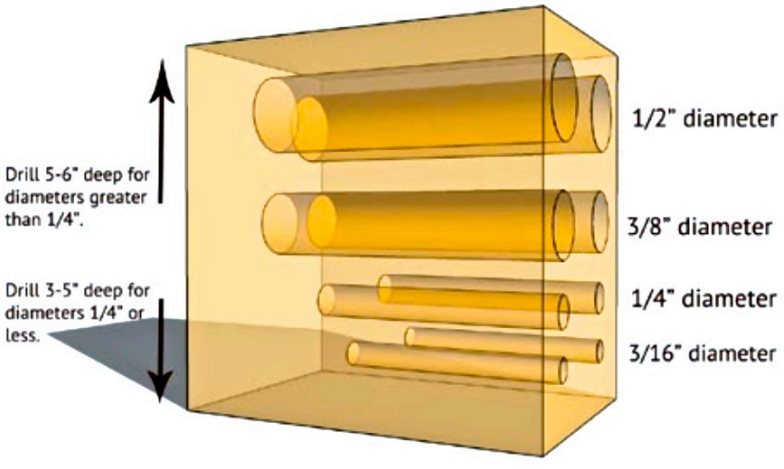
Honeybees may pollinate most of our crops, but it's up to our gentle wild bees to make sure garden plants, ornamentals, and wildflowers get adequate pollination. Wild bees have been discovered to be better at pollinating a lot of plants than honeybees. Their gentle behavior is an asset since they are not hive oriented with that protection mindset. All solitary bees and wasps do not sting, not just mason or leafcutter bees. Watch "Growing A Greener World" TV Episode 503 – Solitary Bees (27 minutes). That is at http://www.growingagreenerworld.com/solitary-bees-pollinators/.

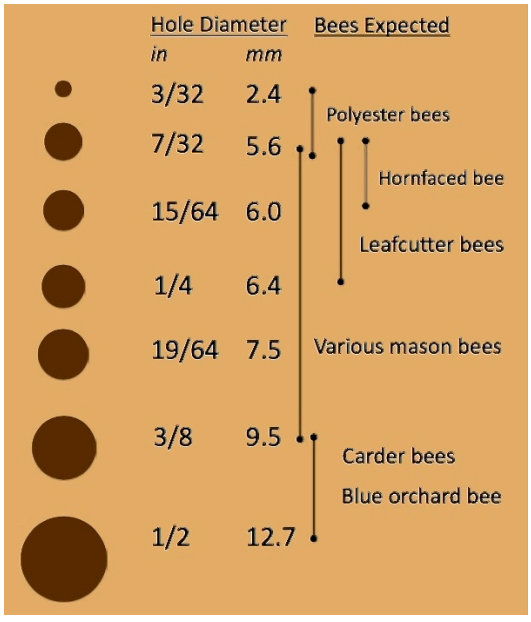
Entomologist Bryan Danforth of Cornell Univ., says the native bees are 3 times better pollinators than honeybees as "*Honeybees are more interested in the nectar than pollen. Wild, native bees are mostly pollen collectors*." Blue Orchard Bees can pollinate about 2,000 flowers a day compared to 15 flowers by honeybees. USDA Agricultural Research Service states *"About 150 alfalfa leafcutter bees working in screen houses or greenhouses would do the job as well as 3,000 domesticated honeybees."* But native bees need help, too. A Vermont Univ. research team found that from 2008 - 2013, the wild bees lost 1/4th of their US population.

There are many ways to provide homes as shown herein. Then place your bee house next to your vegetables or flowers. Avoid nearby bird feeders so your bees don't become snacks. A nearby source of damp dirt helps the bees spend more time pollinating, and less time looking for mud to close off the egg cells.

Nesting blocks Bee blocks are made by drilling nesting holes between 3/32" - 1/2" in diameter, at approximate 3/4" centers, into a block of preservative-free lumber. The holes should be smooth inside, and closed at one end. Search for "orchard mason bees ncsu note109.html" to read a good NCSU publication.

Use a mix of drill bits to accommodate different bees. Mason bees prefer 5/16" and 3/8" diameter with 3-5" depth. For leafcutter bees, the drilled holes should be 1/4" wide and 2 ½ - 4" deep. Smaller 1/8" holes attract aphid wasps, which help reduce aphids. These 2 illustrations are by the University of Nebraska-Lincoln. The first shows the depth depends on the diameter of the hole, with larger diameters requiring deeper drilling. The second details the hole's diameter related to the type of bee attracted to the nesting block.





Logs and snags Get some logs or old stumps and place them in sunny areas. Those with beetle tunnels are ideal. Plant a few upright, like dead trees, to ensure some deadwood habitat stays dry. On the southeast side of each log, drill a range of hole sizes.

Wooden Houses

- Wood, 6"×6"×¼" for the backboard
- Wood, 6"×4"×¼" (2 pieces) for the roof
- Small diameter tubes
- White glue and spray paint, black or blue (optional)
- Tung oil to weatherproof the roof
- A nut can or a plastic bulk CD container also works

Stem or tube bundles Some plants, like bamboo and reeds, have naturally hollow stems. Paper drinking straws, parchment paper, or any small-diameter tube can be used. Cut the stems into 6" to 8" lengths. Cut the stems close to a stem node to create a tube with one end closed. 15 to 20 stem pieces makes a fine nest. Just make sure they can stay dry.

Tips for setting up bee houses

- Bright, fluorescent blue is highly visible and attractive to bees. Painting parts of your house blue colors might attract more bees from longer distances. Paints that are not oil-based are suggested. Use your imagination for decorating your bee house!
- To help the bee "home" in to its straw/hole, aim for unique random patterns. Add various size and type of tubes, sticks, twigs, greenery or other small objects.
- Bee houses should be at least 3 or 4 feet above the ground, ideally closer to 5 feet.
- Location of the nesting sites is important. Put the nest on the eastern side of a tall tree or a building. It will receive morning sunlight, but be shaded from intense afternoon heat. The nest entrance should face southeast to get that warm early morning sun.
- They can be on a building, fence, or stake, or place them in a tree. Fix them firmly so they don't shake in the wind and sheltered from the worst of the weather.
- Mason bees pollinate from March through May. In late September or October, put Mason bees into storage. Store in an unheated sheds or garage. By early March, return the bees outside, in time to pollinate the fruit trees, which they excel at.

Mason Bee Straws/Liners

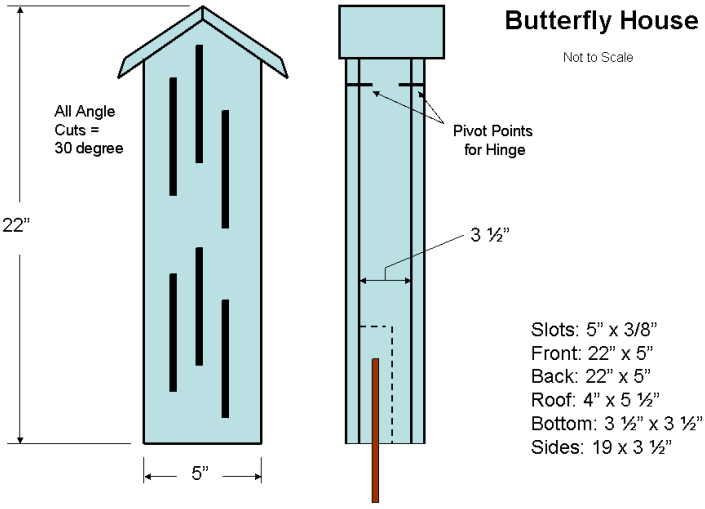
(http://lewiscountybeekeepers.org/yahoo_site_admin/assets/docs/Mason_Bee_Straws.357133625.pdf)
This will make liners that can be put into a nesting block or binder board. Loose straws may be used to fill a coffee can or man-made mason bee shelter. This is the ideal length for a mason bee nesting chamber; with 2 female eggs in the back 1/3, and 3 male eggs in the front 2/3rds of the liner/straw. Plastic straws *will not work* as the moist pollen will cause mold if not in a natural or paper base.

Cut 15" wide cooking parchment (i.e. Reynolds), wax or craft paper, paper into thirds (6 1⁄4 by 5"). Roll length-wise side-to-side on a #2 pencil for a 6" long straw. Varying the size a little is OK, per the uniqueness aspect of the tubes. The "Nesting Blocks" section covered sizes. For 8-1/2 x 11" paper, fold into fourths and cut into quarter sections. Use a #2 wood pencil to roll the paper diagonally.
Keep the paper snug as you roll from one corner to next (opposite corners). Cut off the small triangle section on the open end.

Use tape to secure the straw. Tape over the middle section, and, if needed, near the open end of the straw. Crimp one end of the straw by folding over the paper and tape or staple closed. Leave the opposite end open for entry by the mason bees.

Have an adequate supply of clean, new straws ready and in place before the first female emerges in March. Remember, mason bees reproduce five-fold each year. Remove and discard old straws as the last females emerge. Clean, new straws, protected in shelters from rain and wind, greatly improve chances for a successful mason bee nesting season. For the wood blocks, you need to clean the holes after the last females emerge by re-drilling or applying compressed air.

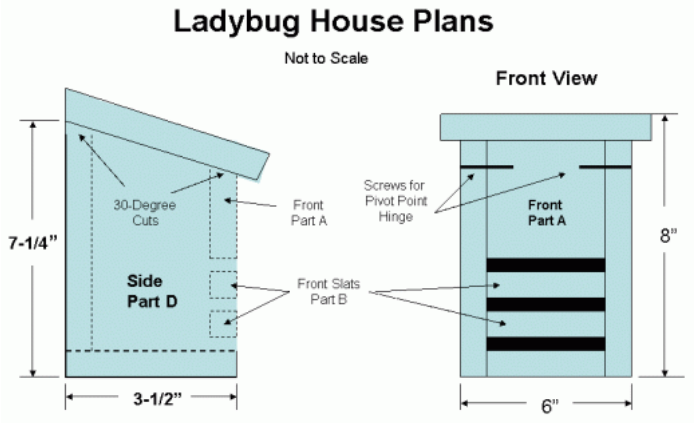
Expand your house with setups for other beneficial bugs! Ladybugs feed on soft-bodied insects such as aphids, scale insects, and other insects that are harmful to plants. A bundle of sticks laid lengthwise works for them. Butterflies also pollinate! Below are basic instructions for butterfly houses found on feltmagnet.com/crafts/garden-butterfly-box and ladybug houses at feltmagnet.com/crafts/how-to-build-a-ladybug-house.



Butterfly House

Not to Scale

Slots: 5" x 3/8"
Front: 22" x 5"
Back: 22" x 5"
Roof: 4" x 5 ½"
Bottom: 3 ½" x 3 ½"
Sides: 19 x 3 ½"



Front (A)	3½" x 4½"	Roof (E)	5" x 7½"
Front Slats (B)	¾" x 4½" (Qty=2)	Bottom (F)	3½" x 4½"
Sides (D)	3½" x 8" (Qty=2)	Back (C)	4½" x 7¼

As the pictures show, there can be wonderful creativity applied to building your beneficial bug house. Recycle items you already have as long as they are natural, not chemically treated. Another excellent reference is University of Nebraska–Lincoln Extension's Creating a Solitary Bee Hotel at http://extensionpublications.unl.edu/assets/pdf/g2256.pdf. So save money, save the bees, and save your local food supply while having a bit of fun!