



TARRANT COUNTY PUBLIC HEALTH DEPARTMENT
ENVIRONMENTAL HEALTH DIVISION
VECTOR CONTROL

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Guild to Making Gravid Water

1.) Introduction:

When ready to lay their eggs, The Culex quinquefasciatus (Cx. quinq) mosquito (main vector for West Nile Virus in Texas) seeks out water sources that are fouled by decaying vegetation or fecal matter. To attract these gravid females to a gravid trap (Oviposition trap) it is necessary to simulate fouled water as close as possible. The best way to do this is to create (brew) gravid water; otherwise known as “stinky” water. Gravid water owes its effectiveness to a chemical called Indole. Indole is created when bacteria breaks down organic material. The more Indole created in gravid water, the better it will work in attracting gravid Cx. quinq mosquitoes. This guide outlines Tarrant County’s process for brewing the best gravid water.

2.) Equipment and Material:

- a. 40 or 50 gallon plastic rain barrel with removable lid and spigot.
- b. Two cinder blocks.
- c. Bulk screen material: Fiberglass, 48 inch by 10 foot roll of standard mesh.
- d. Zip ties: 7 inch or 8 inch (buy bulk).
- e. Standard 3/4 inch male sillcock valve (standard garden spigot on a house).
- f. A 3/4 inch to 1 inch female PVC adapter.
- g. Synthetic twine.
- h. Appropriate length of garden hose and access to running water.
- i. One rake or shovel.
- j. Half-filled tall kitchen trash bag filled with fresh grass.

3.) Gravid Brewing Container:

- a. Size and capacity of the container:
 - i. The size of the gravid water brewing container depends on how much gravid water is needed for each trap run. This amount is dependent on how many traps are set on a trap run. Tarrant County also has the policy of not diluting its gravid water with regular water. To calculate the amount of gravid water needed for a single trap run, the number of traps set is multiplied by the amount of gravid water needed in each trap. To further allow for cleaning and time for brewing another batch, the amount needed for a trap run is doubled. This practice provides a two session buffer to make more gravid water. It is also recommended that a second brewing container be established to brew a new batch of gravid water while another is being used.

- ii. Tarrant County has nine traps in the north unincorporated area and eight traps in the south unincorporated area. Both the north and the south have one roaming trap available if needed. Taking into account the roaming traps, the total number of traps most commonly set by Tarrant County is nineteen. Each trap tray needs approximately 1.25 gallons of gravid water for each trap run (used gravid water is always dumped after trapping to prevent mosquito breeding and to maintain consistent Indole concentrations while trapping).
- iii. Nineteen traps can be set out each week in unincorporated Tarrant County. Approximately 1.25 gallons of gravid water are needed to fill a gravid trap tray. This would mean that Tarrant County needs twenty four (24) gallons of gravid water to accomplish one trap session. Including the two session buffer, this would mean that Tarrant County needs a gravid water brewing container that can hold 48 gallons.

b. Type of container:

Tarrant County needs approximately 48 gallons of gravid water for two weeks. To accommodate this amount, Tarrant County uses a 50 gallon plastic rain barrel. Plastic is used because it will not break down during the brewing process. Tarrant County also selected a rain barrel that has a removable lid and a spigot to provide better access to the gravid water and cleaning of the barrel.

c. Modifications to the brewing barrel:

Even though the 50 gallon rain barrel with a spigot and a removable lid was the best gravid water brewing container for Tarrant County, there needed to be some modifications made to the barrel.

- i. Changing the spigot: Most rain barrels come with a small brass spigot that has a narrow opening and a very slow flow rate. To increase the flow rate and help prevent the spigot from clogging, the existing spigot was replaced with a 3/4 inch male brass sillcock valve (the same as a standard garden spigot on a house).



Using this type of sillcock valve not only increase flow rate, it also allowed for the addition of a standard garden hose if needed.

- ii. Adding an adapter on the inside of the barrel!: Tarrant County had trouble with debris clogging up the existing spigot. To help prevent clogging the existing spigot was replaced with a larger spigot. To further help in preventing the spigot from clogging, Tarrant County added a 3/4 to 1 inch female PVC adapter screwed on the spigot from the inside of the barrel.



The addition of the PVC adapter not only secured the new spigot in place, it provided a way to screen over the inlet of the spigot to prevent debris from flowing into the spigot. A 12 inch by 12 inch piece of screen was wrapped around the PVC adapter and secured in place by a zip tie.

- iii. Closing the hole in the removable lid: The 50 gallon rain barrel used by Tarrant County came with a hole in the removable lid. To prevent mosquitoes from entering the brewing container and laying eggs, the hole in the lid was plugged with a road construction cone wedged upside down. The hole in the road construction cone was plugged with plastic. This method allowed Tarrant County the ability to remove the cone to check on the brewing process and water levels.
- iv. Screening the overflow pipe: To prevent mosquitoes from entering the brewing rain barrel and laying eggs, the overflow pipe also needed to be screened in. To do this Tarrant County used an 8 inch by 8 inch piece of screen, wrapped it around the overflow pipe, and secured it with a zip tie.

4.) **Making Gravid Water; AKA “Stinky” Water:**

- a. The right grass:

Although any type of grass will work for brewing gravid water, the best grass that produces the most “stink” in the gravid water brew is fresh cut grass from a lawn (most often St. Augustine grass); the fresher the better. If fresh cut grass is not available either alfalfa or hay can be used to brew gravid water.

- b. The amount of grass:

Tarrant County does not necessarily measure out the exact amount of grass needed for each brewing batch. The acceptable amount of fresh cut grass used is a half-filled tall kitchen trash bag worth.

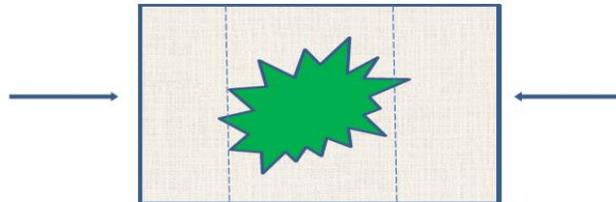


A half-filled kitchen trash bag is plenty of grass to fill the grass packet discussed below.

c. The grass brewing packet; AKA “grass tea bag”:

After trial and error Tarrant County has come up with a method that is both efficient and convenient for handling grass when brewing gravid water. Tarrant County has found that creating a porous packet filled with grass is both easy to make and easy to remove when brewing is complete. The best way to make a grass packet is to follow the steps below.

- i. Spread out a 48 inch by 48 inch piece of fiberglass screen and then fill the middle with fresh cut grass from the half-filled tall kitchen trash bag. Fold opposite ends of the screen over the grass and over each other.



- ii. Fold the other sides over the top of the packet over lapping each other.



- iii. Wrap the grass package with synthetic twine (synthetic twine will not break down during the brewing process) and secure with a knot.



- iv. After the grass packet is secured with twine it can now be added to the gravid brewing container filled with clean tap water.

5.) **The Proper Brewing Time:**

The amount of time it takes to brew gravid water varies with temperature. The hotter the temperatures the faster the bacteria will break down the grass and create Indole. To standardize the practice of brewing gravid water there is a minimum requirement of five days for the grass packet to be left in the brewing container. Tarrant County takes out the grass packet after ten day if the temperature stays above 95°F during the brewing process. In cooler times the grass packet can be left in the brew container for up to twenty days or when all the gravid water is used up.

6.) **Removing the Grass Packet:**

The best way to remove the grass packet is to fish the packet out of the brewing container using a rake or a shovel. Using a rake or a shovel will allow excess water to drain back into the brewing container without having to touch the packet with the hands. After the grass packet is removed from the brewing container it can be thrown away in the trash.

7.) **Brewing a New Batch of Gravid Water:**

When it comes time to make another batch of gravid water there are a few things that need to be done.

- a. At least three or four gallons of old gravid water should be reserved to “seed” the next batch of gravid water with bacteria.
- b. Remove old grass packet if not removed already.
- c. Completely empty out the brewing container by dumping it over. This is done to remove the gelatinous biofilm that forms in the brewing container during the brewing process.
- d. Remove the old screen around the PVC adapter. Completely open the sillcock valve and then spray out the spigot and PVC adapter to remove any material that might clog the spigot.
- e. Spray out the whole brewing container to remove any residual solid or gelatinous biofilm from the container.
- f. Replace the old screen on the PVC adapter with a new 12 inch by 12 inch piece of screen and then secure it with a zip tie.
- g. Fill the brewing container with clean tap water.

- h. Make a new grass packet with fiberglass screen and fresh cut grass.
- i. Lastly place the grass packet in the brewing container then place the lid back onto the brewing container, making sure the hole in the lid is secured from mosquito entry.
- j. Let the batch brew for at least five days before removing the grass packet.

8.) **Recommendations for the Best Brew:**

There are some final recommendations to make the process of brewing gravid water easier.

- a. Be sure to put the 50 gallon rain barrel on two cement cinder blocks to make accessing the spigot easier.
- b. If not using the half-filled bag of grass right away, store the bag on cement or asphalt surfaces. If the bag is stored on a dirt or grass surface there is a potential for fire ants to make a nest underneath the bag and infest the grass.

If you follow the steps above you will have the best brewed gravid water and the mosquitoes will think so too!

