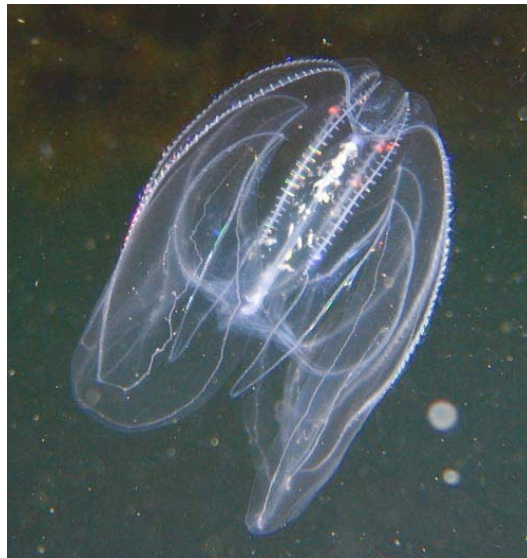


**Sea walnut (American comb jelly) (*Mnemiopsis leidyi*)**



*Mnemiopsis leidyi* with shimmering ciliated combs along its body.  
Photo © Mats Blomqvist, HAFOK AB, Sweden

<b>Common name(s) in English</b>	Sea walnut. American comb jelly. Leidy's comb jelly. Warty comb jelly.
<b>... and in other languages</b>	Danish: Dræbergogle. French: Méduse américaine. German: Rippenqualle. Norwegian: Amerikansk kammanet. Swedish: Amerikansk kammanet.
<b>Scientific name</b>	<i>Mnemiopsis leidyi</i> . Also known as <i>Mnemiopsis gardeni</i> and <i>Mnemiopsis mccradyi</i> . These three described species in the genus <i>Mnemiopsis</i> are in fact believed to represent a single, variable species.
<b>Organism group</b>	Comb jellies (phylum Ctenophora).
<b>May be confused with</b>	Along the west coast of Sweden, <i>Mnemiopsis leidyi</i> may be confused with the native coldwater species <i>Bolinopsis infundibulum</i> . In the Baltic Sea, there is a risk of confusion with the Arctic comb jelly <i>Mertensia ovum</i> . Earlier reports of <i>Mnemiopsis leidyi</i> being found throughout the Baltic were probably mistaken. Genetic analysis of collected specimens in the autumn of 2008 showed that all the individuals from the Bothnian Sea and the Gulf of Finland were <i>Mertensia ovum</i> , while those from the southern Baltic (south of Gotland) probably included both <i>Mnemiopsis leidyi</i> and <i>Mertensia ovum</i> .

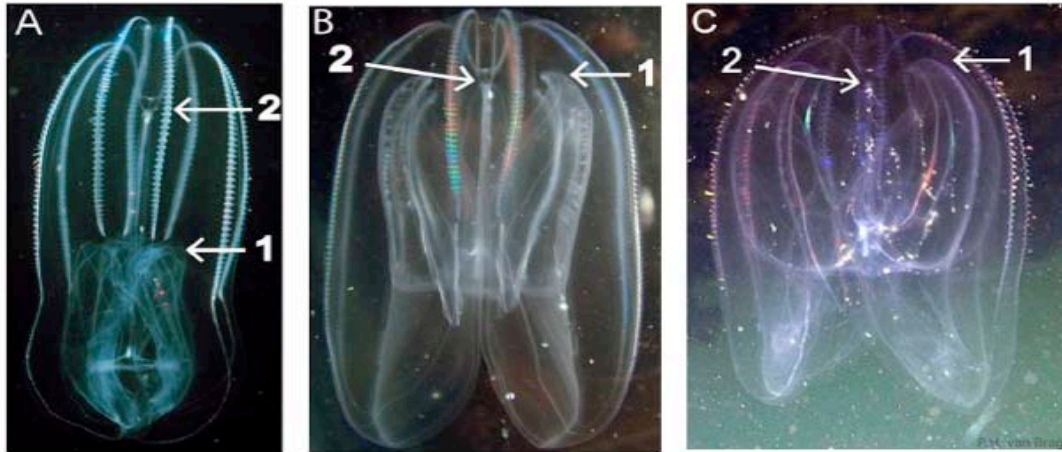


Figure 2: Photographs of A) *Bolinopsis infundibulum* B) *Mnemiopsis leidyi* and C) lobate ctenophore (*M. leidyi*) taken from Bommenede in the Grevelingen (02.09.2006). Note the termination of the oral lobes (1) and the placement of the statocyst (2). In *M. leidyi*, the oral lobes extend all the way to the statocyst, while they terminate near the mouth in *B. infundibulum* (*B. infundibulum* photograph (A) courtesy of G. R. Harbison [Woods Hole Oceanographic Institute], *M. leidyi* photograph (B) by K.M. Bayha and Bommenede *M. leidyi* photograph (C) by P.H. van Bragt).

A: *Bolinopsis infundibulum*; B and C: *Mnemiopsis leidyi*. Both species have two suspended oral lobes, the length of which clearly distinguishes between the species. Arrow 2 shows a statocyst (a small organ of balance), while arrow 1 marks the base of the lobes. In *Mnemiopsis* the oral lobes extend all the way to the statocyst, while in *Bolinopsis* they reach only halfway along the length of the body. Photos: G. R. Harbison, K. M. Bayha and P. H. van Bragt.

<p><b>Size and appearance</b></p>	<p><i>Mnemiopsis leidyi</i> has a shape somewhat reminiscent of a walnut, hence its common English name "sea walnut", and is transparent or slightly milky in colour. At most, it grows to a length of 10–12 cm and a diameter of 2.5 cm. The beautiful shimmering effect, in all the colours of the rainbow, is due to the fact that comb jellies have eight rows of ciliated combs (small plates made up of short "hairs", or cilia) running along the outside of their bodies. Interference in the cilia causes light to be reflected, producing the different colours. Unlike true jellyfish, comb jellies lack stinging cells and are therefore unable to sting.</p>
<p><b>Geographical origin</b></p>	<p>The species originates in temperate and subtropical estuaries along the east coast of North and South America.</p>
<p><b>First observed in Swedish waters</b></p>	<p>The first sighting in Swedish waters was in October 2006, in Kosterfjorden in northern Bohuslän. At the same time, a large number of individuals were identified, for example, around Denmark and in Kiel Bight. The first sighting in north European waters generally was in Oslofjorden in 2005.</p>
<p><b>Occurrence in Swedish seas and coastal areas</b></p>	<p>To date (September 2008), <i>Mnemiopsis leidyi</i> has been found in inshore and shallow waters, from the Norwegian border south to Skåne/Blekinge. Otherwise, in the southern Baltic it mainly occurs below the halocline (at depths of around 30–60 m).</p>
<p><b>Occurrence in other sea areas</b></p>	<p>The species was unintentionally introduced into the Black Sea in the early 1980s, when it was probably released with ballast water. From there, it spread both east and west, reaching the Sea of Azov in 1988, the Sea of Marmara in 1992, the Aegean Sea in 1990, and the Mediterranean and the Caspian Sea in 1999.</p> <p>The first sightings of <i>Mnemiopsis leidyi</i> along the Atlantic coast of Europe were in the summer of 2005. In the early 1990s, however, specimens of what at the time was believed to be the coldwater species <i>Bolinopsis infundibulum</i> were found, and it is very possible that they were in fact individuals of <i>M. leidyi</i> (see under the heading "May be</p>

	<p>confused with").</p> <p>In northern Europe, <i>M. leidy</i> occurs throughout the North Sea and in southern areas of the Baltic.</p>
<b>Probable means of introduction</b>	The species was probably brought to the Black Sea from the western Atlantic in ballast water.
<b>Habitat(s) in which species occurs</b>	<p><i>Mnemiopsis leidy</i> lives as zooplankton in a wide range of marine habitats. It can withstand considerable variations in temperature and salinity, and also tolerates low oxygen levels. It grows rapidly in areas with a good supply of food, but can also survive for several weeks without food.</p> <p>It has been estimated that <i>Mnemiopsis</i> tolerates temperatures between -0.7°C and +34°C and salinities ranging from 3 to 39 psu (practical salinity units). There is even a report of it being found in hypersaline water with a salinity of 70 psu.</p> <p>In its native habitat in the western Atlantic, <i>M. leidy</i> reproduces at temperatures above 12°C, although the optimum range appears to be between 24°C and 28°C.</p>
<b>Ecological effects</b>	<p><i>Mnemiopsis leidy</i> has a competitive advantage over other species, in that it can grow very rapidly when food supplies are plentiful. It consumes large quantities of zooplankton, such as copepods, and can also eat fish eggs and larvae. On the other hand, it does not feed on phytoplankton. When ample food is available, the species can devour far more than it is able to digest. In a single day it can ingest up to ten times its own body weight, but the surplus is then regurgitated. Once organisms have passed through its internal cavity, though, they do not survive. If food is in short supply, <i>Mnemiopsis</i> can survive for up to three weeks, its body size being significantly reduced in the process.</p> <p>Once established in an area, <i>Mnemiopsis</i> often dominates the zooplankton community. The effect can be a depletion of fish populations, both because the species consumes fish eggs and larvae, and because it causes a shortage of zooplankton, the main food of many pelagic fishes. <i>Mnemiopsis</i> itself is not eaten by fish.</p> <p>Another potential risk if zooplankton abundance is reduced by the ravages of <i>Mnemiopsis</i> is that phytoplankton can grow unchecked. This could exacerbate the problems associated with heavy algal blooms, such as increasing areas of the seabed depleted of oxygen.</p> <p>In the early 1980s, <i>Mnemiopsis leidy</i> was unintentionally introduced into the Black Sea. It reproduced at a phenomenal rate, and when it reached its highest density in the area there are reported to have been 7,600 individuals per square metre. 1989 saw the collapse of the stock of the ecologically and economically important anchovy (<i>Engraulis encrasicolus</i>), a species which, like <i>Mnemiopsis</i>, lives on zooplankton. This also had major consequences for predatory fish and dolphins higher up the food web.</p> <p>In 1999 fish populations in the Caspian Sea collapsed in a similar manner to those of the Black Sea.</p> <p>In Scandinavian waters, too, population growth of <i>Mnemiopsis</i> has been explosive. The species was first observed here in 2006, and now (2009) there are areas where its density is as high at times as it was in the Black Sea when fish stocks collapsed.</p> <p>The Baltic is a brackish-water sea, and its low salinity means that it is</p>

	<p>home to fewer species than the more saline and species-rich Kattegat and Skagerrak. Consequently, its ecosystems are more sensitive to disturbance and there is therefore particular concern about <i>Mnemiopsis</i> becoming established here and perhaps eliminating the existing zooplankton community.</p> <p>There are still many question marks surrounding the population dynamics of the species and the factors governing the growth of its populations. In recent years, seawater temperatures in northern Europe have been unusually high, which according to some researchers is part of the reason why <i>M. leidy</i> can survive in places much further north than its native range.</p>
<b>Other effects</b>	<p>The economic impacts of <i>Mnemiopsis leidy</i>'s expansion in European waters have been severe. In the Black Sea, losses in the early 1990s were estimated at over US\$ 300 million.</p> <p>It cannot be ruled out that a contributory factor behind the catastrophic effects of <i>M. leidy</i> in the Black Sea was that fish stocks were already under considerable pressure from overfishing.</p>
<b>Additional information</b>	<p>In its native habitat, <i>Mnemiopsis leidy</i> is kept in check by natural enemies, including various fish species and other comb jellies. One such enemy on the east coast of North America is the comb jelly <i>Beroe ovata</i>. When that species was accidentally introduced into the Black Sea in the late 1990s, it led to an appreciable decline in the population of <i>M. leidy</i>, and ecosystems began to recover.</p>
<p style="text-align: center;">FIND OUT MORE</p> <ul style="list-style-type: none"> <li>• DAISIE (Delivering Alien Invasive Species In Europe), EU project <a href="http://www.europe-aliens.org/speciesFactsheet.do?speciesId=53390">http://www.europe-aliens.org/speciesFactsheet.do?speciesId=53390</a></li> <li>• Global Invasive Species Database: <i>Mnemiopsis leidy</i> <a href="http://www.issg.org/database/species/ecology.asp?si=95&amp;fr=1&amp;sts=">http://www.issg.org/database/species/ecology.asp?si=95&amp;fr=1&amp;sts=</a></li> <li>• Caspian Environment Programme: <i>Mnemiopsis leidy</i> <a href="http://www.caspianenvironment.org/biodb/eng/zooplankton/Mnemiopsis%20leidy/main.htm">http://www.caspianenvironment.org/biodb/eng/zooplankton/Mnemiopsis%20leidy/main.htm</a></li> <li>• Caspian Environment Programme: <i>Mnemiopsis leidy</i> in the Caspian Sea <a href="http://www.caspianenvironment.org/mnemiopsis">http://www.caspianenvironment.org/mnemiopsis</a></li> <li>• Image Quest 3-D: Battle of the Black Sea Jellies <a href="http://www.imagequest3d.com/pages/general/news/blackseajellies/blackseajellies.htm">http://www.imagequest3d.com/pages/general/news/blackseajellies/blackseajellies.htm</a></li> <li>• International Council for the Exploration of the Sea, ICES Insight 45, 2008* <a href="http://www.ices.dk/products/Insight/INSIGHT%20290808%20SCREEN.pdf">http://www.ices.dk/products/Insight/INSIGHT%20290808%20SCREEN.pdf</a>, page 16 (* Please note that the cited reports of <i>Mnemiopsis</i> from the central and northern Baltic were probably mistaken. See above, under "May be confused with")</li> </ul> <p style="text-align: center;">PHOTO CREDITS</p> <p>Photographs are published by kind permission of the following photographers:</p> <ul style="list-style-type: none"> <li>• © Mats Blomqvist, HAFOK AB, Sweden</li> <li>• © Dr Richard Harbison, Woods Hole Oceanographic Institute</li> <li>• © Dr Keith M. Bayha, School of Natural Sciences, University of California Merced</li> <li>• © Dr Peter H. van Bragt, Anemoon Foundation, <a href="http://www.anemoon.org">www.anemoon.org</a></li> </ul>	
<ul style="list-style-type: none"> <li>• This fact sheet on <i>Mnemiopsis leidy</i> was created on 30 November 2006. Latest update 3 September 2009.</li> <li>• Translated by Martin Naylor on 22 December 2009.</li> </ul>	