

# Directions for making the Aphthona Accelerator bug sorter

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Sorting flea beetles allows you to remove weed seeds and other debris from your sweep net collections, but is not a requirement. The *Aphthona* Accelerator requires about an hour of time and \$25 to \$30 in materials to build. Another advantage is that sorted, or "clean," flea beetles can be easily counted. Sorting & counting makes it easier to keep track of how many flea beetles you are releasing.

## Items Required:

For each unit you will require:

- 1- large tomato cage with 4 rings approximately 14-inch diameter at the top with an 8-inch bottom ring and 42 inches tall
- 1- small tomato cage with 3 rings approximately 12-inch diameter at the top with a 7-inch bottom ring diameter and 30 inches tall
- 3- 1/8th inch cable clamps or U bolts and nuts
- 1- screw top collection jar of plastic, 16 oz. Nalgene or lexan
- 1- Rubbermaid Serving Saver 3 QT 7 inch exterior diameter (10 cups - 2.4 Liter)
- 1- wooden ring 3/8 inch x 15 inch diameter with a 7 inch diameter hole in the center ( save hole for second ring)
- 1- wooden ring 3/8 inch x 6 inch diameter
- 1- 1/8th inch hardware cloth 12 inches x 22 inches

## Additional parts needed:

- boat glass (heavy plastic sheeting)
- Pop rivets and washers
- Silicone caulking and caulking gun
- Quick drying hot glue and glue gun
- Screws with washers and nuts
- Jig saw, drill and bits and other common shop tools

## Construction:

### Wood:

- Find the center of your 3/8" x 15" x 15" square of plywood
- Draw circles at the following radius: 7 1/2", 6", 3 1/2", 3", 2 3/4" 1 13/16", and 3/4".
- Cut the circles at the following radius: 7 1/2", 3 1/2" and 3" (saving the 3" circle for the small wooden ring). The



- other circles are guides for centering and assembly.
- Attach the 3" circle to the collection jar lid with the three screws and nuts at the  $1 \frac{13}{16}$ ", radius making sure they are centered.
- Cut out a  $1 \frac{1}{2}$ " hole through the center of the wood and collection jar lid.
- At the  $2 \frac{3}{4}$ " radius drill three holes  $\frac{1}{8}$ " diameter equal distance around the circle. Put the ends of the small tomato cage through each hole and bend the legs around the wood to hold it in place, making sure the lid is facing away from the cage. (Try to make this even as it effects the level of the collection jar.)

### Frame:

- Invert the large tomato cage and cut the leg to 35" tall.
- 1" from the end of the leg bend the leg out at a 90-degree angle.
- Assemble the two tomato cages with the large cage on the bottom and the small cage on top in an hour glass shape. Attach the large cage to the small cage by bending the large cage legs around ring 2 of the small cage at the 90-degree angle one-inch from the end of the leg

### Boat glass funnel:

- Make a pattern out of craft paper that is 47" x 40" on a side.
- Make a mark on the 40 " edge 34 " from the corner. Using a string or compass draw an arc 46" long. Using a 37" straight edge from the 34" mark draw a line to intersect the arc at 44". From the starting corner to the intersection of the 37" line and the arc, draw a straight line.
- Make a mark up  $\frac{1}{2}$ " from the starting corner on the new line. 90 -degrees from the new line at the  $\frac{1}{2}$ " mark make a mark  $\frac{1}{2}$ " out from the line. At the intersection of the arc and the new line make a mark at the 46" on the arc. Connect the 46" mark with the  $\frac{1}{2}$ " mark, this is your glue seam and line.
- Make a second arc 2" in from the original arc. (This is the folding line for connecting the funnel to the small cage top by folding and gluing.
- Cut and test the pattern to see that it fits with your tomato cages and collection jar.
- Transfer your pattern to the plastic and cut and fit it to your frame, then glue the funnel edges together.
- Glue the funnel top to the small cage top and insert the tip of the funnel through the collection jar lid hole, cut the tip into four equal pieces and glue these to the jar top.



## Sorting basket:

- Inscribe a line on the Rubbermaid container 1 ½" from the bottom of the container.
- cut the container to separate the top from the bottom.
- Roll the 12" x 22" screen into a 12" high cylinder and place it into the bottom and top of the Rubbermaid container. Hot glue the seam edges of the screen together.
- Pop rivet the screen cylinder into the top and bottom 1" from the cut edge then hot glue the screen to the container.



## Final assembly:

- Attach the large wood ring to the top of the small cage with the boat glass funnel using 3 U-bolts at equal distance on the 6" radius.
- Silicone seal the wood to the plastic and cover the bolt heads also. Let this dry 24 hours.
- Attach the collection cup to the lid on the small wood circle.
- Place the sorting container in the hole in the large wooden ring and you are finished.



## Additional information:

You will need tent stakes to hold this unit in place as it is not overly stable.

## Operation of the accelerator:

1. Collect flea beetles by sweeping.
2. Remove the lid of the sorting basket and deposit the swept material into the sorter. Do not over fill the basket.
3. After several minutes *Aphthona* flea beetles will move through the hardware cloth to the interior funnel surface.
4. Occasionally tap the top of the accelerator to knock the beetles into the collection jar.
5. Remove and empty the collection jar as it fills no more than ½ full at a time.
6. Transfer sorted *Aphthona* to a different container and place them into a cooler to chill them. This makes volumetric measurement much easier. Finally transfer beetles to shipping containers and keep them cool.

## Additional equipment needed to collect flea beetles:

- Sweep nets
- Coolers with blue ice ( flea beetles don't swim well)
- Shipping containers
- Masking tape to seal containers of beetles.



## Counting

Counting is also relatively easy, and will enable you to know how many flea beetles you are releasing. Plastic 35 mm film containers work great - a film container one-quarter of the way full is about 1,000 flea beetles. Other small containers can also be used, with 10 cc or 10 ml equaling about 1,000 beetles.

