



Control of colonial tunicates

The golden star tunicate (*Botryllus schlosseri*) and the violet tunicate (*Botrylloide violaceus*) are invasive colonial tunicates widely distributed throughout the world. In recent years, they have been found in some water bodies in New Brunswick and their effects on oyster aquaculture activities are a growing concern because of the increased production costs they cause.



Golden star tunicate

Violet tunicate

(Courtesy of Fisheries and Oceans Canada)



Floating bag infested with golden star tunicate
(DAAF)

Some treatments and practices make it possible to control colonial tunicates on various types of floating structures used in the province. This fact sheet is intended to provide producers with information on suggested treatments for controlling the presence of these colonial tunicates on oysters and equipment, and to provide measures to mitigate the risk of spreading these invasive species. The Department makes no explicit or implicit guarantee as to the effectiveness of the suggested measures and treatments.

Note: These suggestions are not aimed at eradicating, but rather controlling or reducing the abundance of tunicates since colonies may still remain attached to the aquaculture product or to the rearing structures and equipment following the measures taken.

Suggested treatments (click [here](#) for information in postcard format).

A) Air drying of aquaculture product (oysters) and/or equipment for:

(i) Equipment/product on the water

Method:

1. Expose oysters and gear to air by flipping the rearing structures.
2. Dry them out for about 48 hours, depending on weather conditions.

Recommendations:

1. In cases of severe infestation, it may be necessary to do this exercise every two weeks while recognizing that the frequent flipping of structures may have an impact on oyster growth. The frequency of treatment should be determined according to the cost-benefit analysis of the procedure.
2. The treatment period should start as soon as organisms appear (i.e. when they are very small) to better control their presence.
3. At the end of the growing season, it may be beneficial to give the structures a final flip to dry them as much as possible just prior to overwintering the facilities.

(ii) Equipment on land

Method:

1. Allow all equipment to air dry for a minimum of 3 days (according to weather conditions).
2. Sprinkle for a few minutes with freshwater using a spray gun.

Source: Karney et al. *Invasive tunicates at Shellfish Restoration and Aquaculture Sites on Martha's Vineyard, Massachusetts*
http://www.rimeis.org/stakeholders/docs/aquaculture/ais_shellfish_poster.pdf

Recommendations:

1. Weather conditions can greatly influence drying time. It is important to ensure that the equipment is dry before applying the freshwater.
2. Perform the watering operation away from any body of water to reduce the risk of spread through runoff.

B) Immersion treatment of aquaculture product (oysters) in a solution of 4% hydrated lime and 30% brine (= 300 ppt) *

Method:

1. Prepare a solution in a large tank by mixing:

4 kg of lime	(8.4 lb.)
29 kg of salt	(64 lb.)
96 litres of water	(25.4 gallons)

2. Immerse the oyster/equipment for 30 seconds.
3. Allow to air dry for at least one (1) hour to avoid dilution of treatment.

*Treatment suggested by Fisheries and Oceans Canada (June 2011)

Recommendations:

1. For better control, treatments should be performed as soon as the organisms appear (i.e., while they are very small).
2. Treat the oysters/equipment just before transferring them into another body of water.
3. Set up a treatment schedule.
4. Shake oysters prior to exposure to treatment to encourage them to close their shells.
5. Dispose of the solution to avoid the risk of runoff into a body of water.

Practices to mitigate the risk of spread

- Due to the **HIGH PROPAGATION HAZARD**, it is best *not* to wash the equipment/remove tunicates *on the water* using a pressure washer or other means. Washing may result in the fragmentation of tunicate colonies, which may increase their spread as they may be viable for at least 18 days after such treatment (Paetzold and Davidson, 2010). To maximize the effectiveness of the treatment, it is recommended to wash the equipment *on land* only when it is completely dry.
- Treat oysters/equipment before transferring them from one body of water to another.
- After taking the boats, motors, and trailers out of the water, inspect them and remove any plants or organisms and dispose of them in a garbage bin or composter on land. It is also necessary to empty the water in the hold and other places that can retain seawater (e.g., motor, tanks). Then wash with freshwater or pure vinegar using a spray gun. **Do all this work away from any body of water** to reduce the risk of runoff and allow to dry for at least one hour before moving to another body of water.
- When visiting more than one body of water in a single day, work should begin in non-tunicate-infested waters and terminate in waters where they are known to be present.
- Worn out or non-reusable equipment must be disposed of in an approved landfill; the same is true for dead oyster shells to reduce the risk of spreading undesirable organisms.

- Where possible, it is recommended to apply an environmentally friendly anti-fouling paint to boats and motors.

Information on invasive species on the east coast of New Brunswick

The Department of Fisheries and Oceans has several fact sheets on aquatic invasive species on its website, as well as information specific to each species. (<http://www.dfo-mpo.gc.ca/science/environmental-environnement/ais-eae/identify-eng.html>). Information on the most common species in our coastal regions can be accessed by clicking on the following links:

[Golden Star Tunicate](#)

[Violet Tunicate](#)

[Japanese Skeleton Shrimp](#)

[Oyster Thief](#)

[European Green Crab](#)

References

Canada. Department of Fisheries and Oceans. *Aquatic invasive species* [online]. URL: <http://www.dfo-mpo.gc.ca/science/environmental-environnement/ais-eae/index-eng.htm> (page consulted on July 9, 2018).

Government of Prince Edward Island. Department of Agriculture and Fisheries. *Freshwater Treatment as a Management Tool to Control the Spread of Colonial Tunicates* [electronic document] in “Aqua Info Notes.” URL: <https://www.princeedwardisland.ca/en/information/agriculture-and-fisheries/aqua-info-notes> (page consulted on July 9, 2018).

Paetzold SC, Davidson J. (2010). *Viability of golden star tunicate fragments after high-pressure water treatment*. *Aquaculture* 303: 105–107.

Professional Shellfish Growers Association of New Brunswick. *Implementation Guide of Standard Operating Procedures for Shellfish Culture in New Brunswick*.