Ascidiella aspersa **System:** Marine

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Ascidiacea	Enterogona	Ascidiidae

Common name dirty sea squirt (English), European sea squirt (English), ascidie sale (French), vuilwitte zakpijp (Dutch), Spritz-Ascidie (German), ruwe zakpijp (Dutch)

Synonym
Ascidia aculeata , (Alder, 1863)
Ascidia affinis , (Hancock, 1870)
Ascidia albida , (Alder & Hancock, 1848)
Ascidia aspersa , (M&#65533;ller, 1776)
Ascidia elliptica , (Alder & Hancock, 1848)
Acidia expansa , (Kiaer, 1893)
Ascidia minuta , (Kiaer, 1893)
Ascidia normanni , (Alder & Hancock, 1870)
Ascidia opalina , (Macgillivray, 1843)
Ascidia patula , (M&#65533;ller, 1776)
Ascidia pedunculata , (Hoffman, 1829)
Ascidia pellucida , (Alder & Hancock, 1848)
Ascidia pustulosa , (Alder, 1863)
Ascidia scabra , (M&#65533;ller, 1776)
Ascidia sordida , (Alder & Hancock, 1848)
Ascidia triangularis , (Herdman, 1881)
Ascidia truncata , (Herdman, 1881)
Ascidiella aspersa , (Kiaer, 1893)
Ascidiella cristata , (Roule, 1884)
Phallusia aspersa , (Traustedt, 1883)
Phallusia cristata , (Risso, 1826)

Similar species *Styela clava, Ciona intestinalis, Molgula spp., Ascidiella scabra*

Summary *Ascidiella aspersa* (European sea squirt) is a solitary marine and estuarine tunicate that is native from Norway to the Mediterranean. It is a suspension filter-feeder and was introduced via foulling on the hulls of ships to the northwest coast of the Atlantic, India, Australia and New Zealand. Commonly called the European sea squirt, it has become a moderate to serious threat by displacing native fauna.

view this species on IUCN Red List

Species Description
Ascidiella aspersa (European sea squirt) is a marine organism classified as a tunicate. The classification comes from a transparent, thick and rough (Curtis, 2005) cartilaginous tunic that covers the body of the adult organism (de Kluijver, 2004). The surface of the tunicate is rough and finely papillated (de Kluijver, 2004), greyish-black to brown (Curtis, 2005) with two siphons, a terminal brachial siphon, and an atrial siphon located up to one-third the length of the body away from the terminal siphon (de Kluijver, 2004). The brachial siphon is 6-8 lobed, while the atrial siphon is 6 lobed (de Kluijver, 2004). The siphons may be frilled (Curtis, 2005). The intestinal gut is located to the left of the brachial sac with numerous rows of straight stigmata (de Kluijver, 2004).

Lifecycle Stages
Ascidiella aspersa (European sea squirt) has a lifespan of 18 months, from mid-summer to the following year's winter (Millar, 1952). In early to mid-summer larval settlement and metamorphosis occurs and takes approximately 24 hours at 20°C (NIMPIS, 2010). Growth is continued through the fall and into the winter, although growth in winter is reduced. Upon reaching a size of 30mm, the male sexual organs begin to fill with sperm and at a much bigger size the female eggs begin to fill the oviducts. At a size of 40mm, both sex organs are fully mature (Millar, 1952). One spawning season occurs, usually one year after larval settlement (Millar, 1952). Under laboratory conditions (Bolton, 1996), there was an observed synchronous response to light in the spawning of ascidians.

Habitat Description
Ascidiella aspersa (European sea squirt) is a solitary tunicate but often forms unfused colonies in close association with each other (Curtis, 2005). It can tolerate salinities from 18-40 ppt (NIMPIS, 2010). This species establishes in subtidal and low water depth, with maximum settlement depth of 90m (de Kluijver, 2004). It can establish on soft muds but is commonly found associated with hard subtrates, like pier pylons (Currie, 1998), rocks, docks, *etc*. (Pederson, 2003). *A. aspersa* is found in low energy habitats, like estuaries, harbours and semi-enclosed embayments that protect them from strong currents and tidal forces (NIMPIS, 2010). Establishment is not inhibited by native fauna for substrate sites (Osman, undated). The establishment of *A aspersa* is increasing as global and ocean water temperatures increase (Stachowicz, 2002).

Reproduction
Ascidiella aspersa (European sea squirt) is hemaphroditic, containing both male and female sex organs, although the male sex organs develop first (Millar, 1952). In spring to early summer both male and female gametes are released into the water column where fertilisation takes place (NIMPIS, 2010). Chemotaxis interactions occur between sperm and egg, with homospecific chemical signalling of the egg, increasing sperm activity in the water column (Bolton, 1996). Larva go through a brief free-swimming stage and then quickly metamorphosise into a juvenile and begin settlement (NIMPIS, 2010).

Nutrition
Ascidiella aspersa (European sea squirt) is a filter-feeding organism (Currie, 1998) with a brachial siphon that regulates inflowing water and an atrial siphon that controls water release (de Kluijver, 2004).

General Impacts
Ascidiella aspersa (European sea squirt) has several impacts on the environment, mainly in the form of affecting the native fauna. The tunicate can form large populations and subsequent high amounts of biomass (Pederson *et al*. 2003), which redirects energy pathways to decomposers and not to higher trophic communities because it lacks many predators (Currie, 1998). It also directly competes with other native filter-feeding fauna of economic importance like scallops, mussels and oysters (Currie, 1998).

Management Info
Chemical: Copper based anti-fouling paints have minimal affect on *Ascidiella aspersa* (European sea squirt). The use of copper compounds is not cost effective under broad applications and is nonspecific, so open sea applications is both illegal and not recommended (McEnnulty *et al*. 2001).

Pathway
Ascidiella aspersa (European sea squirt) could have been accidentaly introduced through aquaculture materials (Carlton, 2003).Ship ballast water is also considered a potential pathway for *Ascidiella aspersa* (European sea squirt) introduction into the New England area (Carlton, 2003).*Ascidiella aspersa* (European sea squirt) was first detected in New England in the 1980s, introduced by hull foulling (Carlton, 2003).

Principal source: de Kluijver, M.J., & Ingalsuo S.S., Feb. 4, 2004, Macrobenthos of the North Sea-Tunicata, Zoological Museum, University of Amsterdam;
Currie, D.R., McArthur, M.A., & Cohen, B.F., Sept. 1998, Exotic Marine Pests in the Port of Geelong, Victoria, Marine and Freshwater Resources Institute, Report no. 8.;
Hewitt, C.L., Martin, R.B., Sliwa, C., McEnnulty, F.R., Murphy, N.E., Jones, T. & Cooper, S., editors, 2002, National Introduced Marine Pest Information System (NIMPIS), [online database].

Compiler: National Biological Information Infrastructure (NBII) & IUCN/SSC Invasive Species Specialist Group (ISSG)

Review: Expert review underway: Dr. Richard Osman, Senior Scientist Smithsonian Environmental Research Center., Edgewater, Maryland, USA

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ALIEN RANGE

[4] AUSTRALIA
[1] NEW ZEALAND
[1] INDIA
[8] UNITED STATES

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Carlton, J.T., 2003, Community assembly and historical biogeography in the North Atlantic Ocean: the potential role of human-mediated dispersal vectors, *Hydrobiologia*, 503, pp.1-8.
Summary: This article gave accounts of how *A. aspersa* was introduced into North America and what common dispersal mechanisms and how the rate of introductions are influenced through history.

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Summary: The electronic tool kits made available on the Cefas page for free download are Crown Copyright (2007-2008). As such, these are freeware and may be freely distributed provided this notice is retained. No warranty, expressed or implied, is made and users should satisfy themselves as to the applicability of the results in any given circumstance. Toolkits available include 1) FISK- Freshwater Fish Invasiveness Scoring Kit (English and Spanish language version); 2) MFISK- Marine Fish Invasiveness Scoring Kit; 3) MI-ISK- Marine invertebrate Invasiveness Scoring Kit; 4) FI-ISK- Freshwater Invertebrate Invasiveness Scoring Kit and AmphISK- Amphibian Invasiveness Scoring Kit. These tool kits were developed by Cefas, with new VisualBasic and computational programming by Lorenzo Vilizzi, David Cooper, Andy South and Gordon H. Copp, based on VisualBasic code in the original Weed Risk Assessment (WRA) tool kit of P.C. Pheloung, P.A. Williams & S.R. Halloy (1999).
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