GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: ***Asterias amurensis***

Asterias amurensis 简体中文 正體中文

System: Marine

Kingdom	Phylum	Class	Order	Family
Animalia	Echinodermata	Asteroidea	Forcipulatida	Asteriidae

Common name
North Pacific seastar (English), Nordpazifischer Seestern (German), Japanese seastar (English), northern Pacific seastar (English), purple-orange seastar (English), flatbottom seastar (English), Japanese starfish (English)

Synonym
Parasterias albertensis , Verrill, 1914
Asterias rubens , Murdoch, 1885
Asterias pectinata , Brandt, 1835
Asterias nortonensis , Clark, 1920
Asterias anomala , Clark, 1913
Asterias amurensis , f. *robusta* Djakonov, 1950
Asterias amurensis , f. *latissima* Djakonov, 1950
Allasterias rathbuni nortonens , Verrill, 1909
Allasterias rathbuni , var. *anom* Verrill, 1909
Allasterias rathbuni , var. *nort* Verrill, 1914
Asterias amurensis , f. *acervispinis* Djakonov, 1950
Asterias amurensis , f. *flabellifera* Djakonov, 1950
Asterias amurensis , f. *gracilispinis* Djakonov, 1950

Similar species
Pisaster brevispinus, Pisaster giganteus, Pisaster ochraceus

Summary
Originally found in far north Pacific waters and areas surrounding Japan, Russia, North China, and Korea, the northern Pacific seastar (Asterias amurensis) has successfully invaded the southern coasts of Australia and has the potential to move as far north as Sydney. The seastar will eat a wide range of prey and has the potential for ecological and economic harm in its introduced range. Because the seastar is well established and abundantly widespread, eradication is almost impossible. However, prevention and control measures are being implemented to stop the species from establishing in new waters.

view this species on IUCN Red List

Species Description
Asterias amurensis (northern Pacific seastar) can grow upto 50cm in diameter. It is yellow with red and purple pigmentation on its five arms, and a small central disk. Its distinctive characteristic is its upturned tips which are its identification key when compared to similar starfish. The undersides are completely yellow and arms are unevenly covered with small, jagged-edged spines (CSIRO, 2004). These spines line the groove in which the tube feet lie, and join up at the mouth in a fan-like shape (NIMPIS, 2002).

Notes
In its native Japan, *Solaster paxillatus* (a sunstar) has been noted as a predator of *Asterias amurensis* (northern Pacific seastar). The predation of *A. amurensis* by king crabs in Alaskan aquaria has also been observed (NIMPIS, 2002). The size of prey eaten by *A. amurensis* usually equals the length of the seastar's arm. Organisms that compete with *A. amurensis* include: *Uniophora granifera*, *Coscinasterias muricata* and *Odobenus rosmarus divergens* (Pacific walruses) (NIMPIS, 2002).

Lifecycle Stages
Juvenile *Asterias amurensis* (northern Pacific seastars) grow up to 6mm per month in the first year and continue to grow 1 - 2mm per month until maturity. The female is able to reproduce at about 12 months of age, when they are around 10cm in diameter.

Uses
No valuable human use has been documented. Hunting incentives have been suggested, such as catching and drying as souvenirs of the Australian coast (Goggin, 1999).

Habitat Description
While *Asterias amurensis* (northern Pacific seastar) prefers waters temperatures of 7-10°C, it has adapted to warmer Australian waters of 22°C. It is typically found in shallow waters of protected coasts and is not found on reefs or in areas with high wave action. The starfish is capable of tolerating many temperatures and wide ranges of salinities. It is often found in estuaries and on mud, sand or rocky sheltered areas of intertidal zones (CSIRO, 2004). The maximum temperature for *Asterias amurensis* is 25°C and the minimum is 0°C (NIMPIS, 2002). The salinity range for this species is between 18.7 and 41ppt, while the maximum depth at which individuals have been found is 220m (NIMPIS, 2002).

Reproduction
Asterias amurensis (northern Pacific seastar) reproduces sexually and asexually. Spawning occurs between July and October in Australian waters . The female seastar is capable of carrying up to 20 million eggs. Fertilisation is external and larvae remains in a planktonic stage for up to 120 days before settling and metamorphosing into juvenile starfish (NSW Department of Primary Industries, 2004). Sperm half life at 10°C > 2 hours, at 17°C < 30 minutes (NIMPIS, 2002).

Nutrition
Asterias amurensis (northern Pacific seastar) eats bivalves, gastropod molluscs, barnacles, crabs, crustaceans, worms, echinoderms, ascidians, sea urchins, sea squirts and other seastars, including conspecifics if food source becomes exhausted (CSIRO, 2004).

General Impacts
Asterias amurensis (northern Pacific seastar) has the potential to establish large populations in new areas. Estimates made in Port Philip Bay (where they were first detected), indicate that numbers reached as much as 12 million individuals in two years. In their native range they are known to go through 'bust and boom' cycles reaching high abundance and then rapid decline (NSW, 2007).
The northern Pacific seastar is a voracious feeder, preferring mussels, scallops and clams. It will eat almost anything it can find, including dead fish and fish waste (CSIRO, 2004). The seastar is considered a serious pest of native marine organisms. It is implicated in the decline of the critically endangered spotted handfish (see *Brachionichthys hirsutus* in IUCN Red List of Threatened Species) in Tasmania It preys on handfish egg masses, and/or on the sea squirts (ascidians) that handfish use to spawn on (NSW, 2007). The seastar is also considered a mariculture pest, settling on scallop longlines, spat bags, mussel and oyster lines and salmon cages (CSIRO, 2004). Oyster production on some marine farms in southeastern Tasmania have been affected by the seastar (NSW, 2007).
In Japan seastar outbreaks cost the mariculture industry millions of dollars (NSW, 2007; NIMPIS, 2002).

Management Info
A two-year study was undertaken for the Department of Environment and Heritage (Australia) by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) to identify and rank introduced marine species found within Australian waters and those not found within Australian waters.
All of the non-native potential target species identified in this report are ranked as high, medium and low priority, based on their invasion potential and impact potential. *Asterias amurensis* is identified as one of the ten most damaging potential domestic target species, based on overall impact potential (economic and environmental). A hazard ranking of potential domestic target species based on invasion potential from infected to uninfected bioregions identifies *Asterias amurensis* as a 'medium priority species' - these species have a reasonably high impact/or invasion potential.
For more details, please see Hayes *et al.* 2005.
The rankings determined in Hayes *et al.* 2005 will be used by the National Introduced Marine Pest Coordinating Group in Australia to assist in the development of national control plans which could include options for control, eradication and/or long term management.
For details on preventative measures, chemical, physical and biological control options, please see *management information compiled by the ISSG*.

Pathway
Asterias amurensis (northern Pacific seastar) can be distributed on ship hulls*Asterias amurensis* (northern Pacific seastar) settles on scallop longlines, spat bags, mussel and oyster lines, and salmon cages.*Asterias amurensis* (northern Pacific seastar) can be transmitted *via* seawater in live fish trade*Asterias amurensis* (northern Pacific seastar) can be unintentionally transferred *via* recreational boats*Asterias amurensis* (northern Pacific seastar) larvae can be distributed through ballast water*Asterias amurensis* (northern Pacific seastar) can be transmitted *via* seawater in live fish trade

Principal source: NIMPIS 2010. *Asterias amurensis* general information. National Introduced Marine Pest Information System

Compiler: Chantal Stevens supervised by Dr. Deborah Rudnick University of Washington, Tacoma & IUCN/SSC Invasive Species Specialist Group (ISSG)

Review:

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[3] AUSTRALIA

BIBLIOGRAPHY
22 references found for **Asterias amurensis**

Managment information
Bryne M., Morrice, M.G., Wolf, B., 1997. Introduction of the northern Pacific asteroid *Asterias amurensis* to Tasmania: reproduction and current distribution. Marine Biology 127: 637-685
Summary: Over view of Introduction and reproduction methods of the *Asterias amurensis*.

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].
Department of Fisheries. 2000. Introduced Marine Invaders, Northern Pacific Seastar.
Summary: Detailed description of habitat, reproduction, description, invasion, and eradicaton attempts.
Available from: http://www.fish.wa.gov.au/docs/pub/IMPPacificSeaStar/index.php?0506 [Accessed 28 October 2004]
Department of the Environment and Heritage. Introduced Marine pests, National Control Plan for Northern Pacific Seastar, Implementation Workshop May 2002.
Summary: Plans for Australia to implement a National Control Plan to prevent further invasion.
Dommisse, M. and Hough, D. 2003. Entrainment of the North Pacific seastar, *Asterias amurensis*, in non-ballast vectors: Ships hulls, aquaculture and fishing gear. In Abstracts: Third International Conference on Marine Bioinvasions, March 16-19, 2003. Scripps Institution of Oceanography La Jolla, California
Summary: Analysis of transmission vectors of *Asterias amurensis* to provide information for the formulation of a management plan.
Available from: http://massbay.mit.edu/publications/marinebioinvasions/mbi3_abstract_book.pdf [Accessed 8 February 2008]
Goggin, C.L., 1998. Proceedings of a meeting on the biology and management of the introduced seastar *Asterias amurensis* in Australian waters, 19 May 1998. Centre for Research on Introduced Marine Pests Tech Rep No. 15. CSIRO Marine Research, Hobart
Hayes, K., Sliwa, C., Migus, S., McEnnulty, F., Dunstan, P. 2005. National priority pests: Part II Ranking of Australian marine pests. An independent report undertaken for the Department of Environment and Heritage by CSIRO Marine Research.
Summary: This report is the final report of a two year study designed to identify and rank introduced marine species found within Australian waters (potential domestic target species) and those that are not found within Australian waters (potential international target species).
Available from: http://www.marine.csiro.au/crimp/reports/PrioritypestsFinalreport.pdf [Accessed 25 May 2005]
Hewitt C. L, L. Campbell., Ronald E. Thresher., Richard B. Martin., Sue Boyd., Brian F. Cohen., David R. Currie., Martin F. Gomon., Michael J. Keough., John A. Lewis., Matthew M. Lockett., Nicole Mays., Matthew A.McArthur., Tim D. O'Hara., Gary C. B. Poore., D. Jeff Ross., Melissa J. Storey., Jeanette E. Watson and Robin S. Wilson., 2004. Introduced and cryptogenic species in Port Phillip Bay, Victoria, Australia. Marine Biology 144: 183–202
Hill, N.A; Blount, C; Poore, A.G.B; Worthington, D; Steinberg, P.D., 2003. Grazing effects of the sea urchin *Centrostephanus rodgersii* in two contrasting rocky reef habitats: effects of urchin density and its implications for the fishery. Marine and Freshwater Researc 3; 54 (6) : 691-700
Summary: Had small section on effects of *Asterias amurensis*.
Koehnken, L., 2001. North-east rivers environmental review: A review of Tasmanian environmental quality data to 2001. Supervising Scientist Report 168, Supervising Scientist, Darwin.
Summary: Available from: http://www.environment.gov.au/ssd/publications/ssr/pubs/ssr168.pdf [Accessed 8 February 2008]
Kuris, A. M., Lafferty, K. D and Grygier, M. J., 1996. Detection and preliminary evaluation of natural enemies for possible biological control of the northern pacific seastar, *Asterias amurensis*. Technical report no 3, Centre for Research on Introduced Marine Pests, 12 pp
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: Has useful information on management options for *A. amurensis*.
Available from: :http://crimp.marine.csiro.au/NIMPIS/controls.htm [Accessed June 13 2004]
New South Wales (NSW) Department of Primary Industries. 2007. Northern Pacific Seastar - *Asterias amurensis*.
Summary: Eradication attempts and description/education about Northern Pacific Seastar.
Available from: http://www.fisheries.nsw.gov.au/threatened_species/general/content/fn_northern_pacific_seastar.htm [Accessed 8 February 2008]
Ross, D. J., Johnson, C. R., Hewitt, C. L., Ruiz, G. M. 2004. Interaction and impacts of two introduced species on soft-sediment marine assembledge in SE Tasmania. Marine Biology 144: 747-756
Summary: Comparison of field study conducted between *Asterias amurensis* and *Carcinus maenus* on the Tasmanian coast.
Ross, J. D., Craig R. Johnson & Chad L. Hewitt., 2003. Assessing the ecological impacts of an introduced seastar: the importance of multiple methods. Biological Invasions 5: 3–21
Summary: This paper synthesizes work on the current and predicted impacts of an introduced predatory seastar (*Asterias amurensis*) on soft sediment assemblages, including native species subject to commercial fishing, in the Derwent Estuary and other areas of southeast Tasmania.
Thresher, R.E. and Bax, N.J. 2001. Classical biological control of the Northern Pacific Sea Star and the European Shore Crab: Prospects from success based on five years of background work. In Abstracts: Second International Conference on Marine Bioinvasions, March 9-11, 2001. New Orleans, LA
Summary: A biological control agent has been found for this species.
Available from: http://massbay.mit.edu/publications/marinebioinvasions/mbi2_abstracts.pdf [Accessed 8 February 2008]

General information

Goggin, L. 1999. Invasion of the killer seastars. Australian Broadcasting Corporation.
Summary: A popular science article outlining the problems posed by *A. amurensis* and research that is being conducted to address this issue.
Available from: http://www.abc.net.au/science/slab/starfish/default.htm

Hewitt, C.L. & Nelson, M.L. 1999. Historical and modern invasions to Port Phillip Bay, Australia: The most invaded southern embayment? In Abstracts: First National Conference on Marine Bioinvasions, January 24 -27, 1999. Massachusetts Institute of Technology, Cambridge, MA
Summary: Report on the invasions that have occurred at Port Phillip Bay.
Available from: http://massbay.mit.edu/publications/marinebioinvasions/mbi1_abstracts.pdf [Accessed 8 February 2008]

ITIS (Integrated Taxonomic Information System), 2004. Online Database *Asterias amurensis*
Summary: An online database that provides taxonomic information, common names, synonyms and geographical jurisdiction of a species. In addition links are provided to retrieve biological records and collection information from the Global Biodiversity Information Facility (GBIF) Data Portal and bioscience articles from BioOne journals.
Available from: http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=157216 [Accessed 8 February 2008]

NIMPIS 2010. *Asterias amurensis* general information. National Introduced Marine Pest Information System
Summary: Available from: http://adl.brs.gov.au/marinepests/index.cfm?fa=main.spDetailsDB&sp=6000005721 [Accessed March 10 2010]

Parry, G.D. and Cohen, B.F. 2001. Factors influencing the distribution and abundance of the exotic sea star *Asterias amunrensis* during the early phase of its establishment in Port Phillip Bay, Southern California. In Abstracts: Second International Conference on Marine Bioinvasions, March 9-11, 2001. New Orleans, LA
Summary: Report into the rate of spread by the invasive sea star.
Available from: http://massbay.mit.edu/publications/marinebioinvasions/mbi2_abstracts.pdff [Accessed 8 February 2008]

Ross, D. Jeff; Craig R. Johnson, Chad L. Hewitt., 2002. Impact of introduced seastars *Asterias amurensis* on survivorship of juvenile commercial bivalves *Fulvia tenuicostata*. Marine Ecology Progress Series Vol. 241: 99–112, 2002