GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: ***Ceratostoma inornatum***

Ceratostoma inornatum 正體中文

System: Marine

Kingdom	Phylum	Class	Order	Family
Animalia	Mollusca	Gastropoda	Neogastropoda	Muricidae

Common name Asian oyster drill (English), Asian drill (English), Japanese oyster drill (English)

Synonym *Ocenebra japonica* , (Dunker, 1860)
Ocinebrellus inornatus , (Recluz, 1851)

Similar species

Summary Ceratstoma inornatum is an oyster driller that destroys populations of oysters, especially that of Crassostrea gigas. In stocked populations though it causes 25% mortality. It is native to Asia and was introduced to the west coast of USA and the Atlantic coast of France.

view this species on IUCN Red List

Species Description
Ceratostoma inornatum has a narrow and elongated physiology (Berrou*et al*, 2004). It is around one inch (2.54cm) long. The radula is the band of teeth that acts as a \"drill\" to penetrate the shells of oysters (Vetmed, undated).

Notes
Ceratostoma inornatum is a \"threat to stocked and native oyster populations\" (Ray, 2005). It is a prohibited species in the state of Oregon as of 1999 (Oregon, 2001) and in the state of Washington you need a permit to transport the species (Washington, undated). *C. inornatum* does not migrate by itself; it has to have another means of transport (Vetmed, undated).

Lifecycle Stages
Ceratostoma inornatum has two lifecycle stages. First, clumps of bright-yellow eggs are layed on the sea floor. When ready, juveniles will emerge and continue to grow (>2mm/month). Reproductive size is reached after about a year. Adult survival is ~30%. (Buhle*et al*, 2004).

Habitat Description
Certostoma inornatum lives in cool waters (Berrou*et al*, 2004).

Reproduction
Certastoma inornatum produces multiple eggs on the sea floor (Buhle*et al*, 2004) and in the cracks of oyster shells (White, 2007). This is done between the months of April and July (White, 2007). Ten juvenile eventually emerge from each egg and they are 2mm in size. Reproductive size is 27mm and is reached a year after they emerge from the eggs (Buhle*et al*, 2004).

Nutrition
Ceratostoma inornatum tends to feed on young oysters such as *Crassostrea gigas* (Ray, 2005). *C. inornatus* uses its radular which acts as the drill, and \"it secretes digestive enzymes into the hole, through which the snail sucks up the partially liquefied flesh.\" It eats about 3 oysters per week (White, 2007).

General Impacts
Ceratostoma inornatum causes about 25% mortality in stocked oyster bed populations. Production costs increase (~20%) and the profits decrease (~55%) because of *C. inornatum* (Elston, 1997).

Management Info
Physical: The larvae of *Ceratostoma inornatum* that is found on the oyster, *Crassostrea gigas*, is killed by freshwater immersion (McEnnulty*et al*, 2001). It can also be controlled by quarantine because the larvae is not planktonic (Ray, 2005). Another method is to manually remove them by hand (Cheney and Booth, undated). Destroying the eggs of *C. inornatum* by burning is an effective means of control (Buhle*et al*, 2004; WGITMO, 2003). Using a screwdriver is a good way to get the eggs off oyster shells (White, 2007).

Principal source: Carlton, J. 1992. Introduced Marine and Estaurine Mollusks of North America: An End-of-the-20th-Century Perspective. *Journal of Shellfish Research*. 11(2): 489-505.; Berrou V., Merle D., Dommergues J.-L., Crônier C. & Néraudeau D. 2004. — Comparative morphology of Pliocene, Quaternary and Recent shells of Ocenebra erinaceus (Linnaeus,1758) and O. brevirobusta Houart, 2000 (Mollusca, Muricidae, Ocenebrinae): reflections on the intra- and interspecific variations. Geodiversitas 26 (2) : 263-295.

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

Review:

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ALIEN RANGE

[1] AUSTRALIA
[3] FRANCE
[1] CANADA
[5] UNITED STATES

BIBLIOGRAPHY
19 references found for **Ceratostoma inornatum**

Managment information
Buhle, E., M. Margolis, J.L. Ruesink. 2004. Bang for the Buck: Cost-Effective Control of Invasive Species with Different Life Histories. Resources For the Future. 1-23.
Summary: This paper shows how to use population statistics and biological data to determine the most cost effective way to stop an invasion of *Ocinebrellus inornatus*.
Available from: http://www.rff.org/documents/RFF-DP-04-06.pdf [Accessed February 8, 2007]
Centre for Environment, Fisheries & Aquaculture Science (CEFAS)., 2008. Decision support tools-Identifying potentially invasive non-native marine and freshwater species: fish, invertebrates, amphibians.
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).
The decision support tools are available from:
http://cefas.defra.gov.uk/our-science/ecosystems-and-biodiversity/non-native-species/decision-support-tools.aspx [Accessed 13 October 2011]
The guidance document is available from http://www.cefas.co.uk/media/118009/fisk_guide_v2.pdf [Accessed 13 January 2009].
Cheney, D. S. Booth. Undated. Development and Implementation of Integrated Pest Management of Burrowing Shrimp on Washington State Commercial Oyster Beds.
Summary: The purpose of this paper is to determine the effect of shrimp on oyster populations and how to supress the shrimp. Damage studies need to be put in place to determine economic loss.
Do you need a collecting, import, or transfer permit? http://depts.washington.edu/fhl/assets/nonImageResources/CollectingPermitsFHL.pdf.
Summary: This website gives you details on obtaining a permit for the transportation of invasive species in Washington.
Available from: http://depts.washington.edu/fhl/assets/nonImageResources/CollectingPermitsFHL.pdf [Accessed February 8, 2007]

Elston, R. 1997. Pathways and Management of Marine Nonindigenous Species in the Shared Waters of British Columbia and Washington. Puget Sound Action Team.
Summary: This website gives information regarding the management of nonindigenous species in shared waters in the areas of British Columbia and Washington.
Available from: http://www.psat.wa.gov/shared/nis.html [Accessed February 8, 2007]
Japanese Oyster Drill (*Ceratostoma inornatum*.
Summary: This page gives a brief description of *Ceratostoma inornatum*, such as where it originated and how it preys on oysters.
Available from: http://mehp.vetmed.ucdavis.edu/introspecies/japoystdrill.html [Accessed February 8, 2007]
McEnnulty, F.R., Jones, T.E. and Bax, N.J. 2001, *The Web-Based Rapid Response Toolbox*. Web publication: . Date of release: June 2001.
Summary: The information in this article shows how changes in salinity of water is a good means for killing alien invaders off the coasts of North America.
Available from: http://www.marine.csiro.au/crimp/nimpis/controlDetail.asp?ID=69 [Accessed February 8, 2007]
Oregon Fish and Wildlife. 2001. Classification of All Species OAR 635-056 - Wildlife Integrity Rules.
Summary: This is a list of mollusks that have been prohibited and controlled in the state of Oregon.
Available from: http://www.dfw.state.or.us/wildlife/pdf/mollusks.pdf [Accessed February 8, 2007]
Ray, G.L. 2005. Invasive Marine and Estaurine Animals of California. Aquatic Nuisance Species Program (ANSRP).
Summary: This article discusses introduced, nonindigenous species. It shows how introduced species can cause potential threats to ecosystems, fisheries, and its impact on humans.
Available from: http://el.erdc.usace.army.mil/elpubs/pdf/ansrp05-2.pdf [Accessed February 8, 2007]
Report of the Working Group on Introductions and Transfers of Marine Organisms (WGITMO). 2003. International Council for the Exploration of the Sea. pp. 9, 43-44.
Summary: This report discusses the transfer of introduced species. It encourages members of WGITMO to track all transfer of species (import/export). Also it stresses to follow all codes so that the introduced species do not become a problem for indigenous species.
Available from: http://www.ices.dk/reports/ACME/2003/WGITMO03.pdf [Accessed February 8, 2007]
Ruesink Lab. Undated. Oyster Drills.
Summary: This website reports on the impacts, demography, and control of oyster drills.
Available from: http://depts.washington.edu/jlrlab/oysterdrills.php [Accessed February 8, 2007]

General information

Berrou V., Merle D., Dommergues J.-L., Cr&#65533;nier C. & N&#65533;raudeau D. 2004. &#65533; Comparative morphology of Pliocene, Quaternary and Recent shells of *Ocenebra erinaceus* (Linnaeus, 1758) and *O. brevirobusta* Houart, 2000 (Mollusca, Muricidae, Ocenebrinae): reflections on the intra- and interspecific variations. Geodiversitas 26 (2) : 263-295.
Summary: This article studies different morphological structures of different oyster drillers from Pliocene, Quaternary, and Recent time periods. The study is of oyster drillers concentrated in the northern-Atlantic Ocean, Mediterranean Sea, and the Moroccan Atlantic.
Available from: http://www.mnhn.fr/museum/front/medias/publication/1923_g04n2a4.pdf [Accessed February 8, 2007]
Carlton, J. 1992. Introduced Marine and Estaurine Mollusks of North America: An End-of-the-20th-Century Perspective. *Journal of Shellfish Research*. 11(2): 489-505.
Summary: This article discusses the species and the mechanisms for which they were introduced to North America. Impacts from these introduced species is also addressed.
Available from: http://www.sgnis.org/publicat/papers/jsr11_2.pdf {Accessed February 8, 2007]
Garcia-Meunier, P., C. Martel, J. Pigeot, G. Chevalier, G. Blanchard, P. Goulletquer, S. Robert, P. Sauriau. 2002. Recent invasion of the Japanese oyster drill along the French Atlantic coast: identification of specific molecular markers that differentiate Japanese, *Ocinebrellus inornatus*, and European, *Ocenebra erinacea*, oyster drills. *Aquat. Living Resour.* 15: 67-71.
Summary: This article discusses how the invasion of the Japanese Oyster Drill in the coasts of France could lead to a risk for cultivated oysters and mussels. It also shows how molecular markers of both the Japanese Oyster Drill and the European Oyster Drill differ in their demographics and reproduction.
Available from: http://www.ifremer.fr/docelec/doc/2002/publication-569.pdf [Accessed February 8, 2007]
Garcia-Meunier, P., C. Martel, J. Pigeot, G. Chevalier, P. Goulletquer, P. Sauriau. Undated. Human Impact and Marine Bioinvasions: Setting Genetic Analysis of the Japanese Drill, *Ocinebrellus inornatus* (Recluz, 1851), Recently Introduced Into the French Atlantic Coasts.
Summary: This paper discusses the potential damage that could be caused as a result of the introduction of *Ocinebrellus inornatus* in the French Atlantic and how to use molecular markers to elarn the history of the invasion.
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Martel, C., F. Viard, P. Garcia-Meunier. Undated. The Use of Mitochondrial DNA to Infer Scenerii About the Origin of the Recent Invasion by *Ocinebrellus inronatus* (Recluz 1851) in France. Marine Bioinvasions.
Summary: This discusses the genetic relationship between native populations of and introduced populations of *Ocinebrellus inornatus*.
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McEnnulty, F.R., N.J. Bax, B. Schaffelke, M. Campbell. Undated. A Literature Review of Rapid Response Options for the Control of ABWMAC Listed Species and Related Taxa in Australia.
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OBIS Indo-Pacific Mollucsan Database. 2006. *Ceratostoma inornatum* (R&#65533;cluz, 1851).
Summary: This website gives the taxonomy for marine species.
Available from: http://data.acnatsci.org/obis/search.php/92364 [Accessed February 8, 2007]
Washington Department of Fish an Wildlife (WDFW). 2000. Shellfish.
Summary: This is basic information on oysters, such as biology, their use as food, and problems affecting oysters.
http://wdfw.wa.gov/fish/shelfish/beachreg/3clam.htm [Accessed February 8, 2007]