

FULL ACCOUNT FOR: Asterias amurensis



System: Marine

Kingdom	Phylum	Class	Order	Family
Animalia	Echinodermata	Asteroidea	Forcipulatida	Asteriidae

North Pacific seastar (English), Nordpazifischer Seestern (German), Japanese Common name

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

Originally found in far north Pacific waters and areas surrounding Japan, **Summary** 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).



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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 $10^{\circ}\text{C} > 2$ hours, at $17^{\circ}\text{C} < 30$ 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).



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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 <u>Hayes et al. 2005</u>.

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 <u>management information compiled by the ISSG</u>.

Pathway

Asterias amurensis (northern Pacific seastar) can be distributed on ship hullsAsterias 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 tradeAsterias 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

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Review:

Pubblication date: 2010-03-10

ALIEN RANGE[3] AUSTRALIA

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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*.



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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. Hallov (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]

<u>The guidance document</u> is available from http://www.cefas.co.uk/media/118009/fisk_guide_v2.pdf [Accessed 13 January 2009]. <u>Department of Fisheries. 2000. Introduced Marine Invaders, Northern Pacific Seastar.</u>

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]

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Summary: Plans for Australia to implement a National Control Plan to prevent further invasion.

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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]

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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):

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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,

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General information

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Summary: A popular science article outlining the problems posed by *A. amurensis* and research that is being conducted to address this issue.

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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.

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