

Building a Gizmo Varroa Mite Sampler

University of Minnesota Instructional Poster #170, Gary S. Reuter, Katie Lee, and Marla Spivak, Department of Entomology

These instructions are for building a Gizmo. See our web site for poster #169 showing how to use it.
www.extension.umn.edu/honeybees



The Gizmo is a device to accurately measure 300 bees. Please see poster #169 for instructions on the use of Gizmo for Varroa sampling.

- Materials needed**
- 3" x 5" PVC pipe
 - 1 1/2" x 6" PVC pipe
 - 3" PVC repair coupling
 - 1 1/2" slip x 1 1/2" MIP PVC adapter
 - 1 1/2" slip x 3" slip PVC coupling
 - PVC primer and cement
 - 1 1/2" lock nut (electrical)
 - 5/16" x 1/2" shoulder screw
 - 1/4" x 20 thread insert (or T-nut)
 - 2 - 32 oz plastic jars with wide opening
 - 3" x 6" 8x8 hardware cloth



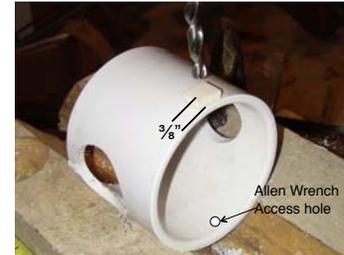
1. Why use the Gizmo? It is easy to pour bees into, you can collect multiple samples without bees escaping, mites can be dislodged from bees with powdered sugar in attached jar, it is strong enough to take some abuse, and can be disassembled for easy cleaning.

2. In addition to the above materials you will need some basic tools. Although this could be made by hand, a drill press and correct size router bit, sanding drum, belt sander, and hole saws will help.

3. Drill 1 1/8" hole into 3" pipe centered 1 1/4" from edge.

4. Sand one end of 1 1/2" pipe to match inside curve of 3" pipe. HINT: Make a template by cutting a piece of 3" pipe in half lengthwise.

5. Glue 1 1/2" pipe in 3" pipe passing it through hole cut in step 3.



6. Cut off excess 1 1/2" pipe and sand flush with 3" pipe. Save cutoff piece for future use.

7. Drill 2, 1 1/8" holes in 3" coupling 1 1/4" from one edge. Be sure they are on the center line of pipe and directly across from each other.

8. Sand the inside of the 3" coupling so the 3" pipe will turn freely inside it.

9. Drill 5/16" hole in the 3" coupling for the thread insert (I cemented a piece of PVC cut from a 4" pipe to give a thicker area). The hole should be 3/8" from the opposite edge you measured the 1 1/4" from in step 3. It is 90° from the 1 1/4" holes (step 7). Also drill a 1/4" hole opposite this hole for allen wrench use.

10. Put 3" pipe into 3" coupling and line up the 1 1/2" pipe with one of the 1 1/8" holes in the coupling. Hold it and drill a 5/16" hole in the 3" pipe through the hole for the thread insert.



11. Turn 3" pipe and line up the 1 1/2" pipe with the other 1 1/8" hole in the coupling. Hold it and drill a 5/16" hole in the 3" pipe through the hole for the thread insert.

12. Turn the 3" pipe slightly in the direction you want it to turn. Place a pencil in the 5/16" hole and mark the pipe as you continue to turn it to the other hole (drilled in step 10).

13. To make a catch to hold the pipe in position, remove the 3" pipe and drill a 5/16" hole along the line (step 12) 5/16" from the existing hole on each end of the line.

14. Rout a 5/16" slot between the two 5/16" holes from step 13. File the material between the two holes on each end to get the catch.

15. Sand the slip end of the 1 1/2" adapter to match the outside curve of the 3" coupling.

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16. Sand the 1½" end of the 1½" x 3" coupling to match the outside curve of the 3" coupling.



17. Put thread insert into its hole in the coupling.

Cut a 1½" pipe the length to fit into the adapter (step 15) and extend into the 3" coupling. Glue this pipe into adapter.



18. Cut a 1½" pipe the length to fit into the coupling (step 16) and extend into the 3" coupling. Glue this pipe into coupling.



19. Glue the adapter and coupling into the 3" coupling.



20. Sand pipes flush on the inside of the coupling.



21. Put 3" pipe into 3" coupling so the slot lines up with the thread insert. Screw the shoulder screw in from the inside.



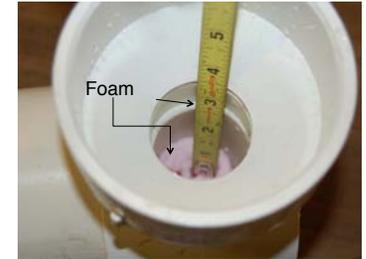
22. Drill 1⅞" hole in a jar lid. Place this on the 1½" adapter and secure with locknut.



23. Drill a 3" hole in a jar lid. Cut a piece of 8x8 hardware cloth to fit in the lid. It is helpful to have multiple jars and lids to do multiple samples.



24. Completed Gizmo.



25. Adjust sample size. Make a round plug from Styrofoam® so it will fit tight into the 1½" tube. Adjust the thickness so the space is 2¾" to the point shown. Then adjust as explained in step 30.



Materials needed for Po' Gizmo
 1½" x 3" PVC pipe
 1½" PVC cap
 1½" slip x 3" slip PVC coupling
 PVC primer and cement

Materials needed for Delux Po' Gizmo
 1½" x 3¼" PVC pipe
 1½" temporary PVC cap
 2 - 1½" slip x 3" slip PVC coupling
 PVC primer and cement

26. Don't want to make one? Gizmo is available already made from www.kelleybees.com (#56-G). Or try the Po' Gizmo or Delux Po' Gizmo.

27. These are designed to replace the cup in poster #169. You can dump the bees in and adjust amount to the line. It is not as easy to use or accurate as the Gizmo but easier to make. The Delux has a wider base for stability.



28. **Po' Gizmo:** cement 3" pipe to cap. Turn over and cement coupling.
Delux Po' Gizmo: put temporary cap in 3¼" pipe then cement coupling. Turn over and cement the other coupling.



29. Measure 100 mL water as explained in poster 168. Pour in and mark line at the water level.

Fill with bees to line, put jar on top, turn over and wrap bees into jar. Remove po' Gizmo and put on cover (step 23).



30. You should then sample and count the bees and make adjustments until it measures 300 bees. If you put the jar of bees into the freezer until they are in chill coma, you can count them, then return them to colony when they awake.