

## Invasive Species Alert!

Zebra mussels have been detected within a variety of moss ball products designed for use in aquarium and water gardens. , Examples of these products are “Betta Buddy Marimo Balls” or “Marimo Balls”.

Zebra mussels (*Dreissena polymorpha*) are regarded as one of the most destructive invasive species in North America. They are small, fingernail-sized mollusks native to the Caspian Sea region of Asia. Zebra mussels have three life stages – larval, juvenile, and adult. In the microscopic larval stage, the mussels live freely in the water column, allowing them to be easily transported. Adult zebra mussels can stay alive for several days outside of water and are common hitchhikers on boats, fishing equipment – and aquatic plants!



In spite of their small size, zebra mussels clog pipelines used for water filtration, render beaches unusable, and damage boats and infrastructure. They also negatively impact aquatic ecosystems by harming native organisms.

**Moss balls or untreated water should not be disposed of in any location where they could reach local waterways.**

If you have purchased a moss ball aquatic plant product after February 1, 2021, we recommend that you take the following steps to destroy and dispose of the moss ball to reduce the risk of any zebra mussels escaping to waterways and causing harm:

### Step 1: Destroy and Dispose of the moss ball

1. Destroy the moss ball using ONE of the following methods, ensuring that the disposal method you choose is in compliance with state laws and animal welfare regulations:
  - Place the moss ball into a sealable plastic bag and freeze for at least 24 hours, OR
  - Place the moss ball in boiling water for at least 1 full minute, OR
  - Submerge the moss ball in chlorine bleach, diluted to 1/3 cup of bleach<sup>1</sup> per gallon of water, for at least 10 minutes, OR
  - Submerge the moss ball in undiluted white vinegar for at least 20 minutes.
2. Once step 1 is complete, place the moss ball and any of its packaging in a sealed plastic bag and dispose in the trash.
3. If vinegar, boiling water, or bleach was used, the liquid can be disposed down a household drain — never down a storm drain where it could enter and damage local waterways.



<sup>1</sup>Use regular, unscented bleach. Check the label to ensure that the bleach is EPA-registered and has a concentration of at least 5% Sodium Hypochlorite. Bleach is corrosive, use with caution. Read and follow all product labels. Appropriate personal protective equipment should be worn to avoid personal injury when using chemicals.

## Step 2: Decontaminate the aquarium, accessories, and water

If the moss ball was placed in an aquarium, please take these additional steps to decontaminate your aquarium and accessories. For additional guidance on holding fish during treatment or re-establishing your aquarium following treatment, contact your local retailer.

If the moss ball was placed in a water garden, or fish or plants cannot be removed from the aquarium for treatment, please refer to the Potassium Chloride (KCl) Method below.

1. Collect any fish or other living organisms and place them in another container, with water from a separate, uncontaminated water source.
2. Remove water from aquarium and sterilize by adding 1/3 cup of bleach per gallon of water. Let the water sit for at least 10 minutes and then dispose the sterilized water down a household drain.
3. Decontaminate the aquarium and accessories using one of the following methods, in accordance with manufacturers' recommendations:
  - **Hot Water Method:**
    - \* Pour water that is 120 °F into aquarium, covering all accessories.
    - \* Allow to sit for a minimum of 5 minutes, ensuring that the water temperature is maintained
    - \* Allow the water to cool, then dispose of treated water in a household drain.
  - **Salt Water Method:**
    - \* Make a saline solution using 1/2 cup of salt (NaCl) per gallon of water.
    - \* Soak aquarium, substrate, rocks, décor, and filter media in salt water solution for at least 24 hours.
    - \* Dispose of treated water in a household drain.
    - \* Rinse off all items prior to re-setting up the aquarium.
  - **Bleach Disinfection Method:**
    - \* Make a disinfection solution using 1/3 cup of bleach per gallon of water.
    - \* Soak aquarium, substrate, rocks, décor, and filter media in the bleach water solution for at least 10 minutes.
    - \* Dispose of treated water in a household drain.
    - \* Rinse off all items prior to re-setting up aquarium.
4. Allow aquarium and accessories to dry for at least 15 minutes before refilling with water.
5. It is recommended that you perform a standard water change (~20%) within a week and continue to monitor the aquarium for any unusual or unexpected aquatic life. If needed, repeat steps 1 - 5.

### Alternative Treatments:

**Potassium Chloride (KCl) Method:** If moss balls were placed in a water garden, or plants or fish cannot be removed from the aquarium, the following Potassium Chloride (KCl) method can be used for decontamination.

**Please note: While this method is considered safe for most finfish and plants, it may not be safe for invertebrates.**

This treatment uses KCl, a sodium-free table salt substitute commonly sold at grocery and nutritional stores. The highest available purity of KCl available should be used. "Half-Salt" products cannot be used.

- Use the chart below to determine the amount of KCl needed based on the volume of water in the aquarium or water garden.
- Remove a small volume of water (~1/2 gallon) into a separate container. Add the required amount of KCl and mix until it is dissolved.
- Pour the KCl solution back into the water garden or aquarium and leave it for at least 14 days at a minimum temperature of 65°F.
- Water changes should be avoided during the treatment period. If it cannot be avoided, ensure that can water removed is sterilized by adding 1/3 cup of bleach per gallon of water. Let the water sit for at least

10 minutes and then dispose the sterilized water down a household drain.

- If water needs to be replenished due to evaporation, ensure that the volume of replacement water does not exceed the volume of water that evaporated. Replacement water should be from an uncontaminated source, warmed to a minimum of 65°F and pre-treated using KCl to ensure a constant concentration of KCl during the 14-day treatment.
- Decontaminate any submerged accessories and equipment used to remove water or organisms from the aquarium or water garden using either the hot water, salt water, or bleach methods listed in Step 2.

Amount of KCl Required for treatment	
Volume of Water (gallons)	Amount of KCl Required (teaspoons)
1	1/4
5	1 1/4
10	2
20	3 3/4
55	10
75	13 1/2
90	16 1/2

For a more detailed set of invasive species prevention recommendations for water gardens, please refer to these voluntary guidelines from the [Aquatic Nuisance Species Task Force](#).

**Quarantine Method:** Decontamination using the steps above is *highly recommended and essential if mussels are observed*; however it is understood that many aquarists make significant investments in establishing and maintaining their aquaria and that disinfecting and reestablishing a system in which mussels have not been observed may not be ideal. As an alternative to decontamination, and consistent with steps necessary to prevent the release of zebra mussels, aquarists may take the following steps to quarantine and monitor their aquarium:

1. The aquarium should be closely inspected once a week for mussels *for at least 6 months*. If mussels are found, follow the decontamination steps above.
2. During the quarantine period, take the following precautions:
  - Any live plants removed from the aquarium should place in a sealed plastic bag, frozen for at least 24 hours, and disposed of in the trash.
  - Plants and animals from the aquarium should not be sold or traded.
  - The aquarium and any accessories should be decontaminated before selling or trading.
3. The quarantine period ends 6 months after no mussels are found.

**Thank you for helping to protect our waters from invasive species!**

These guidelines are provisional and are subject to revision. They are being provided to meet the need for timely best science. Please remember that it is illegal to dump aquaria life into local waterbodies. If you have any questions, please contact your state's appropriate governing body for aquatic invasive species information and regulations.



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