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Didemnum lahillei - Recent Observations on Substrate Preferences and Controls

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Observation No. 1 – *Didemnum* growing on the air/water interface.

As part of our ongoing studies on the ecology of invasive ascidians, we have been collecting information on the timing and magnitude of recruitment of *Didemnum* sp. (provisionally identified as *D. lahillei*) in southeastern Long Island Sound, Connecticut. To collect recruits, four PVC substrates (10 x 10 cm) were placed at a field site located outside of Pine Island (suspended ~1 m off the bottom), about 500 m offshore of the University of Connecticut's marine campus, located at Avery Point, Groton, Connecticut. After several weeks of exposure (roughly the last two weeks in July, 2002), the panels were collected and transported to a running seawater facility in the Rankin Building (University of Connecticut) and placed in a shallow (15 cm depth) seawater water table (~2m x ~1m). The number and size of ascidian recruits were recorded and the panels were placed in an open tray we use to transport the panels and returned to the seawater table (the wing nuts in the photograph are used to secure the panels in a vertical position for ease of transport).

Over time, *Didemnum* grew off the panels and began spreading along the bottom and sides of the seawater table. As space became more and more limiting, the ascidian began spreading along on the underside of the air-water interface! The photograph, taken about one month after the panels were introduced into the seawater table, shows a portion the seawater table with *Didemnum* growing on the bottom of the seawater table and on the underside of the air-water interface. It is unclear whether the bubbles in the photograph were somehow entrained by the organism to facilitate it's buoyancy and ability to colonize the air-water interface or whether they were the result of the water flowing into the tank (seawater pumped into the laboratory typically has super-saturated oxygen concentrations). The colony continued to spread across the air-water interface until it reached several hundred square centimeters in size. In mid-October 2002, the flow of seawater inadvertently stopped, the tank completely drained, and the colony perished.

We have never seen any other colonial ascidian species (either native or introduced) that has the ability to grow on the underside of the air-water interface. Although the conditions in the seawater tank obviously are not representative of the field, the photograph demonstrates the ability of the species to adjust it's growth form in response to space limitation. Whether this may represent a dispersal strategy has yet

NOTE: Text in gray (italic) indicates the topic has not been addressed to date.

to be tested.

Source

R. Whitlatch (UCONN) and R. Osman (SERC). Photo date and credit: Mid August, 2002; R. Osman.

Image RO_PI_CT4206210.

Image RO_PI_CT4206210. Tunicate colonies of *Didemnum* sp (provisionally identified as *D. lahillei*) spreading along the bottom of the seawater table (bottom half of photo) and extending upwards through the water column to spread along the underside of the air/water interface (top half of the photo). The upper surfaces of the *Didemnum* colonies are facing downward from the air/water interface. Bubbles are visible on the lower surfaces of the colonies, which are facing upward. Original specimens collected off Pine Island, Connecticut, on PVC substrates 1 m off the seabed. Observers: Robert Whitlatch (UCONN) and Richard Osman (SERC). Photo date and credit: Mid August 2002; R. Osman.
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Marine Invasive Species

Didemnum lahillei, a colonial tunicate; ascidian; sea squirt

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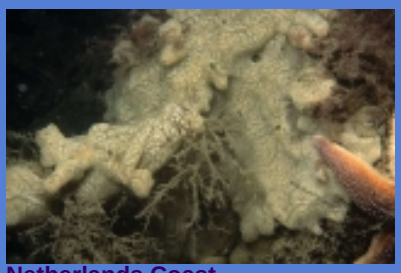

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Taxonomic Classification

Phylum *Chordata*, Subphylum *Tunicata*, Class *Ascidiacea*, Order *Aplousobranchia*, Family *Didemnidae*, Genus *Didemnum*, Species *lahillei.* Hartmeyer, 1909.

Summary of Occurrence

Didemnum lahillei is a marine colonial tunicate (ascidian; sea squirt) that has been observed at several locations in the northeast Pacific and North Atlantic Ocean basins. It exhibits the characteristics of an invasive species: 1) sudden occurrence where not before known; 2) rapid reproduction and excessive biomass; 3) no known predators. It is native to Europe.

The rapid spread of *Didemnum lahillei* alters marine habitats and threatens to interfere with fishing, aquaculture, and other coastal and offshore activities.

It is found on hard substrates that include dock structures and floats, wood and metal pilings, moorings and ropes, steel chain, automobile tires, polythene plastic, rock outcrops, gravel seabed (pebbles, cobbles, boulders), and ship hulls. It overgrows organisms such as tunicates, sponges, macroalgae, hydroids, anemones, bryozoans, scallops, mussels, and oysters. Where *D. lahillei* occurs on the seabed, it likely covers the siphons of infaunal bivalves. *D. lahillei* has been reported from coastal areas in California, New England, northwest France, and the Netherlands. It also has been observed on the continental shelf off New England in the Gulf of Maine region. It has been found at water depths ranging from intertidal to continental shelf depths of 48m (157 ft).

Gross Morphology and Growth Habits

Didemnum lahillei colonies exhibit a wide variety of morphological variants that range from: 1) long, ropey or beard-like colonies that commonly hang from hard substrates such as docks, lines, and ship hulls; to 2) low, undulating mats with short surficial appendages that encrust and drape rocky seabeds (pebbles, cobbles, boulders, and rock outcrops).

Purpose and attribution

The goal of this website is to assemble and communicate information on the distribution, biology, and marine habitat impacts of the highly invasive colonial tunicate *Didemnum lahillei*. Researchers and others are encouraged to share published and preliminary research results and anecdotal observations on these topics. All contributions are acknowledged. The information displayed on this website is in the public domain. Users are expected to give proper credit for images, data, and ideas they incorporate into their work.

Contributions to the website can be sent to Page Valentine, USGS, pvalentine@usgs.gov

Images of *Didemnum lahillei* posted on this website represent occurrences that have been verified through visual inspection or dissection by persons

familiar with the species. Images that have not been verified as *D. lahillei* are noted as a "provisional identification" in the image caption and in the occurrence tables.

Website design: Donna Newman, USGS

Image processing and archival: Dann Blackwood, USGS

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