

Solent marine aliens

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The term “non-native” has largely taken over from “alien” in recent years (e.g. <http://www.nonnativespecies.org>, however this still makes reference to Invasive Aliens)

A helpful definition is provided by James et al (2010):

The term ‘alien’ is given to non-native species which have established self-perpetuating populations in the UK, which can displace native species. Where non-native species have not established self-perpetuating populations or their origin is not clear they are classified as cryptogenic. This classification is particularly useful as it prevents introduced species from being described as new or rare species.

As a major international port, the Solent region has a long history of receiving alien species through fouling of ships hulls, as larvae in ballast waters or introductions in association with mariculture. For example the slipper limpet, *Crepidula fornicata*, is considered to have been introduced with American oysters at the end of the 19th century. *Crepidula* and the ascidian, *Styela clava* (introduced in the 1950s) are now both so widespread as to be characteristic of the region. Recent notable seaweed introductions have been Japanese seaweed, *Sargassum muticum* (1971) and the kelp, *Undaria pinnatifida* (1994).

The Solent is probably the most “alien” estuary in the UK. The first Solent overview was by Thorpe (1980). Eno et al (1997) produced a national directory which highlighted the Solent region. Brown (2004) provides a list of Solent and Southampton Water aliens. James et al. (2010) provide a short overview of some aliens in the south coast region. However new alien species are being identified locally each year, thus we need a readily accessible means of reporting and recording their presence.

This project will:

(1) Create a Solent Aliens web page on www.solentpedia.info/our_biodiversity with a direct link to a site hosted at the National Oceanography Centre, currently in development (Solent Marine Biodiversity www.noc.soton.ac.uk/solentbio).

Eventually this site will list known

- Solent Aliens with links to relevant sites. The tables below are the preparatory work for the web site.
- Solent marine species. The starting point will be the Bembridge flora and fauna (Collins *et al.*, 1990) Jenny also has been recording in the Solent region for over 40 years

In both cases the creation of a dynamic list should prompt further contributions (“you missed out xxx!”)

(2) Search for alien species.

Jenny has been working with Dr John Bishop, MBA Plymouth on ascidians and specifically newly introduced species in marinas. John predicted the presence of *Corella eumyota* here and Jenny was able to confirm its presence at Calshot in 2009. There is current national concern over the spread of the ascidian *Didemnum vexillum*, recently confirmed in Holyhead Harbour. The Countryside Commission for Wales have taken its introduction sufficiently seriously to appoint an eradication officer. We are currently mapping the local distribution of the Pacific oyster *Crassostrea gigas*.

References

- Brown, R. (2004) The Solent and Southampton Water. ECSA Bulletin 46 July 2004 pp.6-8.
- Collins, K.J., Herbert, R.J.H. and Mallinson, J.J. (1990). Marine Flora and Fauna of Bembridge and St. Helen's, Isle of Wight. Proceedings of the Isle of Wight Natural History and Archaeological Society, 9: 41-85.
- Eno, N.C., Clark, R.A. and Sanderson, W.G. (1997). Non-native marine species in British Waters: a review and directory. Joint Nature Conservation Committee, Peterborough, 152pp.
- James, J W C, Pearce, B, Coggan, R A, Arnott, S H L, Clark, R, Plim, J F, Pinnion, J, Barrio Frójan, C, Gardiner, J P, Morando, A, Baggaley, P A, Scott, G, Bigourdan, N. (2010) The South Coast Regional Environmental Characterisation. British Geological Survey Open Report OR/09/51. 249 pp. Published by the Marine Aggregate Levy Sustainability Fund
- Thorpe, C.H. (1980). The benthos of the Solent. In: The Solent Estuarine System, an assessment of present knowledge. NERC publication series C No 22 November 1980. pp. 76-85.

Table 1. Known Solent marine aliens

Group	Species	Common name	Source	Date
ANNELIDA	<i>Ficopomatus enigmaticus</i>	calcareous tube worm	Zibrowius & Thorp	1989
	<i>Hydroides ezoensis</i>	calcareous tube worm	Zibrowius & Thorp	1989
	<i>Hydroides dianthus</i>	calcareous tube worm	Zibrowius	1978
	<i>Janua braziliensis</i>	spirorbid	Knight-Jones et al	1975
	<i>Mercierella enigmatica</i>	old name for <i>Ficopomatus</i>	Thorp (unpublished)	1974
	<i>Pileolaria rosepigmentata</i>	spirorbid	Knight-Jones, Thorp & Grey	1975
CTENOPHORA	<i>Mnemiopsis leidyi</i>	jelly	Burkill	1982
CHELICERATA	<i>Ammothea hilgendorfi</i>	pycnogonid	Bamber	1985
CRUSTACEA	<i>Acartia tonsa</i>	planktonic copepod	Conover	1957
	<i>A. grani</i>	planktonic copepod	Lance & Raymont	1964
	<i>Eusarsiella zostericola</i>	ostracod	Bamber	1987
amphipods	<i>Limnoria tripunctata</i>	gribble	Eltringham & Hockley	1958
	<i>L. quadripunctata</i>	gribble	Eltringham & Hockley	1958
caprellids	<i>Caprella mutica</i>	ghost shrimp		
barnacles	<i>Amphibalanus amphitrite</i>	barnacle		
	<i>Elminius modestus</i>	barnacle	Bishop	1947
MOLLUSCA	<i>Crepidula fornicata</i>	slipper limpet	Holme	1961
bivalves	<i>Crassostrea angulata/gigas</i>	Portuguese oyster	Zibrowius & Thorp	1989
	<i>Crassostrea gigas</i>	Pacific oyster		
	<i>Mercenaria mercenaria</i>	American hard shelled clam	Heppel	1961
	<i>Petricola pholadiformis</i>	piddock	Duval	1963
	<i>Tapes philippinarum</i>	Manilla clam		
BRYOZOA	<i>Bugula neritina</i>	foliose bryozoan		
	<i>Tricellaria inopinata</i>	foliose bryozoan	Galil & Occhipinti-Ambrogi	2006
	<i>Watersipora complanata</i>	encrusting bryozoan		
TUNICATA	<i>Botrylloides violacea</i>	colonial sea squirt		
ascidians	<i>Corella eumyota</i>	a solitary sea squirt	Colin et al	2010
	<i>Styela clava</i>	leathery sea squirt	Houghton & Millar	1960
didemnid	<i>Didemnum vexillum</i>	carpet sea squirt		
FLORA	<i>Spartina alterniflora</i>	a grass	Maskell & Raybould	2001
ALGAE green	<i>Codium fragile</i>	velvet horn weed		
	<i>Sargassum muticum</i>	japweed	Farnham	1980
brown	<i>Undaria pinnatifida</i>	a kelp-like seaweed	Fletcher & Manfredi	1995
red	<i>Agardhiella subulata</i>	similar to <i>Gracilaria bursa-pastoris</i>	Farnham & Irvine	1979
	<i>Grateloupia doryphora</i>	old name for <i>G. turuturu</i> (check)	Farnham & Irvine	1973
	<i>Grateloupia filicina</i>		Farnham & Irvine	1965
	<i>Grateloupia turuturu</i>	= <i>G. doryphora</i> (check)		
	<i>Heterosiphonia japonica</i>		Sjøtun et al	2008
	<i>Solieria chordalis</i>		Hiscock & Maggs	1984

Table 2. Web links for table 1.

Group	Species	Links
ANNELIDA	<i>Ficopomatus enigmaticus</i>	http://www.jncc.gov.uk/page-1700 http://www.exoticsguide.org/species_pages/f_enigmaticus.html http://www.europe-aliens.org/pdf/Ficopomatus_enigmaticus.pdf
	<i>Hydroides ezoensis</i>	http://www.jncc.gov.uk/page-1699 http://www.poppe-images.com/?t=17&photoid=925175
	<i>Hydroides dianthus</i>	http://www.jncc.gov.uk/page-1690 http://www.marinespecies.org/aphia.php?p=taxdetails&id=131000
	<i>Janua braziliensis</i>	http://www.jncc.gov.uk/page-1701
	<i>Mercierella enigmatica</i>	
	<i>Pileolaria rosepigmentata</i>	http://www.jncc.gov.uk/page-1702 http://www.vliz.be/imisdocs/publications/119770.pdf
CTENOPHORA	<i>Mnemiopsis leidyi</i>	http://www.caspianenvironment.org/biodb/eng/zooplankton/Mnemiopsis%20leidyi/main.htm
CHELICERATA	<i>Ammothea hilgendorfi</i>	http://www.jncc.gov.uk/page-1703 http://nathistoc.bio.uci.edu/Pycnogonida/Ammothea.htm http://www.seasearch.co.uk/downloads/Brownseafull.pdf
	<i>Acartia tonsa</i>	http://www.caspianenvironment.org/biodb/eng/zooplankton/Acartia%20tonsa/main.htm http://www.jncc.gov.uk/page-1706 http://www.frammandearter.se/0/2english/pdf/Acartia_tonsa.pdf http://www.medit-mar-sc.net/files/200812/12-1932386.pdf https://livecopepods.com/zencart/index.php?main_page=product_info&products_id=26
CRUSTACEA	<i>A. grani</i>	http://www.aslo.org/photopost/showphoto.php/photo/1213/title/labidocera/cat/518
	<i>Eusarsiella zostericola</i>	http://www.jncc.gov.uk/page-1707
	<i>Limnoria tripunctata</i>	http://www.britannica.com/EBchecked/topic/341512/Limnoria-tripunctata
amphipods	<i>L. quadripunctata</i>	http://en.wikipedia.org/wiki/File:Limnoria_4_punctata.jpg http://green.autoblog.com/tag/Limnoria+Quadripunctata/ http://species-identification.org/species.php?species_group=crustacea&id=554
		http://www.guardian.co.uk/environment/2009/jan/27/biofuels-second-generation
caprellids	<i>Caprella mutica</i>	http://caprellids.lifedesks.org/pages/84 www.vliz.be/imisdocs/publications/132582.pdf www.dirnat.no/multimedia.ap?id=1517&contentdisposition=attachment
barnacles	<i>Amphibalanus amphitrite</i>	http://www.sms.si.edu/IRLSpec/Balanus_amphitrite.htm
	<i>Elminius modestus</i>	http://www.jncc.gov.uk/page-1704 http://www.marinespecies.org/aphia.php?p=taxdetails&id=106209 http://www.seafriends.org.nz/enviro/habitat/rscrust.htm http://www.biopix.com/Photo.asp?Language=en&PhotoId=75966
MOLLUSCA	<i>Crepidula fornicata</i>	http://www.jncc.gov.uk/page-1711 http://www.issg.org/database/species/ecology.asp?fr=1&si=600 http://www.ciesm.org/atlas/CrepidulForni.html http://www.marinespecies.org/aphia.php?p=taxdetails&id=138963 http://en.wikipedia.org/wiki/Common_slipper_shell
	<i>Crassostrea angulata/gigas</i>	http://www.jncc.gov.uk/page-1714
	<i>Mercenaria mercenaria</i>	http://www.jncc.gov.uk/page-1718 http://en.wikipedia.org/wiki/Hard_clam http://www.sms.si.edu/irlspec/mercen_mercen.htm http://www.fao.org/fishery/culturedspecies/Mercenaria_mercenaria/en http://www.jaxshells.org/mercenar.htm http://www.jaxshells.org/mercenar.htm
bivalves	<i>Petricola pholadiformis</i>	http://www.marinespecies.org/aphia.php?p=taxdetails&id=140730 http://www.jncc.gov.uk/page-1717 http://www.aquaticinvasions.net/2009/AI_2009_4_2_Zenetos_etal.pdf
	<i>Tapes philippinarum</i>	http://www.conchsoc.org/encyclopedia/speciesInfo.php?taxon_version_key=NBNSYS0000178284
	<i>Bugula neritina</i>	http://www.marlin.ac.uk/speciesinformation.php?speciesID=4679 http://www.issg.org/database/species/ecology.asp?si=1080&fr=1&sts=&lang=EN
	<i>Tricellaria inopinata</i>	http://www.europe-aliens.org/pdf/Tricellaria_inopinata.pdf http://www.bryozoa.net/cheilostomata/candidae/tricino.html
BRYOZOA	<i>Watersipora complanata</i>	http://eunis.eea.europa.eu/species/31589/general

TUNICATA ascidians	<i>Botrylloides violacea</i>	http://www.marlin.ac.uk/speciesinformation.php?speciesID=2791
	<i>Corella eumyota</i>	http://www.marlin.ac.uk/speciesinformation.php?speciesID=4682 http://www.aquaticinvasions.net/2010/AI_2010_5_2_SCollin_etal.pdf http://www.salemsound.org/mis/C_eumyota.pdf
	<i>Styela clava</i>	http://www.jncc.gov.uk/page-1722 http://www.niwa.co.nz/our-science/aquatic-biodiversity-and-biosecurity/tools/sea_squirt http://www.exoticguide.org/species_pages/s_clava.html
didemnid	<i>Didemnum vexillum</i>	https://secure.fera.defra.gov.uk/nonnativespecies/index.cfm?sectionid=47 http://www.aquaticinvasions.net/2009/AI_2009_4_4_Griffith_etal.pdf
FLORA	<i>Spartina alterniflora</i>	http://www.plants.usda.gov/java/profile?symbol=SPAL http://www.spartina.org/species/spartina-alterniflora-hy_v2.pdf
ALGAE green	<i>Codium fragile</i>	http://www.jncc.gov.uk/page-1678 http://www.marlin.ac.uk/pdf/Aliens_IDguide_codfra.pdf
	<i>Sargassum muticum</i>	http://www.salemsound.org/mis/S_muticum.pdf http://www.jncc.gov.uk/page-1677 http://www.guiry.org/sargassum/index.html http://www.issg.org/database/species/ecology.asp?si=727&fr=1&sts
brown	<i>Undaria pinnatifida</i>	http://www.salemsound.org/mis/U_pinnatifida.pdf http://www.jncc.gov.uk/page-1676 http://www.issg.org/database/species/ecology.asp?si=68&fr=1&sts=sss http://www.invasivespeciesireland.com/files/public/Management%20contingency/Undaria.pdf
	red	<i>Agardhiella subulata</i>
	<i>Grateloupia doryphora</i>	http://www.jncc.gov.uk/page-1667 http://www.californiabiota.com/cabiota/grateloupia_doryphora.htm
	<i>Grateloupia filicina</i>	http://www.horta.uac.pt/species/Algae/Grateloupia_filicina/Grateloupia_filicina.htm http://www.jncc.gov.uk/page-1668 http://www.guiry.org/descriptions/Grateloupia_filicina.html http://www.niobioinformatics.in/seaweeds/system_Grateloupia%20filicina.htm http://docs.google.com/viewer?a=v&q=cache:7CZXCKIR4cYJ:https://secure.fera.defra.gov.uk/nonnati http://www.algaebase.org/search/species/detail/?species_id=4363
	<i>Grateloupia turuturu</i>	http://www.algaebase.org/search/species/detail/?species_id=4722
	<i>Heterosiphonia japonica</i>	http://www.algaebase.org/search/species/detail/?species_id=4722 http://www.jncc.gov.uk/page-1671
	<i>Solieria chordalis</i>	http://www.univ-brest.fr/lebham/algue/alguean.html

USEFUL SITES

http://www.jncc.gov.uk/pdf/pub02_nonnativereviewdirectory.pdf
<http://www.naturalareas.naturalengland.org.uk/Science/natural/profiles/naProfile109.pdf>
http://www.mccip.org.uk/media/7415/mccip201011_nonnatives.pdf
<http://www.snh.org.uk/pdfs/sgp/A303271.pdf>