GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: ***Acanthophora spicifera***

Acanthophora spicifera **System:** Marine

Kingdom	Phylum	Class	Order	Family
Plantae	Rhodophyta	Florideophiceae	Ceramiales	Rhodomelaceae

Common name bulung tombong bideng (Malay), red alga (English), spiny seaweed (English), spiny alga (English, Hawaii), culot (Ilocano)

Synonym
Acanthophora intermedia , Crouan
Fucus spicifer , M. Vahl 1802
Fucus acanthophorus , J.V. Lamouroux 1805
Acanthophora thierryi , J.V. Lamouroux 1813
Chondria acanthophorara , C. Agardh 1822
Acanthophora orientalis , J. Agardh 1863
Acanthophora wightii , J. Agardh 1863
Acanthophora antillarum , Montagne ex K&#65533;tzing 1865
Acanthophora thierryi , f. *gracilis* P.L. Crouan & H.M. Crouan 1878
Acanthophora orientalis , var. *wightii* (J. Agardh) Sonder 1879
Acanthophora spicifera , f. *wightii* (J. Agardh) Weber-van Bosse 1923
Acanthophora spicifera , f. *orientalis* (J.Agardh) Weber-van Bosse 1923
Acanthophora spicifera , var. *orientalis* (J. Agardh) Zaneveld 1956

Similar species

Summary Acanthophora spicifera is a red algae which is found in most tropical or subtropical seas of the world. Its plastic morphology allows it to adapt to a variety of environmental conditions, and hence it can invade a diverse range of habitats. It is an alien invasive species in Hawaii. It is amongst the most successful alien algal species in this region, where it may modify native communities and compete with native algae.

view this species on IUCN Red List

Species Description
Acanthophora spicifera is an erect macroalgae which grows up to 40cm tall. It has solid cylindrical branches, 2-3mm wide, branched either sparingly or repeatedly. The main branches have short, determinate branches, irregularly shaped and spinose, with spines numerous and radially arranged. There are no spines on main axes. The plant grows from a large, irregularly shaped holdfast. In intertidal high-motion water areas, *A. spicifera* has short (4 - 10cm), compact and very dense thalli. In moderate or low water motion areas, the thalli are tall (10 - 25cm), more openly branched and occur in scattered clumps. Apices are pyramidal, with incurved trichoblasts. Pericentral cells are corticated densely, with central axial cells usually evident. In older axes, central axial filaments may be surrounded by small-celled adventitious filaments. *A. spicifera* is highly variable in colour: it can be shades of red, purple, yellow, orange, or brown. Thalli are often very dark in colour in intertidal, high motion areas, and are usually lighter colour in shallow areas with low water motion and reflective sandy or silty bottoms (University of Hawaii, 2001).

Notes
In Panama, it has been reported that fish can exclude *A. spicifera* from some habitats by including it in their diet. *A. spicifera* is also grazed by sea urchins and crabs (Kilar and McLachlan, 1986).

Lifecycle Stages
Acanthophora spicifera has been reported to have a triphasic alternation of generations. Tetrasporophytic and gametophytic generations are isomorphic, and the gametophyte dioecious (Kilar and McLachlan, 1986).

Uses
Acanthophora spicifera is consumed in Tahiti, and also features in the diet of native Fijians (Payri *et al*. 2000; in Guiry, M.D. & Guiry, G.M. 2007; South, 1993). It is also used in vegetable salads, as soup flavouring and as a thickening agent in the Philippines, and is reported to contain carragenaans, used as an emulsifying agent (Trono, 1999).

Habitat Description
Acanthophora spicifera is commonly found on calm, shallow reef flats, tidepools, and on rocky intertidal benches. It usually attaches to hard substrates, such as rocks, basalt ledges, or dead coral heads, but may also occur as an epiphyte on other algae, or as relatively stable unattached populations. It has been reported at depths of up to 22m in the Virgin Islands, although it more typically occurs at 1-8m depths (University of Hawaii, 2001; Kilar and McLachlan, 1986; Hill, 2001). *A. spicifera* cannot withstand prolonged exposure to air, and as such its survival on reefs is increased when it co-occurs with dense aggregates of other algal species which are more tolerant of wave exposure, and are able to retain water when exposed to air (Hill, 2001).

Reproduction
Sexual: Tetrasporophytes were the most common reproductive phase occurring on reef flats in Panama, with over 80% of plants tetrasporic throughout much of the year. This percentage was reduced to only 5% during periods of prolonged tidal immersion (Kilar and McLachlan, 1986; Hill, 2001).
\r\nAsexual: Fragmentation accounts for much of the distribution and standing crop of *A. spicifera*. On reef flats, as much as 26% of the standing crop can be lost to drift fragments each month (Hill, 2001) especially if the fragments either (a) do not release viable spores or (b) are unable to reattache to the substratum by production of secondary rhizoids (Mads Thomsen., pers.comm., June 2008).
A. spicifera appears to be able to release sexual propagules at all times of the year in Hawaii, and therefore may have greater potential for dispersal than macroalgae that reproduce only by fragmentation (Smith *et al*. 2002).

Nutrition
Autotrophic.

General Impacts
Acanthophora spicifera has a plastic morphology, which allows it to adapt to different conditions and invade a diversity of habitats. The brittle nature of its branches often results in fragmentation, which contributes to frequent, large free-floating populations, and its widespread distribution (University of Hawaii, 2001). It is now one of the most widespread and successful alien algae in Hawaii, and may modify native communities by smothering and outcompeting native algal species (Preskitt, 2002; Eldredge, 2003).
Blooms of native *A. spicifera* covered by cyanobacterial epiphytes have been observed on several reefs in the Eastern Tropical Pacific, since widespread coral mortality opened substrate for colonisation during the 1997-98 El Nino Southern Oscillation. The bloom coincided with La Nina conditions, with thermocline shoaling and mixing upwards of nutrient-rich bottom water, but it persisted for several years after this (Fong *et al*. 2006).

Management Info
No specific management action plans have been reported for this species

Pathway
Acanthophora spicifera is likely to have reached Hawaii as fouling on a barge from Guam (Kilar and McLachlan, 1986).

Principal source:

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Review: Mads Solgaard Thomsen, Post doc, Benthic Section, Marine Department, National Environmental Research Institute University of Aarhus, Roskilde, Denmark.

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ALIEN RANGE

[1] ANGOLA
[1] BAHRAIN
[1] BELIZE
[1] CAMEROON
[1] COLOMBIA
[2] EQUATORIAL GUINEA
[3] FRENCH POLYNESIA
[1] GUAM
[1] GUINEA-BISSAU
[1] INDONESIA
[1] JAPAN
[1] KUWAIT
[1] MALAYSIA
[1] MARSHALL ISLANDS
[1] MAURITIUS
[5] MICRONESIA, FEDERATED STATES OF
[1] MYANMAR
[2] NORTHERN MARIANA ISLANDS
[1] PAKISTAN
[1] PANAMA
[1] REUNION
[1] SAO TOME AND PRINCIPE
[1] SENEGAL
[1] SIERRA LEONE
[5] SOLOMON ISLANDS
[1] SRI LANKA
[1] TANZANIA, UNITED REPUBLIC OF
[44] UNITED STATES
[1] VIET NAM
[6] AUSTRALIA
[1] BANGLADESH
[2] BRAZIL
[1] CHINA
[1] COSTA RICA
[2] FIJI
[1] GABON
[1] GUATEMALA
[4] INDIA
[1] IRAN, ISLAMIC REPUBLIC OF
[1] KENYA
[1] MADAGASCAR
[1] MALDIVES
[1] MAURITANIA
[1] MEXICO
[1] MOZAMBIQUE
[1] NEW CALEDONIA
[1] OMAN
[1] PALAU
[1] PHILIPPINES
[2] SAMOA
[1] SAUDI ARABIA
[2] SEYCHELLES
[1] SINGAPORE
[1] SOUTH AFRICA
[1] TAIWAN
[1] TONGA
[2] VENEZUELA
[1] YEMEN

BIBLIOGRAPHY

23 references found for **Acanthophora spicifera**

Managment information

General information

Allender, B.M. and Kraft, G.T. 1983. The marine algae of Lord Howe Island (New South Wales): The Dictyotales and Cutleriales (Phaeophyta). *Brunonia*. 6: 73-130.
Summary: This paper provides a comprehensive report on the marine algae present on Lord Howe Island, Australia.
Capper, A., Tibbetts, I.R., O Neil, J.M. and Shaw, G.R. 2006. Feeding preference and deterrence in rabbitfish *Siganus fuscescens* for the cyanobacterium *Lyngbya majuscula* in Moreton Bay, south-east Queensland, Australia. *Journal of Fish Biology*. 68: 1589-1609.
Summary: This paper discusses the diet of the rabbitfish in Queensland, Australia.

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Summary: This paper discusses the introductions of exotic species to coral reefs, with emphasis on Hawaii.
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Coles, S.L., DeFelice, R.C., Eldredge, L.G. and Carlton, J.T. 1999. Historical and recent introductions of non-indigenous marine species into Pearl Harbor, Oahu, Hawaiian Islands. *Marine Biology*. 135: 147-158.
Summary: This paper presents a record of the introduced marine species in Pearl Harbour, Hawaii.
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Summary: AlgaeBase is a database of information on algae that includes terrestrial, marine and freshwater organisms.
AlgaeBase is available from: http://www.algaebase.org; *Acanthophora spicifera* information is available from: http://www.algaebase.org/speciesdetail.lasso?species_id=3309&sk=0&from=results&-session=abv3:82D8BFA71b8423986CyJV30A9723 [Accessed 15 November 2006].
Hill, K. 2001. *Acanthophora spicifera*. Smithsonian Marine Station at Fort Pierce.
Summary: This website provides comprehensive information about *A. spicifera*.
Available from: http://www.sms.si.edu/irLspec/Acanth_spicif.htm [Accessed 3 December 2006]
ITIS (Integrated Taxonomic Information System), 2007. Online Database *Acanthophora spicifera*
Summary: An online database that provides taxonomic information, common names, synonyms and geographical jurisdiction of a species. 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=183220 [Accessed 6 February 2007]
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Summary: This paper reports on the utilisation of the invasive algaes *A. spicifera* and *Hypnea musciformis* by the endangered green turtle in the Hawaiian Islands.
Smith, J.E., Hunter, C.L. and Smith, C.M. 2002. Distribution and reproductive characteristics of nonindigenous and invasive marine algae in the Hawaiian Islands. *Pacific Science*. 56 (3): 299-315.
Summary: This paper provides information about the distribution and impacts of *A. spicifera* in Hawaii.
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South, G.R. 1993. Edible seaweeds of Fiji: an ethnobotanical study. *Botanica Marina*. 36 (4): 335-349.
Summary: This paper describes the edible seaweeds of Fiji, which include *A. spicifera*.
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Summary: This paper discusses the interactions between *A. spicifera* and another invasive algae in Hawaii.

The Ocean Biogeographic Information System (OBIS) Dataset Extent Map, Distribution of *Acanthophora spicifera*
Summary: The Ocean Biogeographic Information System (OBIS) is the information component of the Census of Marine Life (CoML), a growing network of more than 1000 researchers in 73 nations engaged in a 10-year initiative to assess and explain the diversity, distribution, and abundance of life in the oceans - past, present, and future. OBIS is a web-based provider of global geo-referenced information on marine species. OBIS contains expert species level and habitat level databases and provide a variety of spatial query tools for visualizing relationships among species and their environment.
This page is available from:
http://www.iobis.org/OBISWEB/ObisControllerServlet?category=all&names=data&tableName=0&searchName=acanthophora+spicifera&x=20&y=13 [Accessed 3 December 2006]
Ocean Biogeographic Information System (OBIS) available from: www.iobis.org
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Summary: Available from:
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University of Hawaii. 2001. Algae: Invasive Alien. *Acanthophora spicifera* (Vahl) Borgesen 1910. Botany, University of Hawaii at Manoa.
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Available from: http://pikoi.hawaii.edu/resources/readings/Algae.pdf [Accessed 3 December 2006]