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Cataloguing data

This publication (and any material sourced from it) should be attributed as: Sherman CDH, Jennings G & Miller AD 2020, *Assessment of reproductive propagule size for biofouling risk groups*, Department of Agriculture, Water and the Environment, Canberra, June. CC BY 4.0.

ISBN 978-1-76003-298-2

This publication is available at agriculture.gov.au/biosecurity/avm/vessels/marine-pest-biosecurity/biofouling

Department of Agriculture, Water and the Environment GPO Box 858 Canberra ACT 2601 Telephone 1800 900 090 Web <u>awe.gov.au</u>

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Acknowledgements

The authors thank Sonia Gorgula, Timothy Carew, Bianca Brooks (Department of Agriculture, Water and the Environment) and Eugene Georgiades (Biosecurity New Zealand, Ministry for Primary Industries) for their feedback and input in preparing this report.

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Summary

The purpose of this literature review is to assess reproductive propagules sizes (female gametes, spores, embryos, larvae, juveniles and asexual propagules) of taxonomic risk groups which could generate an adult organism if released during in-water cleaning of biofouling. The Department of Agriculture, Water and the Environment (the department) engaged Deakin University to undertake this review, which will support the development of national policy settings for in-water cleaning of biofouling in Australia.

The review identified a wide range of propagule sizes across and within taxonomic risk groups. Female gamete and spore sizes are summarised in Figure 1. The amphipods, isopods, echinoderms, hydroids and ascidians generally appear to produce propagules > 50 μ m in size. For barnacles, polychaetes, bryozoans and crabs, a small number of species were identified as having propagule sizes < 50 μ m (Table 1). A relative large number of species with propagule sizes < 50 μ m were identified for bivalves, flatworms (Platyhelminthes) and macroalgae (Table 1).

| Taxonomic group | Female gamete size range (µm) | Embryo/ larvae/ juvenile size range (µm) |
|-----------------------|-------------------------------|---|
| Amphipods and Isopods | 120 - 3,000 | 144.7 – 12,600 |
| Barnacles | 34 - 1500 | 82 – 2,550 |
| Bivalves | 20 - 300 | 47 – 95,000 |
| Polychaetes | 25 - 650 | 70 – 1,000 |
| Bryozoans | 35 - 350 | 100 - 400 |
| Crabs | 2.34 - 4,700 | 250 - 2,100 |
| Echinoderms | 50 - 4,400 | 210 - 2,000 |
| Flatworms | 6 - 480 | 125 – 280 |
| Gastropods | 40 - 2,250 | 40 - 10,400 |
| Hydroids | 80 - 700 | 264 - 800 |
| Macroalgae | 1.5 – 250 | 3 – 250 |
| Ascidians | 60 - 720 | 720 – 2,350 |

Table 1 The range of propagule sizes identified from a literature review for taxonomic risk groups which could generate an adult organism if released during in-water cleaning of biofouling

Figure 1 Summary of the range of female gamete and spore sizes for identified macrofouling risk groups

| Amphipods & Isopods | A.C. | | | 120 – 3,000 μm | | | |
|---------------------|-------|--------------------------|---------|-------------------|--------------------|-------|-------|
| Barnacles | | 34 - 1,50 | 00 μm | | | | |
| Bivalves | | <mark>20 – 300 μm</mark> | | | | | |
| Polychaetes | Z | <mark>25 – 650 μm</mark> | | | | | |
| Bryozoans | *** | <mark>35 – 350 μm</mark> | | | | | |
| Crabs | BA. | | | 2.34 – 4,700 µ | ım | | |
| Echinoderms | N. | | | 50 – 4,400 μm | | | |
| Flatworms | | 6 – 480 μm | | | | | |
| Gastropods | | | 40 - 2, | 250 µm | | | |
| Hydroids | ×4 | 80 – 700 μm | | | | | |
| Macroalgae | S. S. | <mark>1.5 – 250</mark> | | | | | |
| Ascidians | Ö | 60 – 720 μm | | | | | |
| | c | 500 | 1,000 | 1,500 | 2,000 | 2,500 | 5,000 |
| | | | Female | e gamete and spor | re size range (μm) | | |

Introduction

The accumulation of biofouling organisms on the submerged surfaces of vessels and other mobile submerged infrastructure pose a biosecurity risk if species are moved outside their normal geographic range (Hewitt et al. 2011; McClary and Nelligan 2001). Biofouling is recognised as a major vector for the introduction and spread of non-indigenous marine species, including into and around Australia. Current management of biofouling on surfaces includes the use of antifouling coatings, regular dry-docking for land-based cleaning and the use of in-water cleaning technologies that aim to remove biofouling from the surface of vessels while still submerged in the water. However, in-water cleaning of biofouled surfaces can potentially lead to the release of attached individuals, propagules or gametes into the surrounding water column and risk species spread and proliferation (Morrisey 2013; Scianni and Georgiades 2019).

In 2013, the Australian and New Zealand governments jointly released the Australian and New Zealand Anti-Fouling and In-Water Cleaning Guidelines (the Guidelines), which were subsequently updated in 2015. The Guidelines address concerns in relation to in-water hull cleaning practices that have the potential to cause harm through the release of anti-fouling biocides and non-indigenous marine species. A review of the uptake and effectiveness of the Guidelines in 2018-19 identified a number of gaps in the national policy framework for in-water cleaning. It was recommended that the department should develop a national standard for inwater cleaning of biofouling that can be implemented across various levels of government in Australia.

Currently the Guidelines state 'When in-water cleaning involves the removal of macrofouling, methods should be used to ensure that unacceptable amounts of biological material are not released into the water column. In-water cleaning technologies should aim to, at least, capture debris greater than 50 μ m in diameter which will minimise the release of viable adult, juvenile and larval stages of macrofouling organisms.' In the development of a national in-water cleaning standard, the department is reviewing the rationale that formed the basis of the recommended 50 μ m capture limit. This report updates the information currently known about the minimum propagule and fragment viability sizes of macrofouling risk groups (Department of the Environment and New Zealand Ministry for Primary Industries 2015).

The purpose of this literature review is to assess the theoretical minimum viable propagule sizes (female gametes, spores, embryos, larvae, juveniles and asexual propagules) of macrofouling groups that include identified risk taxa that could generate an adult organism if released during in-water cleaning of biofouling. Male gametes were not considered in this review given their inability to develop into an adult organism.

Marine macrofouling risk groups that are examined in this report include:

- Amphipods and Isopods
- Barnacles
- Bivalves
- Polychaetes
- Bryozoans

- Crabs •
- Echinoderms •
- Flatworms •
- Gastropods •
- Hydroids •
- Macroalgae •
- Ascidians. •

1. Amphipods and Isopods

In most amphipods and isopods the sexes are separate, although some hermaphroditic species have been described (Ruppert et al. 2004). Most females brood their eggs in an external pouch (marsupium) and the larval stage is bypassed with hatchlings emerging as fully developed juveniles that are morphologically similar to adults (Hartnoll 1985; Poore and Bruce 2012; Thiel 1997).

The literature review identified 283 potential references, of which we were able to obtain relevant propagule size information from 137 references for a total of 170 species. This included 33 female gamete size estimates and 177 embryo/juvenile sizes estimates (Table A1). Egg size ranged from 120 – 3000 µm, while reported embryo/juvenile sizes ranged from 144.7 – 12,600 µm (Table A1).

The smallest identified female gamete size was for the isopod *Clypeoniscus hanseni*, with an egg diameter of 120 μ m (Sheader 1977a). The minimum identified embryo and juvenile sizes were for the isopod *Athelges takanoshimensis*, at 144.7 μ m for embryos and 262.1 μ m for juveniles (Cericola and Williams 2015) (Table 2). Other newly hatched juveniles found in the literature search were all > 1,000 μ m (Table A1).

The literature search identified the minimum propagule sizes of four species that have been identified as biofouling risk species (Hewitt et al. 2011; McClary and Nelligan 2001). These included *Ampelisca abdita* (juvenile: 390 µm), *Gammarus tigrinus* (embryo: 460 µm) (Steele 1972), *Limnoria lignorum* (egg: 400 µm) (McClary and Nelligan 2001) and *Sphaeroma serratum* (embryo: 1120 µm) (Charmantier and Charmantier-Daures 1994) (Table 2).

| Species | Egg (µm) | Embryo/juvenile (µm) | References |
|--------------------------|----------|----------------------|---|
| Clypeoniscus hanseni | 120 | - | (Sheader 1977a) |
| Athelges takanoshimensis | - | 144.7 ± 17.4 | (Cericola and Williams 2015) |
| Ampelisca abdita | - | 390 | (Nelson 1978) |
| Gammarus tigrinus | - | 460 | (Steele 1972) |
| Limnoria lignorum | 400 | - | (McClary and Nelligan 2001) |
| Sphaeroma serratum | - | 1120 | (Charmantier and Charmantier- Daures 1994) |

Table 2 Propagule sizes for key amphipod and isopod species

2. Barnacles

Barnacles are sessile marine organisms with most being simultaneous hermaphrodites, although some species are dioecious (Charnov 1987). Eggs develop outside the body, within the mantle cavity. Barnacles have two free swimming larval stages, the nauplius and cyprid (Høeg et al. 2003).

The literature review identified 114 potential references, of which we were able to obtain relevant propagule size information from 24 references for a total of 118 species. This included 70 female gamete size estimates and 91 larval size estimates (Table A2). Egg sizes ranged from 34 – 1,500 µm, while larval sizes ranged from 82 – 2,550 µm.

The smallest identified female gamete size was for *Thompsonia sp.* from the Great Barrier Reef region with a diameter of 34 μ m (Table 3) (1989). However, the account given is incomplete as there is no knowledge surrounding the maturation stage of the eggs measured. No other reports for *Thompsonia sp.* from the Great Barrier Reef were found in a further literature search, however it was found that other species of *Thompsonia* had recorded egg sizes of 69 μ m (*Thompsonia japonica*), 87 μ m (*Thompsonia reinhardi*) and 156 μ m (*Thompsonia littoralis*) (Poulin and Hamilton 1997) (Table 3). The next smallest egg sizes identified in the literature search were all > 50 μ m. *Sacculina carcini* had a reported egg diameter of 54 μ m and *Sylon hippolytes* had an egg size of 60 μ m (Barnes 1989). The smallest larval size was *Pollicipes polymerus* at 82 μ m (Barnes 1989), (Strathmann) (Table 3).

The literature search identified propagule sizes of two species that have been identified as biofouling risk species (Hewitt et al. 2011; McClary and Nelligan 2001). *Balanus eberneus* was identified as having a width of 160 μ m (for a stage 1 larvae) (Costlow Jr and Bookhout 1957). *Balanus improvises* was found to have an egg diameter of 163 μ m and a stage 1 naupilus width of 195 μ m (Barnes and Barnes 1965; Jones and Crisp 1954).

| Species | Egg (µm) | Embryo/Larvae (µm) | References |
|----------------------|----------|--------------------|---|
| Thompsonia sp. | 34 | - | (Barnes 1989) |
| Sacculina carcini | 54 - 150 | 120 | (Barnes 1989) |
| Sylon hippolytes | 60 | - | (Barnes 1989) |
| Balanus improvises | 163 | 195 | (Barnes and Barnes 1965; Jones and Crisp 1954) |
| Pollicipes polymerus | - | 82 | (Strathmann, Barnes 1989) |
| Balanus eberneus | - | 160 | (Costlow Jr and Bookhout 1957) |

| rubic o riopuguic sizes for key sumucic species |
|---|
|---|

3. Bivalves

Bivalves display a range of reproductive modes. In most species the sexes are separate, although some are hermaphroditic (Ruppert et al. 2004). Many species show synchronous mass spawning with males and female releasing gametes into the water column where external fertilisation and development occurs. In some species females take up sperm from the water column and fertilisation is internal, the eggs are brooded and larvae/juveniles released (Wilbur et al. 2013; Andrade-Villagrán et al. 2016).

The literature review identified 397 potential references, of which we were able to obtain relevant propagule size information from 50 references for a total of 106 species. This included 120 female gamete size estimates and 35 embryo/juvenile size estimates (Table A3). Egg sizes ranged from 20 – 300 µm, while embryo/juvenile sizes ranged from 47 – 95,000 µm (Table A3).

The smallest identified female gamete size was $20 - 55 \mu m$ for the bathymodiolin mussel *Idas washingtonia* (Tyler et al. 2009). In another study, fully grown vitollogenic oocytes of *I. washingtonia*, had a mean diameter of $41.5 \pm 7.6 \mu m$ (Marylène Gaudron et al. 2012). *I. washingtonia are* protandric hermaphrodites, commonly found on organic substrata, especially sunken wood, woody plant material and whale bones at depths of 150 to > 3,500 m (Dell 1987; Bennett et al. 1994) (Table 4).

Other bivalve species found to have relatively small female gamete sizes include the deep water bivalve *Xylophaga depalmai* (egg: 40 μ m) (Knudsen 1961; Tyler et al. 2007), the brown mussel *Perna perna* (egg: 40 μ m) (Aarab et al. 2013). the quahog clam *Mercenaria mercenaria* (egg: 40 – 55 μ m (Keck et al. 1975), the freshwater zebra mussel *Dreissena polymorpha* (egg: 40 – 96 μ m) (Ackerman et al. 1994), the Pacific angelwing clam *Pholas orientalis* (egg: mean 43.0 ± 0.8 μ m) (Ronquillo and McKinley 2006), *Anomia simplex* (egg: 42 μ m) (Loosanoff and Engle 1941), *Perna viridis* and *P. indica* (egg: 45 – 50 μ m) (Appukuttan et al. 1988; Loosanoff and Davis 1963), the Asian date mussel *Musculista senhousia* (egg: 46.8 μ m) (Sgro et al. 2002), *Bankia setacea* (egg: 47 μ m) (Strathmann, 1987), *Marcia opima* (egg: 47.8 μ m) (Muthiah et al. 2002), *Ostrea rivularis* (egg: 49 – 53 μ m) (Zhou and Allen 2003), *Laternula elliptica* (egg: 49.3 μ m) (Kang et al. 2003), *Crassostrea virginica* (egg: 48 – 54 μ m) (Loosanoff and Davis 1963), and *Magallana gigas* (formerly *Crassostrea gigas*) (egg: 50 – 60 μ m) (Strathmann 1987; van der Veer et al. 2006).

Excluding *Idas washingtonia*, the minimum egg size range found in this literature search were largely consistent with the findings in a review by (Cardoso et al. 2006), which recorded egg diameters ranging from $40 - 120 \mu m$, and the minimum length of larvae at hatching $60 - 200 \mu m$ (Cardoso et al. 2006).

The smallest larvae identified from this literature search were for *A. simplex* at 47 μ m (Loosanoff and Davis 1963). *Crassostrea virginica* and *Arca transversa* both had minimum larval diameters of 55 μ m (Loosanoff and Davis 1963).

A number of bivalve species were identified as known biofouling risk species (Hewitt et al. 2011; McClary and Nelligan 2001). These include *Dreissena polymorpha, Crassostrea virginica, Perna perna, Musculista senhousia, Magallana gigas* (formerly *Crassostrea gigas*), and *Perna viridis*, which all had propagule sizes < 50 µm (Table 4). *Teredo navalis* was found to have an unfertilised egg diameter of 50 µm and a larvae width of 70 µm (Loosanoff and Davis 1963),

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Mytilopsis sallei was found to have an egg diameter of 64 μ m and larvae shell length of 87.3 μ m (He et al. 2016).

| Species | Egg (µm) | Embryo/larvae (µm) | References |
|--|--------------|--------------------|---|
| Idas washingtonia | 20 - 55 | - | (Tyler et al. 2009) |
| Perna perna | 40 | - | (Aarab et al. 2013) |
| Mercenaria mercenaria | 40 - 60 | - | (Keck et al. 1975) |
| Dreissena polymorpha | 40 - 96 | 57 - 121 | (Ackerman et al. 1994) |
| Xylophaga depalmai | 40 | - | (Tyler et al. 2007) |
| Anomia simplex | 42-45 | 58 x 47 | (Loosanoff and Engle 1941; Loosanoff and Davis 1963) |
| Pholas orientalis | 43.0 ± 0.8 | - | (Ronquillo and McKinley 2006) |
| Perna indica | 45 - 50 | 52–55 | (Loosanoff and Davis 1963) |
| Perna viridis | | 300 | (Appukuttan et al. 1988; Alagarswami |
| | 45 - 50 | | 1980) |
| Musculista senhousia | 46.8 | - | (Sgro et al. 2002) |
| Bankia setacea | 47 | - | (Strathmann 1987) |
| Marcia opima | 47.8 | 87 x 71 | (Muthiah et al. 2002) |
| Ostrea rivularis | 49 - 53 | - | (Zhou and Allen 2003) |
| Laternula elliptica | 49.3 | - | (Kang et al. 2003) |
| Crassostrea virginica | 48 - 54 | 68 x 55 | (Loosanoff and Davis 1963) |
| Magallana gigas (formerly Crassostrea gigas) | 50 - 60 | - | (Strathmann 1987) |
| Teredo navalis | 50 | 70 | (Loosanoff and Davis 1963) |
| Mytilopsis sallei | 64 | 87.3 | (He et al. 2016) |
| Arca transversa | - | 70 x 55 | (Loosanoff and Davis 1963) |

Table 4 Propagule sizes for key bivalve species

Note: For propagules that are not spherical, the longest by shortest length are given (where available).

4. Polychaetes

Reproduction in polychaetes is complex with both sexual and asexual modes. Most sexes are separate with external fertilisation but some species do copulate and have internal fertilisation (Ruppert et al. 2004). Larvae typically hatch as a trochophore larvae and development occurs in the plankton before settlement. Asexual reproduction usually occurs either by budding or fission (Ruppert et al. 2004).

The literature review identified propagule size information for 211 species including 232 female gamete sizes estimates and 24 embryo/larval size estimates (Table A4). Reported egg size ranged from 25 – 650 μ m, while embryo/larval sizes ranged from 70 – 1,000 μ m (Table A4).

The smallest identified female gamete size was for *Euzonus mucronata* that has lens shaped coelomic oocytes of $25 - 30 \ \mu\text{m}$ in thickness and $65 \ \mu\text{m}$ in diameter (Strathmann 1987). The next smallest egg size was $40 \ \mu\text{m}$ reported for *Amphisamytha galapegensis* (egg: $40 - 150 \ \mu\text{m}$) (Zottoli 1983), *Ophryotrocha mandibulata* (egg: $40-48 \ \mu\text{m}$) (Hilbig and Blake 1991), *Serpula vermicularis* ($40 - 200 \ \mu\text{m}$) (Strathmann 1987) and *Pectinaria gouldi* (egg: $43.7 \ \mu\text{m}$) (Pernet and Jaeckle 2004). The smallest reported larval size was 70 $\ \mu\text{m}$ for *Arenicola claparedii* (Okuda 1946), followed by 95 $\ \mu\text{m}$ for *Polydora giardia* (Day and Blake 1979) (Table 5).

The literature search identified the minimum egg size of three species that has been identified as biofouling risk species (Hewitt et al. 2011; McClary and Nelligan 2001). *Sabella spallanzanii* has a reported minimum egg size of 50 μ m (Lee et al. 2018), *Polydora nuchalis* has a reported egg size of 145 ± 60 μ m (Strathmann 1987), while *Polydora proboscidea* was identified to have an egg diameter of 100 μ m (Strathmann 2017).

| Species | Egg (µm) | Embryo/larvae (µm) | References |
|---------------------------|--------------|--------------------|--|
| Euzonus mucronata | 25 x 65 | - | (Strathmann 1987) |
| Amphisamytha galapegensis | 40 | - | (Zottoli 1983; Blake 1993) |
| Ophryotrocha mandibulata | 40 | - | (Hilbig and Blake 1991; Blake 1993) |
| Serpula vermicularis | 40 | - | (Strathmann 1987) |
| Pectinaria gouldi | 43.7 | - | (Pernet and Jaeckle 2004) |
| Sabella spallanzanii | 50 | - | (Lee et al. 2018) |
| Polydora proboscidea | 100 | - | (Strathmann 2017) |
| Polydora nuchalis | 145 ± 60 | - | (Strathmann 1987) |
| Arenicola claparedii | - | 70 | (Okuda 1946) |
| Polydora giardia | - | 95 | (Day and Blake 1979) |

Table 5 Propagule larval sizes for key polychaete species

Note: For propagules that are not spherical, the longest by shortest length are given (where available).

5. Bryozoa

Most bryozoans are colony forming organisms with many able to reproduce both sexually and asexually (Ruppert et al. 2004). Colonies typically consist of hermaphroditic zooids, although zooids may be at different stages of development and be either male or female. Both external and internal fertilisation have been reported (Ruppert et al. 2004).

The literature review identified propagule size information for 22 species including 6 female gamete size estimates and 28 embryo/larval size estimates (Table A5). Reported egg sizes ranged from $35 - 350 \mu m$ and larval sizes ranged from $100 - 400 \mu m$ (Table A5). The smallest reported egg sizes were for *Bugula pacifica* (egg: $35 \mu m$) (Strathmann 1987), *Membranipora membranacea* (egg: $60 \mu m$) (Strathmann 1987) and *Electra pilosa* (egg: $60 \mu m$) (Ryland and Stebbing 1971) (Table 6). The smallest reported larval size was for *Crisia elongota* (larvae: 100 μm) (Strathmann 1987).

None of the species identified from the literature search were identified as known biofouling risk species (Hewitt et al. 2011; McClary and Nelligan 2001).

| Species | Egg (µm) | Embryo/larvae (µm) | References |
|--------------------------|----------|--------------------|-------------------------------|
| Bugula pacifica | 35 | 200 | (Strathmann 1987) |
| Membranipora membranacea | 60 | - | (Strathmann 1987) |
| Electra pilosa | 60 | - | (Ryland and Stebbing 1971) |
| Crisia elongata | - | 100 | (Strathmann 1987) |

Table 6 Propagule sizes for key bryozoan species

6. Crabs

Most crab species are dioecious and sexually outcrossing. Males transfer the sperm to females who store it in a storage sac, called the spematheca, until needed to fertilise their eggs. After fertilisation the eggs are released onto the female's abdomen and stored in a spongy mass between the abdominal flap and the body. Eggs hatch into zoea larva which have a planktonic dispersal phase (Ruppert et al. 2004).

The literature review identified 82 references containing propagule size information for a total of 159 species. This included 166 female gamete sizes estimates and 29 larval size estimates (Table A6). Reported female gamete sizes ranged from $2.34 - 4,700 \mu m$, while larval sizes ranged from $250 - 2,100 \mu m$ (Table 7).

The smallest egg size was reported for the crab *llyoplax frater* (range $2.34 - 2.51 \mu$ m, mean 2.80 ± 0.26 µm) (Saher and Qureshi 2010). This is an unusually small reported egg size for this taxonomic group with the next smallest egg size estimate being 60 µm for *Metapenaeopsis dalei* (Choi et al. 2005). Further, the majority of egg size estimates were > 200 µm (Table A6). Given the unusual size range reported for *I. frater*, further validation of this size estimate is required.

The literature search identified the propagule sizes of four species that have been identified as biofouling risk species (Hewitt et al. 2011; McClary and Nelligan 2001). *Palaemon elegans* was identified to have an embryo diameter of 473 μ m (Anger et al. 2002), *Charybdis japonica* was found to have an egg diameter of 240 μ m (Fowler and McLay 2013), *Hemigrapsus takanoi* was found to have an egg size 281.4 ± 0.7 μ m (Yamasaki et al. 2008), *Carcinus maenas* was found to have a minimum egg diameter of 300 μ m (Hartnoll and Paul 1982) and *Eriocheir sinensis* was found to have an egg diameter of 354.4 μ m (Chang et al. 2017).

| Species | Egg (µm) | Embryo/larvae (µm) | References |
|----------------------|-------------|--------------------|----------------------------------|
| Ilyoplax frater | 2.34 - 2.51 | - | (Saher and Qureshi 2010) |
| Metapenaeopsis dalei | 60 | - | (Choi et al. 2005) |
| Charybdis japonica | 240 | - | (Fowler and McLay 2013) |
| Hemigrapsus takanoi | 281.4 ± 0.7 | - | (Yamasaki et al. 2008) |
| Carcinus maenas | 300 | - | (Hartnoll and Paul 1982) |
| Eriocheir sinensis | 350 | - | (Dittel and Epifanio 2009) |
| Palaemon elegans | 473 | - | (Anger et al. 2002) |
| Callinectes sapidus | - | 250 | (Hill et al. 1989) |

Table 7 Propagule sizes for key crab species

7. Echinoderms

The Echinodermata are a diverse group of marine taxa including sea stars, brittle stars, sea urchins, sand dollars, sea cucumbers, and sea lilies (Ruppert et al. 2004). Most species are dioecious and reproduce via spawning and external fertilization, although some brooding species have been described (Ruppert et al. 2004). Many species can reproduce asexually through regeneration from fragments (Ruppert et al. 2004).

The literature review identified 71 relevant references containing propagule size information from a total of 193 species. This included 273 female gamete size estimates and 33 larval size estimates (Table A7). Female gamete sizes ranged from $50 - 4,400 \mu$ m, while larval sizes ranged from $210 - 2,000 \mu$ m (Table A7).

The class Holothuroidea has a large range of egg diameters, from 50 μ m (*Synaptula reciprocans*) to 4,400 μ m (*Psychropotes longicauda*), however 80% of the species have eggs with diameters less than 1,000 μ m (Sewell and Young 1997) (Table A7). The next minimum egg diameters were recorded in *Arbacia punctulata* (60 μ m) (Marshall and Keough 2003a), *Pseudostichopus mollis* (61 μ m) (Morgan and Neal 2012) and *Arbacia stellata* (65 μ m) (Emlet 1995) (Table 8). The minimum larval sizes identified were typically greater than > 200 μ m (Byrne and Cerra, 1996; Herrera et al., 1996) with the smallest (210 μ m) identified for *Patiriella parvivpara* (Byrne and Cerra 1996) (Table 8).

One species identified from the literature search was identified as a known biofouling risk species (Hewitt et al. 2011; McClary and Nelligan 2001). *Asterias amurensis* was found to have an egg diameter of 149 (SE =1.13) (Morris 2002) (Table 8).

| Species | Egg (µm) | Embryo/larvae (µm) | References |
|------------------------|----------------|--------------------|--------------------------------|
| Synaptula reciprocans | 50 | - | (Sewell and Young 1997) |
| Arbacia punctulata | 60 | - | (Marshall and Keough 2003a) |
| Pseudostichopus mollis | 61 – 421 | - | (Morgan and Neal 2012) |
| Arbacia stellata | 65 | - | (Emlet 1995) |
| Asterias amurensis | 149 (SE =1.13) | - | (Morris 2002) |
| Patiriella parvivipara | - | 210 | (Byrne and Cerra 1996) |
| Leodia sexiesperforata | - | 260 | (Herrera et al. 1996) |

Table 8 Propagule sizes for key echinoderm species

8. Flatworms

Flatworms comprise the phylum Platyhelminthes, consisting of approximately 20,000 species. They are a hermaphroditic group and capable of self-fertilisation, outcrossed sexual reproduction and asexual modes of reproduction (Ruppert et al. 2004).

The literature review identified propagule size information from a total of 66 species. This included 68 female gamete sizes estimates and 4 larval size estimates (Table A8). Female gametes ranged from $6 - 480 \mu m$, while larval size ranged from $125 - 280 \mu m$ in length.

We identified 30 species (53%) with female gamete sizes < 50 μ m (Table 9). Many of the egg sizes reported were asymmetrical, with at least one of the reported measures < 50 μ m. The minimum egg size identified was 6 x 20 μ m for *Sclerocollum saudii* (Al-Jahdali, 2010), followed by *Aphanurus stossichii* and *Aphanurus virgula* with minimum diameters of 9 μ m (Kostadinova et al. 2004)(Table 9).

None of the species identified from the literature search were identified as known biofouling risk species (Hewitt et al. 2011; McClary and Nelligan 2001).

| Species | Egg (µm) | Embryo/larvae (µm) | References |
|-------------------------------|----------|--------------------|---|
| Sclerocollum saudii | 6 x 20 | - | (Al-Jahdali 2010) |
| Aphanurus stossichii | 9 – 13 | - | (Kostadinova et al. 2004) |
| Aphanurus virgula | 9 – 13 | - | (Kostadinova et al. 2004) |
| Haploporus indicus | 11 – 15 | - | (Atopkin et al. 2019) |
| Sclerocollum rubrimaris | 14 x 55 | - | (Al-Jahdali 2010) |
| Haploporus pseudoindicus | 15 | - | (Atopkin et al. 2019) |
| Pseudohaploporus vietnamensis | 15 – 19 | - | (Atopkin et al. 2019) |
| Haploporus musculosaccus | 17 – 23 | - | (Atopkin et al. 2019) |
| Pseudopecoelus ibunami | 17 – 40 | - | (Estrada-García et al. 2018) |
| Haploporus spinosus | 18 – 23 | - | (Atopkin et al. 2019) |
| Haploporus magnisaccus | 18 – 26 | - | (Atopkin et al. 2019) |
| Haploporus mugilis | 19 – 22 | - | (Atopkin et al. 2019) |
| Pseudohaploporus planilizum | 23 – 27 | - | (Atopkin et al. 2019) |
| Haploporus benedeni | 24 – 27 | - | (Atopkin et al. 2019; Blasco-Costa et al. 2009) |
| Spirorchiidae gen. sp | 25 – 30 | - | (Lehnert et al. 2019) |
| Myzoxenus insolens | 25 x 64 | - | (Bray and Cribb 1998) |
| Multitestis pyriformis | 26 x 57 | - | (Bray and Cribb 1998) |
| Haploporus pacificus | 27 – 31 | - | (Atopkin et al. 2019) |
| Echeneidocoelium indicum | 29 x 54 | - | (Bray and Cribb 1998) |
| Lepocreadioides orientalis | 29 x 69 | - | (Bray and Cribb 1998) |
| Anantrum histocephalum | 31 x 48 | - | (Jensen and Heckmann 1977) |
| Bulbocirrus aulostomi | 31 x 51 | - | (Bray and Cribb 1998) |

Table 9 Propagule sizes for key flatworm species

| Species | Egg (µm) | Embryo/larvae (µm) | References |
|----------------------------------|----------|--------------------|------------------------------|
| Clavogalea trachinoti | 32 x 61 | - | (Bray and Cribb 1998) |
| Pseudopisthogonoporus vitellosus | 32 x 67 | - | (Bray and Cribb 1998) |
| Bianium plicitum | 34 x 66 | - | (Bray and Cribb 1998) |
| Opechona austrobacillaris | 35 x 70 | - | (Bray and Cribb 1998) |
| Lepocreadium oyabitcha | 38 x 70 | - | (Bray and Cribb 1998) |
| Bianium spongiosum | 40 x 60 | - | (Bray and Cribb 1998) |
| Neowardula brayi | 42 x 58 | - | (Al-Jahdali 2010) |
| Anoplodium hymanae | 45 – 97 | - | (Shinn 1985) |
| Melloplana ferruginea | - | 125 | (Bolanos and Litvaitis 2009) |
| Maritigrella crozieri | - | 134 – 200 | (Bolanos and Litvaitis 2009) |
| Kaburakia excelsa | - | 280 | (Strathmann 1987) |

Note: For propagules that are not spherical, the longest by shortest length are given (where available).

9. Gastropods

While most terrestrial gastropods are hermaphrodites, the majority of marine gastropods are dioecious. Many marine species have internal fertilisation although some do have external fertilisation (Ruppert et al. 2004). Self-fertilisation is possible for some hermaphroditic species and asexual reproduction through parthenogenesis has also been reported (Ruppert et al. 2004).

The literature review identified propagule size information for a total of 315 species from 72 references. This included 342 female gamete size estimates and 122 larval/juvenile size estimates (Table A9). Female gamete sizes ranged from 40 – 2,250 μ m, while size of larvae/juveniles ranged from 40 – 10,400 μ m (Table A9).

The smallest egg size was reported for *Placida viridis* (egg: 40 μm) (Schmekel et al. 1982), followed by *Elysia trisinuata* (egg: 46 μm) (Hamatani 1967), *Placida dendritica* (egg: 47 μm) (Strathmann, 1987; Clark, 1975) and *Hermaea bifida* (egg: 48 μm) (Schmekel et al. 1982) (Table 10). The smallest reported larvae/juvenile sizes were *Stramonita haemastoma haemastoma* (40 μm) (Lahbib et al. 2011), *Stramonita haemastoma canaliculata* (49.7 μm) (Roller and Stickle 1988), and *Doris immonda* (67.4 μm) (Goddard and Hermosillo 2008) (Table 10).

The literature search identified propagule sizes of two species that have been identified as biofouling risk species (Hewitt et al. 2011; McClary and Nelligan 2001). *Doridella steinbergae* was identified to have an oocyte size of 75 μ m (Strathmann 2017) and *Rapana venosa* was found to have a minimum mean veliger diameter of 310 μ m (Harding et al. 2013).

| Species | Egg (µm) | Larvae/juvenile (µm) | References |
|------------------------------------|----------|----------------------|--------------------------------|
| Placida viridis | 40 - 60 | - | (Schmekel et al. 1982) |
| Elysia trisinuata | 46 | - | (Hamatani 1967) |
| Placida dendritica | 47 - 67 | - | (Strathmann 1987; Clark, 1975) |
| Hermaea bifida | 48 | - | (Schmekel et al. 1982) |
| Doridella steinbergae | 75 | - | (Strathmann 2017) |
| Stramonita haemastoma haemastoma | - | 40 - 62 | (Lahbib et al. 2011) |
| Stramonita haemastoma canaliculata | - | 49.7 ± 8.3 | (Roller and Stickle 1988) |
| Doris immonda | - | 67.4 ± 1.2 | (Goddard and Hermosillo 2008) |
| Rapana venosa | - | 310 | (Harding et al. 2013) |

Table 10 Propagule sizes for key gastropods species

10. Hydroids

Hydrozoa are cnidarians and can occur as solitary polyps or as colonies. They often alternate between a benthic polyp stage and a free floating sexual medusa phase (Ruppert et al. 2004). Most species are dioecious with males and females releasing gametes into the water for external fertilisation. Larvae develop in the plankton before settling. Asexual reproduction can occur through budding of the polyp and through the asexual production of medusa (Ruppert et al. 2004).

The literature review identified propagule size information for 31 species from 8 references. This included 33 female gamete size estimates and 4 larval/medusa size estimates (Table A10). Female gamete size ranged from 80 – 700 μ m, while the medusae sizes were 260 – 800 μ m (Table 11). The smallest egg size was reported for *Sarsia turbulosa* (egg: 80 – 95 μ m) (Freeman and Miller 1982; Strathmann 1987), followed by *Gonoionemus vertens* (egg: 95 – 100 μ m) (Takeda et al. 2006) and *Polyorchis penicillatus* (egg: 100 μ m) (Strathmann 2017). The smallest reported medusa size was for *Tubularia crocea* (medusa: 260 μ m) (Walters and Wethey 1996) (Table 11).

The literature search identified the minimum egg size of one species that has been identified as a biofouling risk species (Hewitt et al. 2011; McClary and Nelligan 2001). *Sarsia tubulosa* was identified to have a minimum egg diameter of 80 μ m (Freeman and Miller 1982).

| Species | Egg (µm) | Medusa size (µm) | References |
|-------------------------|----------|------------------|--|
| Sarsia turbulosa | 80 – 95 | - | (Freeman and Miller 1982; Strathmann 1987) |
| Gonoionemus vertens | 95 – 100 | - | (Takeda et al. 2006) |
| Polyorchis penicillatus | 100 | - | (Strathmann 2017) |
| Tubularia crocea | - | 260 | (Walters and Wethey 1996) |

Table 11 Propagule sizes for key hydroid species

11. Macroalgae

The literature review identified algal reproductive cell size information for 104 species (Table A11). This included 171 gamete/spore size estimates, ranging from $1.5 - 250 \mu m$ (Table A11).

The smallest algal reproductive cell size was reported *Penicillus pyriformis* (1.5 μ m) (Clifton and Clifton 1999) and *Halimeda incrassate* (1.5 μ m) (Clifton and Clifton 1999) (Table 12). A further 58 species were identified as having reproductive cells between 2 – 50 μ m (Table 12). The sizes reported here are similar to those reported in a review by Clayton (Clayton 1992), where algal reproductive cells were found to range from 2 – 250 μ m in diameter.

The literature search identified the minimum gamete size of one species that has been identified as a biofouling risk species (Hewitt et al. 2011; McClary and Nelligan 2001). *Codium fragile* was found to have a minimum female egg size of $10 - 13 \mu m$ (Miravalles et al. 2012; Prince and Trowbridge 2004).

| Species | Propagule (µm) | References |
|-------------------------|----------------|------------------------------|
| Halimeda incrassata | 1.5 | (Clifton and Clifton 1999) |
| Penicillus pyriformis | 1.5 | (Clifton and Clifton 1999) |
| Caulerpa cupressoide | 2.3 | (Clifton and Clifton 1999) |
| Caulerpa mexicana | 2.3 | (Clifton and Clifton 1999) |
| Halimeda simulans | 2.3 | (Clifton and Clifton 1999) |
| Udotea abbottiorum | 2.3 | (Clifton and Clifton 1999) |
| Rhipcephalus phoenix | 2.3 | (Clifton and Clifton 1999) |
| Udotea caribaea | 2.3 | (Clifton and Clifton 1999) |
| Penicillus dumetosus | 2.3 | (Clifton and Clifton 1999) |
| Udotea cyathiformis | 2.3 | (Clifton and Clifton 1999) |
| Penicillus capitatus | 2.3 | (Clifton and Clifton 1999) |
| Penicillus lamouroxii | 2.3 | (Clifton and Clifton 1999) |
| Halimeda discoidea | 2.3 | (Clifton and Clifton 1999) |
| Halimeda monile | 2.3 | (Clifton and Clifton 1999) |
| Caulerpa serrulata | 2.3 | (Clifton and Clifton 1999) |
| Halimeda tuna | 2.3 | (Clifton and Clifton 1999) |
| Halimeda goreaui | 2.3 | (Clifton and Clifton 1999) |
| Caulerpa sertularioides | 2.3 | (Clifton and Clifton 1999) |
| Caulerpa racemosa | 2.3 | (Clifton and Clifton 1999) |
| Udotea flabellum | 2.3 | (Clifton and Clifton 1999) |
| Halimeda opuntia | 2.3 | (Clifton and Clifton 1999) |
| Prasiola stipitata | 2.4 | (Cole and Akintobi 1963) |
| Scytosiphon lomentaria | 3 | (Clayton 1978; Clayton 1980) |
| Bryopsis hypnoides | 4 | (Burr and West 1970) |

Table 12 Propagule sizes for key algae species

| Species | Propagule (µm) | References |
|---------------------------|----------------|--|
| Laminariales various spp. | 4 | (Henry and Cole 1982; Clayton 1990) |
| Ectocarpus siliculosus | 4 | (Baker and Evans 1973; Müller 1977) |
| Cladophora vagabunda | 4 | (Hoek 1978) |
| Sphacelaria rigidula | 4 | (Van Reine 1982) |
| Ulva rigida | 4 | (Phillips 1988) |
| Laurencia papillosa | 5 | (Ngan and Price 1979) |
| Halimeda inerassata | 8 | (Meinesz 1980) |
| Chondrococcus hornemanni | 10 | (Ngan and Price 1979) |
| Hypnea cervicornis | 10 | (Ngan and Price 1979) |
| Coelothrix indica | 10 | (Ngan and Price 1979) |
| Codium fragile | 10 | (Miravalles et al. 2012) |
| Bangia fuscopurpurea | 11 | (Okuda and Neushul 1981) |
| Enteromorpha intestinalis | 11 | (Evans et al. 1970) |
| Graciliaria edulis | 11 | (Ngan and Price 1979) |
| Hypnea pannosa | 12.5 | (Ngan and Price 1979) |
| Hypnea boergeseni | 12.5 | (Ngan and Price 1979) |
| Solierla mollis | 12.5 | (Ngan and Price 1979) |
| Codium fragile | 13.3 | (Prince and Trowbridge 2004) |
| Grateloupia divaricata | 13.5 | (Ngan and Price 1979) |
| Hypnea esperi | 13.5 | (Ngan and Price 1979) |
| Gracilaria crassa | 15 | (Ngan and Price 1979) |
| Solierla robusta | 15 | (Ngan and Price 1979) |
| Sarconema filiforme | 15 | (Ngan and Price 1979) |
| Gracilaria verrucosa | 15 | (Destombe et al. 1992) |
| Gelidiopsis variabilis | 15 | (Ngan and Price 1979) |
| Chondrus verrucosus | 15.1 | (Bellgrove et al. 2019) |
| Ceramium sp. | 16 | (Ngan and Price 1979) |
| Graciliaria rhodotricha | 16 | (Ngan and Price 1979) |
| Gigantina canaliculata | 17 | (Okuda and Neushul 1981) |
| Gelidium crinale | 17.2 | (Ngan and Price 1979) |
| Gelidium corneum | 17.5 | (Ngan and Price 1979) |
| Gracilia textorii | 17.5 | (Ngan and Price 1979) |
| Gigantina canaliculata | 18 | (Ryland and Stebbing 1971) |
| Gigartina leptorhynchos | 18.4 | (Okuda and Neushul 1981) |
| Gelidium heteroplatos | 18.5 | (Ngan and Price 1979) |
| Gelidium pusillum | 18.5 | (Ngan and Price 1979) |
| Hypnea valentiae | 20 | (Ngan and Price 1979) |
| Gracilia verrucosa | 20 | (Ngan and Price 1979) |
| Articulated corrallines | 20 | (Chihara 1973) |

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| Species | Propagule (µm) | References |
|---------------------------|----------------|-------------------------------|
| Gracilaria edulis | 22 | (Ngan and Price 1979) |
| Caulacanths ustulatus | 22.5 | (Ngan and Price 1979) |
| Gracilaria edulis | 23 | (Ngan and Price 1979) |
| Gracilaria sjoestedti | 23 | (Okuda and Neushul 1981) |
| Champia parvula | 25 | (Ngan and Price 1979) |
| Antithamnion kylinii | 25.4 | (Okuda and Neushul 1981) |
| Laurencia perforate | 26 | (Ngan and Price 1979) |
| Laurencia succisa | 26 | (Ngan and Price 1979) |
| Gelidium coulterii | 26.5 | (Okuda and Neushul 1981) |
| Ceramium fastigiatum | 27.5 | (Ngan and Price 1979) |
| Centroceras clavulatum | 27.5 | (Ngan and Price 1979) |
| Neoagardhiella baileyi | 28 | (Okuda and Neushul 1981) |
| Zygnema sp. | 29 | (Poulíčková et al. 2007) |
| Bostrychia tenella | 30 | (Ngan and Price 1979) |
| Pedobesia clavaeformis | 30 | (MacRaild and Womersley 1974) |
| Caloglossa bombayensis | 30 | (Ngan and Price 1979) |
| Caloglossa leprieurii | 30 | (Ngan and Price 1979) |
| Acrocystis nana | 31 | (Ngan and Price 1979) |
| Ceramium californicum | 31.5 | (Okuda and Neushul 1981) |
| Tolypiocladia glomerulata | 32.5 | (Ngan and Price 1979) |
| Ceramium fastigiatum | 33 | (Ngan and Price 1979) |
| Polysiphonia coacta | 33.5 | (Ngan and Price 1979) |
| Laurencia majuscula | 35 | (Ngan and Price 1979) |
| Laurencia obtusa | 35 | (Ngan and Price 1979) |
| Polysiphonia subtilissima | 35 | (Ngan and Price 1979) |
| Catenella nipae | 35 | (Ngan and Price 1979) |
| Eucheuma uncinatum | 39.5 | (Okuda and Neushul 1981) |
| Acanthophora spicifera | 40 | (Ngan and Price 1979) |
| Centoceras clavulatum | 40.8 | (Okuda and Neushul 1981) |
| Laurencia nidifica | 41 | (Ngan and Price 1979) |
| Acanthophora muscoides | 42.5 | (Ngan and Price 1979) |
| Bostrychia radicans | 42.5 | (Ngan and Price 1979) |
| Laurencia pygmaea | 42.5 | (Ngan and Price 1979) |
| Laurencia tenera | 43.5 | (Ngan and Price 1979) |
| Chondria sp | 45 | (Ngan and Price 1979) |
| Bostrychia binderi | 46 | (Ngan and Price 1979) |

Note: Only the measurement of the shortest axis of the smallest propagule is reported in this table, see Table A11 for more measurement details.

12. Ascidians

Ascidians are sessile organisms which can reproduce either sexually or asexually by budding. When sexually reproducing, embryos develop in the atrium and are released as either tadpoles, or small juveniles (Strathmann 1987). Larval settlement occurs between 30 minutes – 12 hours after release (Strathmann 1987).

The literature review identified 248 potential references, of which we were able to obtain relevant propagule size information for 53 species from 41 references (Table A12). This included 58 female gamete size estimates and 17 larval size estimates. Egg sizes ranged from 60 – 720 μ m, while reported tadpole/juvenile size ranged from 720 – 2,350 μ m (Table 13).

The smallest identified female gamete sizes were for *Botryllus schlosseri* (stage 3 oocyte: 60 μ m) (Stewart-Savage et al. 1999), *Dendrodoa grossularia* (egg: 60 μ m) (Millar 1954) and *Molgula oculate* (egg: 80 μ m) (Jeffery and Swalla 1992; Berrill 1945; Swalla and Jeffery 1990). The minimum identified tadpole/juvenile sizes was a width of 220 μ m for one day old *Molgula manhattensis* (Bullard and Whitlatch 2004) (Table 13).

The literature search identified propagule sizes of four species that have been identified as biofouling risk species (Hewitt et al. 2011; McClary and Nelligan 2001). The four identified biofouling risk species included *Botrylloides violaceus* (unfertilised egg 80 µm) (Carver et al. 2006), *Didemnum sp.*, (larvae width 930 µm) (Bullard and Whitlatch 2004), *Molgula manhattensis* (larvae width 200 µm) (Bullard and Whitlatch 2004) and *Styela clava* (ripe ova size 150 µm (McClary et al. 2008) and juvenile width 290 µm) (Bullard and Whitlatch 2004) (Table 13).

| Species | Egg (µm) | Embryo/larvae (µm) | References |
|------------------------|----------|--------------------|---|
| Botryllus schlosseri | 60 - 100 | - | (Stewart-Savage et al. 1999) |
| Dendrodoa grossularia | 60 | - | (Millar 1954) |
| Molgula oculata | 80 | - | (Jeffery and Swalla 1992; Berrill 1945; Swalla and Jeffery 1990) |
| Botrylloides violaceus | 80 | - | (Carver et al. 2006) |
| Styela clava | 150 | 200 | (McClary et al. 2008; Bullard and Whitlatch 2004) |
| Molgula manhattensis | - | 200 | (Bullard and Whitlatch 2004) |
| Styela canopus | - | 600 - 900 | (Huang et al. 2003) |
| Didemnum sp. | _ | 930 | (Bullard and Whitlatch 2004) |

Table 13 Propagule sizes for key ascidian species

13. Asexual Reproduction

Most of the taxonomic risk groups covered in this review contain species that have the potential to reproduce asexually (Hughes 2002; Allen et al. 2018). The forms of asexual reproduction are diverse and include the fission, fragmentation or the budding of somatic tissue, parthenogenesis (development of an individual from an unfertilised egg), and polyembryony (the splitting of one sexually produced embryo into many independent individuals during development) (Hughes 2002; Craig et al. 1997).

The literature review identified 664 potential references, of which we were able to obtain relevant asexual propagule sizes for only six species from six references. The smallest reported size identified in this review was 200 µm for clones of the cypris larval stage of the barnacle *Loxothylacus panopaei*, which are formed through polyembryony (Allen et al. 2015)(Table 14). None of the species identified from the literature search were identified as known biofouling risk species (Hewitt et al. 2011; McClary and Nelligan 2001), however, the ascidian *Botryllus schlosseri* is regarded as invasive in some parts of the world (Fofonoff et al. 2018).

While there are few direct estimates of asexual propagules sizes for most taxonomic groups reviewed in this study, the theoretical minimum sizes for asexual propagules derived from somatic tissue (e.g. fragments, budding) would equal the smallest somatic cell size for that species. However, it is likely that viable asexual propagules derived from somatic tissue are likely to be multicellular and therefore much larger than this theoretical minimum.

For asexual propagules derived from unfertilised eggs (parthenogenesis), or the splitting of developing embryos (polyembryony), the theoretical smallest size should be equal to the egg size estimates for species. However, it remains possible that the splitting of developing embryos during polyembryony, may generate clonal propagules smaller than the original egg size.

| Risk group | Species | Propagule (µm) | Comment | References |
|-------------|-----------------------|----------------|---|----------------------------------|
| Echinoderms | Ophidiaster granifer | 600-650 | Egg diameter | (Yamaguchi and Lucas 1984) |
| Ascidians | Botryllus schlosseri | 344.2 ± 35.5 | Size of stage 8 bud | (Gasparini et al. 2015) |
| Hydrozoa | Moerisia lyonsi | 1000-4000 | Medusae diameter | (Purcell et al. 1999) |
| Polychaetes | Pygospio elegans | 1570 ± 100 | Size of tail fragment produce by asexual fission | (McCurdy 2001) |
| Echinoderms | Echinarachnius parma | 200-400 | Size of larvae derived from single embryos and from twinned embryos | (Allen et al. 2015) |
| Barnacles | Loxothylacus panopaei | 200 | Clones at cypris larval stage | (Craig et al. 1997) |

| Table 14 Asexual | propagule | sizes of | species | from k | ey taxa |
|------------------|-----------|----------|---------|--------|---------|
|------------------|-----------|----------|---------|--------|---------|

Appendix A

A1. Amphipods and Isopods

Literature search: To identify literature on propagule and female gamete size a systematic literature search was undertaken using the <u>Web of Science</u> database. For amphipods and isopods five searches were performed using the following search criteria:

Web of Science: TOPIC: (amphipod) AND TOPIC: (egg size) AND ALL FIELDS: (diameter) Results: 4

Web of Science: TITLE: (amphipod*) AND TOPIC: (hatching size) AND ALL FIELDS: (marine) Results: 14

Web of Science: TITLE: (isopod*) AND TOPIC: (embryo) AND ALL FIELDS: (marine) Results: 21

Web of Science: TITLE: (amphipod*) AND TOPIC: (embryo) AND ALL FIELDS: (marine) Results: 44

Web of Science: TITLE: (amphipod*) AND TOPIC: (juvenile length)) Results: 96

Additional articles were also sourced from citations and reference lists of articles produced in the Web of Science database searches.

| Species | Egg (µm) | Larval (µm) | Comments | References |
|--------------------------|----------|-------------|-----------------|---|
| Acanthohaustorius millsi | - | 780 | Embryo diameter | (Sameoto 1969; Van Dolah and Bird, 1980) |
| Alicella gigantea | - | 9,110 | Embryo diameter | (Barnard and Ingram, 1986) |
| Allomelita pellucida | - | 480 | Embryo diameter | (Legueux, 1926) |
| Ampelisca abdita | - | 430 | Embryo diameter | (Mills, 1967) |
| Ampelisca abdita | - | 390 | Embryo diameter | (Nelson, 1978) |
| Ampelisca araucana | - | 450 | Embryo diameter | (Carrasco and Arcos, 1984) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|--------------------------|----------|--------------|-------------------|--|
| Ampelisca brevicorni | - | 480 | Embryo diameter | (Kaim-Malka, 1969) |
| Ampelisca diadema | - | 490 | Embryo diameter | (Ivanov, 1961) |
| Ampelisca macrocephala | - | 680 | Embryo diameter | (Kanneworff, 1965) |
| Ampelisca tenuicornis | - | 370 | Embryo diameter | (Sheader, 1977b) |
| Ampelisca vadorum | - | 560 | Embryo diameter | (Mills, 1967) |
| Ampelisca vadorum | - | 510 | Embryo diameter | (Van Dolah and Bird, 1980) |
| Amphiporeia lawrenciana | - | 830 | Embryo diameter | (Downer and Steele, 1979) |
| Amphiporeia virginiana | - | 270 | Embryo diameter | (Van Dolah and Bird, 1980) |
| Ampithoe lacertosa | - | 460 | Embryo diameter | (Heller, 1968) |
| Ampithoe longimana | - | 380 | Embryo diameter | (Nelson, 1978) |
| Ampithoe ramond | - | 310 | Embryo diameter | (Gilat, 1962) |
| Ampithoe valida | - | 420 | Embryo diameter | (Barrett, 1966) |
| Anonyx nugax | - | 1,300 | Embryo diameter | (Kuznetsov, 1964, MacGinitie, 1955) |
| Anonyx sarsi | - | 1,020 | Embryo diameter | (Sainte-Marie et al., 1990) |
| Apherusa glacialis | 180-230 | - | Egg diameter | (Poltermann et al., 2000) |
| Asellus aquaticus | 300-400 | - | Egg diameter | (Steel, 1961, Andersson, 1969) |
| Athelges takanoshimensis | - | 144.7 ± 17.4 | Mean egg diameter | (Cericola and Williams, 2015) |
| Athelges takanoshimensis | - | 262.1 ± 12.7 | Larvae width | (Cericola and Williams, 2015) |
| Atyloella magellanica | - | 670 | Embryo diameter | (Thurston, 1974) |
| Atylus guttatus | - | 400 | Embryo diameter | (Ivanov, 1961) |

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| Species | Egg (µm) | Larval (µm) | Comments | References |
|--------------------------|----------|------------------|--|---|
| Bathyporeia pelagic | - | 1,300 | Hatched juvenile length | (Fish, 1975) |
| Bathyporeia pelagica | - | 420 | Embryo diameter | (Fish, 1975) |
| Bathyporeia pilosa | - | 1,400 | Length of newly hatched juveniles | (Fish, 1975) |
| Bathyporeia pilosa | - | 440 | Embryo diameter | (Fish, 1975) |
| Bovallia gigantea | - | 1,340 | Embryo diameter | (Thurston, 1974) |
| Bruzelia tuberculata | - | 850 | Embryo diameter | (Stephensen, 1923) |
| Caecosphaeroma burgundum | 750 | - | Egg diameter | (Daum, 1954) |
| Calliopius laeviusculus | - | 450 | Embryo diameter | (Steele and Steele, 1973) |
| Calliopius laeviusculus | - | 580 | Embryo diameter | (Steele and Steele, 1973) |
| Caprella arimotoi | - | 1,100–1,500 | Body length of first instar young * | (Aoki, 1999) |
| Caprella danilevskii | - | 370 | Late stage embryo | (Takeuchi and Hirano, 1992) |
| Caprella danilevskii | - | 1,600-1,800 | Body length of first instar young * | (Aoki, 1999) |
| Caprella decipiens | - | 1,200-1,400 | Body length of first instar young * | (Aoki, 1999) |
| Caprella glabra | - | 1,200-1,400 | Body length of first instar young * | (Aoki, 1999) |
| Caprella monoceros | - | 1,000-1,200 | Body length of first instar young * | (Aoki, 1999) |
| Caprella mutica | - | 300-330 | Early stage embryo width | (Nakajima and Takeuchi, 2008) |
| Caprella mutica | - | 2,800 (SE ± 100) | Minimum mean juvenile length | (Willis et al., 2009) |
| Caprella mutica | 150 | 300 x 380 | Small oocyte size, minimum embryo dimensions | (Nakajima and Takeuchi, 2008, Matthews, 2008) |
| Caprella okadai | - | 1,700-1,800 | Body length of first instar young * | (Aoki, 1999) |
| Caprella okadai | - | 280 (SD ± 20) | Width of early stage embryo | (Takeuchi and Hirano, 1992) |
| Caprella penantis | - | 1,000-1,200 | Body length of first instar young * | (Aoki, 1999) |

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| Species | Egg (µm) | Larval (µm) | Comments | References |
|-----------------------------|---------------|-------------------|--|--|
| Caprella scaura | - | 1,100-1,300 | Body length of first instar young * | (Aoki, 1999) |
| Caprella subinermis | - | 1,550–1,800 | Body length of first instar young * | (Aoki, 1999) |
| Casco bigelowi | - | 2,700 | Length of smallest juvenile in mothers burrow | (Thiel, 1998) |
| Casco bigelowi | - | 3,600 | Juvenile in mother's burrow | (Thiel et al., 1997) |
| Casco bigelowi | - | 620 | Embryo diameter | (Wildish, 1982) |
| Ceratoserolis trilobitoides | 3,000 | - | Egg diameter | (Wägele, 1987) |
| Chaetogammarus marinus | - | 670 | Stage 3 embryo length | (Lawrence and Poulter, 2001) |
| Cheirimedon femoratus | - | 670 | Embryo diameter | (Bregazzi, 1972) |
| Chelura terebrans | - | 450 | Embryo diameter | (Kühne and Becker, 1964) |
| Clypeoniscus hanseni | 120-126 | - | Egg diameter | (Sheader, 1977a) |
| Corophium acherusicum | - | 310 | Embryo diameter | (Walter, 1980) |
| Corophium bonnellii | - | 360 | Embryo diameter | (Moore, 1978) |
| Corophium insidiosum | - | 280 | Embryo diameter | (Sheader, 1978) |
| Corophium insidiosum | - | 360 | Embryo diameter | (Nair and Anger, 1979) |
| Cyathura carinata | 480 | - | Egg diameter | (Wägele, 1979) |
| Cyathura polita | - | 2,700 (SD ± 250) | Body length of juveniles released from marsupium | (Mercer et al., 2007) |
| Cyathura polita | - | 2,060 (SD ± 160) | Embryos hatched from vitelline membrane | (Mercer et al., 2007) |
| Cymadusa compta | - | 370 | Embryo diameter | (Nelson, 1978) |
| Cymadusa filosa | - | 390 | Embryo diameter | (Gilat, 1962) |
| Cyphocaris challengeri | 470 (SD ± 60) | 1,500 (SD ± 1100) | Egg diameter (shortest), juvenile body length | (Yamada and Ikeda, 2000) |
| Diogidias littoralis | _ | 350 | Embryo diameter | (Fenwick, 1985) |
| Dulichia spinosissima | _ | 520 | Embryo diameter | (MacGinitie, 1955) |
| Dynamene bidentata | 500 | - | Egg diameter | (Holdich, 1968, Naylor and Quénisset, 1964) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|---------------------------|----------|-------------|---|------------------------------------|
| Dynamene bidentata | 500 | - | Egg diameter | (Naylor and Quénisset, 1964) |
| Dynoides daguilarensis | - | 1,800 | Juvenile body length | (Li, 2000) |
| Dyopedos monacanthus | - | 580 | Smallest juvenile length on mother's whip | (Thiel, 1997) |
| Elasmopus levis | - | 400 | Embryo diameter | (Nelson, 1978) |
| Eohaustorius sencillus | - | 390 | Embryo diameter | (Slattery, 1985) |
| Epimeria monodon | - | 1,270 | Embryo diameter | (Thurston, 1974) |
| Euonyx chelatus | - | 680 | Embryo diameter | (Comely and Ansell, 1988) |
| Eurydice pulchra | 600 | - | Egg diameter | (Fish, 1970) |
| Eurydice pulchra | 600 | - | Egg diameter | (Jones, 1970) |
| Eurymera monticulosa | - | 750 | Embryo diameter | (Thurston, 1974) |
| Eurythenes gryllus | - | 2,300 | Embryo diameter | (Ingram and Hessler, 1987) |
| Excirolana braziliensis | - | 800-1,200 | Mean stage 1 embryo | (Martínez and Defeo, 2006) |
| Gammaracanthus loricatus | - | 850 | Embryo diameter | (Steele and Steele, 1975) |
| Gammarellus angulosus | - | 650 | Embryo diameter | (Steele and Steele, 1972a) |
| Gammarellus homari | - | 1,000 | Embryo diameter | (Kuznetsov, 1964, Steele, 1972) |
| Gammaropsis inaequistylis | - | 230 | Embryo diameter | (Steele et al., 1986) |
| Gammaropsis megalops | - | 450 | Embryo diameter | (MacGinitie, 1955) |
| Gammarus | 350-720 | - | Egg diameter | (Steele and Steele, 1975) |
| Gammarus crinicornis | - | 440 | Embryo diameter | (Dumay, 1972) |
| Gammarus duebeni | - | 610 | Embryo diameter | (Hynes, 1954, Hynes, 1955) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|-----------------------|----------|-------------|-----------------|-------------------------------|
| Gammarus duebeni | - | 650 | Embryo diameter | (Hynes, 1954, Hynes, 1955) |
| Gammarus duebeni | - | 560 | Embryo diameter | (Steele and Steele, 1969) |
| Gammarus fasciatus | - | 460 | Embryo diameter | (Clemens, 1950) |
| Gammarus finmarchicus | - | 500 | Embryo diameter | (Steele and Steele, 1975) |
| Gammarus lawrencianus | - | 410 | Embryo diameter | (Steele and Steele, 1975) |
| Gammarus locusta | - | 430 | Embryo diameter | (Spooner, 1947) |
| Gammarus mucronatus | - | 360 | Embryo diameter | (Steele and Steele, 1975) |
| Gammarus mucronatus | - | 280 | Embryo diameter | (Van Dolah and Bird, 1980) |
| Gammarus mucronatus | - | 430 | Embryo diameter | (LaFrance and Ruber, 1985) |
| Gammarus mucronatus | - | 420 | Embryo diameter | (Fredette and Diaz, 1986) |
| Gammarus obtusatus | - | 550 | Embryo diameter | (Sheader and Chia, 1970) |
| Gammarus obtusatus | - | 610 | Embryo diameter | (Steele and Steele, 1970) |
| Gammarus obtusatus | - | 650 | Embryo diameter | (Steele and Steele, 1970) |
| Gammarus oceanicus | - | 550 | Embryo diameter | (Steele and Steele, 1972b) |
| Gammarus palustri | - | 410 | Embryo diameter | (Van Dolah et al., 1975) |
| Gammarus salinus | - | 310 | Embryo diameter | (Kolding and Fenchel, 1981) |
| Gammarus setosus | - | 690 | Embryo diameter | (Steele and Steele, 1970) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|-------------------------|----------|-------------|-----------------|---|
| Gammarus stoerensis | - | 440 | Embryo diameter | (Steele and Steele, 1975) |
| Gammarus subtypicus | - | 370 | Embryo diameter | (Dumay, 1972) |
| Gammarus tigrinus | - | 460 | Embryo diameter | (Steele and Steele, 1972a) |
| Gammarus wilkitzkii | 600-800 | - | Egg diameter | (Poltermann et al., 2000) |
| Gammarus wilkitzkii | - | 730 | Embryo diameter | (Barnard, 1959, Steele and Steele, 1975) |
| Gammarus zaddachi | - | 530 | Embryo diameter | (Barnard, 1959) |
| Gitanopsis squamosa | - | 400 | Embryo diameter | (Thurston, 1974) |
| Glyptonotus antarcticus | 3,000 | - | Egg diameter | (White, 1970) |
| Haploops fundiensis | - | 430 | Embryo diameter | (Wildish, 1982) |
| Haploops tenuis | - | 590 | Embryo diameter | (Kanneworff, 1966) |
| Haploops tubicola | - | 750 | Embryo diameter | (Kanneworff, 1966) |
| Hippomedon kergueleni | - | 740 | Embryo diameter | (Bregazzi, 1972, Bregazzi, 1973) |
| Hippomedon propinquus | - | 550 | Embryo diameter | (Stephensen, 1923) |
| Hippomedon propinquus | - | 580 | Embryo diameter | (Lamarche and Brunel, 1987) |
| Hippomedon whero | - | 390 | Embryo diameter | (Fenwick, 1985) |
| Hirondellea gigas | - | 720 | Embryo diameter | (Hessler et al., 1978) |
| Hyalella azteca | - | 350 | Embryo diameter | (Strong Jr, 1972) |
| Hyalella azteca | - | 290 | Embryo diameter | (Strong Jr, 1972) |
| Hyalella azteca | - | 280 | Embryo diameter | (Strong Jr, 1972) |
| Idotea baltica | 488 | - | Egg diameter | (Strong, 1978) |
| Idotea emarginata | 700 | - | Egg diameter | (Naylor, 1955) |
| Idotea neglecta | 525 | - | Egg diameter | (Kjennerud, 1950) |

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| Species | Egg (µm) | Larval (µm) | Comments | References |
|-----------------------------|----------|-------------|--|----------------------------------|
| Idotea pelagica | 500-580 | - | Egg diameter | (Sheader, 1977a) |
| Jera albifrons | 260 | - | Egg diameter | (Forsman, 1944) |
| Lembos websteri | - | 390 | Embryo diameter | (Nelson, 1978) |
| Lepidepecreum cingulatum | - | 440 | Embryo diameter | (Thurston, 1974) |
| Leptocheirus pinguis | - | 2000-10,000 | Juveniles in burrow | (Thiel et al., 1997) |
| Leptocheirus pinguis | - | 470 | Embryo diameter | (Wildish, 1980) |
| Leucothoe ``spongicola'' | - | 1,200 | Minimum body length found in sponges | (Thiel, 2000) |
| Leucothoe "ascidicola" | - | 1,310 | Minimum size found in zooids | (Thiel, 2000) |
| Leucothoe spinicarpa | - | 660 | Embryo diameter | (Thurston, 1974) |
| Limnoria chilensis | - | 800 | Minimum juvenile body length in burrow | (Thiel, 2003) |
| Limnoria lignorum | 400 | - | Egg diameter | (Henderson, 1924) |
| Limnoria lignorum | 400 | - | Egg diameter | (Sømme, 1940) |
| Melita appendiculata | - | 360 | Embryo diameter | (Nelson, 1978) |
| Melita celericula | - | 320 | Embryo diameter | (Croker, 1971) |
| Melita formosa | - | 700 | Embryo diameter | (MacGinitie, 1955) |
| Melita nitida | - | 300 | Embryo diameter | (Van Dolah and Bird, 1980) |
| Melita palmata | - | 450 | Embryo diameter | (Ivanov, 1961) |
| Metaleptamphopus pectinatus | - | 430 | Embryo diameter | (Thurston, 1974) |
| Metambasia faeroensis | - | 400 | Embryo diameter | (Stephensen, 1923) |
| Metopa glacialis | 400 | - | Egg diameter | (Tandberg et al., 2010) |
| Metopelloides micropalpa | - | 490 | Mean embryo diameter | (Sainte-Marie, 1991) |
| Monoculodes edwardsi | - | 280 | Embryo diameter | (Van Dolah et al., 1975) |
| Monoporeia affinis | - | 1,450-1,550 | Newly hatched juvenile | (Sundelin and Eriksson, 1998) |
| Neohaustorius schmitzi | - | 450 | Embryo diameter | (Van Dolah and Bird, 1980) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|-----------------------------|---------------|-------------|---|--------------------------------|
| Oediceros saginatus | _ | 940 | Mean embryo diameter | (Sainte-Marie, 1991) |
| Onisimus caricus | 1,680 | - | Egg size | (Tandberg et al., 2010) |
| Onisimus litoralis | - | 880 | Embryo diameter | (Sainte-Marie et al., 1990) |
| Orchestia cavimana | - | 620 | Embryo diameter | (Wildish, 1979) |
| Orchestia gammarellus | - | 730 | Embryo diameter | (Wildish, 1979) |
| Orchestia mediterranea | - | 650 | Embryo diameter | (Wildish, 1979) |
| Orchestia platensis | - | 620 | Embryo diameter | (Nagata, 1966) |
| Orchestia platensis | - | 580 | Embryo diameter | (Morino, 1978) |
| Orchestia roffensis | - | 560 | Embryo diameter | (Wildish, 1979) |
| Orchomene plebs | - | 830 | Embryo diameter | (Rakusa-Suszczewski, 1982) |
| Orchomenella minuta | - | 520 | Embryo diameter | (Sainte-Marie et al., 1990) |
| Orchomenella pinguis | - | 510 | Embryo diameter | (Sainte-Marie et al., 1990) |
| Paragnathia formica | 200-300 | 1,000 | Egg diameter range, prehatching juvenile length | (Manship et al., 2011) |
| Paraharpinia rotundifrons | - | 540 | Embryo diameter | (Thurston, 1974) |
| Paramoera walkeri | - | 2,100-2,700 | Juvenile 0–2 weeks since emergence | (Brown et al., 2015) |
| Paramoera walkeri | - | 550 | Embryo diameter | (Rakusa-Suszczewski, 1982) |
| Parhyalella basrensis | - | 390 | Embryo diameter | (Ali and Salman, 1986) |
| Parhyalella pietschmanni | - | 390 | Embryo diameter | (Steele, 1973) |
| Patuki roperi | - | 480 | Embryo diameter | (Fenwick, 1985) |
| Pectenogammarus planicrurus | 332 (SE 2.15) | - | Width of stage 1 egg | (Bella and Fish, 1996) |
| Photis reinhardi | - | 500 | Embryo diameter | (MacGinitie, 1955) |
| Pontogeneia antarctica | - | 650 | Embryo diameter | (Thurston, 1974) |
| Pontogeneia inermis | - | 570 | Mean embryo diameter | (Sainte-Marie, 1991) |

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| Species | Egg (µm) | Larval (µm) | Comments | References |
|---------------------------|--------------|-------------|------------------------------------|--|
| Pontogeniella brevicornis | - | 670 | Embryo diameter | (Thurston, 1974) |
| Pontoporeia affinis | - | 530 | Embryo diameter | (Mathisen, 1953) |
| Pontoporeia femorata | - | 450 | Embryo diameter | (Steele et al., 1978) |
| Pontoporeia femorata | - | 410 | Embryo diameter | (Wildish and Peer, 1981) |
| Pontoporeia sp. | - | 610 | Mean embryo diameter | (Sainte-Marie, 1991) |
| Primno abyssalis | 450 ± 10 | 1,250 | Egg diameter, juvenile body length | (Yamada et al., 2002) |
| Primno abyssalis | 480 ± 20 | 1,300 | Egg diameter, juvenile body* | (Ikeda, 1995) |
| Proasellus cavaticus | 300 | - | Egg diameter | (Henry, 1976) |
| Proboscinotus loquax | - | 500 | Embryo diameter | (Hughes, 1982) |
| Prostebbingia gracilis | - | 440 | Embryo diameter | (Thurston, 1974) |
| Protophoxus australis | - | 450 | Embryo diameter | (Fenwick, 1985) |
| Psammonyx terranovae | - | 1,070 | Embryo diameter | (Sainte-Marie et al., 1990) |
| Quadrivisio lutzi | 350 ± 80 | - | Egg diameter | (Medeiros and Weber, 2016) |
| Quadrivisio lutzi | - | 350 | Embryo diameter | (Stephensen, 1933) |
| Rhepoxynius abronius | - | 420 | Embryo diameter | (Slattery, 1985) |
| Rhepoxynius fatigans | - | 410 | Embryo diameter | (Slattery, 1985) |
| Seborgia minima | - | 250 | Embryo diameter | (Bousfield, 1970) |
| Serolis polita | 1,500 | - | Egg diameter* | (Luxmoore, 1982) |
| Sphaeroma hookeri | 500 | - | Egg diameter | (Jensen, 1956) |
| Sphaeroma hookeri | 500 | - | Egg diameter | (Kinne, 1954) |
| Sphaeroma serratum | - | 1,120 ± 80 | Early embryo | (Charmantier and Charmantier-Daures, 1994) |
| Species | Egg (µm) | Larval (µm) | Comments | References |
|----------------------------|----------|-------------|---|--|
| Sphaeroma serratum | - | 1,390 ± 30 | Stage 1 juvenile | (Charmantier and Charmantier-Daures, 1994) |
| Sphaeroma serratum | - | 1,920 ± 130 | Total body length of stage 1 juveniles | (Kittlein, 1991) |
| Sphaeroma terebrans | - | 2,000-3,000 | Juvenile body length in mothers burrows | (Thiel, 1999) |
| Stegocephalina ingolf | - | 600 | Embryo diameter | (Stephensen, 1944) |
| Stegocephalus inflatus | - | 1,370 | Embryo diameter | (Steele, 1967) |
| Stegocephalus inflatus | - | 1,660 | Embryo diameter | (Steele, 1967) |
| Synchelidium trioostegitum | - | 1,610 | Juvenile body length | (Yu and Suh, 2006) |
| Talitrus saltator | - | 850 | Embryo diameter | (Williams, 1978) |

Note: Smallest value was recorded when available, * indicates that size was an approximate value.

A2. Barnacles

Literature search: To identify literature on propagule and female gamete size a systematic literature search was undertaken using the <u>Web of Science</u> database. For barnacles two searches were performed using the following search criteria:

Web of Science: TOPIC: (barnacle) AND TOPIC: (egg size) NOT TOPIC: (goose) Results: 67

Web of Science: TOPIC: (cirripedia) AND ALL FIELDS: (egg size) Results: 35

Additional articles were also sourced from citations and reference lists of articles produced in the Web of Science database searches.

Table A2 Barnacle propagule sizes identified from the literature search

| Species | Egg (µm) | Larval (µm) | Comments | References |
|-------------------------------|-------------|--------------|----------------------------|------------------------------------|
| Arcoscalpellum michelottianum | 1,000–1,200 | 1,340, 1,200 | Egg size, cyprid, nauplius | (Buhl-Mortensen and Høeg, 2006) |
| Ascoscalpellum chiliense | 500 | - | Egg size | (Buhl-Mortensen and Høeg, 2006) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|---------------------------------|-----------|-------------|---|--|
| Ascoscalpellum micrum | 500 | - | Egg size | (Buhl-Mortensen and Høeg, 2006) |
| Ascoscalpellum sergi | 580 | - | Egg size | (Buhl-Mortensen and Høeg, 2006) |
| Balanus alatus | 240 | - | Egg size | (Barnes, 1989) |
| Balanus aligola | - | 98 x 180 | Stage 1 nauplius dimensions | (Sandison and Day, 1954, Barnes, 1989) |
| Balanus amphitrite | - | 140 x 260 | Stage 1 nauplius dimensions | (Geraci and Romairone, 1986, Barnes, 1989) |
| Balanus amphitrite albicosatus | - | 140 x 240 | Stage 1 nauplius dimensions | (Barnes, 1989) |
| Balanus amphitrite amphitrite | - | 120 x 180 | Stage 1 nauplius dimensions | (Barnes, 1989) |
| Balanus amphitrite cirratus | - | 220 | Stage 1 nauplius dimensions | (Barnes, 1989) |
| Balanus amphitrite communis | - | 180 | Stage 1 nauplius dimensions | (Barnes, 1989) |
| Balanus amphitrite denticulata | 90 x 150 | 140-200 | Egg dimensions, Stage 1 nauplius dimensions | (Barnes, 1989) |
| Balanus amphitrite hawaiiensis | - | 100 x 190 | Stage 1 nauplius dimensions | (Barnes, 1989) |
| Balanus austrobalanus flosculus | 160 x 280 | 140 x 330 | Egg dimensions, Stage 1 nauplius dimensions | (Barnes, 1989) |
| Balanus balanoides | - | 340 | Length of naupilar stage 1 | (Pyefinch, 1948) |
| Balanus balanoides | 160 x 305 | 34 x 189 | Egg size, Stage 1 nauplius dimensions | (Barnes, 1989) |
| Balanus balanus | 168 x 307 | 210 x 370 | Egg dimensions, Stage 1 nauplius dimensions | (Barnes, 1989) |
| Balanus calceolus | 170 | - | Egg size | (Barnes, 1989) |
| Balanus crenatus | - | 280 | Length of naupilar stage 1 | (Pyefinch, 1948) |
| Balanus crenatus | 120 x 190 | 124 x 263 | Egg dimensions, Stage 1 nauplius dimensions | (Barnes, 1989) |
| Balanus eberneus | - | 800 | Larvae length at 6 days | (Grave, 1933) |
| Balanus eburneus | - | 160-180 | Width of stage 1 larvae | (Costlow Jr and Bookhout, 1957) |
| Balanus glandula | 125 x 220 | 153 x 244 | Egg dimensions, Stage 1 nauplius dimensions | (Barnes, 1989) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|-------------------------------|-----------|-------------|---|--|
| Balanus improvisus | 163 | 195 | Egg size, naunilus width stage 1 | (Jones and Crisp, 1954, Barnes and Barnes, 1965) |
| Balanus kondakovi | | 135 x 200 | Stage 1 naunlius dimensions | (Barnes, 1989) |
| Balanus meaabalanus nsittacus | 70-100 | 140 x 290 | Egg size range. Stage 1 naunlius dimensions | (Barnes, 1989) |
| Balanus nubilis | - | 157 x 266 | Stage 1 nauplius dimensions | (Strathmann) |
| Balanus perforatus | 115 x 221 | 130 x 279 | Egg size range. Stage 1 nauplius dimensions | (Barnes, 1989) |
| Balanus reticulatus | | 143 x 256 | Stage 1 nauplius dimensions | (Barnes, 1989) |
| Balanus rostratus | 120-150 | _ | Ova dimensions | (Barnes, 1989) |
| Balanus sp. | - | 356.7 | Cyprid morphology | (Walters and Wethey, 1996) |
| Balanus terebratus | 150 x 250 | - | Egg dimensions | (Barnes, 1989) |
| Balanus trigonus | - | 210-230 | Carapace length of stage 1 larvae | (Barker, 1976) |
| Balanus trigonus | 90 x 170 | 100 x 210 | Egg size range, Stage 1 nauplius dimensions | (Barnes, 1989) |
| Balanus variegatus | _ | 200 | Stage 1 nauplius dimensions | (Barnes, 1989) |
| Balanus vestitus | - | 170, 300 | Carapace width, and total length of stage I nauplii | (Foster, 1967) |
| Balanus vestitus | - | 200 x 550 | Stage 1 nauplius dimensions | (Barnes, 1989) |
| Bocquetia rosea | - | 88.9 ± 1 | Cyprid size | (Barnes, 1989) |
| Calantica pollicipedoides | 340 | - | Egg size | (Buhl-Mortensen and Høeg, 2006) |
| Catherinum perlongum | - | 460 | Nauplius larval size | (Buhl-Mortensen and Høeg, 2006) |
| Chamaesipho brunnea | - | 120, 270 | Carapace width, and total length of stage 1 nauplii | (Foster, 1967) |
| Chamaesipho brunnea | - | 190-210 | Carapace length of stage 1 larvae | (Barker, 1976) |
| Chamaesipho columna | - | 100, 230 | Carapace width, and total length of stage 1 nauplii | (Foster, 1967) |
| Chamaesipho columna | - | 200-230 | Carapace length of stage 1 larvae | (Barker, 1976) |
| Chthamalus anisopoma | 82 x 163 | - | Egg dimensions | (Barnes, 1989) |
| Chthamalus challengeri | 80 x 110 | - | Egg dimensions | (Barnes, 1989) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|-----------------------|------------|--------------|---|-----------------------------|
| Chthamalus dalli | - | 138 (SE ± 3) | Stage 1 larvae width | (Miller et al., 1989) |
| Chthamalus dentatus | 90 x 166 | 100 x 140 | Egg dimensions, Stage 1 nauplius dimensions | (Barnes, 1989) |
| Chthamalus depressus | - | 149 x 200 | Stage 1 nauplius dimensions | (Barnes, 1989) |
| Chthamalus fissus | - | 124 (SE ± 5) | Stage 1 larvae width | (Miller et al., 1989) |
| Chthamalus malayensis | _ | 239 ± 12 | Naupliar length stage 1 | (Yan and Chan, 2001) |
| Chthamalus montagui | _ | 99 (SD ± 9) | Mean width of naupliar stage 1 | (Burrows et al., 1999) |
| Chthamalus montagui | 74.9-90.5 | - | Measurements of eggs from newly laid to a few cells | (O'Riordan et al., 1995) |
| Chthamalus montagui | 74.9-111.2 | _ | Egg width | (Yan et al., 2006) |
| Chthamalus montagui | - | 99 (SD ± 9) | Mean width of naupliar stage 1 | (Burrows et al., 1999) |
| Chthamalus montagui | 74.9-90.5 | - | Measurements of eggs from newly laid to a few cells | (O'Riordan et al., 1995) |
| Chthamalus montagui | 74.9–111.2 | - | Egg width | (Yan et al., 2006) |
| Chthamalus stellatus | 78.3-123.6 | _ | Egg width | (Yan et al., 2006) |
| Chthamalus stellatus | 79.9–93.7 | - | Measurements of eggs from newly laid to a few cells | (O'Riordan et al., 1995) |
| Chthamalus stellatus | - | 99 (SD ± 5) | Width of Naupliar stage 1 | (Burrows et al., 1999) |
| Chthamalus stellatus | 78.3-123.6 | - | Egg width | (Yan et al., 2006) |
| Chthamalus stellatus | 79.9–93.7 | - | Measurements of eggs from newly laid to a few cells | (O'Riordan et al., 1995) |
| Chthamalus stellatus | - | 99 (SD ± 5) | Width of Naupliar stage 1 | (Burrows et al., 1999) |
| Chthamalus withersi | - | 205 | Stage 1 nauplius | (Barnes, 1989) |
| Chthamalus malayensis | 100-160 | - | Egg width stage 1–4 | (Yan et al., 2006) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|--------------------------------|-------------|-------------|---|------------------------------------|
| Clistosaccus paguri | 165 | 90 x 184 | Ova diameter, Embryo released as cyprid from mantle cavity of adult | (Barnes, 1989) |
| Compressoscalpellum compressum | 800 | - | Egg size | (Buhl-Mortensen and Høeg, 2006) |
| Compressoscalpellum faurei | - | 750 | Cypris larva size | (Buhl-Mortensen and Høeg, 2006) |
| Drepanorchis neglecta | - | 140 | Cyprid | (Barnes, 1989) |
| Drepanorchis villosa | 100 | - | Egg size | (Barnes, 1989) |
| Eliminius modestus | - | 250 | Length of stage 1 nauplii | (Foster, 1967) |
| Eliminius modestus | - | 210-230 | Carapace width of stage 1 larvae | (Barker, 1976) |
| Eliminius plicatus | - | 350 | Stage 1 nauplii length | (Foster, 1967) |
| Eliminius plicatus | - | 300-320 | Carapace width of stage 1 larvae | (Barker, 1976) |
| Elminius covertus | - | 140 x 230 | Stage 1 nauplius dimensions | (Barnes, 1989) |
| Elminius kingii | 175 x 250 | 140 x 250 | Egg dimensions, Stage 1 nauplius dimensions | (Barnes, 1989) |
| Heterosccus ruginosus | 108 x 135 | 200 | Egg dimensions, stage 1 nauplii length | (Barnes, 1989) |
| Hexaminius popeiana | - | 110 x 200 | Stage 1 nauplius dimensions | (Barnes, 1989) |
| Lernaeodiscus cornutus | 94 | - | Egg size | (Barnes, 1989) |
| Lernaeodiscus cornutus | 94 | - | Egg size | (Barnes, 1989) |
| Lernaeodiscus galatheae | - | 130 | Small cyprid | (Barnes, 1989) |
| Lernaeodiscus porcellanae | 126 x 160 | - | Egg dimensions | (Barnes, 1989) |
| Litoscalpellum regina | - | 1,250 | Cypris larva size | (Buhl-Mortensen and Høeg, 2006) |
| Octolasmis mulleri | - | 790-850 | Length of stage 2 larvae | (Lang, 1976) |
| Octomeris angulosa | 133 x 212 | 100 x 180 | Egg dimensions, Stage 1 nauplius dimensions | (Barnes, 1989) |
| Ornatoscalpellum gibberum | 1,090-1,500 | - | Egg size range | (Buhl-Mortensen and Høeg, 2006) |
| Ornatoscalpellum ornatum | 800 | - | Egg size | (Buhl-Mortensen and Høeg, 2006) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|-------------------------------|-----------|-------------|---|--|
| Ornatoscalpellum stroemii | 500-600 | 100 | Egg size range, cyprid larvae size | (Buhl-Mortensen and Høeg, 2006) |
| Peltogaster sulcatus | - | 250 | Stage 1 nauplius size | (Barnes, 1989) |
| Peltogasterella gracilis | 110-170 | 220-275 | Range of egg size, range for nauplius stage 1 | (Barnes, 1989) |
| Peltogasterella gracilis | 140-150 | - | Egg diameter | (Newman and Abbott, 1980) |
| Peltogasterella socialis | - | 207-247 | Nauplius size range | (Barnes, 1989) |
| Peltogasterella subterminalis | - | 126-148 | Nauplius size range | (Barnes, 1989) |
| Pilsbryiscalpellum capense | - | 700 | Cypris larva size | (Buhl-Mortensen and Høeg, 2006) |
| Pilsbryiscalpellum subalatum | - | 800 | Cypris larva size | (Buhl-Mortensen and Høeg, 2006) |
| Pollicipes polymerus | - | 82 x 173 | Dimensions of N1 larvae | (Strathmann) |
| Sacculina carcini | 54-180 | 120 x 165 | Range of egg width, nauplius dimensions | (Barnes, 1989) |
| Sacculina micracantha | 134 | - | Egg size | (Barnes, 1989) |
| Sacculina papposa | 100 | - | Egg size | (Barnes, 1989) |
| Sacculina rotundata | 100 | 135 x 215 | Egg size, stage 1 nauplius size | (Barnes, 1989) |
| Sacculina setosa | 100 | - | Egg size | (Barnes, 1989) |
| Sacculina sulcata | 110 | - | Egg size | (Barnes, 1989) |
| Scalpellum uncinatum | 1,000 | - | Egg size | (Buhl-Mortensen and Høeg, 2006) |
| Semibalanus balanoides | - | 220 | Stage 1 larvae minimum length | (Bassindale, 1936, Drouin et al., 2002) |
| Semibalanus cariosus | - | 157 x 266 | Dimensions of N1 larvae | (Strathmann) |
| Semibalanus hesperius | - | 129 x 265 | Dimensions of N1 larvae | (Strathmann) |
| Septodiscus flabellum | 129 x 182 | - | Egg dimensions | (Barnes, 1989) |
| Septosaccus cuenoti | 125 x 170 | 135 x 190 | Egg size, stage 1 larvae size | (Barnes, 1989) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|-----------------------------------|-----------|-------------|---|------------------------------------|
| Smilium hypocrites | 200 | - | Egg size | (Buhl-Mortensen and Høeg, 2006) |
| Solidobalanus hesperius hesperius | - | 85 x 177 | Stage 1 nauplius dimensions | (Barnes, 1989) |
| Sylon hippolytes | 60 | - | Ova size | (Barnes, 1989) |
| Sylon schneideri | 60 | - | Ova size | (Barnes, 1989) |
| Tarasovium brevicaulis | 400 | - | Egg size | (Buhl-Mortensen and Høeg, 2006) |
| Tarasovium eumitos | 900 | - | Egg size | (Buhl-Mortensen and Høeg, 2006) |
| Tarasovium natalense | 600 | - | Egg size | (Buhl-Mortensen and Høeg, 2006) |
| Tarasovium valvulifer | 500 | 750 | Egg size, cypris larva size | (Buhl-Mortensen and Høeg, 2006) |
| Teloscalpellum retrieveri | 500 | - | Egg size | (Buhl-Mortensen and Høeg, 2006) |
| Teloscalpellum ventricosum | - | 1,330 | Cypris larva size | (Buhl-Mortensen and Høeg, 2006) |
| Tetraclita divisa | 840 | 620 | Egg size, Stage 1 nauplius | (Barnes, 1989) |
| Tetraclita japonica | - | 181 | Stage 1 larvae width | (Chan, 2003) |
| Tetraclita karande | - | 240 | Stage 1 larvae length | (Chan, 2003) |
| Tetraclita pacifica | 387 x 527 | - | Egg dimensions | (Barnes, 1989) |
| Tetraclita purpurascens | - | 330 | Stage 1 nauplii length | (Foster, 1967) |
| Tetraclita purpurascens | - | 290-310 | Carapace length of stage 1 larvae | (Barker, 1976) |
| Tetraclita serrata | - | 154 x 274 | Stage 1 nauplius dimensions | (Barnes, 1989) |
| Tetraclita squamosa | - | 190 | Stage 1 larvae width | (Chan, 2003) |
| Tetraclita squamosa rubescens | 195 x 340 | 229 x 498 | Egg dimensions, Stage 1 nauplius dimensions | (Barnes, 1989) |
| Tetraclita squamosa rufotincta | - | 336 x 509 | Stage 1 nauplius dimensions | (Chan, 2003) |
| Thompsonia cubensis | 85 | - | Egg size | (Barnes, 1989) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|-----------------------------------|-------------------|-------------------|---|---|
| Thompsonia sp. | 34 | 200 | Egg diameter, cyprid size | (Barnes, 1989) |
| Thoracica (Superorder) | 107–1,500 (SE 21) | 375–2,550 (SE 19) | Egg size range from 170 species of Superorder Thoracica | (Ewers-Saucedo and Pappalardo, 2019) |
| Trianguloscalpellum balanoides | 420 | - | Egg size | (Buhl-Mortensen and Høeg, 2006) |
| Trianguloscalpellum compactum | 800 | 1030 | Cypris larva size | (Buhl-Mortensen and Høeg, 2006) |
| Trianguloscalpellum darwinii | 1,500 | - | Egg size | (Buhl-Mortensen and Høeg, 2006) |
| Trianguloscalpellum regium regium | 1,030 | - | Egg size | (Buhl-Mortensen and Høeg, 2006) |
| Trianguloscalpellum sessile | 470 | - | Egg size | (Buhl-Mortensen and Høeg, 2006) |
| Triangulus galatheae | - | 100 x 257 | Nauplius size | (Barnes, 1989) |
| Trypetesa lateralis | 250 | 500 | Egg diameter longest axis, hatching length | (Newman and Abbott, 1980) |
| Verruca stroemia | - | 270 | Length of naupilar stage 1 | (Pyefinch, 1948, Bassindale, 1936) |
| Weltnerium convexum | 780 | - | Egg size | (Buhl-Mortensen and Høeg, 2006) |

Note: Smallest value was recorded when available, * indicates that size was an approximate value.

A3. Bivalves

Literature search: To identify literature on propagule and female gamete size a systematic literature search was undertaken using the <u>Scopus</u> and the <u>Web of Science</u> databases. For bivalves three searches were performed using the following search criteria:

Scopus (TITLE-ABS-KEY (ascidiacea) AND TITLE-ABS- KEY (viable AND propagule AND size) OR TITLE-ABS-KEY ('egg AND size') OR ALL (diameter) OR TITLE-ABS-KEY 78 results

Web of Science: TOPIC: (decapod) AND TOPIC: (egg size) refined by: TOPIC: (diameter) Results: 56

Web of Science: You searched for: TOPIC: (bivalv) AND TOPIC: (egg size) Results: 197

Additional articles were also sourced from citations and reference lists of articles produced in the Web of Science database searches.

| Species | Egg (µm) | Larval (µm) | Comments | References |
|-------------------------|------------------|-------------|--|--|
| Abra tenuis | 140 | _ | Mature oocyte diameter | (Gibbs, 1984) |
| Adula californiensis | 70-80 | - | Oocyte diameter | (Strathmann, 1987) |
| Aequipecten irradians | 55-65 | - | Egg diameter range | (Loosanoff and Davis, 1963, Sastry, 1966) |
| Aequipecten opercularis | 63, 68 | - | Mean egg diameter | (Jørgensen, 1946, Sasaki, 1979) |
| Anadara concinna | 52.9 (SD ± 1.0) | - | Mean egg diameter (longest) | (Moran, 2004) |
| Anadara nux | 53.6 (SD ± 5.5) | - | Mean egg diameter (longest) | (Moran, 2004) |
| Anomia simplex | 42-45 | 47 x 58 | Egg diameter range, smallest larvae with formed shell | (Loosanoff and Davis, 1963) |
| Arca imbricata | 74.1 (SD ± 5.7) | - | Mean egg diameter (longest) | (Moran, 2004) |
| Arca mutabilis | 61.4 (SD ± 2.1) | - | Mean egg diameter (longest) | (Moran, 2004) |
| Arca pacifica | 69.7 (SD ± 6.1) | - | Mean egg diameter (longest) | (Moran, 2004) |
| Arca transversa | 52 | 55 | Mean egg diameter *, width of smallest straight hinge larvae | (Loosanoff and Davis, 1963) |
| Arca zebra | 77.0 (SD ± 4.5) | - | Mean egg diameter (longest) | (Moran, 2004) |
| Arcopsis adamsi | 65.7 (SD ± 2.0) | - | Mean egg diameter (longest) | (Moran, 2004) |
| Arcopsis solida | 65.7 (SD ± 1.80 | - | Mean egg diameter (longest) | (Moran, 2004) |
| Aulacomya maoriana | 55 | - | Egg diameter | (Ackerman et al., 1994) |
| Bankia indica | 45 | - | Egg diameter | (Ackerman et al., 1994) |
| Bankia setacea | 47 | - | Oocyte diameter | (Strathmann, 1987) |
| Barbatia bailyi | 216.8 (SD ± 5.9) | - | Mean egg diameter (longest) | (Moran, 2004) |

Table A3 Bivalves propagule sizes identified from the literature search

| Species | Egg (µm) | Larval (µm) | Comments | References |
|------------------------|------------------|-------------|-------------------------------------|-------------------------------------|
| Barbatia cancellaria | 116.5 (SD ± 3.5) | - | Mean egg diameter (longest) | (Moran, 2004) |
| Barbatia candida | 61.5 (SD ± 2.2) | - | Mean egg diameter (longest) | (Moran, 2004) |
| Barbatia domingensis | 74.9 (SD ± 0.8) | - | Mean egg diameter (longest) | (Moran, 2004) |
| Barbatia gradata | 69.5 (SD ± 2.9) | - | Mean egg diameter (longest) | (Moran, 2004) |
| Barbatia illota | 64.8 (SD ± 1.5) | - | Mean egg diameter (longest) | (Moran, 2004) |
| Barbatia reeveana | 55.9 (SD ± 1.1) | - | Mean egg diameter (longest) | (Moran, 2004) |
| Barbatia tenera | 67.5 (SD ± 0.4) | - | Mean egg diameter (longest) | (Moran, 2004) |
| Bittium eschrichtii | 220 | - | Oocyte diameter | (Strathmann, 1987) |
| Brachidontes granulata | 66.3 | 73 | Egg diameter, Trocophore height | (Ackerman et al., 1994) |
| Cardium exiguum | 64 | - | Egg diameter | (Lovén, 1850) |
| Cardium fasciatum | 80 | - | Egg size | (Jørgensen, 1946) |
| Cardium pinnulatum | - | 80 x 90 | Larvae dimensions | (Sullivan, 1948) |
| Cerastoderma edule | 77 | - | Egg diameter | (Honkoop and Van der Meer, 1998) |
| Cerastoderma edule | 77.5 | - | Egg diameter | (Honkoop et al., 1999) |
| Chlamys asperrimus | 62 | - | Mean egg diameter | (Rose and Dix, 1984) |
| Chlamys hastata | 71-74 | - | Oocyte | (Strathmann, 1987) |
| Clinocardium nuttallii | 80 | - | Oocyte | (Strathmann, 1987) |
| Crassostrea | 50 | - | Average egg size * | (Powell et al., 2011) |
| Crassostrea glomerata | 40 | - | Egg diameter | (Ackerman et al., 1994) |
| Crassostrea iredalei | 48 | - | Egg diameter | (Ackerman et al., 1994) |
| Crassostrea virginica | 45–62 | 55 x 68 | Egg diameter range, smallest larvae | (Loosanoff and Davis, 1963) |
| Crassotrea gigas | 50-60 | - | Oocyte diameter | (Strathmann, 1987) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|------------------------|-------------------|-------------|--|-------------------------------------|
| Cyprina Islandica | 80-95 | - | Egg diameter range | (Loosanoff, 1953) |
| Dreissena polymorpha | 68-100 | 230-240 | Egg diameter range, larvae at predeviliger stage | (Stoeckel et al., 2004) |
| Dreissena polymorpha | 40-96 | 57–121 | Egg diameter, trocophore height | (Ackerman et al.) |
| Ensis directus | 64-73 | 80 | Egg diameter range, length of smallest larvae | (Loosanoff and Davis, 1963) |
| Equichlamys bifrons | 119.6 (SE ± 0.38) | 150-181 | Egg diameter, 3–day old veliger range | (Dix, 1976) |
| Gari californica | 70 | - | Oocyte diameter | (Strathmann, 1987) |
| Idas washingtonia | 20-55 | - | Ripe primary oocytes | (Tyler et al., 2009) |
| Katelysia scalarina | 69 ± 2 | 110 ± 1.3 | Mean egg diameter, mean veliger shell length | (Kent et al., 1998) |
| Laevicardium mortoni | 60-65 | 90 | Egg diameter range, shell-bearing veliger length | (Loosanoff and Davis, 1963) |
| Lasaea subviridis | 300 | - | Oocyte diameter | (Strathmann, 1987) |
| Laternula elliptica | 49.3 | - | Mean oocytes in spawning ovaries | (Kang et al., 2003) |
| Laternula elliptica | 156.6 | - | Diameter of fully developed eggs | (Kang et al., 2003) |
| Littorinacea keena | 89 | 137 | Oocyte diameter | (Strathmann, 1987) |
| Littorinacea plena | 96 | 169 | Oocyte diameter, larvae size | (Strathmann, 1987) |
| Littorinacea scutulata | 100 | 155 | Oocyte diameter | (Strathmann, 1987) |
| Littorinacea sitkana | 175 | - | Oocyte diameter | (Strathmann, 1987) |
| Lyonsia bracteata | 120 | - | Oocyte diameter | (Strathmann, 1987) |
| Macoma balthica | 97 | - | Oocyte | (Strathmann, 1987) |
| Macoma balthica | 107 | - | Egg diameter | (Honkoop and Van der Meer, 1998) |
| Macoma balthica | 100-110 | - | Mean egg diameter | (Honkoop and Van der Meer, 1997) |
| Macoma balthica | 107.8 (SE ± 1.2) | - | Mean egg diameter | (Honkoop et al., 1999) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|---------------------------------|-----------------|-------------|--|----------------------------------|
| Macoma balthica | - | 228-287 | Size of primary settlers | (Philippart et al., 2003) |
| Macoma mitchelli | 59 | - | Egg diameter | (Ackerman et al., 1994) |
| Mactra solidissima | 56 | 63-65 | Approximate egg diameter, larvae width | (Loosanoff and Davis, 1963) |
| Marcia opima | 47.8 (SD ± 5.1) | 71 x 87 | Fertilised egg diameter, straight hinged larvae dimensions | (Muthiah et al., 2002) |
| Mercenaria campechiensis | 70–115 | - | Egg diameter range | (Kraeuter and Castagna, 2001) |
| Mercenaria campechiensis texana | 83-95 | - | Egg diameter range | (Kraeuter and Castagna, 2001) |
| Mercenaria mercena | 60 | - | Egg diameter | (Ackerman et al., 1994) |
| Mercenaria mercenaria | 70-73 | 64 x 86 | Egg diameter range, smallest larvae measurements | (Loosanoff and Davis, 1963) |
| Mercenaria mercenaria | 70-87 | - | Egg diameter range | (Kraeuter and Castagna, 2001) |
| Mercenaria mercenaria | 50-60 | - | Mature oocyte diameter | (Keck et al., 1975) |
| Modiolarca subpicta | 56 | - | Egg diameter * | (Morton and Dinesen, 2011) |
| Modiolarca subpicta | 60 | - | Egg diameter * | (Morton and Dinesen, 2011) |
| Modiolarca subpicta | - | 95 | Initial larval shell * | (Morton and Dinesen, 2011) |
| Modiolus capax | 70 | 100 | Egg diameter, Trocophore height | (Ackerman et al., 1994) |
| Modiolus modiolus | 78-90 | - | Oocyte | (Strathmann, 1987) |
| Modiolus modiolus | - | 85 x 100 | Larvae dimensions | (Jørgensen, 1946) |
| Mulina lateralis | 50 | _ | Egg diameter | (Ackerman et al., 1994) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|----------------------------|-----------|-------------|--|-------------------------------------|
| Musculista senhousia | 46.8-50.1 | - | Range of mean oocyte diameters | (Sgro et al., 2002) |
| Mya arenaria | 62.5 | - | Average egg diameter | (Belding, 1931) |
| Mya arenaria | 75 | - | Oocyte diameter | (Strathmann, 1987) |
| Mya arenaria | 68-73 | 71 x 86 | Egg diameter range, smallest larvae dimensions | (Loosanoff and Davis, 1963) |
| Mya arenaria | 70-80 | - | Egg size range | (Battle, 1932) |
| Mysella tumida | 95 | - | Oocyte diameter | (Strathmann, 1987) |
| Mysella tumida | 95 | - | Oocyte size | (Strathmann, 1987) |
| Mytilimeria nuttallii | 120 | - | Oocyte diameter | (Strathmann, 1987) |
| Mytilopsis sallei | 64 | 87.3 ± 8.2 | Oocyte diameter, veliger shell length | (He et al., 2016) |
| Mytilus californianus | 60 | - | Oocyte diameter | (Strathmann, 1987) |
| Mytilus edulis | 72 | - | Egg diameter | (Honkoop and Van der Meer, 1998) |
| Mytilus edulis | 73.2 | - | Egg diameter | (Honkoop et al., 1999) |
| Mytilus edulis | 60 | - | Oocyte diameter | (Strathmann, 1987) |
| Mytilus edulis x trossulus | 40 | - | - | (Toro et al., 2002) |
| Mytilus trossulus | 40 | - | - | (Toro et al., 2002) |
| Mytilus viridis | 50 | _ | Egg diameter | (Ackerman et al., 1994) |
| Nitidiscala tincta | - | 70-250 | Veliger shell length | (Strathmann, 1987) |
| Noetia ponderosa | 65 | - | Egg diameter | (Ackerman et al., 1994) |
| Ostrea lurida | 100-110 | 149 x 160 | Egg diameter range, smallest larvae measurements | (Loosanoff and Davis, 1963) |
| Ostrea lurida | 100-110 | - | Oocyte diameter | (Strathmann, 1987) |
| Ostrea rivularis | 49-53 | - | Egg diameter | (Zhou and Allen, 2003) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|-----------------------------|-------------------|--------------|--|-----------------------------------|
| Pandora inaequivalvis | 105 | _ | Egg diameter | (Ackerman et al., 1994) |
| Panope abrupta | 80 | - | Oocyte diameter | (Strathmann, 1987) |
| Patinopecten yessoensis | 55 | - | Egg diameter | (Sanders, 1973) |
| Pecten maximus | 70 | 90 | Size of trocophore embryo | (Gruffydd and Beaumont, 1972) |
| Pecten maximus | 66.13 (SD ± 1.52) | - | Egg diameter | (Paulet et al., 1988) |
| Pecten meridionalis | 71.1 (SD ± 2.4) | 76 x 93 | Egg diameter, smallest straight hinge veliger | (Dix and Sjardin, 1975) |
| Pecten opercularis | 68 | - | Egg diameter | (Fullarton, 1890) |
| Perna indica | 55 | 260 x 300 | Ripe ovum, early pediveliger larval stage | (Alagarswami, 1980) |
| Perna indica | 45-50 | 52–55 | Egg diameter, larvae width | (Appukuttan et al., 1988) |
| Perna perna | 40-60 | - | Oocyte diameter | (Aarab et al., 2013) |
| Perna viridis | 45-50 | 300 | Spawned egg diameter, prediveliger shell length | (Alagarswami, 1980) |
| Petaloconchus compactus | 104-110 | - | Oocyte diameter | (Strathmann, 1987) |
| Petricola pholadiformis | 51–58 | 65 x 79 | Egg diameter range, smallest larvae measurements | (Loosanoff and Davis, 1963) |
| Pholas orientalis | 43.0 ± 0.8 | - | Egg diameter (self fertilise) | (Ronquillo and McKinley, 2006) |
| Pitar morrhuana | 49 | - | Egg diameter | (Ackerman et al., 1994) |
| Placuna placenta | 56 (SD ± 5) | 84 (SD ± 18) | Spawned egg diameter, veliger shell length | (Madrones-Ladja, 1997) |
| Pododesmus cepio | 65 | - | Oocyte diameter | (Strathmann, 1987) |
| Solemya reidi | 270 | - | Oocyte diameter | (Strathmann, 1987) |
| Spisula solidissima similis | 58.5 | - | Egg diameter | (Walker and O'Beirn, 1996) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|-------------------------|----------|-------------|--|--------------------------------|
| Tapes semidecusata | 60-75 | 70 x 95 | Egg diameter range, smallest larvae measurements | (Loosanoff and Davis, 1963) |
| Teredo navalis | 50-60 | 70 x 80 | Unfertilised egg diameter range, smallest larvae measurements | (Loosanoff and Davis, 1963) |
| Transennella tantilla | 250 | - | Oocyte diameter | (Strathmann, 1987) |
| Tresus capax | 60-70 | - | Oocyte diamter | (Strathmann, 1987) |
| Various bivalve species | 40 | - | The range between minimum and maximum egg diameter between bivalve species | (Cardoso et al., 2006) |
| Various bivalve species | - | 60-200 | Minimum length at hatchling across various bivalve species | (Cardoso et al., 2006) |
| Various bivalve species | - | - | Lowest observed length at settlement | (Cardoso et al., 2006) |
| Xylophaga depalmai | 40 | - | Egg diameter | (Tyler et al., 2007) |
| Yolida spp. | 120-150 | - | Oocyte diameter | (Strathmann, 1987) |

Note: Smallest value was recorded when available, * indicates that size was an approximate value.

A4. Polychaetes

Literature search: To identify literature on propagule and female gamete size a systematic literature search was undertaken using the <u>Web of Science</u> database. For polychaetes two searches were performed using the following search criteria:

Web of science: (TOPIC: (polychaete) AND TOPIC: (egg size) Results: 190

Web of science: TOPIC: (polychaete) AND TOPIC: (reproduction) Refined by: TOPIC: (egg size) Results: 55

Additional articles were also sourced from citations and reference lists of articles produced in the Web of Science database searches.

Table A4 Polychaetes propagule sizes identified from the literature search

| Species | Egg (µm) | Larval (µm) | Comments | References |
|-----------------------|----------|-------------|-----------------|--------------------|
| Abarenicola pacifica | 160-190 | - | Oocyte diameter | (Strathmann, 1987) |
| Abarenicola vagabunda | 45x 145 | - | Oocyte diameter | (Strathmann, 1987) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|---------------------------|-----------------|-------------|--|------------------------------------|
| Ampharetidae family | 220 (SD ± 68) | - | Egg diameter | (McHugh and Fong, 2002) |
| Amphiglena mediterranea | - | - | Hermaphroditic | (McEuen et al., 1983) |
| Amphisamytha galapagensis | 240 | - | Maximum egg size | (McHugh and Tunnicliffel, 1994) |
| Amphisamytha galapegensis | 40-150 | - | Egg diameter | (Zottoli, 1983, Blake, 1993) |
| Anaitides mucosa | 113.4 ± 5.4 | - | Egg diameter | (Sach, 1975) |
| Arctonoe vittata | 75-90 | - | Egg diameter | (Britayev, 1991) |
| Arenicola claparedii | 200-220 | 70 x 320 | Fertilised egg size, larvae dimensions | (Okuda, 1946) |
| Arenicola marina | 190 | - | Egg diameter | (Newell, 1948) |
| Arenicola marina | 180 | - | Diameter of spawning oocytes | (Meijer, 1979) |
| Arenicola marina | 190 | - | Egg diameter | (Newell, 1948) |
| Armandia brevis | 50 | - | Oocyte diameter | (Strathmann, 1987) |
| Arnecolidae family | 185 (SD ± 5) | - | Egg diameter | (McHugh and Fong, 2002) |
| Aurospio dibranchiata | 70-98 | - | Egg diameter | (Blake, 1993) |
| Australonuphis parateres | 260-280 | - | Mature oocyte diameter | (Paxton, 1979) |
| Australonuphis teres | 256-260 | - | Mature oocyte diameter | (Paxton, 1979) |
| Axiothella mucosa | 212.4 | - | Egg diameter | (Pernet and Jaeckle, 2004) |
| Axiothella mucosa | 195-200 | - | Width of unfertilised egg | (Bookhout and Horn, 1949) |
| Axiothella rubrocincta | 220-385 | - | Maximum oocyte diameters | (Wilson, 1983) |
| Axiothella rubrocinta | 230 | - | Oocyte diameter | (Strathmann, 1987) |
| Axiothella rubrocinta | 385 | - | Oocyte diameter | (Strathmann, 1987) |
| Axiothella serrata | 240 | - | Maximum oocyte diameter | (Read, 1984) |
| Branchiomma cingulata | - | - | Hermaphroditic | (McEuen et al., 1983) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|---------------------------|----------------|-------------|-----------------------------|--|
| Branchiomma nigromaculata | 135 | - | Egg size | (McEuen et al., 1983) |
| Capitella capitella | 95 | - | Egg diameter | (Warren, 1976, Tsutsumi and Kikuchi, 1984) |
| Capitella capitella | 250 | - | Minimum egg diameter | (Reish, 1974, Tsutsumi and Kikuchi, 1984) |
| Capitella capitella | - | 240-270 | Embryo width | (Wu, 1964, Tsutsumi and Kikuchi, 1984) |
| Capitella capitella | 233.3-266.8 | - | Range of mean egg diameters | (Yamamoto, 1980, Tsutsumi and Kikuchi, 1984) |
| Capitella capitella | 256 (SD ± 7.3) | - | Egg size | (Tsutsumi and Kikuchi, 1984) |
| Capitella capitella | 75-80 | - | Egg size | (Foret, 1974, Tsutsumi and Kikuchi, 1984) |
| Capitella capitella | 95 | - | Egg diameter | (Warren, 1976, Tsutsumi and Kikuchi, 1984) |
| Capitella capitella | 250 | - | Minimum egg diameter | (Reish, 1974, Tsutsumi and Kikuchi, 1984) |
| Capitella capitella | - | 240-270 | Embryo width | (Wu, 1964, Tsutsumi and Kikuchi, 1984) |
| Capitella capitella | 233.3-266.8 | - | Range of mean egg diameters | (Yamamoto, 1980, Tsutsumi and Kikuchi, 1984) |
| Capitella capitella | 256 (SD ± 7.3) | - | Egg size | (Tsutsumi and Kikuchi, 1984) |
| Capitella capitella | 75-80 | - | Egg size | (Foret, 1974, Tsutsumi and Kikuchi, 1984) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|--------------------------|--------------------|-------------|--|--|
| Capitella sp | 50-260 | - | Egg diameter | (Eckelbarger and Grassle, 1983) |
| Capitella sp I | 180 x 260 | - | Egg diameter | (Eckelbarger, 1986) |
| Capitella sp Ia | 75 | - | Egg diameter | (Eckelbarger, 1986) |
| Capitella sp II | 190 | - | Egg diameter | (Eckelbarger, 1986) |
| Capitella sp III | 50 | - | Egg diameter | (Eckelbarger, 1986) |
| Capitella sp IIIa | 250 | - | Egg diameter | (Eckelbarger, 1986) |
| Capitella sp. | 220 | 440 | Egg size, larvae size at release | (Levin, 1984) |
| Capitella sp. | 94.10 (SD ± 15.69) | - | Egg diameter of subtidal species | (Qian and Chia, 1991) |
| Ceratonereis costae | 200 | - | Egg diameter | (Mazurkiewicz, 1975, Durchon, 1956) |
| Chaetopteridae family | 107 (SD ± 8) | - | Egg diameter | (McHugh and Fong, 2002) |
| Chaetopterus sp. | 94.7 | - | Egg diameter | (Pernet and Jaeckle, 2004) |
| Chone echaudata | 200 | - | Egg size | (McEuen et al., 1983) |
| Chone teres | 200 | 100 x 200 | Egg diameter, prototroch width | (Okuda, 1946) |
| Circeis armoricana | 95 x 140 | - | Egg size | (Kupriyanova and Nishi) |
| Circeis cf. armoricana A | 95 x 140 | - | Egg size | (Kupriyanova and Nishi) |
| Cirratulidae family | 155 (SD ± 40) | - | Egg diameter | (McHugh and Fong, 2002) |
| Cirratulus cirratus | 100 | 100 x 110 | Fertilised egg diameter, larvae dimensions | (Okuda, 1946) |
| Cirratulus cirratus | 140-150 | - | Egg diameter | (Olive, 1970, Stephenson, 1950) |
| Cirratulus cirratus | 300 | - | Egg diameter | (Olive, 1970) |
| Cirratulus cirratus | 110-120 | - | Egg diameter | (Olive, 1970) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|-------------------------|----------------|-------------|----------------------------------|--|
| Cossura longocirrata | 60-70 | _ | Egg diameter | (Blake, 1993) |
| Crucigera irregularis | 90 | - | Oocyte diameter | (Strathmann, 1987) |
| Crucigera zygophora | 70 | _ | Oocyte diameter | (Strathmann, 1987) |
| Diopatra variabilis | 600 | - | Egg diameter | (Richards, 1967, Krishnan, 1936) |
| Dipolydora commensalis | 120 | _ | Egg diameter * | (Hatfield, 1965) |
| Dodecaeria fewkesi | 100 | _ | Oocyte diameter | (Strathmann, 1987) |
| Dorvilleidae family | 164 (SD ± 120) | - | Egg diameter | (McHugh and Fong, 2002) |
| Eteone longa | 100 | _ | Minimum oocyte diameter | (Emlet et al., 1987) |
| Euchome bansei | 60 | - | Mean egg width | (Blake, 1993, Ruff and Brown, 1989) |
| Euchone analis | 150 | - | Egg size | (McEuen et al., 1983) |
| Eudistylia vancouveri | 182 | - | Egg size | (McEuen et al., 1983) |
| Eunice pennata | 160 | - | Egg diameter * | (Richards, 1967, Allen, 1957) |
| Eunice valens | 310 | - | Oocyte diameter | (Strathmann, 1987) |
| Eunicidae family | 219 (SD ± 57) | - | Egg diameter | (McHugh and Fong, 2002) |
| Euratella salmacidis | - | - | Hemaphroditic | (McEuen et al., 1983) |
| Euzonus mucronata | 25 x 65 | - | Oocyte diameter | (Strathmann, 1987) |
| Exogone lourei | 100 | 400-500 | Egg size, larvae size at release | (Levin, 1984) |
| Fabricia limnicola | 300 | 1,000 | Egg size, larvae size at release | (Levin, 1984) |
| Fabricia sabella | 210 | - | Egg size | (McEuen et al., 1983) |
| Fabricia sp. | 140 | - | Egg size | (McEuen et al., 1983) |
| Ficopomatus enigmaticus | 60 | - | Egg size | (Kupriyanova and Nishi) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|-----------------------------|-------------------|-------------|---|---------------------------------|
| Ficopomatus miamiensis | 46-50 | - | Egg size | (Kupriyanova and Nishi) |
| Filograna/Salmacina complex | 180-200 | - | Egg size | (Kupriyanova and Nishi)) |
| Galeolaria caespitosa | 53 | - | Eggs this size or greater were fertilizable, Released eggs varied from 26–68, only eggs ≥53 were fertilised | (Kupriyanova, 2006) |
| Galeolaria caespitosa | 80 | - | Egg diameter | (Marshall and Keough, 2003a) |
| Galeolaria hystrix | 65-68 | - | Fertilised egg diameter | (Nelson et al., 2017) |
| Glyceridae family | 170 | - | Egg diameter | (McHugh and Fong, 2002) |
| Goniadidae family | 100 | - | Egg diameter | (McHugh and Fong, 2002) |
| Haploscoloplos kerguelensis | 200 | 140 x 250 | Fertilised egg size, larvae dimensions | (Okuda, 1946) |
| Harmothoe extenuata | 95 | - | Oocyte diameter | (Strathmann, 1987) |
| Harmothoe imbricata | 136 | - | Oocyte diameter | (Strathmann, 1987) |
| Hesionidae family | 108 | - | Egg diameter | (McHugh and Fong, 2002) |
| Hydroides dianthus | - | 60-70 | Prototroch diameter | (Scheltema et al., 1981) |
| Hydroides elegans | 44.78 (SE ± 0.15) | - | Egg diameter | (Miles, 2006) |
| Hydroides ezoensis | 50 x 55 | - | Egg dimensions | (Miura and Kajihara, 1981) |
| Hydroides fusicola | 67 | - | Egg size | (Kupriyanova and Nishi) |
| Hydroides hexagonis | 67-72 | - | Mature egg diameter | (Grave, 1933) |
| Hydroides sanctaecrucis | 52.2 | - | Egg diameter | (Pernet and Jaeckle, 2004) |
| Idanthyrus armantus | 70 | - | Oocyte diameter | (Strathmann, 1987) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|--------------------------|----------------|-------------|--|-------------------------------------|
| Janua pagenstecheri | 120-150 | _ | Egg size | (Kupriyanova and Nishi) |
| Kinbergonuphis simoni | 351.9 | - | Egg diameter | (Pernet and Jaeckle, 2004) |
| Laeonereis culveri | 135-162 | - | Egg diameter | (Mazurkiewicz, 1975) |
| Lanassa nuda | 170 | 100 x 280 | Fertilised egg size, larvae dimensions | (Okuda, 1946) |
| Lepidonotus cementarium | 120 | - | Oocyte diameter | (Strathmann, 1987) |
| Lumbriconereis latreilli | 300 | - | Fertilised egg diameter | (Okuda, 1946) |
| Lumbrineridae family | 270 (SD ± 119) | - | Egg diameter | (McHugh and Fong, 2002) |
| Lumbrineris bassi | 250 | - | Egg diameter | (Richards, 1967, Hartman, 1944) |
| Lumbrineris fragilis | 176-216 | - | Mature egg diameter range | (Valderhaug, 1985) |
| Lumbrineris latreilli | 200 | - | Egg diameter | (Richards, 1967, Hartman, 1944) |
| Lumbrineris pallida | 200 | - | Egg diameter | (Hartman, 1944) |
| Manayunkia aestuarina | - | - | Hemaphroditic | (McEuen et al., 1983) |
| Marphysa borradailei | 170 | - | Egg diameter in early development | (Richards, 1967, Pillai, 1958) |
| Marphysa gravelyi | 200 | - | Egg diameter | (Richards, 1967, Southern, 1921) |
| Megalomma vesiculosum | 150 | - | Egg size | (McEuen et al., 1983) |
| Melinna cristata | 240-400 | - | Oocyte diameter range | (Hutchings, 1973) |
| Melinna palmata | 200-350 | - | Mature oocyte diameter range | (Guillou and Hily, 1983) |
| Mesochaetopterus taylori | 115 | - | Oocyte diameter | (Strathmann, 1987) |
| Microprotula ovicellata | 80 | - | Egg size | (Kupriyanova and Nishi) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|--------------------------------|---------------|-------------|--|---|
| Nainereis laevigata | 250 | 200 x 300 | Fertilised egg size, larvae dimensions | (Okuda, 1946) |
| Naineris laevigata | 240 | - | Eggdiameter | (Giangrande and Petraroli, 1991) |
| Neanthes sp. | 280 | - | Spawned egg diameter | (Okuda, 1946) |
| Neodexiospira cf. brasiliensis | 95-99 | - | Egg size range | (Kupriyanova and Nishi) |
| Neodexiospira foraminosa | 80 | - | Egg size | (Kupriyanova and Nishi)) |
| Nephtyidae family | 145 (SD ± 33) | - | Egg diameter | (McHugh and Fong, 2002) |
| Nereidae family | 226 (SD ± 88) | - | Egg diameter | (McHugh and Fong, 2002) |
| Nereis arenaceodentata | 420-520 | - | Egg diameter range | (Mazurkiewicz, 1975, Reish, 1957) |
| Nereis diversicolor | 200-275 | - | Mature oocyte diameter range | (Dales, 1950) |
| Nereis fucata | 200-250 | - | Egg diameter | (Mazurkiewicz, 1975, Brown-Gilpin, 1959) |
| Nereis grubei | 162-380 | - | Mature oocyte diameter | (Mazurkiewicz, 1975, Reish, 1954) |
| Nereis grubei | 162-380 | - | Egg diameter | (Schroeder, 1968) |
| Nereis irrorata | 210 | - | Egg diameter | (Mazurkiewicz, 1975) |
| Nereis limnicola | 170 | - | Oocyte diameter | (Strathmann, 1987) |
| Nereis pelagica | 180 | - | Egg diameter | (Mazurkiewicz, 1975, Wilson, 1932) |
| Nereis pelagica | 160-180 | - | Oocyte diameter | (Strathmann, 1987) |
| Nereis procera | 140-150 | - | Oocyte diameter | (Strathmann, 1987) |
| Nereis succinea | 140-150 | - | Egg diameter | (Mazurkiewicz, 1975, Banse, 1954) |
| Nereis vexillosa | 200 | - | Oocyte diameter | (Strathmann, 1987) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|---------------------------|----------------|-------------|--|---|
| Nereis vexillosa | 250 | 322 | Egg diameter, larvae length | (Roe, 1975) |
| Nereis vexillosa | 200 | _ | Oocyte diameter | (Strathmann, 1987) |
| Nereis virens | 170-180 | - | Egg diameter | (Mazurkiewicz, 1975, Bass and Brafield, 1972) |
| Nicon aestuariensis | 150 | - | Egg diameter | (Mazurkiewicz, 1975, Estcourt, 1966) |
| Onuphidae family | 291 (SD ± 122) | - | Egg diameter | (McHugh and Fong, 2002) |
| Onuphis iridescens | 250 | _ | Oocyte diameter | (Strathmann, 1987) |
| Onuphis taeniata | 220-240 | - | Mature oocyte diameter | (Paxton, 1979) |
| Opheliidae family | 139 (SD ± 51) | - | Egg diameter | (McHugh and Fong, 2002) |
| Ophiodromus pugettensis | 80 | _ | Oocyte diameter | (Strathmann, 1987) |
| Ophiodromus pugettensis | 85.1 | - | Egg diameter | (Pernet and Jaeckle, 2004) |
| Ophryotrocha diadema | 180 | - | Egg diameter | (Sella, 1990, Åkesson, 1976) |
| Ophryotrocha labidion | 55.7-73.0 | - | Egg diameter | (Hilbig and Blake, 1991, Blake, 1993) |
| Ophryotrocha mandibulata | 40-48 | - | Egg diameter | (Hilbig and Blake, 1991, Blake, 1993) |
| Ophryotrocha paralabidion | 56.5 | - | Egg diameter | (Hilbig and Blake, 1991, Blake, 1993) |
| Ophryotrocha vivipara | - | 200-250 | Embryos in different stages of development | (Richards, 1967, Banse et al., 1963) |
| Orbinidae sp. | 150-250 | - | Oocyte diameter | (Strathmann, 1987) |
| Orbiniidae family | 237 (SD ± 72) | - | Egg diameter | (McHugh and Fong, 2002) |
| Owenia fusiformis | 80-130 | - | Fully grown oocyte diameter | (Gentil et al., 1990) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|------------------------------------|-----------------|-------------|---|--------------------------------|
| P. (Boccardia) proboscidea | 100 | - | Oocyte diameter | (Strathmann, 1987) |
| P. (Polydora) commensalis | 100-120 | - | Oocyte diameter | (Strathmann, 1987) |
| P. (Pseudopolydora) kempi japonica | 100 | - | Oocyte diameter | (Strathmann, 1987) |
| Paralvinella palmiformis | 260 | - | Egg diameter | (McHugh, 1989, Blake, 1993) |
| Paralvinella pandorae | 215 | - | Mean egg diameter | (Blake, 1993) |
| Paraprionospio sp. | 110 | 200 | Width of mature oocytes, width of earliest recruits st | (Yokoyama, 1990) |
| Paraprotis dendrova | 80 | - | Egg size | (Kupriyanova and Nishi) |
| Paraprotula apomatoides | - | 90 | Approximate trocophore diameter | (Kupriyanova and Nishi) |
| Pectinaria gouldi | 43.7 | - | Egg diameter | (Pernet and Jaeckle, 2004) |
| Pectinaria koreni | 60-65 | - | Mature ova diameter | (Nicolaidou, 1983) |
| Pectinariidae | 60-80 | - | Oocyte diameter | (Strathmann, 1987) |
| Pectinariidae family | 67 (SD ± 8) | - | Egg diameter | (McHugh and Fong, 2002) |
| Perinereis cultrifera | 250-400 | - | Egg diameter | (Mazurkiewicz, 1975) |
| Pholoe anoculata | 141 (SD ± 18.5) | - | Egg diameter | (Blake, 1993) |
| Phragmatopoma lapidosa | 84.6 | - | Egg diameter | (Pernet and Jaeckle, 2004) |
| Phragmatopoma lapidosa | 89.5 (SD ± 4.3) | - | Egg diameter | (McCarthy et al., 2003) |
| Phragmatopoma lapidosa | 97-103 | - | Spawned oocyte diameter range | (Eckelbarger, 1976) |
| Phragmatopoma lapidosa | 84.6 | - | Egg diameter | (Pernet and Jaeckle, 2004) |
| Phragmatopoma lapidosa | 89.5 (SD ± 4.3) | - | Egg diameter | (McCarthy et al., 2003) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|----------------------------|---------------|-------------|--|--|
| Phragmatopoma lapidosa | 97-103 | _ | Spawned oocyte diameter range | (Eckelbarger, 1976) |
| Phyllodoce williamsi | 85-90 | - | Oocyte diameter | (Strathmann, 1987) |
| Phyllodocidae family | 110 (SD ± 15) | - | Egg diameter | (McHugh and Fong, 2002) |
| Platynereis bicanaliculata | 132 | - | Egg diameter | (Roe, 1975) |
| Platynereis bicanaliculata | 132-165 | - | Oocyte diameter | (Strathmann, 1987) |
| Platynereis bicanaliculata | 149 | - | Egg diameter | (Pernet and Jaeckle, 2004) |
| Platynereis dumerilii | 175 | - | Egg diameter | (Mazurkiewicz, 1975) |
| Platynereis massiliensis | 250 | - | Egg diameter | (Mazurkiewicz, 1975, Hauenschild, 1951) |
| Poecilochaetus serpens | 200 | - | Oocyte diameter | (Allen, 1905, Rouse and Pleijel, 2001) |
| Polydora commensalis | 120 | - | Egg diameter | (Blake, 1969) |
| Polydora commensalis | 100-120 | - | Oocyte diameter | (Strathmann, 1987) |
| Polydora giardi | 80 | 95 x 120 | Mature oocyte diameter, early asetigerous larvae dimensions | (Day and Blake, 1979) |
| Polydora ligni | 70 | 280 | Egg size, larvae size at release | (Levin, 1984) |
| Polydora nuchalis | 120 | 180 | Egg diameter *, larvae length | (Woodwick, 1960) |
| Polydora proboscidea | 100 | - | Oocyte diameter | (Strathmann, 1987) |
| Polydora variegata | 130-140 | - | Peak distribution of oocytes in August | (Sato-Okoshi et al., 1990) |
| Polydora variegata | 150 | 229.6 | Long-axis diameter of fertilised egg, length of one-steiger larvae | (Sato-Okoshi et al., 1990) |
| Polynoidae | 120 (SD ± 27) | - | Egg diameter | (McHugh and Fong, 2002) |
| Pomatoceros terranovae | 60 | - | Egg size | (Kupriyanova and Nishi) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|---------------------------------|---------------|-------------|-----------------------------------|--|
| Pomatoceros triqueter | 60-80 | - | Egg size | (Kupriyanova and Nishi) |
| Pomatoleios kraussii | 60-65 | - | Egg size | (Kupriyanova and Nishi) |
| Potamethus elongatus | 110-150 | - | Egg size | (McEuen et al., 1983) |
| Potamilla myriops | 140 | - | Fertilised egg size | (Okuda, 1946) |
| Potamilla neglecta | 200 | - | Egg size | (McEuen et al., 1983) |
| Protodrilidae | 105 (SD ± 87) | - | Egg diameter | (McHugh and Fong, 2002) |
| Protula palliata | 80 | - | Egg size | (Kupriyanova and Nishi) |
| Protula sp. | 86.3 | - | Egg diameter | (Pernet and Jaeckle, 2004) |
| Protula sp. I | 85 | - | Egg size | (Kupriyanova and Nishi) |
| Protula sp. II | 86 | - | Egg size | (Kupriyanova and Nishi) |
| Psammodrilis balanoglossoides | 110 | - | Egg diameter | (Swedmark, 1958, Rouse and Pleijel, 2001) |
| Psammodrilius aedificator | 290-310 | - | Egg diameter | (Kristensen and Nørrevang, 1982, Rouse and Pleijel, 2001) |
| Psammodrilius fauveli | 110 | _ | Found in Rouse and Pleijel (2001) | (Swedmark, 1958, Rouse and Pleijel, 2001) |
| Psedopolydora kempi japonica | 100 | - | Oocyte diameter | (Strathmann, 1987) |
| Pseudochitinopom a occidentalis | 60 | - | Egg size | (Kupriyanova and Nishi) |
| Pseudopolydora paucibranchiata | 80 | 200 | Egg size, larvae size at release | (Levin, 1984) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|-------------------------|---------------|-------------|--|------------------------------|
| Rhodopsis pusilla | 78-90 | _ | Egg size | (Kupriyanova and Nishi) |
| Rhynchospio arenincola | - | 175 | Larvae size at release | (Levin, 1984) |
| Romanchella pustulata | 100-160 | - | Egg size | (Kupriyanova and Nishi)) |
| Sabella media | 200 | - | Newly fertilised eggs | (McEuen et al., 1983) |
| Sabella media | 200 | - | Oocyte | (Strathmann, 1987) |
| Sabella microphthalma | 250 | - | Egg size | (McEuen et al., 1983) |
| Sabella spallanzanii | 151 ± 45 | - | Mean egg size | (Giangrande et al., 2010) |
| Sabella spallanzanii | 160 | - | Minimum egg size at maturation in Port Phillip Bay | (Currie et al., 2000) |
| Sabella spallanzanii | 250 | - | Minimum egg size at maturation in the Ionian Sea | (Giangrande et al., 2000) |
| Sabella spallanzanii | 50 | - | Minimum egg size at maturation in Gulf St Vincent | (Lee et al., 2018) |
| Sabellaria cementarium | 60 | - | Oocyte diameter | (Strathmann, 1987) |
| Sabellaria cementarium | 68.8 | - | Egg diameter | (Pernet and Jaeckle, 2004) |
| Sabellidae | 158 (SD ± 55) | - | Egg diameter | (McHugh and Fong, 2002) |
| Sabillariidae | 100 | - | Egg diameter | (McHugh and Fong, 2002) |
| Salmacina dysteri | 120-150 | - | Egg size | (Kupriyanova and Nishi) |
| Scalibregma infatum | 130-160 | - | Egg diameter | (Blake, 1993) |
| Schiobranchia insignis | 180-200 | - | Oocyte diameter | (Strathmann, 1987) |
| Schizobranchia insignis | 155.5 | - | Egg diameter | (Pernet and Jaeckle, 2004) |
| Schizobranchia insignis | 194 | - | Egg size | (McEuen et al., 1983) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|----------------------------|---------------|-------------|----------------------------------|--|
| Serpula columbiana | 69.1 | - | Egg diameter | (Pernet and Jaeckle, 2004) |
| Serpula vermicularis | 40 x 60 | - | Oocyte dimensions | (Strathmann, 1987) |
| Serpulidae | 85 | - | Egg diameter | (McHugh and Fong, 2002) |
| Serpulids | 40-200 | - | Egg size range | (Kupriyanova and Nishi) |
| Sigalionidae | 130 (SD ± 57) | - | Egg diameter | (McHugh and Fong, 2002) |
| Spionidae | 145 (SD ± 60) | - | Egg diameter | (McHugh and Fong, 2002) |
| Spirobranchus corniculatus | 80 | - | Egg size | (Smith, 1984, Selim et al., 2005) |
| Spirobranchus polycerus | 65 | - | Egg size | (Marsden, 1992, Selim et al., 2005) |
| Spirobranchus tetraceros | 78 | - | Diameter of ripe ova | (Selim et al., 2005) |
| Spirorbidae | 99 | - | Oocyte diameter | (Strathmann, 1987) |
| Spirorbids | 80-230 | - | Egg size | (Kupriyanova and Nishi) |
| Spirorbis corallinae | 100-150 | - | Egg size | (Kupriyanova and Nishi) |
| Spirorbis infundibulum | 125-128 | - | Egg size | (Kupriyanova and Nishi) |
| Spirorbis inornatus | 150-230 | - | Egg size | (Kupriyanova and Nishi) |
| Spirorbis rupestris | 110-180 | - | Egg size | (Kupriyanova and Nishi) |
| Spirorbis spirillum | 140 | 150 | Fertilised egg size, larvae size | (Okuda, 1946) |
| Spirorbis tridentatus | 110-180 | - | Egg size | (Kupriyanova and Nishi) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|--------------------------|----------|-------------|---|---|
| Spriobranchus giganteus | 83 | - | Egg diameter | (Allen, 1957, Selim et al., 2005) |
| Sternaspis fossor | 170 | - | Oocyte diameter | (Strathmann, 1987) |
| Streblospio benedicti | 70-200 | 200-650 | Mature egg diameter, larval size at release | (Eckelbarger) |
| Streblospio benedicti | 100 | 550 | Egg size, larvae size at release | (Levin, 1984) |
| Trochochaeta carica | 405-650 | - | Egg diameter range | (Buzhinskaja and Jørgensen, 1997, Rouse and Pleijel, 2001) |
| Trochochaeta multisetosa | 250 | - | Maximum egg diameter | (Hannerz, 1956, Rouse and Pleijel, 2001) |

Note: Smallest value was recorded when available, * indicates that size was an approximate value.

A5. Bryozoans

Literature search: To identify literature on propagule and female gamete size a systematic literature search was undertaken using the <u>Web of Science</u> database. For Bryozoans three searches were performed using the following search criteria:

Web of science: (bryozoa*) AND TOPIC: (egg size) results: 40

Web of science: (bryozoa*) AND TOPIC: (egg size) AND ALL FIELDS: (diameter) Results: 0

Additional articles were also sourced from citations and reference lists of articles produced in the Web of Science database searches.

Table A5 Bryozoan propagule sizes identified from the literature search

| Species | Egg (µm) | Larval (µm) | Comments | References |
|----------------------|----------|-------------|---------------------------------|----------------------------------|
| Bowerbankia gracilis | - | 200 | Width of one day old juvenile | (Bullard and Whitlatch, 2004) |
| Bowerbankia grasilis | 160 | 150 x 200 | Egg diameter, larvae dimensions | (Strathmann, 1987) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|-----------------------|----------|------------------|---|----------------------------------|
| Bugula flabellata | - | 170-190 | Larvae size | (Shanks, 2001) |
| Bugula neritina | - | 200 | Larvae width | (Lynch, 1947) |
| Bugula neritina | - | 290 | Size of 1 day old juvenile | (Bullard and Whitlatch, 2004) |
| Bugula neritina | - | 166.67 (SE 3.12) | Coronate diameter | (Walters and Wethey, 1996) |
| Bugula pacifica | 35 | 200 | Egg diameter, larvae dimensions | (Strathmann, 1987) |
| Bugula pacifica | - | 110-120 | Larvae diameter | (Shanks, 2001) |
| Bugula simplex | - | 170 | Width of one day old juvenile | (Bullard and Whitlatch, 2004) |
| Celleporella hyalina | _ | 300 | Larvae length * | (Atkinson et al., 2006) |
| Conopeum reticulum | - | 180-200 | Cyphonautes height | (Shanks, 2001) |
| Crisia cribraria | - | 350 | Zooid length | (Ryland and Hayward, 1991) |
| Crisia elongata | - | 100 | Larvae diameter | (Strathmann, 1987) |
| Crisia sp. | - | 320 | Zooid length | (Ryland and Hayward, 1991) |
| Cryptosula pallasiana | - | 240 | Total length of larvae | (Bullard and Whitlatch, 2004) |
| Electra crustulenta | - | 120-170 | Larvae height | (Shanks, 2001) |
| Electra crustulenta | - | 200 | Total length of larvae | (Bullard and Whitlatch, 2004) |
| Electra pilosa | 60 | - | Length of ovoid egg | (Ryland and Stebbing, 1971) |
| Electra pilosa | - | 400-500 | Fully developed larvae width and height | (Ryland and Stebbing, 1971) |
| Electra pilosa | - | 130 | Larvae height | (Atkins, 1955) |
| Electra pilosa | - | 390 | Width of one day old juvenile | (Bullard and Whitlatch, 2004) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|--------------------------|----------|---------------------|-------------------------------|----------------------------------|
| Hippiodiplosia insculpta | - | 330-350 | Larvae diameter | (Shanks, 2001) |
| Membranipora membranacea | - | 290 | Width of one day old juvenile | (Bullard and Whitlatch, 2004) |
| Membranipora membranacea | 60 | 750 | Egg diameter, larvae length | (Strathmann, 1987) |
| Pentapora fascialis | - | 380.57 (SD ± 41.59) | Smallest mean zooid width | (Lombardi et al., 2006) |
| Schizoporella errata | - | 400 | Width of one day old juvenile | (Bullard and Whitlatch, 2004) |
| Schizoporella unicornis | 350 | - | Egg diameter | (Strathmann, 1987) |
| Schizoprella errata | - | 207.69 (SE 6.28) | Coronate morphology | (Walters and Wethey, 1996) |
| Stenolaemata | - | 100 | Larvae width | (Shanks, 2001) |
| Tricellaria occidentalis | 135-140 | - | Larvae diameter | (Shanks, 2001) |
| Watersipora subtorquata | - | 167 (SE ± 5) | Mean size of delayed settlers | (Marshall and Keough, 2003b) |

Note: Smallest value was recorded when available, * indicates that size was an approximate value.

A6. Crabs

Literature search: To identify literature on propagule and female gamete size a systematic literature search was undertaken using the <u>Web of Science</u> database. For crabs one search was performed using the following search criteria:

Web of Science: TOPIC: (decapod*) AND TOPIC: (egg size) refined by: TOPIC: (diameter) Results: 56

Additional articles were also sourced from citations and reference lists of articles produced in the Web of Science database searches.

Table A6 Crab propagule sizes identified from the literature search

| Species | Egg (µm) | Larval (µm) | Comments | References |
|------------------------------|-----------|-------------|----------------|-----------------|
| Acanthephyra acanthitelsonis | 640 x 920 | - | Egg dimensions | (Herring, 1974) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|---------------------------|--------------|--------------|--|------------------------------|
| Acanthephyra acutifrons | 720 x 800 | - | Egg dimensions | (Herring, 1974) |
| Acanthephyra curtirostris | 620 x 900 | - | Egg dimensions | (Herring, 1974) |
| Acanthephyra pelagica | 680 x 1000 | - | Egg dimensions | (Herring, 1974) |
| Acanthephyra purpurea | 560 x 820 | - | Egg dimensions | (Herring, 1974) |
| Amarinus lacustris | 650-800 | - | Egg diameter | (Lucas, 1980) |
| Amarinus latinasus | 300 | - | Egg diameter | (Lucas, 1980) |
| Amarinus paralacustris | 350 | - | Egg diameter | (Lucas, 1980) |
| Aratus pisonii | - | 690 | Zoea stage 1 total length | (Cuesta et al., 1999) |
| Armases augustipes | - | 780 | Zoea stage 1 total length | (Cuesta et al., 1999) |
| Armases cinereum | - | 660 | Zoea stage 1 total length | (Cuesta et al., 1999) |
| Armases miersii | - | 470 ± 10 | Zoea 1 carapace width | (Cuesta et al., 1999) |
| Armases miersii | 510-610 | - | Egg size | (Schuh and Diesel, 1995b) |
| Armases ricordi | - | 720 | Zoea stage 1 total length | (Cuesta et al., 1999) |
| Armases rubrides | - | 630 | Zoea stage 1 total length | (Cuesta et al., 1999) |
| Atya scabra | 373 (SD ± 9) | - | Smaller diameter embryonic egg stage 1 | (Anger et al., 2002) |
| Callinectes sapidus | 225-275 | - | Blastula stage – prior to hatch | (Amsler and George, 1984) |
| Callinectes sapidus | 255-300 | - | Embryo diameter range | (Jacobs et al., 2003) |
| Callinectes sapidus | 250 | 250 | Egg size, larvae stage 1 width | (Hill et al., 1989) |
| Cancer borealis | 305 | 1200 | Egg diameter, zoea length | (Shields et al., 1991) |
| Cancer gracilis | - | 1200 | Zoea length | (Shields et al., 1991) |
| Cancer irroratus | - | 1500 | Zoea length | (Shields et al., 1991) |
| Cancer magister | 400-440 | 2500 | Egg diameter, zoea length | (Shields et al., 1991) |
| Cancer pagurus | 450-500 | 1800 | Egg diameter, zoea length | (Shields et al., 1991) |
| Cancer productus | - | 1800 | Zoea length | (Shields et al., 1991) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|---------------------------|-------------------|-------------|--------------------------------------|-------------------------------------|
| Cancer setosus | 450 | - | Egg diameter | (Shields et al., 1991) |
| Carcer antennarius | - | 1300 | Zoea length | (Shields et al., 1991) |
| Carcer anthonyi | 265-300 | - | Egg diameter | (Shields et al., 1991) |
| Carcinus maenas | 300-330 | _ | Egg diameter | (Hartnoll and Paul, 1982) |
| Cervimunida johni | 480-750 | - | Egg size | (Flores et al., 2017) |
| Charybdis japonica | 240-330 | - | Egg diameter range | (Fowler and McLay, 2013) |
| Chasmagnathus granulata | 270-370 | - | Mean egg size range | (Gimenez and Anger, 2001) |
| Chasmagnathus granulata | - | 1,140-1,360 | Mean carapace width stage 1 juvenile | (Giménez and Anger, 2003) |
| Cherax quadricarinatus | 730 –2550 | - | Large oocytes diameter range | (Sagi et al., 1996) |
| Chorocaris chacei | 122.0 (SD ± 26.0) | - | Mean vitellogenic oocyte size | (Llodra et al., 2000) |
| Clibanarius antillensi | 375 (SD ± 9) | - | Egg size | (Turra and Leite, 2001) |
| Clibanarius sclopetarius | 482 (SD ± 23) | - | Egg size | (Turra and Leite, 2001) |
| Clibanarius vittatus | 441 (SD ± 21) | - | Egg size | (Turra and Leite, 2001) |
| Cryptolithodes sitchensis | 1035 | - | Egg size | (Zaklan, 2002) |
| Cryptolithodes sitchensis | 803 (SD ± 54) | - | Mean egg diameter | (Thatje and Hall, 2016) |
| Cryptolithodes typicus | 835 | - | Mean egg size | (Thatje and Hall) |
| Cyclograpsus lavauxi | 250-300 | - | Egg diameter | (Taylor and Leelapiyanart, 2001) |
| Diogenes pugilator | 350 ± 30 | - | Mean egg size | (Manjón-Cabeza and Raso, 2000) |
| Elamena gordonae | 350 | - | Egg diameter range | (Lucas, 1980) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|------------------------------|---------------------|-------------|------------------------|--------------------------------------|
| Elamenopsis kempi | 520-600 | - | Egg diameter | (Abele, 1972) |
| Emerita asiatica. | 242.50 (SD ± 12.99) | - | Oocyte diameter | (Subramoniam and Gunamalai, 2003) |
| Emerita talpoida | - | 460 | Maximum carapace width | (Rees, 1959) |
| Ephyrina bifida | 3520 x 4700 | - | Egg dimensions | (Herring, 1974) |
| Ephyrina hoskynii | 3120 x 4000 | - | Egg dimensions | (Herring, 1974) |
| Erimacrus isenbeckii | 800 ± 10 | - | Egg diameter | (Nagao et al., 1999) |
| Eriocheir sinensis | 354.4 ± 8.1 | - | Egg diameter | (Chang et al., 2017) |
| Eriocheir sinensis | 350-380 | - | Egg diameter range | (Dittel and Epifanio, 2009) |
| Eurypanopeus depressus | 300 | - | Mean egg diameter | (McDonald, 1982) |
| Glyphocrangon investigatoris | 1,000-3,340 | - | Embryo diameter | (Benjamin et al., 2019) |
| Halicarcinus afecundus | 700 | - | Egg diameter | (Lucas, 1980) |
| Halicarcinus bedfordi | 300 | - | Egg diameter | (Lucas, 1980) |
| Halicarcinus hondai | 230 | - | Egg diameter | (Lucas, 1980) |
| Halicarcinus nuytsi | 330 | - | Egg diameter | (Lucas, 1980) |
| Hapalogaster cavicauda | 775 | - | Mean egg size | (Zaklan, 2002) |
| Hapalogaster cavicauda | 633 (SD ± 41) | - | Mean egg diameter | (Thatje and Hall, 2016) |
| Hapalogaster dentata | 970 | - | Mean egg diameter | (Goshima et al., 1995) |
| Hemigrapsus takanoi | 281.4 +/- 0.7 | - | Egg diameter | (Yamasaki et al., 2008) |
| Hemigraspsus nudus | 380 | 600 | - | (Strathmann, 1987) |
| Hemigraspsus oregonensis | 330 | 350 | - | (Strathmann, 1987) |
| Heterocarpus ensifer | 400 x 540 | - | Egg dimensions | (Herring, 1974) |
| Heterocarpus grimaldii | 520 x 640 | - | Egg dimensions | (Herring, 1974) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|--|------------------|-------------|--|-------------------------------------|
| Heterozius rotundifrons | 700-800 | _ | Fertilised egg diameter | (Taylor and Leelapiyanart, 2001) |
| Hyas lyratus | - | 1100 | - | (Strathmann, 1987) |
| Hymenodora gracilis | 1920 x 2160 | - | Egg dimensions | (Herring, 1974) |
| Hymenosoma hodgkini | 350 | - | Egg diameter | (Lucas, 1980) |
| Hymenosomatids with free larval stages | 250-450 | - | Egg diameter | (Lucas, 1980) |
| Ilyoplax frater | 2.80 (SD ± 0.26) | - | Typical inhabitants of subtidal and intertidal mud flats of mangrove forests | (Saher and Qureshi, 2010) |
| Latreillia australinsis | 400 | - | Ripe egg diameter | (Williamson, 1965) |
| Linuparus trigonus | 960-1,120 | - | Egg size range | (Haddy et al., 2003) |
| Lithodes aequispinus | 2,295 | - | Mean egg size | (Hiramoto and Sato, 1970) |
| Lithodes aequispinus | 2,300 | - | Mean egg size | (Thatje and Hall) |
| Lithodes aequispinus | 2,400 | - | Mean length of external eggs | (Jewett et al., 1985) |
| Lithodes couesi | 2,300 | - | Mean egg size | (Somerton, 1985) |
| Lithodes ferox | 1,970 | - | Mean egg size | (Abelló and Macpherson, 1991) |
| Lithodes maja | 2,000 | - | Mean egg size | (MacDonald et al., 1957) |
| Lithodes mendagnai | 2,252 (SD ± 140) | - | Mean egg diameter | (Thatje and Hall, 2016) |
| Lithodes santolla | 1,935 | - | Mean egg diameter | (Guzmán and Campodónico, 1972) |
| Lithodes santolla | 2,100 | 2000 | Maximum egg diameter, zoeal hatching size | (Vinuesa, 1987) |
| Lithodes santolla | 1,537–1,984 | - | Egg diameter range | (Militelli et al., 2019) |
| Lithodes tropicalis | 2,364 (SD ± 94) | - | Mean egg diameter | (Thatje and Hall, 2016) |
| Lithodes turkayi | 1,700 | - | Mean egg size | (Lovrich, 1993) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|--------------------------------|-------------------|-------------|--|--|
| Lithodes turritus | 2,131 (SD ± 116) | - | Mean egg diameter | (Thatje and Hall, 2016) |
| Lophopanopeus bellus bellus | 330 | 500 | - | (Strathmann, 1987) |
| Lophopanopeus bellus diegensis | - | 450 | - | (Strathmann, 1987) |
| Lyreidus tridentatus | 470-500 | - | Egg diameter before laying | (Williamson, 1965) |
| Macrobrachium acanthurus | 573 (SD ± 19) | - | Smaller diameter embryonic egg stage 2 | (Anger et al., 2002) |
| Macrobrachium carcinus | 532 (SD ± 13) | - | Smaller diameter embryonic egg stage 1 | (Anger et al., 2002) |
| Macrobrachium olfersii | 512 (SD ± 12) | - | Smaller diameter embryonic egg stage 1 | (Anger et al., 2002) |
| Matuta lunaris | 274 ± 3.19 | - | Mean egg size | (Perez, 1990) |
| Meningodora miccylus | 720 x 940 | - | Egg dimensions | (Herring, 1974) |
| Meningodora vesca | 620 x 840 | - | Egg dimensions | (Herring, 1974) |
| Metapenaeopsis dalei | 60-200 | - | Maturing oocytes range | (Choi et al., 2005) |
| Mirocaris fortunata | 249.9 (SD ± 89.5) | - | Mean vitellogenic oocyte size | (Llodra et al., 2000) |
| Mithraculus forceps | 560 ± 60 | - | Mean egg diameter | (Cobo and Okamori, 2008) |
| Munida gregaria | 530 (SD ± 22.5) | - | Mean egg diameter | (Dellatorre and González-Pisani, 2011) |
| Munida subrugosa | 360-900 | - | Oocytes in secondary vitellogenesis | (Tapella et al., 2002) |
| Munida subrugosa | 690 (SD ± 60) | - | Average egg diameter | (Tapella et al., 2002) |
| Munidopsis platirostris | 740-820 | - | Early embryo diameter | (Williams et al., 2019) |
| Nematocarcinus cursor | 420 x 540 | - | Egg dimensions | (Herring, 1974) |
| Nematocarcinus exilis | 500 x 640 | - | Egg dimensions | (Herring, 1974) |
| Neorhynchoplax chipolini | 430 ± 20 | - | Egg size | (Hsueh, 2018) |
| Neptunus pelagicus | 360-375 | 1250 | Egg diameter, larvae length | (Raghu Prasad and Tampi, 1953) |
| Notostomus auriculatus | 640 x 980 | - | Egg dimensions | (Herring, 1974) |
| Species | Egg (µm) | Larval (µm) | Comments | References |
|-----------------------------|------------------|-------------|--|-----------------------------------|
| Notostomus elegans | 760 x 760 | - | Egg dimensions | (Herring, 1974) |
| Oedignathus inermis | 1175 | - | Mean egg size | (Zaklan, 2002) |
| Oplophorus spinosus | 3,210 (SD ± 190) | - | Outer egg diameter | (Sudnik, 2018) |
| Orconectes limosus | 1,405–2,150 | - | Egg diameter range | (Kozák et al., 2006) |
| Oregonia gracilis | 500 | 1150 | - | (Strathmann, 1987) |
| Ovalipes cathams | 317 | - | Mean egg size | (Haddon, 1994) |
| Ovalipes catharus | 300-388 | - | Mean egg size range | (Haddon, 1994) |
| Palaemon adspersus | 552 (SD ± 14) | - | Smaller diameter embryonic egg stage 1 | (Anger et al., 2002) |
| Palaemon elegans | 473 (SD ± 4) | - | Smaller diameter embryonic egg stage 1 | (Anger et al., 2002) |
| Palaemon northropi | 479 (SD ± 15) | - | Smaller diameter embryonic egg stage 1 | (Anger et al., 2002) |
| Palaemon pandaliformis | 631 (SD ± 32) | - | Smaller diameter embryonic egg stage 1 | (Anger et al., 2002) |
| Pandalus montagui | 639 (SD ± 6) | - | Smaller diameter embryonic egg stage 3 | (Anger et al., 2002) |
| Panopeus herbstii | 310 | - | Mean egg diameter | (McDonald) |
| Paralithodes brevipes | 972 (SD ± 56) | - | Mean egg diameter | (Thatje and Hall, 2016) |
| Paralithodes californiensis | 1,750 | - | Mean egg size | (Zaklan, 2002) |
| Paralithodes californiensis | 1,860 (SD ± 96) | - | Mean egg diameter | (Thatje and Hall, 2016) |
| Paralithodes camtschaticus | 780 | - | Mean egg size | (Marukawa, 1933) |
| Paralithodes camtschaticus | 950 | - | Mean egg size | (Marukawa, Thatje and Hall) |
| Paralithodes camtschaticus | 853 (SD ± 76) | - | Mean egg diameter | (Thatje and Hall, 2016) |
| Paralithodes platypus | 1,180 | - | Mean egg size | (Somerton) |
| Paralithodes platypus | 1,200 | - | Mean egg size | (Somerton and MacIntosh, 1985) |
| Paralithodes rathbuni | 1,668 (SD ± 100) | - | Mean egg diameter | (Thatje and Hall, 2016) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|----------------------------|------------------|-------------|---|--------------------------------|
| Paralomis aculeate | 2,076 (SD ± 127) | - | Mean egg diameter | (Thatje and Hall, 2016) |
| Paralomis africana | 1,834 (SD ± 78) | - | Mean egg diameter | (Thatje and Hall, 2016) |
| Paralomis anamerae | 2,276 (SD ± 131) | - | Mean egg diameter | (Thatje and Hall, 2016) |
| Paralomis cristata | 2,360 (SD ± 142) | - | Mean egg diameter | (Thatje and Hall, 2016) |
| Paralomis cristulata | 1,883 (SD ± 131) | - | Mean egg diameter | (Thatje and Hall, 2016) |
| Paralomis elongata | 1,950 (SD ± 155) | - | Mean egg diameter | (Thatje and Hall, 2016) |
| Paralomis Formosa | 2,047 (SD ± 136) | - | Mean egg diameter | (Thatje and Hall, 2016) |
| Paralomis granulosa | 1,900 | 2100 | Maximum egg diameter, zoeal hatching size | (Lovrich and Vinuesa, 1999) |
| Paralomis granulosa | 2,100 | - | Mean egg size | (Vinuesa, 1987) |
| Paralomis granulosa | 1,788 (SD ± 84) | - | Mean egg diameter | (Thatje and Hall, 2016) |
| Paralomis grossmani | 1,862 (SD ± 99) | - | Mean egg diameter | (Thatje and Hall, 2016) |
| Paralomis inca | 1,806 (SD ± 100) | - | Mean egg diameter | (Thatje and Hall, 2016) |
| Paralomis longipes | 2,000 | - | Egg diameter | (Faxon, 1893) |
| Paralomis mendagnai | 1,882 (SD ± 43) | - | Mean egg diameter | (Thatje and Hall, 2016) |
| Paralomis seagranti | 2,500 | - | Egg diameter | (Eldredge and LG, 1976) |
| Paralomis spinosissima | 2,000 | - | Mean egg diameter | (Otto, 1993) |
| Parapasiphaea sulcatifrons | 2560 x 4000 | - | Egg dimensions | (Herring, 1974) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|------------------------------|-------------------|-------------|--|---------------------------------------|
| Pasiphaea hoplocerca | 1600 x 2240 | - | Egg dimensions | (Herring, 1974) |
| Pasiphaea multidentata | 1760 x 2520 | - | Egg dimensions | (Herring, 1974) |
| Pinnotheres taylori | 350 | 500 | - | (Strathmann, 1987) |
| Plesionika edwardsi | 340 x 440 | - | Egg dimensions | (Herring, 1974) |
| Pleuroncodes monodon | 370-520 | - | Egg size | (Flores et al., 2017) |
| Polyonyx gibbesi | - | 1,200 | Carapace width of zoea stage 1 | (Gore, 1968) |
| Pontophilus talismani | 520 x 740 | - | Egg dimensions | (Herring, 1974) |
| Portunus sanguinolentus | 253.8 (SD ± 3.19) | - | Diameter of external eggs at stage 1 | (Wimalasiri and Dissanayake, 2016) |
| Portunus sanguinolentus | 340 | - | Newly spawned egg diameter | (Samuel and Soundarapandian) |
| Potimirim potimirim | 372 (SD ± 26) | - | Smaller diameter embryonic egg stage 2 | (Anger et al., 2002) |
| Procambarus clarkii | 1,900 (SE ± 20) | - | Newly extruded egg diameter | (Noblitt et al., 1995) |
| Procambarus zonangulus | 2,400 (SE ± 40) | - | Newly extruded egg diameter | (Noblitt et al., 1995) |
| Pseudocarcinus gigas | - | 1,650 ± 130 | Zoea stage 1 carapace width | (Gardner and Quintana, 1998) |
| Ranina ranina | 600 | - | Minor–axis egg diameter | (Ichikawa et al., 2004) |
| Ranina ranina | 620 | - | Egg diameter | (Krajangdara and Watanabe, 2005) |
| Rhinolithodes wossnessenskii | 1,125 | - | Mean egg size | (Zaklan, 2002) |
| Rhinolithodes wossnessenskii | 908 (SD ± 48) | - | Mean egg diameter | (Thatje and Hall, 2016) |
| Rimicaris exoculata | 166.9 (SD ± 48.7) | - | Mean vitellogenic oocyte size | (Llodra et al., 2000) |
| Scylla serrata | 285-414 | - | Egg diameter range from extrusion to hatch | (Churchill, 2003) |
| Scyllarides delfosi | 600-640 | - | Egg diameter range | (Lima et al., 2018) |
| Sesarma cuaracoense | 580 ± 20 | - | Mean egg diameter after spawning | (Schuh and Diesel, 1995a) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|------------------------------|------------------|-------------|--------------------------------|------------------------------------|
| Sesarma quadratum | 225 | - | Diameter at zoea release | (Syama and Anilkumar, 2011) |
| Sesarmidae rectum | 500.5 (SD ± 3.7) | - | Egg diameter | (Anger and Moreira, 2004) |
| Systellaspis braueri | 3120 x 4640 | - | Egg dimensions | (Herring, 1974) |
| Systellaspis cristata | 2720 x 4120 | - | Egg dimensions | (Herring, 1974) |
| Systellaspis debilis | 1880 x 3400 | - | Egg dimensions | (Herring, 1974) |
| Telmessus cheiragonus | 660-770 | - | Egg diameter range | (Nagao and Munehara, 2007) |
| Trachysalambria curvirostris | 230-340 | - | Egg diameter range | (Cha et al., 2004) |
| Tumidotheres moseri | - | 530 ± 10 | Carapace width of zoea stage 1 | (Bolaños et al., 2004) |
| Uca annulipes | 240 | - | Egg diameter | (Thurman, 1985) |
| Uca rapax | 260 | - | Egg diameter | (Thurman, 1985) |
| Uca rapax | 200 - 280 | - | Egg diameter range | (Costa and Soares- Gomes, 2009) |
| Uca triangularis | 240 | - | Egg diameter | (Thurman, 1985) |
| Upogebia edulis | 1,000 | - | Freshly laid egg size | (Chan and Shy, 1996) |

Note: Smallest value was recorded when available, * indicates that size was an approximate value,* indicates species and propagule sizes recorded in the report by Georgiades (2012) that we were not access.

A7. Echinoderms

Literature search: To identify literature on propagule and female gamete size a systematic literature search was undertaken using the <u>Web of Science</u> database. For echinoderms one search was performed using the following search criteria:

Web of Science: TOPIC: (echinoderm*) AND TOPIC: (egg size) Results: 205

Additional articles were also sourced from citations and reference lists of articles produced in the Web of Science database searches.

| Species | Egg (µm) | Larval (µm) | Comments | References |
|--------------------------------|-----------------|-------------|---|------------------------------------|
| Abatus cavernosus | 1400 | - | Mean egg size | (Gil et al., 2009) |
| Abatus cordatus | 1,340 (SD ± 40) | - | Mean egg diameter | (Lawrence et al., 1984) |
| Abatus nimrodi | 1,400 | 2,000 | Average egg diameter, juvenile size | (Schinner and McClintock, 1993) |
| Abatus shackletoni | 1,000 | 1,600 | Average egg diameter, juvenile size | (Schinner and McClintock, 1993) |
| Acodontaster hodgsoni | 547 | - | Egg diameter | (McEdward and Miner, 2006) |
| Allocentrotus fragilis | 110-115 | - | Egg diameter | (Strathmann, 1987) |
| Amphiodia occidentalis | 90-106 | - | Egg diameter | (Strathmann, 1987) |
| Amphipholis squamata | 110-130 | - | Egg diameter | (Strathmann, 1987) |
| Amphipneustes lorioli | 550-1,971 | 1,500–1,760 | Vitellogenic – mature oocyte range, Stage 1 embryo diameter | (Galley et al., 2005) |
| Anasterias minuta | 1,810 ± 270 | - | Stage 1 mean diameter, includes eggs and early embryos | (Gil et al., 2011) |
| Anasterias perrieri | 1750 | - | _ | (McEdward and Morgan, 2001) |
| Anasterias rupicola | 1370 | - | - | (McEdward and Morgan, 2001) |
| Anthocidaris crassispina | 90 | - | Egg size | (Emlet, 1995, Onoda, 1931) |
| Aquilonastra batheri | 433 | - | Egg diameter | (Byrne, 2006) |
| Aquilonastra burtoni | 550 | - | Egg diameter | (Byrne, 2006) |
| Aquilonastra coronata japonica | 422 | - | Egg diameter | (Byrne, 2006) |
| Aquilonastra minor | 437 | - | Egg diameter | (Byrne, 2006) |
| Aquilonastra scobinata | 450 | - | Egg diameter | (Byrne, 2006) |
| Arbacia lixula | 76.6 (SD ± 3.1) | - | Mean egg diameter | (George et al., 1997) |

Table A7 Echinoderm propagule sizes identified from the literature search

| Species | Egg (µm) | Larval (µm) | Comments | References |
|-------------------------|-----------------|-------------|--------------------------------------|---|
| Arbacia lixula | 77 | - | Mean egg diameter | (George et al., 1990, Emlet, 1995, McEdward and Miner, 2006) |
| Arbacia punctulata | 60 | - | Egg diameter * | (Marshall and Keough, 2003a) |
| Arbacia punctulata | 74 | - | Egg diameter | (Villinski et al., 2002) |
| Arbacia punctulata | 73.8 (SE ± 0.6) | - | Egg diameter | (Whitehill and Moran, 2012) |
| Arbacia punctulata | 74 | 460 | Egg size, metamorph size | (Harvey, 1956, Emlet et al., 1987) |
| Arbacia punctulata | 75 | - | Egg diameter | (McEdward and Miner, 2006) |
| Arbacia punctulata | 75 | - | Egg diameter | (McEdward and Miner, 2006) |
| Arbacia stellata | 65 | - | Egg diameter | (Emlet, 1995) |
| Arbacia stellata | 66.78 (SD 3.68) | - | Mean measurement of the longest axis | (Lessios, 1990) |
| Archaeopneustes histrix | 134 | - | Egg diameter | (McEdward and Miner, 2006) |
| Archaster angulatus | 284 (SE ± 8.8) | - | Mean size of mature eggs | (Keesing et al., 2011) |
| Archaster typicus | 180-200 | - | Diameter of spawned eggs | (Keesing et al., 2011) |
| Aresoma fenecstratum | 1250 | - | Egg size | (Emlet et al., 1987, Thomas et al., 2001) |
| Aspidodiadema jacobyi | 97 | - | Egg diameter | (McEdward and Miner, 2006) |
| Asterias amurensis | 149 (SE 1.13) | - | Egg diameter | (Morris, 2002) |
| Asterias forbesi | 133 | - | Egg diameter | (McEdward and Miner, 2006) |
| Asterias vulgaris | 530 | - | Egg diameter | (Pechenik, 1999) |
| Asterina batheri | 800 | - | Egg size | (Pechenik, 1999) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|--------------------------------|-----------------|-------------|-----------------------------|---|
| Asterina gibbosa | 500 | - | Egg diameter | (Byrne, 2006) |
| Asterina minor | 700 | - | Egg size | (Pechenik, 1999) |
| Asterina phylactica | 500 | - | Egg diameter | (Byrne, 2006) |
| Asterina pseudoexigua pacifica | 900 | - | Egg size | (Pechenik, 1999) |
| Asterina stellifera | 150 | - | Egg diameter | (Byrne, 2006) |
| Astropyga magnifica | 104.04 (1.45) | - | Egg diameter (longest axis) | (Lessios, 1990) |
| Astropyga pulvinata | 89.47 (SD 4.20) | - | Egg diameter (longest axis) | (Lessios, 1990) |
| Australostichopus mollis | 160 | - | Egg size | (Peters-Didier and Sewell, 2017) |
| Boltenia villosa | 160 | - | Egg size | (Bates, 2002) |
| Brisaster latifrons | 330-355 | - | Egg diameter | (Strathmann, 1987) |
| Brisaster latifrons | 357.4 ± 21.7 | - | Egg diameter | (Zigler et al., 2008) |
| Brisaster latifrons | 365 | 420 | Egg size, metamorph size | (Zigler and Raff, 2013, Hart, 1996) |
| Brisaster latifrons | 330-355 | - | Egg diameter | (Strathmann, 1987) |
| Cassidulus mitis | 367 (SD ± 26) | - | Egg diameter | (Contins and Ventura, 2011) |
| Clarkcoma canaliculata | 266 (SE ± 2.6) | - | Egg diameter | (Falkner et al., 2013, Falkner et al., 2015) |
| Clarkcoma pulchra | 290 ± 3.4 | - | Mean egg diameter | (Falkner et al., 2013, Falkner et al., 2015) |
| Clypeaster japonicus | 110-120 | - | Egg diameter range | (Mohri and Hamaguchi, 1990) |
| Clypeaster rosaceus | 265.7 (SE 0.35) | - | Mean egg diameter | (Allen et al., 2006) |
| Clypeaster rosaceus | 274 (SD ± 4.38) | _ | Mean egg diameter | (Miner et al., 2002) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|----------------------------|-------------------|-------------|----------------------------------|--|
| Clypeaster rosaceus | 280 | 340 | Egg size, metamorph size | (Herrera et al., 1996, Falkner et al., 2013, Falkner et al., 2015, Sewell and Young, 1997, Zigler and Raff, 2013, Reitzel and Miner, 2007) |
| Clypeaster rosaceus | 283.4 (SD ± 8.9) | - | Egg diameter | (Zigler et al., 2008) |
| Clypeaster rosaceus | 321.05 (SD 18.43) | - | Mean egg diameter (longest axis) | (Lessios, 1990) |
| Clypeaster subdepressus | 150 | 340 | Egg size, metamorph size | (Herrera et al., 1996) |
| Clypeaster subdepressus | 155.5 (SD ± 4.0) | - | Egg diameter | (Zigler et al., 2008) |
| Clypeaster subdepressus | 162.06 (SD 8.82) | - | Mean egg diameter (longest axis) | (Lessios, 1990) |
| Cnemidocarpa finmarkiensis | 150-160 | - | Egg size | (Bates, 2002) |
| Coelopleurus floridanus | 115 | - | Egg diameter | (McEdward and Miner, 2006) |
| Colobocentrotus atratus | 73 | - | Egg diameter | (McEdward, 1986) |
| Crossaster papposus | 750-800 | - | Egg diameter | (Strathmann, 1987) |
| Crossaster papposus | 796 | - | Egg diameter | (Strathmann et al., 2002) |
| Cryptoasterina hystera | 440 | - | Egg diameter | (Byrne, 2006) |
| Cryptoasterina pacifica | 400 | - | Egg diameter | (Byrne, 2006) |
| Cryptoasterina pentagona | 413 | - | Egg diameter | (Byrne, 2006) |
| Cucumaria miniata | 493 | - | Egg diameter | (McEdward and Miner, 2006) |
| Dendraster excentricus | 114-120 | 360 | Egg size, metamorph size | (Emlet et al., 1987) |
| Dendraster excentricus | 119 | - | Egg diameter | (McEdward and Miner, 2006) |
| Dendraster excentricus | 125 | - | Egg diameter | (McEdward and Herrera, 1999) |
| Dendraster excentricus | 127 | - | Egg diameter | (McEdward, 1986) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|---------------------------|-----------------|-------------|----------------------------------|--|
| Dendraster excentricus | 110-125 | - | Egg diameter | (Strathmann, 1987) |
| Dermasterias imbricata | 200 | - | Egg diameter | (Strathmann, 1987) |
| Diadema antillarium | 73 | - | Egg size | (Emlet et al., 1987, Thomas et al., 2001) |
| Diadema antillarium | 68 | 515 | Egg size, metamorph size | (Eckert, 1998) |
| Diadema antillarium | 68.11 (SD 3.09) | - | Mean egg diameter (longest axis) | (Lessios, 1990) |
| Diadema antillarium | 73 | - | Egg size | (Emlet et al., 1987, Thomas et al., 2001) |
| Diadema mexicanum | 67 | - | Egg diameter | (Emlet, 1995) |
| Diadema mexicanum | 69.54 (SD 2.63) | - | Mean egg diameter (longest axis) | (Lessios, 1990) |
| Diplasterias brucei | 2800 | - | - | (McEdward and Morgan, 2001) |
| Diplasterias meridionalis | 2790 | - | - | (McEdward and Morgan, 2001) |
| Echinarachnius parma | 145 | 375 | Egg size, metamorph size | (Harvey, 1956, Emlet et al., 1987) |
| Echinaster sp. 1 | 720 | - | Egg diameter | (McEdward and Miner, 2006) |
| Echinaster sp. 2 | 765 | - | Egg diameter | (McEdward and Miner, 2006) |
| Echinaster spinulosus | 834 | - | Egg diameter | (McEdward and Miner, 2006) |
| Echinolampas crassa | 220 | 320-380 | Egg size, metamorph size | (Emlet et al., 1987, Clark, 1923) |
| Echinometra lucunter | 82 | 380 | Egg size, metamorph size | (Emlet et al., 1987, Thomas et al., 2001, Emlet, 1995, Cameron, 1986) |
| Echinometra lucunter | 88.93 (SD 8.59) | - | Mean egg diameter (longest axis) | (Lessios, 1990) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|-----------------------|------------------|-------------|----------------------------------|---|
| Echinometra lucunter | 106 | - | Egg diameter | (McEdward and Miner, 2006) |
| Echinometra mathaei | 75-80 | - | Egg diameter | (Kominami and Takata, 2003) |
| Echinometra vanbrunti | 70 | 360 | Egg size, metamorph size | (Emlet, 1995, Emlet et al., 1987) |
| Echinometra vanbrunti | 72.4 (SD 8.53) | - | Mean egg diameter (longest axis) | (Lessios, 1990) |
| Echinometra viridis | 91 | - | Egg size | (Emlet, 1995, Emlet et al., 1987) |
| Echinometra viridis | 93.65 (SD 5.24) | - | Mean egg diameter (longest axis) | (Lessios, 1990) |
| Encope aberrans | 190 | 280 | Egg size, metamorph size | (Herrera et al., 1996) |
| Encope aberrans | 189 | - | Egg diameter | (McEdward and Miner, 2006) |
| Encope michelini | 170 | 305 | Egg size, metamorph size | (Herrera et al., 1996) |
| Encope michelini | 212 | - | Egg diameter | (McEdward and Miner, 2006) |
| Encope stokesii | 119.65 (SD 7.44) | - | Mean egg diameter (longest axis) | (Lessios, 1990) |
| Eucidaris metularia | 90 | - | Egg diameter | (Emlet et al., 1987, Thomas et al., 2001) |
| Eucidaris thouarsi | 86 | - | Egg diameter | (Emlet et al., 1987, Thomas et al., 2001) |
| Eucidaris thouarsi | 86 | - | Egg diameter | (Emlet, 1995, Emlet, 1988) |
| Eucidaris thouarsi | 91.06 (SD 7.47) | - | Mean egg diameter (longest axis) | (Lessios, 1990) |
| Eucidaris tribuloides | 86 | 380 | Egg diameter, metamorph size | (Emlet et al., 1987, Villinski et al., 2002) |
| Eucidaris tribuloides | 94.79 (SD 4.49) | - | Mean egg diameter (longest axis) | (Lessios, 1990) |
| Evasterias troschelii | 150 | - | Egg diameter | (Strathmann, 1987) |
| Evasterias troschelii | 162 | - | Egg diameter | (Strathmann et al., 2002) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|----------------------------|-----------|-------------|--------------------------------|--|
| Evechinus chloroticus | 87 | _ | Egg diameter | (Sewell, 2005) |
| Florometra serretissima | 241 | - | Egg diameter | (McEdward and Miner, 2006) |
| Gorgonocephalus eucnemis | 200 | - | Egg diameter | (Strathmann, 1987) |
| Heliocidaris erythrogramma | 380 | - | Median egg size for population | (Marshall and Bolton, 2007) |
| Heliocidaris erythrogramma | 400 | - | Egg diameter | (Emlet et al., 1987, Thomas et al., 2001) |
| Heliocidaris erythrogramma | 430 | - | Egg diameter | (Villinski et al., 2002) |
| Heliocidaris tuberculata | 90 | - | Egg diameter | (Villinski et al., 2002, Byrne and Sewell, 2019, Prowse et al., 2017) |
| Heliocidaris tuberculata | 95 | - | Egg diameter | (McEdward and Miner, 2006, Emlet et al., 1987, Thomas et al., 2001) |
| Hemicentrotus pulcherrimus | 95 | - | Egg diameter * | (Kominami and Takata, 2003) |
| Hemicentrotus pulcherrimus | 95-105 | - | Egg diameter range | (Mohri and Hamaguchi, 1990) |
| Henricia leviuscula | 1236 | - | Egg diameter | (McEdward and Miner, 2006) |
| Henricia leviuscula | 1342 | - | Egg diameter | (Strathmann et al., 2002) |
| Henricia sp | 1,087 | - | Egg diameter | (Strathmann et al., 2002) |
| Henricia sp. | 700-1,000 | - | Egg diameter | (Strathmann, 1987) |
| Henricia spp. | 940-1,500 | - | Egg diameter | (Strathmann, 1987) |
| Heterocentrotus mamillatus | 100 | 302 | Egg size, metamorph size | (Mortensen, 1938, Emlet, 1995, McEdward, 1986) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|---------------------------|--------------------|-------------|----------------------------------|--|
| Hippasteria spinosa | 1,200 | _ | Egg diameter | (Strathmann, 1987) |
| Holopneustes inflatus | 500 | - | Egg diameter | (Emlet et al., 1987, Thomas et al., 2001) |
| Holopneustes purpurascens | 610 | - | Egg diameter | (Byrne and Sewell, 2019) |
| Holopneustes purpurascens | 580 | - | Egg diameter | (Villinski et al., 2002) |
| Isostichopus fuscus | 104 | - | Maximum size of mature oocyte | (Herrero-Pérezrul et al., 1999) |
| Isostichopus fuscus | 153.4 ± 24.6 | - | Mean mature oocyte diameter | (Toral-Granda and Martínez, 2007) |
| Laganum depressum | 100 | 310 | Egg size, metamorph size | (Mortensen, 1938, Emlet, 1995) |
| Leodia sexiesperforata | 180 | - | Egg size | (Reitzel et al., 2005) |
| Leodia sexiesperforata | 208 | 260 | Egg size, metamorph size | (Herrera et al., 1996) |
| Leptasterias aequalis | 900 | - | Egg size | (Bingham et al., 2004) |
| Leptasterias epichlora | 976.9 ± 110.9 | - | Mean egg diameter | (George, 1994) |
| Leptasterias hexactis | 995 | - | Egg diameter | (Strathmann et al., 2002) |
| Leptasterias hexactis | 800-1,100 | - | Egg diameter | (Strathmann, 1987) |
| Luidia clathrata | 166 | - | Egg diameter | (McEdward and Miner, 2006) |
| Luidia foliolata | 152 | - | Egg diameter | (Strathmann et al., 2002) |
| Luidia foliolata | 165 | - | Egg diameter | (Strathmann, 1987) |
| Lytechinus variegatus | 102.15 9 (SD 8.52) | - | Mean egg diameter (longest axis) | (Lessios, 1990) |
| Lytechinus variegatus | 104 | - | Egg diameter | (McEdward and Miner, 2006) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|----------------------------|-------------------|-------------|----------------------------------|---|
| Lytechinus variegatus | 110 | 485, 410 | Egg size, metamorph size | (Emlet et al., 1987, McEdward and Herrera, 1999, Mazur and Miller, 1971) |
| Lytechinus williamsi | 110.34 (SD 8.71) | - | Mean egg diameter (longest axis) | (Lessios, 1990) |
| Macrophiothrix koehleri | 147 | - | Mean egg diameter | (Podolsky and McAlister, 2005) |
| Macrophiothrix longipeda | 155 | - | Mean egg diameter | (Podolsky and McAlister, 2005) |
| Macrophiothrix lorioli | 166 | - | Mean egg diameter | (Podolsky and McAlister, 2005) |
| Macrophiothrix rhabdota | 230 | - | Mean egg diameter | (Podolsky and McAlister, 2005) |
| Mediaster aequalis | 940-1200 | - | Egg diameter | (Strathmann, 1987) |
| Mediaster aequalis | 951 | - | Egg diameter | (McEdward and Miner, 2006) |
| Mellita quinquiesperforata | 110 | 350 | Egg size, metamorph size | (Herrera et al., 1996, Emlet et al., 1987) |
| Mellita quinquiesperforata | 137.91 (SD 8.47) | - | Mean egg diameter (longest axis) | (Lessios, 1990) |
| Mellita sexiesperforata | 237.16 (SD 17.81) | - | Mean egg diameter (longest axis) | (Lessios, 1990) |
| Mellita tenuis | 100 | - | Egg size | (Reitzel et al., 2005) |
| Meridiastra atyphoida | 400 | - | Egg diameter | (Byrne, 2006) |
| Meridiastra calcar | 415 (SE ± 3.18) | - | Egg diameter | (Prowse et al., 2008) |
| Meridiastra gunnii | 431 (SE ± 3.85) | - | Egg diameter | (Prowse et al., 2008) |
| Meridiastra mortenseni | 239 (SE ± 4.19) | _ | Egg diameter | (Prowse et al., 2008) |
| Meridiastra occidens | 400 | - | Egg diameter | (Byrne, 2006) |
| Meridiastra oriens | 399 (SE ± 5.14) | - | Egg diameter | (Prowse et al., 2008) |
| Mespilia globulus | 80 | - | Egg diameter | (Emlet et al., 1987, Thomas et al., 2001) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|------------------------|-------------------|-------------|----------------------------------|---|
| Mespilia globulus | 80 | 377 | Egg diameter, metamorph size | (Emlet, 1995, Emlet et al., 1987) |
| Molgula pacifica | 160-180 | - | Egg size | (Bates, 2002) |
| Odontaster validus | 169 | - | Egg diameter | (McEdward and Miner, 2006) |
| Ophiactis resiliens | 83 (SE ± 0.3) | - | Mean egg diameter | (Falkner et al., 2015) |
| Ophiarachnella ramsayi | 84 (SE ± 0.3) | - | Mean egg diameter | (Falkner et al., 2015) |
| Ophiarthrum elegans | 381 (SE ± 4.0) | - | Mean egg diameter | (Falkner et al., 2015) |
| Ophiocoma alexandri | 71.0 (SE ± 0.4) | - | Mean egg diameter | (Whitehill and Moran, 2012) |
| Ophiocoma dentata | 71 (SE ± 0.7) | - | Mean egg diameter | (Falkner et al., 2013, Falkner et al., 2015) |
| Ophiocoma endeani | 353 (SE ± 2.0) | - | Mean egg diameter | (Falkner et al., 2013, Falkner et al., 2015) |
| Ophioderma wahlbergii | 250 (SD ± 100) | - | Mean oocyte diameter | (Landschoff and Griffiths, 2015) |
| Ophionereis fasciata | 90-110 (SE 1.2) | - | Egg diameter | (Falkner et al., 2015) |
| Ophionereis schayeri | 248 (SE ± 1.4) | - | Mean egg diameter | (Falkner et al., 2015) |
| Ophiopholis aculeata | 105 | - | Egg diameter | (Strathmann, 1987) |
| Ophiopteris antipodum | 110 (SE ± 0.7) | - | Mean egg diameter | (Falkner et al., 2015) |
| Ophiothrix caespitosa | 100-110 | - | Egg diameter | (Selvakumaraswamy and Byrne, 2000) |
| Ophiothrix spongicola | 122-131 (SE 0.4) | - | Egg diameter | (Selvakumaraswamy and Byrne, 2000) |
| Ophiura sarsi | 100-110 | - | Egg diameter | (Strathmann, 1987) |
| Oreaster occidentalis | 144.83 (SD 6.23) | - | Mean egg diameter (longest axis) | (Lessios, 1990) |
| Oreaster reticulatus | 197.28 (SD 33.69) | - | Mean egg diameter (longest axis) | (Lessios, 1990) |
| Oreaster reticulatus | 224.4 (SD 5.97) | _ | Mean egg size | (Metaxas et al., 2008) |
| Orphnurgus dorisae | 500 | - | Egg diameter | (Pawson, 2002) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|----------------------------|-----------------|---------------|--|---|
| Orthasterias koehleri | 148 | - | Egg diameter | (Strathmann et al., 2002) |
| Orthasterias koehleri | 150-180 | _ | Egg diameter | (Strathmann, 1987) |
| Paracentrotus lividus | 90-100 | 315 | Egg diameter, metamorph size | (Emlet, 1995) |
| Paracentrotus lividus | 92 | - | Egg diameter | (McEdward and Miner, 2006) |
| Paracentrotus lividus | 92 (SD ± 7.8) | _ | Mean egg diameter | (George et al., 1997) |
| Parapanthia aucklandensis | 400 | - | Egg diameter | (Byrne, 2006) |
| Parapanthia grandis | 800 | - | Egg diameter | (Byrne, 2006) |
| Parastichopus californicus | 189 | - | Egg diameter | (McEdward and Miner, 2006) |
| Parvulastra exigua | 384 (SE ± 2.69) | - | Egg diameter | (Prowse et al., 2008) |
| Patirella calcar | 517 | - | Egg size | (Pechenik, 1999) |
| Patirella parvivipara | 1,000 | - | Egg size | (Pechenik, 1999) |
| Patirella regularis | 410 | - | Egg size | (Pechenik, 1999) |
| Patirella vivipara | 1,500 | - | Egg size | (Pechenik, 1999) |
| Patiria chilensis | 160 | - | Egg diameter | (Byrne, 2006) |
| Patiria miniata | 173–197 | - | Egg diameter | (Strathmann, 1987) |
| Patiriella brevispina | 420 | - | Egg diameter | (Villinski et al., 2002) |
| Patiriella calcar | 415 | 746.9 | Oocyte diameter, brachiolaria larva length | (Villinski et al., 2002, Byrne et al., 1999, Byrne and Cerra, 1996, Byrne, 1991) |
| Patiriella exigua | 390 (SE 4.3) | 690 (SE 14.6) | Oocyte diameter, brachiolaria larva length | (Villinski et al., 2002, Byrne et al., 1999, Byrne and Cerra, 1996, Byrne, 1991) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|---------------------------|-------------------|----------------|--|---|
| Patiriella gunnii | 400 | 490 | Egg diameter, larvae size | (Villinski et al., 2002, Byrne et al., 1999, Byrne and Cerra, 1996, Byrne, 1991) |
| Patiriella parvivipara | 135 | 207 (SE 11.9) | Oocyte diameter, brachiolaria larva length | (Byrne and Cerra, 1996) |
| Patiriella parvivipara | 150 | - | Egg diameter | (Byrne et al., 1999) |
| Patiriella pseudoexigua | 440 | - | Egg diameter | (Byrne et al., 1999) |
| Patiriella pseudoexigua | 440 | - | Egg diameter | (Byrne et al., 1999) |
| Patiriella regularis | 150 (SE 0.8) | 1,430 (SE 3.9) | Oocyte diameter, brachiolaria larva length | (Villinski et al., 2002, Byrne et al., 1999, Byrne and Cerra, 1996, Byrne, 1991) |
| Patiriella regularis | 165 (SE ± 2.18) | - | Egg diameter | (Prowse et al., 2008) |
| Patiriella vivipara | 135 | - | Egg diameter | (Byrne et al., 1999) |
| Patiriella vivipara | 148 (SE 0.7) | 270 (SE 8.1) | Oocyte diameter, brachiolaria larva length | (Byrne and Cerra, 1996) |
| Perknaster fuscus | 1,192 | - | Egg diameter | (McEdward and Miner, 2006) |
| Phyllacanthus imperialis | 500 | - | Egg diameter | (Emlet et al., 1987, Thomas et al., 2001) |
| Phyllacanthus parvispinus | 500 | - | Egg diameter | (Emlet et al., 1987, Thomas et al., 2001) |
| Pisaster brevispinus | 160-170 | - | Egg diameter | (Strathmann, 1987) |
| Pisaster ochraceus | 150-160 | - | Egg diameter | (Strathmann, 1987) |
| Pisaster ochraceus | 178 | - | Egg diameter | (Strathmann et al., 2002) |
| Pisaster ochraceus | 151.2 (SD ± 10.8) | - | Mean egg diameter | (George, 1999) |
| Pisaster ochraceus | 154 | - | Egg diameter | (McEdward and Miner, 2006) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|--------------------------|------------------|-------------|--|--|
| Plagiobrissus grantis | 106.70 (SD 9.10) | - | Mean egg diameter (longest axis) | (Lessios, 1990) |
| Prionocidaris baculosa | 150 | - | Egg diameter | (Emlet et al., 1987, Thomas et al., 2001) |
| Prionocidaris bispinosa | 150 | - | Egg diameter | (Mortensen, 1938, Emlet, 1995) |
| Psammechinus miliaris | 97 | - | Egg diameter | (Emlet, 1995) |
| Pseudostichopus mollis | 61-421 | - | Growth and advanced growth oocyte size | (Morgan and Neal, 2012) |
| Psilaster charcoti | 944 | - | Egg diameter | (McEdward and Miner, 2006) |
| Psolus chitinoides | 569 | - | Egg diameter | (McEdward and Miner, 2006) |
| Psolus patagonicus | 887 ± 26 | - | Mean egg diameter | (Giménez and Penchaszadeh, 2010) |
| Psychropotes longicauda | 4,400 | - | Egg diameter | (Sewell and Young, 1997) |
| Pteraster militaris | 1,192 | - | Egg diameter | (McEdward and Miner, 2006) |
| Pteraster militaris | 1200 | - | - | (McEdward and Morgan, 2001) |
| Pteraster militaris | 1,192 | - | Egg diameter | (McEdward and Miner, 2006) |
| Pteraster tesselatus | 1,176 | - | Egg diameter | (McEdward and Miner, 2006) |
| Pteraster tesselatus | 1,175 | - | Egg diameter | (Strathmann et al., 2002) |
| Pteraster tesselatus | 1,200 | - | Egg diameter | (Strathmann, 1987) |
| Pycnopodia helianthoides | 120 | - | Egg diameter | (Strathmann, 1987) |
| Salmacis bicolor | 100 | - | Egg diameter | (Emlet, 1995) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|-----------------------------------|-----------|-------------|--------------------------|--|
| Scaphechinus mirabilis | 105-110 | _ | Egg diameter | (Mohri and Hamaguchi, 1990) |
| Solaster dawsoni | 887 | - | Egg diameter | (McEdward and Miner, 2006) |
| Solaster dawsoni | 950-1,000 | - | Egg diameter | (Strathmann, 1987) |
| Solaster endeca | 811 | - | Egg diameter | (McEdward and Miner, 2006) |
| Solaster endeca | 1,000 | - | Egg diameter | (Strathmann, 1987) |
| Solaster stimpsoni | 900-1,000 | - | Egg diameter | (Strathmann, 1987) |
| Solaster stimpsoni | 912 | - | Egg diameter | (McEdward and Miner, 2006) |
| Solaster stimpsoni | 964.8 | - | Mean egg width | (McEdward and Carson, 1987) |
| Stegnaster inflatus | 1000 | - | Egg diameter | (Byrne, 2006) |
| Sterechinus neumayeri | 179 | - | Egg diameter | (Moore and Manahan, 2007) |
| Strongylocentrotus droebachiensis | 145 | - | Egg diameter | (Podolsky and Strathmann, 1996) |
| Strongylocentrotus droebachiensis | 152 | - | Egg diameter | (McEdward, 1986) |
| Strongylocentrotus droebachiensis | 150 | - | Egg diameter | (McEdward and Herrera, 1999) |
| Strongylocentrotus droebachiensis | 155 | 406 | Egg size, metamorph size | (Hart, 1995) |
| Strongylocentrotus droebachiensis | 157 | - | Egg diameter | (McEdward and Miner, 2006) |
| Strongylocentrotus droebachiensis | 153-159 | - | Egg diameter | (Bertram and Strathmann, 1998) |
| Strongylocentrotus droebachiensis | 155-160 | - | Egg diameter | (Strathmann, 1987) |
| Strongylocentrotus franciscanus | 130 | 350 | Egg size, metamorph size | (Emlet, 1995, Emlet et al., 1987, Thomas et al., 2001) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|---------------------------------|----------|-------------|--------------------------|--|
| Strongylocentrotus franciscanus | 130-140 | - | Egg diameter | (Strathmann, 1987) |
| Strongylocentrotus franciscanus | 134 | - | Egg diameter | (McEdward, 1986) |
| Strongylocentrotus franciscanus | 135 | - | Egg diameter | (Podolsky and Strathmann, 1996) |
| Strongylocentrotus franciscanus | 139 | - | Egg diameter | (McEdward and Miner, 2006) |
| Strongylocentrotus franciscanus | 130 | 350 | Egg size, metamorph size | (Emlet, 1995, Emlet et al., 1987, Thomas et al., 2001) |
| Strongylocentrotus pallidus | 155-170 | - | Egg diameter | (Strathmann, 1987) |
| Strongylocentrotus pallidus | 164 | - | Egg diameter | (McEdward and Miner, 2006) |
| Strongylocentrotus purpuratus | 84 | - | Egg diameter | (Podolsky and Strathmann, 1996) |
| Strongylocentrotus purpuratus | 80, 84 | 391, 400 | Egg size, metamorph size | (Strathmann, 2017, Emlet, 1995) |
| Strongylocentrotus purpuratus | 78-80 | - | Egg diameter | (Strathmann, 1987) |
| Strongylocentrotus purpuratus | 80 | - | Egg diameter | (Zigler and Raff, 2013, McEdward and Miner, 2006, Villinski et al., 2002, Emlet et al., 1987, Thomas et al., 2001, McEdward and Herrera, 1999, Matson et al., 2012) |
| Stylocidars lineata | 110 | - | Egg diameter | (McEdward and Miner, 2006) |
| Styracaster elongatus | 230 | - | Previtellogenic oocytes | (Benítez-Villalobos and Díaz-Martínez, 2010) |
| Synaptula reciprocans | 50 | - | Egg diameter | (Sewell and Young, 1997) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|-------------------------|------------------|-------------|----------------------------------|---|
| Temnopleurus alexandri | 125 | - | Egg diameter | (Byrne and Sewell, 2019) |
| Temnopleurus hardwicki | 85-95 | - | Egg diameter | (Mohri and Hamaguchi, 1990) |
| Temnotrema sculptum | 97 | - | Egg diameter | (Emlet, 1995) |
| Toxopneustes roseus | 101.72 (SD 2.07) | - | Mean egg diameter (longest axis) | (Lessios, 1990) |
| Toxopneustes roseus | 101.72 (SD 2.07) | - | Mean egg diameter (longest axis) | (Lessios, 1990) |
| Tripneustes depressus | 79.16 (SD 1.41) | - | Mean egg diameter (longest axis) | (Lessios, 1990) |
| Tripneustes gratilla | 82 | - | Egg diameter | (McEdward, 1986) |
| Tripneustes gratilla | 85 | - | Egg diameter | (Byrne et al., 2008a, Byrne et al., 2008b) |
| Tripneustes ventricosus | 79 | 600 | Egg size, metamorph size | (Emlet, 1995, Cameron, 1986) |
| Tripneustes ventricosus | 80.35 (SD 2.66) | - | Mean egg diameter (longest axis) | (Lessios, 1990) |
| Uniphora granifera | 500 | - | Egg diameter * | (Marshall and Keough, 2003a) |

Note: Smallest value was recorded when available, * indicates that size was an approximate value.

A8. Flatworms

Literature search: To identify literature on propagule and female gamete size a systematic literature search was undertaken using the <u>Web of Science</u> database. For flatworms four searches were performed using the following search criteria:

Web of Science: TOPIC: (platyhelminth*) AND TOPIC: (egg size) AND TOPIC: (marine) Results: 406

Web of Science: TOPIC: (platyhelminth*) AND TOPIC: (marine) AND ALL FIELDS: ('egg size') Results: 8

Web of Science: TOPIC: (platyhelminthes) AND TOPIC: (egg size) AND ALL FIELDS: (marine) Results: 17

Web of Science: TOPIC: (platyhelminthes) AND TOPIC: (egg size) Results: 65

Additional articles were also sourced from citations and reference lists of articles produced in the Web of Science database searches.

| Species | Egg (µm) | Comments | References |
|---------------------------|---------------|------------------------------|---------------------------------|
| Allomurraytrema robustrum | 53.2-73.1 | Egg size range | (Roubal, 1994) |
| Anantrum histocephalum | 31-53 | Egg size range | (Jensen and Heckmann, 1977) |
| Anoplodium hymanae | 45-97 | Egg capsule, zygote 36–40 | (Shinn, 1985) |
| Anoplodium hymanae | 45 x 75 | Egg dimensions | (Shinn, 1985) |
| Aphanurus stossichii | 9–13 | Egg width | (Kostadinova et al., 2004) |
| Aphanurus virgula | 9–13 | Egg width | (Kostadinova et al., 2004) |
| Archocelis macrorhabditis | 75 x 80 | - | (Riser, 1974) |
| Bianium plicitum | 34-35 x 66-67 | Range of egg width x length | (Bray and Cribb, 1998) |
| Bianium spongiosum | 40-45 x 60-63 | Range of egg width x length | (Bray and Cribb, 1998) |
| Bulbocirrus aulostomi | 31-32 x 51-54 | Range of egg width x length | (Bray and Cribb, 1998) |
| Capitella teleta | 200 | Egg diameter * | (Pernet et al., 2012) |
| Clavogalea trachinoti | 30-41 x 61-76 | Range of egg width x length | (Bray and Cribb, 1998) |
| Convoluta paradoxa | 70 | Mature ova diameter | (GAMBLE, 1893) |
| Convoluta psammophyla | 80-100 | Vitellogenic oocyte diameter | (Falleni and Gremigni, 1990) |
| Echeneidocoelium indicum | 29-39 x 54-58 | Range of egg width x length | (Bray and Cribb, 1998) |
| Echinoplana celerrima | 130 | Zygote diameter | (Gammoudi et al., 2012) |
| Euplana gracilis | 85-100 | Fertilised ovum diameter | (Christensen, 1971) |

Table A8 Flatworm propagule sizes identified from the literature search

| Species | Egg (µm) | Comments | References |
|----------------------------|---------------|--------------------------------|---|
| Freemania littoricola | 160-170 | Zygote diameter | (Strathmann, 1987) |
| Haliotrema spariensis | 53.2-66.5 | Egg size range | (Roubal, 1994) |
| Haploporus benedeni | 24–27 | Egg width | (Atopkin et al., 2019, Blasco-Costa et al., 2009) |
| Haploporus indicus | 11-15 | Egg width | (Atopkin et al., 2019) |
| Haploporus magnisaccus | 18-26 | Egg width | (Atopkin et al., 2019) |
| Haploporus mugilis | 19-22 | Egg width | (Atopkin et al., 2019) |
| Haploporus musculosaccus | 17-23 | Egg width | (Atopkin et al., 2019) |
| Haploporus pacificus | 27-31 | Egg width | (Atopkin et al., 2019) |
| Haploporus pseudoindicus | 15 | Egg width | (Atopkin et al., 2019) |
| Haploporus spinosus | 18-23 | Egg width | (Atopkin et al., 2019) |
| Hypocreadium patellare | 51 x 70 | Uncollapsed egg width x length | (Bray and Cribb, 1998) |
| Imogine mcgrathi | 120 | - | (Jennings and Newman, 1996) |
| Imogine mediterranea | 70 | Zygote diameter | (Gammoudi et al., 2012) |
| Imogine zebra | 175-225 | Egg diameter | (Rawlinson et al., 2008) |
| Labellodiscus major | 63.8-67.8 | Egg size range | (Roubal, 1994) |
| Lamellodiscus acanthopagri | 95-104 | Egg size range | (Roubal, 1994) |
| Lamellodiscus squamosus | 53.2-59.8 | Egg size range | (Roubal, 1994) |
| Lepocreadioides orientalis | 29-34 x 69-76 | Range of egg width x length | (Bray and Cribb, 1998) |
| Lepocreadium oyabitcha | 38-41 x 70-74 | Range of egg width x length | (Bray and Cribb, 1998) |
| Macrostomum lignano | 100 | Egg diameter | (Mouton et al., 2018) |
| Maritigrella crozieri | 220 (± 15.6) | Egg diameter | (Rawlinson, 2010) |

| Species | Egg (µm) | Comments | References |
|-----------------------------------|---------------|-----------------------------|----------------------------------|
| Maritigrella crozieri | 134 | Average zygote diameter | (Bolanos and Litvaitis, 2009) |
| Melloplana ferruginea | 125 | Average embryo diameter | (Bolanos and Litvaitis, 2009) |
| Monocelis lineata | 40-50 | Mature oocyte diameter | (Gremigni and Nigro, 1984) |
| Multitestis pyriformis | 26-32 x 57-61 | Range of egg width x length | (Bray and Cribb, 1998) |
| Myzoxenus insolens | 25-32 x 64-73 | Range of egg width x length | (Bray and Cribb, 1998) |
| Neochilda fusca | 150 | Egg diameter | (Bush, 1975) |
| Neowardula brayi | 42-52 | Egg width | (Al-Jahdali, 2010) |
| Notoplana australis | 120–125 | Egg diameter | (Anderson, 1977) |
| Opechona austrobacillaris | 35-54 x 70-89 | Range of egg width x length | (Bray and Cribb, 1998) |
| Pleioplama atomata | 290-480 | Egg diameter | (Rawlinson et al., 2008) |
| Prosthiostomum siphunculus | 110 | Zygote | (Gammoudi et al., 2012) |
| Prototransversotrema steeri | 81.6-108.8 | Egg length | (Roubal, 1998) |
| Pseudohaplogonaria vacua | 180–190 | - | (Riser, 1974) |
| Pseudohaploporus planilizum sp. | 23-27 | Egg width | (Atopkin et al., 2019) |
| Pseudohaploporus vietnamensis sp. | 15-19 | Egg width | (Atopkin et al., 2019) |
| Pseudopecoelus ibunami | 17-20 x 40-50 | Egg dimensions | (Estrada-García et al., 2018) |
| Pseudopisthogonoporus vitellosus | 32-42 x 67-79 | Range of egg width x length | (Bray and Cribb, 1998) |
| Pseudosylochus ostreophagus | 147 | - | (Woelke, 1957) |
| Retronectes euterpe | 140 | - | (Sterrer and Rieger, 1974) |

| Species | Egg (µm) | Comments | References |
|-------------------------|------------|------------------------|---------------------------------|
| Sclerocollum rubrimaris | 14-16 | Egg width | (Al-Jahdali, 2010) |
| Sclerocollum saudii | 6-10 | Egg width | (Al-Jahdali, 2010) |
| Spirorchiidae gen. sp | 25-30 | Egg diameter | (Lehnert et al., 2019) |
| Stylochus aomori | 95-105 | - | (Kato, 1940) |
| Stylochus ellipticus | 61 - 74 | Egg diameter range | (Chintala and Kennedy, 1993) |
| Stylochus uniporis | 85-95 | - | (Kato, 1940) |
| Stylochus zebra | 200-220 | Egg diameter | (Lytwyn and McDermott, 1976) |
| Stylostomum sanjuania | 80-90 | Zygote diameter | (Strathmann, 1987) |
| Syndesmis dendrasrorum | 72 x 105 | Egg capsule dimensions | (Stunkard and Corliss, 1951) |
| Thysanozoon brocchii | 130 | Diameter of zygote | (Gammoudi et al., 2012) |
| Transversotrema licinum | 95.2-108.8 | Egg length | (Roubal, 1998) |

Note: Smallest value was recorded when available, * indicates that size was an approximate value,^{*} indicates species and propagule sizes recorded in the report by Georgiades (2012) that we were not able to access.

A9. Gastropods

Literature search: To identify literature on propagule and female gamete size a systematic literature search was undertaken using the <u>Web of Science</u> database. For gastropods a search was performed using the following search criteria:

Web of Science: TOPIC: (gastropod*) AND TOPIC: (egg size) AND ALL FIELDS: (diameter) Results: 63

Additional articles were also sourced from citations and reference lists of articles produced in the Web of Science database searches.

Table A9 Gastropod propagule sizes identified from the literature search

| Species | Egg (µm) | Larval (µm) | Comments | References |
|--------------------------|-----------------|------------------|--|---|
| Acanthodoris brunnea | 80 | - | Oocyte size | (Strathmann, 1987) |
| Acanthodris pilosa | 70 | - | Oocyte size | (Strathmann, 1987) |
| Acnthodoris hudsoni | 70 | - | Oocyte size | (Strathmann, 1987) |
| Aegires albopunctatus | 107-120 | - | Oocyte size | (Strathmann, 1987) |
| Aeolidia papillosa | 74 | - | Oocyte size | (Strathmann, 1987) |
| Aeolidiella alba | 69.7 (SD ± 0.4) | - | Egg diameter | (Goddard and Hermosillo, 2008) |
| Aeolidiella chromosoma | 85 | 127.0 (SD ± 4.3) | Maximum egg diameter, shell length at hatching | (Goddard and Hermosillo, 2008) |
| Alderia modesta | 70 | - | Oocyte size | (Strathmann, 1987) |
| Alderia modesta | 62-87 | - | Egg diameter | (CLARK and GOETZFRIED, 1978) |
| Aldisa cooperi | 110 | - | Oocyte size | (Strathmann, 1987) |
| Alia gausapata | 180 | - | Oocyte size | (Strathmann, 1987) |
| Amauropsis islandica | 1500 | - | Egg diameter | (Thorson, 1935) |
| Amphissa columbiana | 195 | - | Oocyte size | (Strathmann, 1987) |
| Ancula pacifica | 58-59 | - | Oocyte size | (Strathmann, 1987) |
| Anisodoris nobilis | 83 | - | Oocyte size | (Strathmann, 1987) |
| Aplysiopsis smithi | 70 | - | Oocyte size | (Strathmann, 1987) |
| Apylysiopsis maculosa | 50 | - | Egg diameter | (Jensen and Ong, 2015) |
| Apylysiopsis zebra | 71 | - | Egg diameter | (Clark and Jensen, 1981) |
| Archidoris montereyensis | 81-82 | - | Oocyte size | (Strathmann, 1987) |
| Armina californica | 95-102 | - | Oocyte size | (Strathmann, 1987) |
| Ascobulla ulla | 60 | _ | Egg diameter | (Jensen, 2001, De Freese and Clark, 1991) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|------------------------|-----------------|------------------|--|---|
| Bajaeolis bertschi | 89 | - | Maximum egg diameter | (Goddard and Hermosillo, 2008) |
| Berthelina darwini | 102.8 ± 5.9 | - | Egg diameter | (Jensen, 2001) |
| Berthelina ganapati | 50 | - | Egg diameter | (Jensen, 2001) |
| Berthelinia australis | 54 | - | Egg diameter | (Jensen, 2001) |
| Berthelinia australis | 54 | - | Egg diameter | (Wisely, 1962) |
| Berthelinia caribbea | 100 | - | Egg diameter | (Jensen, 2001) |
| Berthella californica | 93 | - | Oocyte size | (Strathmann, 1987) |
| Berthellina ilisima | - | 144.5 (SD ± 0.4) | Shell length at hatching | (Goddard and Hermosillo, 2008) |
| Bittium eschrichtii | 220 | - | Oocyte size | (Strathmann, 1987) |
| Boonea bisuturalis | 68-80 | 250 | Egg enclosed in capsule, Shell diameter at metamorphosis | (Robertson, 2012a) |
| Boonea impressa | 182-238 | 265 | Hatching shell diameter | (Robertson, 2012a, White et al., 1985) |
| Boonea impressa | 80-236 | 154-276 | Egg size, hatching shell diameter | (Robertson, 2012a) |
| Boonea seminuda | 65-78 | 146-158 | Egg size, hatching shell diameter | (Robertson, 2012a) |
| Bosellia leve | 64 | - | Egg diameter | (Fernández-Ovies and Ortea, 1986) |
| Bosellia mimetica | 59–75 | - | Egg diameter | (Clark and Jensen, 1981) |
| Buccinanops cochlidium | 160-280 | - | Egg size | (Averbuj and Penchaszadeh, 2010) |
| Buccinanops paytensis | 184.5-341 | - | Egg size | (Averbuj and Penchaszadeh, 2010) |
| Buccinum scalariforme | 300-500 | - | Egg size | (Montgomery et al., 2017) |
| Bulbus carcellesi | 200 | 197–198 | Egg diameter, embryo shell diameter | (Penchaszadeh et al., 2016) |
| Cadlina marginata | 90 | - | Oocyte size | (Strathmann, 1987) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|--------------------------|-----------------|------------------|--|-----------------------------------|
| Caliphylla mediterranea | 89, 50–70 | _ | Egg diameter | (Schmekel et al.) |
| Calliostoma ligatum | 220-230 | - | Oocyte size | (Strathmann, 1987) |
| Calliostoma ligatum | 233 | - | Egg diameter | (Strathmann et al., 2002) |
| Callipoea oophaga | 61.7 | - | Egg diameter | (Jensen, 1990) |
| Calyptraea cf. chinensis | 480 | - | Egg size | (Collin, 2003) |
| Calyptraea chinensis | 480 | - | Egg diameter | (Collin, 2003) |
| Calyptraea conica | 177 | - | Egg size | (Collin, 2003) |
| Calyptraea conica | 200 | - | Egg size | (Collin, 2003) |
| Calyptraea extinctorum | 200-215 | - | Egg size | (Collin, 2003) |
| Calyptraea mamillaris | 200 | 320-380 | Egg size, hatching size | (Collin, 2003) |
| Calyptraea mamillaris | - | 340 | Hatching size | (Collin, 2003) |
| Calyptraea pellucida | 120 | 220-227 | Egg size, hatching size | (Collin, 2003) |
| Cellana grata | 110-170 | - | Mature egg diameter | (Yang et al., 2017) |
| Clione limacina | 90 | - | Oocyte size | (Strathmann, 1987) |
| Conualevia alba | 87.7 (SD ± 1.4) | 150.7 (SD ± 2.5) | Egg diameter, shell length at hatching | (Goddard and Hermosillo, 2008) |
| Conus biliosus | 172 ± 10.5 | - | Diameter of uncleaved egg | (Zehra and Perveen, 1991) |
| Conus coronatus | 152 ± 9.49 | - | Diameter of uncleaved egg | (Zehra and Perveen, 1991) |
| Conus flavidus | 180 | - | Egg diameter | (Strathmann, 1985) |
| Conus lividus | 150 | - | Egg diameter | (Strathmann, 1985) |
| Conus marmoreus | 338 | - | Egg diameter | (Strathmann, 1985) |
| Conus pennaceus | 500 | _ | Egg diameter | (Strathmann, 1985) |
| Conus quercinus | 192 | _ | Egg diameter | (Strathmann, 1985) |
| Conus textile | 260 | - | Egg diameter | (Strathmann, 1985) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|------------------------|-----------------|-------------|-------------------------------|---|
| Costasiella nonatoi | 69 | - | Egg diameter | (Clark and Jensen, 1981) |
| Costasiella ocellifera | 98 | - | Egg diameter | (Clark and Jensen, 1981, De Freese and Clark, 1991) |
| Costasiella pallida | 84.6 (SD ± 7.7) | - | Egg diameter | (Jensen, 1990, Jensen, 2001) |
| Crepidula aculeata | 180 | 360 | Egg size | (Collin, 2003) |
| Crepidula aculeata | 197.6 | - | Egg size | (Collin, 2003) |
| Crepidula aculeata | 200 | 1,200 | Egg size, hatching size | (Collin, 2003) |
| Crepidula aculeata | 360-390 | 840 | Egg size range, hatching size | (Collin, 2003) |
| Crepidula aculeata | 488 | - | Egg size | (Collin, 2003) |
| Crepidula aculeata | 530-560 | - | Egg size | (Collin, 2003) |
| Crepidula adunca | 240 | - | Oocyte size | (Strathmann, 1987) |
| Crepidula adunca | 262-315 | 1,500-2,700 | Egg size, hatching size | (Collin, 2003) |
| Crepidula adunca | 400-420 | - | Egg size | (Collin, 2003) |
| Crepidula adunca | - | 1,190 | Hatching size | (Collin, 2003) |
| Crepidula aplysioides | 300 | 600 | Egg size, hatching size | (Collin, 2003) |
| Crepidula arenata | 160 | - | Egg size | (Collin, 2003) |
| Crepidula argentina | 170 | 190-230 | Egg size, hatching size | (Collin, 2003) |
| Crepidula atrasolea | 330.1 | 987 | Egg size, hatching size | (Collin and Salazar, 2010) |
| Crepidula atrasolea | 335 | 1,002 | Egg size, hatching size | (Collin, 2003) |
| Crepidula atrasolea | - | 900 | Hatching size | (Collin, 2003) |
| Crepidula cerithicola | 234 | - | Egg size | (Collin, 2003) |
| Crepidula cerithicola | 160-180 | 670-920 | Egg size, hatching size | (Collin, 2003) |
| Crepidula complanata | 438 | 1,064 | Egg size, hatching size | (Collin, 2003) |
| Crepidula convexa | 262 | 920 | Egg size, hatching size | (Collin, 2003) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|------------------------|----------|-------------|-------------------------|---|
| Crepidula convexa | 280 | - | Egg size | (Collin, 2003) |
| Crepidula convexa | 280 | - | Egg size | (Coe, 1949) |
| Crepidula convexa | 320 | 950 | Egg size, hatching size | (Collin, 2003, Hendler and Franz, 1971) |
| Crepidula convexa | 280-320 | 900–1,080 | Egg size, hatching size | (Collin, 2003, Hoagland, 1986) |
| Crepidula coquimbensis | 228 | 1142 | Egg size, hatching size | (Collin, 2003) |
| Crepidula costata | 256 | 447 | Egg size, hatching size | (Collin, 2003) |
| Crepidula depressa | - | 255 | Hatching size | (Collin, 2003) |
| Crepidula dilatata | 220.4 | 1,239 | Egg size, hatching size | (Collin, 2003) |
| Crepidula dilatata | 239 | 1375 | Egg size, hatching size | (Collin, 2003) |
| Crepidula dilatata | 195-263 | 900-1,370 | Egg size, hatching size | (Gallardo, 1977) |
| Crepidula dilatata | - | 1,075–1,600 | Hatching size | (Chaparro and Paschke, 1990) |
| Crepidula fecunda | 191 | 294 | Egg size, hatching size | (Collin, 2003) |
| Crepidula fecunda | 275.4 | - | Egg size | (Collin, 2003) |
| Crepidula fecunda | 204-238 | 500-560 | Egg size, hatching size | (Gallardo, 1977) |
| Crepidula fimbriata | - | 1,570 | Hatching size | (Collin, 2003) |
| Crepidula fornicata | 160-180 | - | Egg size | (Hoagland, 1986) |
| Crepidula fornicata | 165-180 | - | Egg size | (Coe, 1949) |
| Crepidula fornicata | - | 988 | Settling size | (Ament, 1979) |
| Crepidula fornicata | - | 445-489 | Hatching size | (Pechenik et al., 1996) |
| Crepidula incurva | 150 | 270 | Egg size, hatching size | (Collin, 2003) |
| Crepidula incurva | 160 | 200 | Egg size, hatching size | (Hoagland, 1986) |
| Crepidula incurva | 171 | 287 | Egg size, hatching size | (Collin, 2003) |
| Crepidula lessoni | 213 | 321 | Egg size, hatching size | (Collin, 2003) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|----------------------|----------|-----------------|-------------------------|-------------------------------------|
| Crepidula lessoni | 260 | 320 | Egg size, hatching size | (Hoagland, 1986) |
| Crepidula lingulata | 150 | 271 | Egg size, hatching size | (Hoagland, 1986) |
| Crepidula lingulata | 150 | - | Egg size | (Hoagland, 1986) |
| Crepidula lingulata | 150 | - | Egg size | (Hoagland et al., 1982) |
| Crepidula lingulata | 150.8 | 271 | Egg size, hatching size | (Coe, 1949) |
| Crepidula maculosa | 440 | - | Egg size | (Hoagland et al., 1982) |
| Crepidula marginalis | 151 | 382 | Egg size, hatching size | (Collin, 2003) |
| Crepidula marginalis | 143-168 | 204-229 | Egg size, hatching size | (Collin, 2003) |
| Crepidula marginalis | - | 296 | Hatching size | (Collin, 2003) |
| Crepidula monoxyla | 156 | 2,779 | Egg size, hatching size | (Collin, 2003) |
| Crepidula monoxyla | 160 | 2,900 | Egg size, hatching size | (Collin, 2003) |
| Crepidula monoxyla | - | 2,500-3,000 | Hatching size | (Collin, 2003) |
| Crepidula monoxyla | - | 2,000-3,250 | Hatching size | (Collin, 2003, Pilkington, 1974) |
| Crepidula naticarum | 164 | 275 | Egg size, hatching size | (Collin, 2003) |
| Crepidula navicula | 350 | 550-1,170 | Egg size, hatching size | (Collin, 2003) |
| Crepidula nivea | 130-140 | - | Egg size | (Collin, 2003) |
| Crepidula norrisarum | 500 | - | Egg size | (Collin, 2003, Coe, 1949) |
| Crepidula nummaria | 400 | - | Egg size * | (Collin, 2003, Dehnel, 1955) |
| Crepidula onyx | 172 | - | Egg size | (Collin, 2003, Coe, 1949) |
| Crepidula onyx | 150-160 | 294 | Egg size, hatching size | (Collin, 2003) |
| Crepidula onyx | 160-180 | - | Egg size | (Collin, 2003) |
| Crepidula onyx | - | 297 (112, 16.5) | Hatching size | (Collin, 2003) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|------------------------|----------|-------------|--------------------------|-----------------------------------|
| Crepidula perforans | 135 | 239 | Egg size, hatching size | (Collin, 2003) |
| Crepidula perforans | 500 | - | Egg size | (Collin, 2003, Coe, 1949) |
| Crepidula philippiana | 140-160 | 3,000 | Egg size, hatching size | (Collin, 2003) |
| Crepidula plana | 136 | - | Egg size | (Collin, 2003) |
| Crepidula plana | 130-140 | - | Egg size | (Collin, 2003, Hoagland, 1986) |
| Crepidula plana | - | 300 | Hatching size | (Collin, 2003) |
| Crepidula porcellana | 400 | 1,000 | Egg size, hatching size | (Collin, 2003) |
| Crepidula protea | 150 | - | Egg size * | (Collin, 2003) |
| Crepidula striolata | 140-180 | 240-440 | Egg size, hatching size | (Collin, 2003) |
| Crepidula ustulatulina | 300 | 840 | Egg size*, hatching size | (Collin, 2003) |
| Crepidula ustulatulina | 300-340 | 744 | Egg size, hatching size | (Collin, 2003) |
| Crepidula ustulatulina | 300-340 | 744 | Egg size, hatching size | (Collin and Salazar, 2010) |
| Crepidula williamsi | 158 | 318 | Egg size, hatching size | (Collin, 2003) |
| Crepidula williamsi | 345 | 976 | Egg size, hatching size | (Collin, 2003) |
| Crepidula williamsi | 403 | 1,470 | Egg size, hatching size | (Collin, 2003) |
| Crepidula williamsi | 450 | - | Egg size | (Collin, 2003, Coe, 1949) |
| Crucibulum auricula | 218 | 728 | Egg size, hatching size | (Collin, 2003) |
| Crucibulum marense | - | 1,020-1,160 | Hatching size | (Collin, 2003) |
| Crucibulum personatum | - | 320 | Hatching size | (Collin, 2003) |
| Crucibulum personatum | - | 326 | Hatching size | (Collin, 2003, Hoagland, 1986) |
| Crucibulum quirquinae | 309 | 468 | Egg size, hatching size | (Collin, 2003) |
| Crucibulum quirquinae | 325 | 458 | Egg size, hatching size | (Collin, 2003) |
| Crucibulum radiatum | 169 | 366 | Egg size, hatching size | (Collin, 2003) |

Assessment of reproductive propagule size for biofouling risk groups

| Species | Egg (µm) | Larval (µm) | Comments | References |
|---------------------------|------------------|------------------|--|-----------------------------------|
| Crucibulum scutellatum | - | 700 | Hatching size | (Collin, 2003) |
| Crucibulum sp. A | 230 | 934 | Egg size, hatching size | (Collin, 2003) |
| Crucibulum sp. B | 292 | 1,067 | Egg size, hatching size | (Collin, 2003) |
| Crucibulum spinosum | 170-190 | 250-300 | Egg size, hatching size | (Collin, 2003) |
| Crucibulum spinosum | - | 325 | Hatching size | (Collin, 2003, Coe, 1949) |
| Crucibulum spinosum | - | 240-360 | Egg size, hatching size | (Collin, 2003) |
| Crucibulum spinosum | - | 330 | Hatching size | (Collin, 2003, Hoagland, 1986) |
| Crucibulum umbrella | - | 380-480 | Hatching size | (Collin, 2003) |
| Cryptochiton stelleri | 275-285 | - | Oocyte size | (Strathmann, 1987) |
| Cryptonatica janthostoma | 176 | - | Mean egg diameter | (Kulikova et al., 2007) |
| Cuthona columbiana | 100 | - | Oocyte size | (Strathmann, 1987) |
| Cuthona divae | 107 | - | Oocyte size | (Strathmann, 1987) |
| Cuthona lizae | 88.6 (SD ± 1.4) | 241.0 (SD ± 6.0) | Egg diameter, shell length at hatching | (Goddard and Hermosillo, 2008) |
| Cuthona pustulata | 120 | - | Oocyte size | (Strathmann, 1987) |
| Cyerce antillensis | 112 | - | Egg diameter | (Clark and Jensen, 1981) |
| Cyerce cristallina | 60 | - | Egg diameter | (Schmekel et al., 1982) |
| Dendrodoris fumata | 101.6 (SD ± 0.7) | 174.8 (SD ± 4.8) | Egg diameter, shell length at hatching | (Goddard and Hermosillo, 2008) |
| Dendronotus diversicolour | 96 | - | Oocyte size | (Strathmann, 1987) |
| Dendronotus frondosus | 85-90 | - | Oocyte size | (Strathmann, 1987) |
| Dendronotus iris | 110 | - | Oocyte size | (Strathmann, 1987) |
| Dendropoma petraeum | 500 | - | Egg size | (Templado et al., 2016) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|----------------------------|-----------------|------------------|--|-----------------------------------|
| Diaphorodoris lirulaocauda | 62-64 | - | Oocyte size | (Strathmann, 1987) |
| Diaulula aurila | 87.9 (SD ± 2.6) | 139.6 (SD ± 5.7) | Egg diameter, shell length at hatching | (Goddard and Hermosillo, 2008) |
| Dirona albolineata | 70 | - | Oocyte size | (Strathmann, 1987) |
| Discodoris heathi | 73-78 | - | Oocyte size | (Strathmann, 1987) |
| Doridella steinbergae | 75-85 | - | Oocyte size | (Strathmann, 1987) |
| Doriopsilla rowena | 97.4 (SD ± 3.1) | - | Egg diameter | (Goddard and Hermosillo, 2008) |
| Doris granulosa | 73 | - | Maximum egg diameter | (Goddard and Hermosillo, 2008) |
| Doris immonda | - | 67.4 (SD ± 1.20) | Shell length at hatching | (Goddard and Hermosillo, 2008) |
| Doto amyra | 150-154 | - | Oocyte size | (Strathmann, 1987) |
| Doto kya | 75 | - | Oocyte size | (Strathmann, 1987) |
| Doto sp. (brown) | 80 | 104.3 (SD ± 1.8) | Maximum egg diameter, shell length at hatching | (Goddard and Hermosillo, 2008) |
| Doto sp. 2 | 80 | 121.4 (SD ± 4.6) | Maximum egg diameter, shell length at hatching | (Goddard and Hermosillo, 2008) |
| Doto sp. 3 | 89 | 127.4 (SD ± 8.8) | Maximum egg diameter, shell length at hatching | (Goddard and Hermosillo, 2008) |
| Elysia atroviridus | 54 ± 6 | - | Egg diameter | (Jensen, 2001) |
| Elysia australis | 64 | - | Egg diameter | (Jensen, 2001) |
| Elysia catulus | 75.3 ± 3.1 | - | Egg diameter | (Jensen, 2001) |
| Elysia chlorotica | 79 ± 3 | - | Egg diameter | (Jensen, 2001) |
| Elysia cornigera | 105 | - | Egg diameter | (Jensen, 2001) |
| Elysia diomedea | - | 128.4 (SD ± 2.4) | Shell length at hatching | (Goddard and Hermosillo, 2008) |
| Elysia elsiae | 80 | - | Egg diameter | (Jensen, 2001) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|----------------------------|-------------|-------------|----------------------|---|
| Elysia evelinae | 104 | - | Egg diameter | (Jensen, 2001, Clark and Jensen, 1981) |
| Elysia hamatanii | 68 | _ | Egg diameter | (Jensen, 2001) |
| Elysia hegpethi | 70 | - | Oocyte size | (Strathmann, 1987) |
| Elysia japonica | 91 ± 4 | - | Egg diameter | (Jensen, 2001) |
| Elysia maoria | 70 | - | Egg diameter | (Jensen, 2001) |
| Elysia papillosa | 92 | - | Egg diameter | (Jensen, 2001, Clark and Jensen, 1981) |
| Elysia patina | 63 | - | Egg diameter | (Jensen, 2001, De Freese and Clark, 1991) |
| Elysia pusilla | 65 | - | Maximum egg diameter | (Goddard and Hermosillo, 2008) |
| Elysia serca | 61 | - | Egg diameter | (Clark and Jensen, 1981) |
| Elysia subornata | 120 | - | Egg diameter | (Clark and Jensen, 1981, De Freese and Clark, 1991) |
| Elysia thompsoni | 62 | - | Egg diameter | (Jensen) |
| Elysia trisinuata | 46 | - | Egg diameter | (Hamatani, 1960) |
| Elysia tuca | 111 | - | Egg diameter | (Clark and Jensen, 1981) |
| Elysia viridis | 60-76 | - | Egg diameter | (Schmekel et al., 1982) |
| Enteroxenos parastichopoli | 110-120 | - | Oocyte size | (Strathmann, 1987) |
| Epheria turrita | 120-130 | - | Egg diameter | (Kolbin and Kulikova, 2008) |
| Ercolania boodleae | 65-100 | _ | Egg diameter | (Hamatani, 1960) |
| Ercolania coerulea | 60, 70 | - | Egg diameter | (Jensen, 2001) |
| Ercolania emarginata | 58 (SD ± 4) | - | Egg diameter | (Jensen, 2001) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|--------------------------|-----------------|------------------|--|-----------------------------------|
| Ercolania endophytophaga | 77 (SD ± 1.4) | - | Egg diameter | (Jensen, 2001) |
| Ercolania felina | 56 | - | Egg diameter | (Jensen, 2001) |
| Ercolania funerea | 59, 75–90 | - | Egg diameter | (De Freese and Clark, 1991) |
| Ercolania fuscata | 64.5 (SD ± 2) | - | Egg diameter | (Clark and Jensen, 1981) |
| Ercolania gopalai | 70 | - | Egg diameter | (Jensen, 2001) |
| Ercolania n.sp | 58.5 (SD ± 2.6) | - | Egg diameter | (Jensen, 2001) |
| Ercolania nigra | 70 | - | Egg diameter | (Jensen, 2001) |
| Ercolania nigrovittata | 70 | - | Egg diameter | (Jensen, 2001) |
| Eubranchus cucullus | 100 | - | Maximum egg diameter | (Goddard and Hermosillo, 2008) |
| Eubranchus rustyus | 93 | - | Oocyte size | (Strathmann, 1987) |
| Eubranchus sp | 94 | 203.2 (SD ± 8.5) | Maximum egg diameter, shell length at hatching | (Goddard and Hermosillo, 2008) |
| Eubranchus sp. 2 | - | 227.8 (SD ± 3.2) | Shell length at hatching | (Goddard and Hermosillo, 2008) |
| Euspira pallida | 2250 | - | Egg diameter | (Thorson, 1935) |
| Euspira triseriata | 350 | - | Egg diameter | (Giglioli, 1955) |
| Falsilunatia eltanini | 171-209 | - | Egg diameter | (Averbuj et al., 2018) |
| Fargoa bartschi | 55-60 | 129–158 | Egg size, hatching veliger shell diameter | (Robertson, 2012b) |
| Fargoa dianthophila | 53–57 | 120 to 132 | Egg size, hatching veliger shell diameter | (Robertson, 2012b) |
| Favorinus elenalexiae | - | 115.0 (SD ± 1.8) | Shell length at hatching | (Goddard and Hermosillo, 2008) |
| Fiona pinnata | 125 | - | Oocyte size | (Strathmann, 1987) |
| Fissurellidea bimaculata | 150-160 | - | Oocyte size | (Strathmann, 1987) |
| Flabellina marcusorum | 73 | - | Maximum egg diameter | (Goddard and Hermosillo, 2008) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|-------------------------------|-----------------|------------------|--|-------------------------------------|
| Flabellina sp. 1 | 74 | 99.6 (SD ± 4.9) | Maximum egg diameter, shell length at hatching | (Goddard and Hermosillo, 2008) |
| Flabellina telja | 66.1 (SD ± 0.6) | 123.7 (SD ± 3.7) | Egg diameter, shell length at hatching | (Goddard and Hermosillo, 2008) |
| Flabellina trilineata | 60 | - | Oocyte size | (Strathmann, 1987) |
| Fusitriton oregonensis | 150 | - | Oocyte size | (Strathmann, 1987) |
| Gastropteron pacificum | 95 | - | Oocyte size | (Strathmann, 1987) |
| Glossaulax vesicalis | 480 | - | Egg diameter | (Amio, 1963) |
| Haliotis asinina | 190 | - | Mean egg size | (Singhagraiwan and Sasaki, 1991) |
| Haliotis coccoradiata | 150-250 | - | Egg diameter | (Wong et al., 2010) |
| Haliotis discus hannai | 230 | _ | Mean egg size | (Ino, 1952) |
| Haliotis iris | 230 | - | Mean egg size | (Harrison and Grant, 1971) |
| Haliotis kamschatkana | 190 | - | Oocyte size | (Strathmann, 1987) |
| Haliotis midae | 212-222 | 164 x 190 | Trocophore dimensions | (Genade et al., 1988) |
| Haliotis rubra | 217-247 | - | Egg size range | (Huchette et al., 2004) |
| Haliotis rufescens | 170-190 | - | Mature oocytes | (Rogers-Bennett et al., 2004) |
| Haliotis sieboldii | 270-280 | - | Mean egg size | (Ino, 1952) |
| Haliotis tuberculata | 180 | - | Egg diameter * | (Crofts, 1937) |
| Haliotis tuberculata coccinea | 196 (SD ± 8) | 172 (SD ± 8.8) | Mean unfertilised egg size, larvae width | (De Vicose et al., 2007) |
| Haliotis varia | 180 | - | Mean egg size | (Najmudeen and Victor, 2004) |
| Haminaea callidegenita | 250 | - | Egg diameter | (Strathmann et al., 2002) |
| Haminaea vesicula | 6000 ± 900 | - | Width of egg ribbons | (Kang et al., 2003) |
| Species | Egg (µm) | Larval (µm) | Comments | References |
|----------------------------|-----------------|------------------|---|-----------------------------------|
| Haminaea vesicula | 82 | - | Egg diameter | (Strathmann et al., 2002) |
| Haminoea ovalis | - | 100.9 (SD ± 4.7) | Shell length at hatching | (Goddard and Hermosillo, 2008) |
| Haminoea sp. | 220 | - | Oocyte size | (Strathmann, 1987) |
| Haminoea vesicula | 90 | - | Oocyte size | (Strathmann, 1987) |
| Haminoea virescens | - | 144.1 (SD ± 4.7) | Shell length at hatching | (Goddard and Hermosillo, 2008) |
| Hancockia californica | 99.6 (SD ± 2.1) | 242.9 (SD ± 3.0) | Egg diameter, shell length at hatching | (Goddard and Hermosillo, 2008) |
| Hermaea bifida | 48 | - | Egg diameter | (Schmekel et al., 1982) |
| Hermaea cruciata | 77, 100 | - | Egg diameter | (Clark and Jensen, 1981) |
| Hermissenda crassicornis | 65 | - | Oocyte size | (Strathmann, 1987) |
| Hermissenda crassicornis | 65.4 (SD ± 1.2) | 75.4 (SD ± 4.8) | Mean egg diameter, mean width of hatching shell | (Harrigan and Alkon, 1978) |
| Hermosita hakunamatata | - | 115.9 (SD ± 5.6) | Shell length at hatching | (Goddard and Hermosillo, 2008) |
| Hipponix cranioides | 350 | - | Oocyte size | (Strathmann, 1987) |
| Ilyanassa obsoleta | 165 | - | Oocyte size | (Strathmann, 1987) |
| Jorunna sp. | 65 | - | Maximum egg diameter | (Goddard and Hermosillo, 2008) |
| Julia japonica | 65 | - | Egg diameter | (Jensen, 2001) |
| Katharina tunicata | 230 | - | Average egg diameter | (Strathmann, 1987) |
| Lacuna spp. | 95-125 | - | Oocyte size | (Strathmann, 1987) |
| Lacuna vincta or variegata | 101 | - | Egg diameter | (Strathmann et al., 2002) |
| Laila cockerelli | 95 | - | Oocyte size | (Strathmann, 1987) |

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| Species | Egg (µm) | Larval (µm) | Comments | References |
|------------------------|-----------------|-------------|--|---|
| Lepidochitoa fernaldi | 270 | - | Average egg diameter | (Strathmann, 1987) |
| Limacina helicina | 98 | - | Oocyte size | (Strathmann, 1987) |
| Limapontia capitata | 82 | - | Egg diameter | (Chia, 1971) |
| Limapontia depressa | 80 | - | Egg diameter | (Chia, 1971) |
| Limapontia senestra | 200 | - | Egg diameter | (Chia, 1971) |
| littorina keenae | 89 | - | Oocyte size | (Strathmann, 1987) |
| Littorina plena | 96 | - | Oocyte size | (Strathmann, 1987) |
| Littorina scutulata | 100 | - | Oocyte size | (Strathmann, 1987) |
| Littorina scutulata | 100 | - | Egg diameter | (Strathmann et al., 2002) |
| Littorina sitkana | 175 | - | Oocyte size | (Strathmann, 1987) |
| Littorina sitkana | 190 | - | Egg diameter | (Strathmann et al., 2002) |
| Lobiger souverbiei | 56 | - | Egg diameter | (Jensen, 2001, De Freese and Clark, 1991) |
| Lobiger viridis | 93.4 ± 3.0 | 106 ± 3.3 | Size of egg capsule, maximum diameter of the veliger shell | (Jensen and Ong, 2015) |
| Lomanotus sp. 2 | 65.0 (SD ± 1.5) | - | Egg diameter | (Goddard and Hermosillo, 2008) |
| Margarites marginatus | 190-200 | - | Oocyte size | (Strathmann, 1987) |
| Marsenina rhombica | 200 | - | Oocyte size | (Strathmann, 1987) |
| Melanochlamys diomedea | 98 | - | Oocyte size | (Strathmann, 1987) |
| Melibe leolina | 90 | - | Oocyte size | (Strathmann, 1987) |
| Mopalia ciliata | 225 | - | Average egg diameter | (Strathmann, 1987) |
| Mopalia lignosa | 230 | - | Average egg diameter | (Strathmann, 1987) |
| Mopalia muscosa | 215 | - | Average egg diameter | (Strathmann, 1987) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|-------------------------|-----------------|------------------|---|-----------------------------------|
| Mourgona germaineae | 62 | - | Egg diameter | (Clark and Jensen, 1981) |
| Natica vitellus | 1000 | - | Egg diameter | (Thorson, 1940) |
| Navanax aenigmaticus | 81 | - | Maximum egg diameter | (Goddard and Hermosillo, 2008) |
| Neptunea lyrata | 300 | - | Oocyte size | (Strathmann, 1987) |
| Nucella canaliculata | 375-600 | - | Oocyte size | (Strathmann, 1987) |
| Nucella emarginata | 180 | - | Oocyte size | (Strathmann, 1987) |
| Nucella lamelosa | 590-638 | - | Oocyte size | (Strathmann, 1987) |
| Odontocymbiola pescalia | - | 192.0 (SD ± 6) | Four cell embryo size | (Penchaszadeh et al., 2017) |
| Oenopota levidensis | 279-301 | - | Oocyte size | (Strathmann, 1987) |
| Okenia angelensi | 62 | - | Egg diameter | (Goddard and Hermosillo, 2008) |
| Okenia angelica | 68 | 103.5 (SD ± 1.9) | Maximum egg diameter, shell length at hatching | (Goddard and Hermosillo, 2008) |
| Onchidella borealis | 125-132 | - | Oocyte size | (Strathmann, 1987) |
| Onchidoris bilamellata | 100 | - | Oocyte size | (Strathmann, 1987) |
| Onchidoris muricata | 75–77 | - | Oocyte size | (Strathmann, 1987) |
| Ophiodermella inermis | 160-280 | - | Oocyte size | (Strathmann, 1987) |
| Oxynoe antillarum | 63 | - | Egg diameter | (Jensen, 2001) |
| Oxynoe azuropunctata | 120 | - | Egg diameter | (Jensen, 2001) |
| Oxynoe olivacea | 62–69, 250 | - | Egg diameter | (Jensen, 2001) |
| Oxynoe panamensis | 73 | - | Maximum egg diameter | (Goddard and Hermosillo, 2008) |
| Oxynoe viridis | 56, 72 | - | Egg diameter | (Jensen, 2001) |
| Palio dubia | 69.2 (SD ± 0.8) | 119.2 (SD+ 4.6) | Mean diameter of zygotes, mean hatching larvae shell length | (Goddard, 2011) |
| Palio zosterae | 70 | - | Oocyte size | (Strathmann, 1987) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|---------------------------|------------------|------------------|--|-----------------------------------|
| Petaloconchus cf. varians | 145 | - | Embryo diameter | (Weinberger et al., 2010) |
| Petaloconchus compactus | 104-110 | - | Oocyte size | (Strathmann, 1987) |
| Petaloconchus sp | 180-210 | - | Embryo diameter | (Weinberger et al., 2010) |
| Phidiana lascrucensis | 146.6 (SD ± 1.8) | 248.6 (SD ± 7.2) | Egg diameter, shell length at hatching | (Goddard and Hermosillo, 2008) |
| Phyllaplysia padinae | 100 | - | Maximum egg diameter | (Goddard and Hermosillo, 2008) |
| Phyllaplysia taylori | 144-157 | - | Oocyte size | (Strathmann, 1987) |
| Placida cremoniana | 50-60 | - | Egg diameter | (Jensen, 1990) |
| Placida daguilarensis | 56 | - | Egg diameter | (Schmekel et al., 1982) |
| Placida dendritica | 47-67 | - | Egg diameter | (Clark, 1975) |
| Placida dendritica | 47-67 | - | Oocyte size | (Strathmann, 1987) |
| Placida kingstoni | 60 | - | Egg diameter | (Clark and Jensen, 1981) |
| Placida viridis | 40-60 | - | Egg diameter | (Schmekel et al., 1982) |
| Pleurobranchus areolatus | - | 121.4 (SD ± 3.1) | Shell length at hatching | (Goddard and Hermosillo, 2008) |
| Polinices lewisi | 250 | - | Oocyte size | (Strathmann, 1987) |
| Polinices pulchellus | - | 300 | Larvae size | (Kulikova et al., 2007) |
| Polybranchia viridis | - | 96.4 (SD ± 2.9) | Shell length at hatching | (Goddard and Hermosillo, 2008) |
| Polycera alabe | 60 | - | Egg diameter | (Goddard and Hermosillo, 2008) |
| Provocator corderoi | 256.0 (SD ± 6.4) | - | Uncleaved egg diameter | (Penchaszadeh et al., 2017) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|------------------------------------|---------------|------------------|--|------------------------------------|
| Rapana venosa | - | 310-340 | Range of mean veliger diameters | (Harding et al., 2013) |
| Rostanga pulchra | 80 | - | Oocyte size | (Strathmann, 1987) |
| Serpulorbis arenarius | 352.5 | - | Mean diameter of uncleaved ova | (Calvo and Templado, 2005) |
| Siphonaria thersites | 150-162 | - | Oocyte size | (Strathmann, 1987) |
| Siphopatella walshi | 240-260 | - | Egg size | (Collin, 2003) |
| Stiliger aureomarginatus | 56 (SD ± 1.6) | - | Egg diameter | (Jensen, 2001) |
| Stiliger berghi | 65 | - | Egg diameter | (Hamatani) |
| Stiliger fuscovittatus | 66.5 | - | Egg diameter | (CLARK and GOETZFRIED, 1978) |
| Stiliger Ilerai | 122 | - | Egg diameter | (CLARK and GOETZFRIED, 1978) |
| Stiliger verticillata | 130 | - | Egg diameter | (Jensen) |
| Stilinger fuscovittatus | 95 | - | Oocyte size | (Strathmann, 1987) |
| Stramonita haemastoma canaliculata | 65-70 | 49.70 ± 8.30 | Egg diameter, hatching size | (Roller and Stickle, 1988) |
| Stramonita haemastoma floridana | 107 | 130 | Egg diameter, hatching size | (D'Asaro, 1966) |
| Stramonita haemastoma haemastoma | 60-75 | 40-62 | Hatching size | (Lahbib et al., 2011) |
| Tectura persona | 200 | - | Oocyte size | (Strathmann, 1987) |
| Tectura scutum | 140-150 | - | Oocyte size | (Strathmann, 1987) |
| Tectura scutum | 138 | - | Egg diameter | (Strathmann et al., 2002) |
| Thordisa sp | 80 | 120.5 (SD ± 4.7) | Maximum egg diameter, shell length at hatching | (Goddard and Hermosillo, 2008) |
| Thuridella vatae | 55-65 | - | Egg diameter | (Jensen, 2001) |
| Thuridilla bayeri | 80 | - | Egg diameter | (Johnson and Boucher) |
| Thuridilla hopei | 200 | - | Egg diameter | (Thompson and Salghetti-Drioli) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|-------------------------|-----------------|------------------|--|---|
| Thuridilla ratna | 80-85 | - | Egg diameter | (Johnson and Boucher) |
| Thylaeodus equatorialis | - | 1,100–2,200 | Larvae diameter | (Spotorno and Simone, 2013) |
| Tonicella insignis | 245 | - | Average egg diameter | (Strathmann, 1987) |
| Tonicella lineata | 230 | - | Average egg diameter | (Strathmann, 1987) |
| Trichotropis cancellata | 250 | - | Oocyte size | (Strathmann, 1987) |
| Tridachia crispata | 205 | - | Egg diameter | (Clark and Jensen, 1981, De Freese and Clark, 1991) |
| Triopha catalina | 75-87 | - | Oocyte size | (Strathmann, 1987) |
| Tritonia diomedea | 87 | - | Oocyte size | (Strathmann, 1987) |
| Tritonia festiva | 79 | - | Oocyte size | (Strathmann, 1987) |
| Tritonia pickensi | 69 | - | Maximum egg diameter | (Goddard and Hermosillo, 2008) |
| Trochita calyptraeformi | 460 | 1150 | Egg size, hatching size | (Collin, 2003) |
| Trophon acanthodes | 213-236 | - | Egg diameter | (Pastorino and Penchaszadeh, 2009) |
| Trophon geversianus | 270 ± 10 | 2,790 ± 40 | Hatching size | (Cumplido et al., 2011) |
| Tylodina fungina | 73 | 126.0 (SD ± 3.7) | Shell length at hatching | (Goddard and Hermosillo, 2008) |
| Tyrinna evelinae | 81 | 118 | Maximum egg diameter, minimum shell length at hatching | (Goddard and Hermosillo, 2008) |
| Velutina plicatilis | 200 | - | Oocyte size | (Strathmann, 1987) |
| Volutidae | 90-450 | - | Spawned egg diameter | (Penchaszadeh et al., 2017) |
| Volvatella australis | 100.8 ± 6.2 | - | Egg diameter | (Jensen, 2001) |
| Volvatella bermudae | 66 | - | Egg diameter | (Jensen, 2001) |

| Species | Egg (µm) | Larval (µm) | Comments | References |
|-----------------------|-------------|-------------|--------------|----------------|
| Volvatella ventricosa | 97.2 ± 10.5 | - | Egg diameter | (Jensen, 2001) |

Note: Smallest value was recorded when available, * indicates that size was an approximate value.

A10. Hydroids

Literature search: To identify literature on Hydroid reproductive cell sizes a systematic literature search was undertaken using the <u>Web of Science</u> database. For Hydroids three searches were performed using the following search criteria:

Web of Science: TOPIC: (hydrozoa*) AND TOPIC: (egg size) Results: 21

Web of Science: TOPIC: (hydrozoa*) AND TOPIC: (asexual) Results: 62

Web of Science: TOPIC: (hydrozoa*) AND TOPIC: (medusae size) Results: 54

Additional articles were also sourced from citations and reference lists of articles produced in the Web of Science database searches.

| Species | Egg (µm) | Medusa (µm) | Comments | References |
|----------------------------|----------|-------------|--------------------------------------|--------------------------------|
| Aequorea victoria | 100 | - | Egg diameter | (Strathmann, 1987) |
| Anthopleura elegantissima | 120-150 | - | Egg diameter | (Strathmann, 1987) |
| Anthopleura xanthogrammica | 175-220 | - | Egg diameter | (Strathmann, 1987) |
| Bougainvillia principis | 160 | - | Egg diameter | (Strathmann, 1987) |
| Caryophyllia alaskensis | 120-150 | - | Egg diameter | (Strathmann, 1987) |
| Clytia hemisphaerica | 160-180 | - | Fully–grown oocytes | (Amiel and Houliston, 2009) |
| Clytia linearis | - | 348-540 | Newly liberated medusa base diameter | (Lindner and Migotto, 2002) |
| Clytia noliformis | - | 264-420 | Newly liberated medusa base diameter | (Lindner and Migotto, 2002) |

Assessment of reproductive propagule size for biofouling risk groups

| Species | Egg (µm) | Medusa (µm) | Comments | References |
|------------------------------|----------|-------------|---|----------------------------------|
| Cytaeis uchidae | 110 | _ | Diameter of fully developed oocytes before spawning | (Takeda et al., 2006) |
| Euphysa japonica | 250 | - | Egg diameter | (Strathmann, 1987) |
| Eutonina indicans | 170-180 | - | Egg diameter | (Strathmann, 1987) |
| Gonoionemus vertens | 95-100 | - | Egg diameter | (Strathmann, 1987) |
| Gonothyraea loveni | 150 | - | Diameter of mature oocytes | (Burmistrova et al., 2018) |
| Gonothyrea sp. | 140-170 | - | Egg diameter | (Strathmann, 1987) |
| Hydractinia spp. | 180 | - | Egg diameter | (Strathmann, 1987) |
| Hydractinia spp. | 210-220 | - | Unfertilised egg diameter | (Freeman and Miller, 1982) |
| Mitrocomella polydiademata | 130-170 | - | Egg diameter | (Strathmann, 1987) |
| Obelia geniculata | - | 350 | Medusae diameter | (Slobodov and Marfenin, 2004) |
| Orthopyxis | 195-205 | - | Unfertilised egg diameter | (Freeman and Miller, 1982) |
| Orthopyxis compressa | 200-220 | - | Egg diameter | (Strathmann, 1987) |
| Phialidium eggs | 175-195 | - | Unfertilised egg diameter | (Freeman and Miller, 1982) |
| Phialidium gregarium | 165-180 | - | Egg diameter | (Strathmann, 1987) |
| Polyorchis penicillatus | 100 | - | Egg diameter | (Strathmann, 1987) |
| Proboscidactyla flavicirrata | 120 | - | Egg diameter | (Strathmann, 1987) |
| Sarsia princeps | 107 | - | Egg diameter | (Strathmann, 1987) |
| Sarsia sp | 120-125 | - | Unfertilised egg diameter | (Freeman and Miller, 1982) |
| Sarsia spp. | 129 | - | Egg diameter | (Strathmann, 1987) |
| Sarsia turbulosa | 80-85 | - | Unfertilised egg diameter | (Freeman and Miller, 1982) |
| Sarsia turbulosa | 92 | - | Egg diameter | (Strathmann, 1987) |

| Species | Egg (µm) | Medusa (µm) | Comments | References |
|------------------------|----------|---------------|-----------------------------------|-------------------------------|
| Stomotoca atra | 100 | - | Egg diameter | (Strathmann, 1987) |
| Tubularia crocea | - | 260 (SE 5.34) | Diameter of actinula central disc | (Walters and Wethey, 1996) |
| Urticinia crassicornis | 500-700 | - | Egg diameter | (Strathmann, 1987) |
| Urticinia lofotensis | 1200 | - | Egg diameter | (Strathmann, 1987) |

Note: Smallest value was recorded when available, * indicates that size was an approximate value.

A11. Macroalgae

Literature search: To identify literature on macroalgae reproductive cell sizes a systematic literature search was undertaken using the <u>Web of</u> <u>Science</u> database. For macroalgae three searches were performed using the following search criteria:

Web of Science: TOPIC: (Chlorophyta) AND TOPIC: (spore size) Results: 12

Web of Science: TOPIC: (macroalgae) AND TOPIC: (spore size) Results: 23

Web of Science: TOPIC: (Rhodophyta) AND TOPIC: (spore size) Results: 49

Additional articles were also sourced from citations and reference lists of articles produced in the Web of Science database searches.

Table A11 Macroalgae propagule sizes identified from the literature search

| Species | Spore (µm) | Comments | References |
|------------------------|-----------------|------------|---------------------------|
| Acanthophora muscoides | 63.5-112.5 | Carpospore | (Ngan and Price, 1979) |
| Acanthophora muscoides | 42.5-98.5 | Tetraspore | (Ngan and Price, 1979) |
| Acanthophora spicifera | 55.0 | Carpospore | (Ngan and Price, 1979) |
| Acanthophora spicifera | 40.0-112.5 | Tetraspore | (Ngan and Price, 1979) |
| Acrocystis nana | 31.0-123.5 | Tetraspore | (Ngan and Price, 1979) |
| Antithamnion kylinii | 25.4 ± 0.17 | Tetraspore | (Okuda and Neushul, 1981) |

| Species | Spore (µm) | Comments | References |
|-------------------------|-------------|---------------------------------------|-----------------------------|
| Articulated corrallines | 20-90 | Tetraspore | (Chihara, 1973) |
| Bangia fuscopurpurea | 11 | Carpospore | (Okuda and Neushul, 1981) |
| Bostrychia binderi | 46 | Tetraspore | (Ngan and Price, 1979) |
| Bostrychia binderi | 67 | Carpospore | (Ngan and Price, 1979) |
| Bostrychia binderi | 58.5-81 | Carpospore | (Ngan and Price, 1979) |
| Bostrychia binderi | 250-51 | Tetraspore | (Ngan and Price, 1979) |
| Bostrychia radicans | 42.5-68.5 | Tetraspore | (Ngan and Price, 1979) |
| Bostrychia tenella | 30.0-53.5 | Tetraspore | (Ngan and Price, 1979) |
| Bryopsis hypnoides | 4–5 x 10–12 | Female gamete dimensions | (Burr and West, 1970) |
| Caloglossa bombayensis | 30-61 | Tetraspore | (Ngan and Price, 1979) |
| Caloglossa leprieurii | 31-57.7 | Carpospore | (Ngan and Price, 1979) |
| Caloglossa leprieurii | 30-51 | Tetraspore | (Ngan and Price, 1979) |
| Catenella nipae | 45.0-66.0 | Carpospore | (Ngan and Price, 1979) |
| Catenella nipae | 35.0-69.0 | Tetraspore | (Ngan and Price, 1979) |
| Caulacanths ustulatus | 22.5-46.0 | Carpospore | (Ngan and Price, 1979) |
| Caulacanths ustulatus | 23.5-37.5 | Tetraspore | (Ngan and Price, 1979) |
| Caulerpa cupressoide | 10.3 x 2.3 | Minimum length x width of macrogamete | (Clifton and Clifton, 1999) |
| Caulerpa cupressoide | 5.3 x 2.3 | Microgamete | (Clifton and Clifton, 1999) |
| Caulerpa mexicana | 10.5x 2.3 | Minimum length x width of macrogamete | (Clifton and Clifton, 1999) |
| Caulerpa mexicana | 4.5 x 2.3 | Microgamete | (Clifton and Clifton, 1999) |
| Caulerpa racemosa | 7.3 x 2.3 | Minimum length x width of macrogamete | (Clifton and Clifton, 1999) |
| Caulerpa racemosa | 2.3 x 5.3 | Microgamete | (Clifton and Clifton, 1999) |
| Caulerpa serrulata | 6.3 x 2.3 | Minimum length x width of macrogamete | (Clifton and Clifton, 1999) |
| Caulerpa serrulata | 5.3 x 2.3 | Microgamete | (Clifton and Clifton, 1999) |
| Caulerpa sertularioides | 7.1 x 2.3 | Minimum length x width of macrogamete | (Clifton and Clifton, 1999) |
| Caulerpa sertularioides | 5.3 x 2.3 | Microgamete | (Clifton and Clifton, 1999) |

| Species | Spore (µm) | Comments | References |
|--------------------------|------------------|-----------------------------|-------------------------------|
| Centroceras clavulatum | 43.6 (SE ± 0.32) | Carpospore | (Okuda and Neushul, 1981) |
| Centroceras clavulatum | 40.8 (SE ± 0.24) | Tetraspore | (Okuda and Neushul, 1981) |
| Centroceras clavulatum | 33.5-43.5 | Carpospore | (Ngan and Price, 1979) |
| Centroceras clavulatum | 27.5-38.5 | Tetraspore | (Ngan and Price, 1979) |
| Ceramium californicum | 34.5 (SE ± 0.19) | Carpospore | (Okuda and Neushul, 1981) |
| Ceramium californicum | 31.5 (SE ± 0.15) | Tetraspore | (Okuda and Neushul, 1981) |
| Ceramium fastigiatum | 33 | Carpospore | (Ngan and Price, 1979) |
| Ceramium fastigiatum | 27.5-38.5 | Carpospore | (Ngan and Price, 1979) |
| Ceramium sp. | 17.5-50 | Carpospore | (Ngan and Price, 1979) |
| Ceramium sp. | 16-51 | Tetraspore | (Ngan and Price, 1979) |
| Champia parvula | 45.0-73.5 | Carpospore | (Ngan and Price, 1979) |
| Champia parvula | 25.0-98.5 | Tetraspore | (Ngan and Price, 1979) |
| Chondria dasyphylla | 57.5-95.0 | Carpospore | (Ngan and Price, 1979) |
| Chondria dasyphylla | 57.5-102.5 | Tetraspore | (Ngan and Price, 1979) |
| Chondria rainfordii | 68.5-111.0 | Carpospore | (Ngan and Price, 1979) |
| Chondria rainfordii | 48.5-110 | Tetraspore | (Ngan and Price, 1979) |
| Chondria sp | 46-96 | Carpospore | (Ngan and Price, 1979) |
| Chondria sp | 45-75 | Tetraspore | (Ngan and Price, 1979) |
| Chondrococcus hornemanni | 10.0-21.0 | Carpospore | (Ngan and Price, 1979) |
| Chondrus verrucosus | 15.1-25.3 | Carpospore | (Bellgrove et al., 2019) |
| Chondrus verrucosus | 15.06-27.12 | Tetraspore | (Bellgrove et al., 2019) |
| Cladophora vagabunda | 4–5 x 7–11 | Female gamete | (Hoek, 1978) |
| Codium fragile | 13.3 | Female gamete mean diameter | (Prince and Trowbridge, 2004) |
| Codium fragile | 10-11 x 15 | Female gamete | (Miravalles et al., 2012) |
| Coelothrix indica | 21.0-61.0 | Carpospore | (Ngan and Price, 1979) |

| Species | Spore (µm) | Comments | References |
|---------------------------|----------------------|--------------------|--|
| Coelothrix indica | 10-51 | Tetraspore | (Ngan and Price, 1979) |
| Crytopleura violaceae | 53.4 (SE ± 0.22) | Carpospore | (Okuda and Neushul, 1981) |
| Crytopleura violaceae | 51.4 (SE ± 0.21) | Tetraspore | (Okuda and Neushul, 1981) |
| Cystophora torulosa | 100 | Propagule diameter | (Stevens et al., 2008) |
| Dictyota diemensis | 58-77 | Spore | (Phillips et al., 1990) |
| Dictyota diemensis | 58-70 | Egg dimensions | (Phillips et al., 1990) |
| Durvillaea antarctica | 29 | Propagule diameter | (Stevens et al., 2008) |
| Ectocarpus siliculosus | 7-10 | Zoospore | (Baker and Evans, 1973, Müller, 1977) |
| Ectocarpus siliculosus | 4-5 | Gametes | (Baker and Evans, 1973, Müller, 1977) |
| Enteromorpha intestinalis | 11-12 | Zoospore | (Phillips, 1988) |
| Eucheuma uncinatum | 39.5 (SE ± 0.330) | Caraspore | (Okuda and Neushul, 1981) |
| Fucales various spp. | 64–250 | Egg | (Clayton, 1990, Ramon, 1973) |
| Gelidiopsis variabilis | 20.0-47.5, 15.0-32.5 | Tetraspore | (Ngan and Price, 1979) |
| Gelidium corneum | 17.5-22.5 | Tetraspore | (Ngan and Price, 1979) |
| Gelidium coulterii | 27.8 (SE ± 0. 15) | Carpospore | (Okuda and Neushul, 1981) |
| Gelidium coulterii | 26.5 (SE ± 0.16) | Tetraspore | (Okuda and Neushul, 1981) |
| Gelidium crinale | 17.2-38.5 | Carpospore | (Ngan and Price, 1979) |
| Gelidium heteroplatos | 18.5-33.5 | Carpospore | (Ngan and Price, 1979) |
| Gelidium heteroplatos | 20.0-28.5 | Tetraspore | (Ngan and Price, 1979) |
| Gelidium pusillum | 18.5–37.5 | Tetraspore | (Ngan and Price, 1979) |
| Gigantina canaliculata | 17 | Tetraspore | (Okuda and Neushul, 1981) |
| Gigantina canaliculata | 18 | Carpospore | (Okuda and Neushul, 1981) |
| Gigartina leptorhynchos | 19.9 (SE ± 0.14) | Carpospore | (Okuda and Neushul, 1981) |
| Gigartina leptorhynchos | 18.4 (SE ± 0.13) | Tetraspore | (Okuda and Neushul, 1981) |

| Species | Spore (µm) | Comments | References |
|-------------------------|------------------|---------------------------------------|-----------------------------|
| Gracilari | 25 | Spore size | (Kain and Destombe, 1995) |
| Gracilaria crassa | 15.0 -32.5 | Carpospore | (Ngan and Price, 1979) |
| Gracilaria crassa | 16.0-35.0 | Tetraspore | (Ngan and Price, 1979) |
| Gracilaria edulis | 22 | Carpospore | (Ngan and Price, 1979) |
| Gracilaria edulis | 23 | Tetraspore | (Ngan and Price, 1979) |
| Gracilaria sjoestedti | 24.6 (SE ± 0.13) | Carpospore | (Okuda and Neushul, 1981) |
| Gracilaria sjoestedti | 23.0 (SE ± 0.12) | Tetraspore | (Okuda and Neushul, 1981) |
| Gracilaria verrucosa | 15.07 (SE, 0.19) | Haploid spore | (Destombe et al., 1992) |
| Gracilaria verrucosa | 27.71 (SE 0.14) | Diploid spore | (Destombe et al., 1992) |
| Gracilia textorii | 17.5-26.0 | Carpospore | (Ngan and Price, 1979) |
| Gracilia textorii | 20.0-32.5 | Tetraspore | (Ngan and Price, 1979) |
| Gracilia verrucosa | 20.0-32.5 | Carpospore | (Ngan and Price, 1979) |
| Graciliaria edulis | 17.5–28.5 | Carpospore | (Ngan and Price, 1979) |
| Graciliaria edulis | 11.0-31.0 | Tetraspore | (Ngan and Price, 1979) |
| Graciliaria rhodotricha | 20.0-37.5 | Carpospore | (Ngan and Price, 1979) |
| Graciliaria rhodotricha | 16.0-30.0 | Tetraspore | (Ngan and Price, 1979) |
| Grateloupia divaricata | 13.5-20.0 | Tetraspore | (Ngan and Price, 1979) |
| Halimeda discoidea | 6.0x 2.0 | Macrogamete | (Clifton and Clifton, 1999) |
| Halimeda discoidea | 4.5 x 2.3 | Microgamete | (Clifton and Clifton, 1999) |
| Halimeda goreaui | 6.8x 7.0 | Macrogamete | (Clifton and Clifton, 1999) |
| Halimeda goreaui | 4.5 x 2.3 | Microgamete | (Clifton and Clifton, 1999) |
| Halimeda incrassata | 13.5 x 2.3 | Minimum length x width of macrogamete | (Clifton and Clifton, 1999) |
| Halimeda incrassata | 5.3 x 1.5 | Microgamete | (Clifton and Clifton, 1999) |
| Halimeda incrassata | 12-22 x 8-10 | Female gamete dimensions | (Meinesz, 1980) |
| Halimeda monile | 6.0x 2.3 | Minimum length x width of macrogamete | (Clifton and Clifton, 1999) |
| Halimeda monile | 5.0 x 2.3 | Microgamete | (Clifton and Clifton, 1999) |

| Species | Spore (µm) | Comments | References |
|---------------------------|------------|---------------------------------------|--|
| Halimeda opuntia | 5.3 x 2.3 | Minimum length x width of macrogamete | (Clifton and Clifton, 1999) |
| Halimeda opuntia | 5.0 x 2.3 | Microgamete | (Clifton and Clifton, 1999) |
| Halimeda simulans | 16.5 x 2.0 | Minimum length x width of macrogamete | (Clifton and Clifton, 1999) |
| Halimeda simulans | 16.5 x 2.3 | Microgamete | (Clifton and Clifton, 1999) |
| Halimeda tuna | 6.8 x 2 | Minimum length x width of macrogamete | (Clifton and Clifton, 1999) |
| Halimeda tuna | 5.3 x 2.3 | Microgamete | (Clifton and Clifton, 1999) |
| Hormosira banksii | 61 | Propagule diameter | (Stevens et al., 2008) |
| Hypnea boergeseni | 12.5-32.5 | Carpospore | (Ngan and Price, 1979) |
| Hypnea boergeseni | 18.5-28.5 | Tetraspore | (Ngan and Price, 1979) |
| Hypnea cervicornis | 17.5-36.0 | Carpospore | (Ngan and Price, 1979) |
| Hypnea cervicornis | 10.0-30.0 | Tetraspore | (Ngan and Price, 1979) |
| Hypnea esperi | 20.0-40.0 | Carpospore | (Ngan and Price, 1979) |
| Hypnea esperi | 13.5-25.0 | Tetraspore | (Ngan and Price, 1979) |
| Hypnea pannosa | 12.5-31.0 | Tetraspore | (Ngan and Price, 1979) |
| Hypnea valentiae | 20.0-27.5 | Tetraspore | (Ngan and Price, 1979) |
| Laminariales various spp. | 4-8 x 4 | Zoospore | (Henry and Cole, 1982, Clayton, 1990) |
| Laminariales various spp. | 20-45 | Egg dimensions | (Henry and Cole, 1982, Clayton, 1990) |
| Laurencia majuscula | 35-105 | Carpospore | (Ngan and Price, 1979) |
| Laurencia majuscula | 61-103.5 | Tetraspore | (Ngan and Price, 1979) |
| Laurencia nidifica | 65-113.5 | Carpospore | (Ngan and Price, 1979) |
| Laurencia nidifica | 41-116 | Tetraspore | (Ngan and Price, 1979) |
| Laurencia obtusa | 35-92.5 | Tetraspore | (Ngan and Price, 1979) |
| Laurencia papillosa | 5-101 | Carpospore | (Ngan and Price, 1979) |
| Laurencia papillosa | 40-101 | Tetraspore | (Ngan and Price, 1979) |

| Species | Spore (µm) | Comments | References |
|----------------------------|------------------|---------------------------------------|--------------------------------|
| Laurencia perforate | 26.0-81.0 | Tetraspore | (Ngan and Price, 1979) |
| Laurencia pygmaea | 42.5-77.5 | Carpospore | (Ngan and Price, 1979) |
| Laurencia pygmaea | 43.5-77.5 | Tetraspore | (Ngan and Price, 1979) |
| Laurencia succisa | 55-73.5 | Carpospore | (Ngan and Price, 1979) |
| Laurencia succisa | 26-68.5 | Tetraspore | (Ngan and Price, 1979) |
| Laurencia tenera | 56-102.5 | Carpospore | (Ngan and Price, 1979) |
| Laurencia tenera | 43.5-86 | Tetraspore | (Ngan and Price, 1979) |
| Leveillea jungermannioides | 106.0-182.5 | Tetraspore | (Ngan and Price, 1979) |
| Microcladia coulteri | 98 | Tetraspore | (Coon et al., 1971) |
| Neoagardhiella baileyi | 34.1 (SE ± 0.20) | Carpospore | (Okuda and Neushul, 1981) |
| Neoagardhiella baileyi | 28.0 (SE ± 0.25) | Tetraspore | (Okuda and Neushul, 1981) |
| Pedobesia clavaeformis | 30-40 | Zoospore | (MacRaild and Womersley, 1974) |
| Penicillus capitatus | 210 x 120 | Minimum length x width of macrogamete | (Clifton and Clifton, 1999) |
| Penicillus capitatus | 4.5 x 2.3 | Microgamete | (Clifton and Clifton, 1999) |
| Penicillus dumetosus | 180 x 72.0 | Minimum length x width of macrogamete | (Clifton and Clifton, 1999) |
| Penicillus dumetosus | 4.5 x 2.3 | Microgamete | (Clifton and Clifton, 1999) |
| Penicillus lamouroxii | 210 x 90 | Minimum length x width of macrogamete | (Clifton and Clifton, 1999) |
| Penicillus lamouroxii | 5.3 x 2.3 | Microgamete | (Clifton and Clifton, 1999) |
| Penicillus pyriformis | 168 x 102 | Minimum length x width of macrogamete | (Clifton and Clifton, 1999) |
| Penicillus pyriformis | 5.3 x 1.5 | Microgamete | (Clifton and Clifton, 1999) |
| Polysiphonia coacta | 37.5-67-5 | Carpospore | (Ngan and Price, 1979) |
| Polysiphonia coacta | 33.5-62.5 | Tetraspore | (Ngan and Price, 1979) |
| Polysiphonia subtilissima | 37.5-55 | Carpospore | (Ngan and Price, 1979) |
| Polysiphonia subtilissima | 35-73 | Tetraspore | (Ngan and Price, 1979) |
| Prasiola stipitata | 2.4-4 | Female gamete | (Cole and Akintobi, 1963) |

| Species | Spore (µm) | Comments | References |
|---------------------------|-------------|---------------------------------------|-----------------------------------|
| Prasiola stipitata | 14 | Zygote | (Cole and Akintobi, 1963) |
| Rhipcephalus phoenix | 168 x 66 | Minimum length x width of macrogamete | (Clifton and Clifton, 1999) |
| Rhipcephalus phoenix | 5.3 x 2.3 | Microgamete | (Clifton and Clifton, 1999) |
| Sarconema filiforme | 15.0-28.5 | Carpospore | (Ngan and Price, 1979) |
| Sarconema filiforme | 17.5-27.5 | Tetraspore | (Ngan and Price, 1979) |
| Scytosiphon lomentaria | 3-4 x 7 | Zoospore | (Clayton, 1978, Clayton, 1980) |
| Scytosiphon lomentaria | 5-6 | Female gamete | (Clayton, 1978, Clayton, 1980) |
| Solierla mollis | 12.5-33-5 | Carpospore | (Ngan and Price, 1979) |
| Solierla mollis | 21.0-31.0 | Tetraspore | (Ngan and Price, 1979) |
| Solierla robusta | 15.0-21.0 | Carpospore | (Ngan and Price, 1979) |
| Solierla robusta | 15.0-32.5 | Tetraspore | (Ngan and Price, 1979) |
| Sphacelaria rigidula | 7–13 x 5–9 | Zoospore | (Van Reine, 1982) |
| Sphacelaria rigidula | 4-13 | Female gamete | (Van Reine, 1982) |
| Tolypiocladia glomerulata | 35.0 | Carpospore | (Ngan and Price, 1979) |
| Tolypiocladia glomerulata | 32.5 | Tetraspore | (Ngan and Price, 1979) |
| Udotea abbottiorum | 168 x 60 | Minimum length x width of macrogamete | (Clifton and Clifton, 1999) |
| Udotea abbottiorum | 6 x 2.3 | Microgamete | (Clifton and Clifton, 1999) |
| Udotea caribaea | 180 x 102 | Minimum length x width of macrogamete | (Clifton and Clifton, 1999) |
| Udotea caribaea | 5.3 x 2.3 | Microgamete | (Clifton and Clifton, 1999) |
| Udotea cyathiformis | 198 x 102 | Minimum length x width of macrogamete | (Clifton and Clifton, 1999) |
| Udotea cyathiformis | 5.3 x 2.3 | Microgamete | (Clifton and Clifton, 1999) |
| Udotea flabellum | 9.8 x 2.3 | Minimum length x width of macrogamete | (Clifton and Clifton, 1999) |
| Udotea flabellum | 6.0 x 2.3 | Microgamete | (Clifton and Clifton, 1999) |
| Ulva rigida | 9–15 x 5–10 | Zoospore | (Phillips, 1988) |

| Species | Spore (µm) | Comments | References |
|-------------|----------------|------------------|---------------------------|
| Ulva rigida | 7–11 x 4–6 | Female gamete | (Phillips, 1988) |
| Zygnema sp. | 29 (SD ± 3.13) | Mature zygospore | (Poulíčková et al., 2007) |

Note: Smallest value was recorded when available, * indicates that size was an approximate value.

A12. Ascidians

Literature search: To identify literature on propagule and female gamete size a systematic literature search was undertaken using the <u>Scopus</u> and the <u>Web of Science</u> databases. For ascidians, searches were performed using the following search criteria:

Scopus (TITLE-ABS-KEY (ascidiacea) AND TITLE-ABS-KEY (viable AND propagule AND size) OR TITLE-ABS-KEY ('egg AND size') OR ALL (diameter) OR TITLE-ABS-KEY 78 results

Web of Science: TOPIC: (ascidia) AND TOPIC: (egg size) 59 results

Web of Science: TOPIC: (ascidia) AND TOPIC: (egg size) OR TOPIC: (viable propagule) OR TOPIC: (diameter) Refined by: TOPIC: (ascidiacea) 111 results

Additional articles were also sourced from citations and reference lists of articles produced in the Web of Science database searches.

| Table A12 Ascidian propagule s | sizes identified from | the literature search |
|--------------------------------|-----------------------|-----------------------|
|--------------------------------|-----------------------|-----------------------|

| Species | Egg (µm) | Larvae (µm) | Comments | References |
|-----------------------|----------|-------------|-------------------------------|----------------------------------|
| Aplidium constellatum | - | 770 | Length of zooid | (Bullard and Whitlatch, 2004) |
| Ascidia callosa | 165 | 1,200 | Egg diameter, larvae length | (Strathmann, 1987) |
| Ascidia mentula | 125 | - | Mature oocyte size | (Svane, 1984) |
| Ascidia paratropa | 169 | - | Egg diameter | (Strathmann et al., 2002) |
| Ascidiella aspersa | - | 270 | Width of one day old juvenile | (Bullard and Whitlatch, 2004) |

| Species | Egg (µm) | Larvae (µm) | Comments | References |
|-------------------------|----------|-------------|--|--|
| Boltenia echniata | 180 | _ | Diameter of ovum | (Millar, 1951) |
| Boltenia villosa | 156 | - | Egg diameter | (Strathmann et al., 2002) |
| Boltenia villosa | 160 | - | Egg diameter | (Bates, 2002) |
| Boltenia villosa | - | 1,200 | Larvae length | (Strathmann, 1987) |
| Botrylloides lenis | 90 | - | Egg diameter | (Mukai et al., 1987) |
| Botrylloides simodensis | 180 | - | Egg diameter | (Mukai et al., 1987) |
| Botrylloides violaceus | 80 | - | Egg size | (Carver et al., 2006, Manni et al., 1995) |
| Botrylloides violaceus | - | 2,350 | Width of one day old juvenile | (Bullard and Whitlatch, 2004) |
| Botryllus gigas | 450 | - | Egg diameter | (Jeffery and Swalla, 1992, Swalla and Jeffery, 1990) |
| Botryllus schlosseri | 60-100 | - | Stage 3 oocyte size range | (Stewart-Savage et al., 1999) |
| Botryllus schlosseri | 120 | _ | Oocyte diameter initial phases of vitellogenesis | (Manni et al., 1994) |
| Botryllus schlosseri | 300 | - | Egg size | (Carver et al., 2006) |
| Botryllus schlosseri | - | 380-630 | Width range of one day old juveniles | (Bullard and Whitlatch, 2004) |
| Botryllus schlosseri | - | 1,500 | Size of gonozoid at 5 days old | (Grave, 1933) |
| Bulla hydatis | 200 | _ | Egg diameter * | (Berrill, 1931) |
| Ciona intestinalis | 140 | - | Egg diameter * | (Gregory and Veeman, 2013) |
| Ciona intestinalis | 140 | - | Egg diameter * | (Lemaire et al., 2008) |
| Ciona intestinalis | 150 | - | Approximate egg diameter | (Marshall and Keough, 2003a) |
| Ciona intestinalis | 170 | - | Egg diameter | (Jantzen et al., 2001) |

| Species | Egg (µm) | Larvae (µm) | Comments | References |
|----------------------------|----------|-------------|--------------------------------------|--|
| Ciona intestinalis | - | 240-340 | Width range of one day old juveniles | (Bullard and Whitlatch, 2004) |
| Clavelina oblonga | 310 | 2,250 | Egg diameter, tadpole length | (Berrill, 1932) |
| Clavelina picta | 490 | 3,300 | Egg diameter, tadpole length | (Berrill, 1932) |
| Cnemidocarpa finmarkiensis | 150 | - | Egg diameter | (Bates, 2002) |
| Cnemidocarpa verrucosa | 200 | - | Mature oocyte size | (Sahade et al., 2004) |
| Corella inflata | 135 | - | Egg diameter | (Strathmann et al., 2002) |
| Corella inflata | 140 | - | Egg diameter | (Strathmann, 1987) |
| Dendrodoa grossularia | 60-120 | - | Oocyte diameter (no yolk present) | (Millar, 1954) |
| Diazona violacea | 100 | - | Egg size | (Berrill, 1948) |
| Didemnum albidum | 250 | - | Minimum size of eggs containing yolk | (Marks, 1996) |
| Didemnum romssae | 350 | - | Mature egg size | (Marks, 1996) |
| Didemnum sp. | - | 930 | Width of one day old juvenile | (Bullard and Whitlatch, 2004) |
| Diplosoma listerianum | 130 | - | Vitellogenic oocytes diameter > 130 | (Bishop et al., 2000) |
| Diplosoma listerianum | - | 1,240 | Width of one day old juvenile | (Bullard and Whitlatch, 2004) |
| Diplosoma listerianum | 278-344 | - | Oocyte diameter * | (Hammerschmidt et al., 2011) |
| Diplosoma listerianum | - | 625-700 | Larval trunk length * | (Hammerschmidt et al., 2011) |
| Diplosoma migrans | 200 | - | Fully grown egg diameter * | (Groepler, 2002) |
| Distaplia occidentalis | 450 | - | Egg diameter | (Strathmann, 1987) |
| Ecteinascidia thurstoni | 300 | - | Maximum oocyte diameter | (Rao, 1959) |
| Ecteinascidia turbinata | 720 | - | Egg diameter | (Jeffery and Swalla, 1992, Berrill, 1945, Swalla and Jeffery, 1990) |

| Species | Egg (µm) | Larvae (µm) | Comments | References |
|-------------------------------|----------|-------------|--|--|
| Halocynthia pyriformis | 260 | - | Diameter of ovum | (Millar, 1951) |
| Halocynthia roretzi | 280 | - | Egg diameter * | (Lemaire et al., 2008) |
| Herdmania momus | 120 | - | Minimum size of mature oocytes | (Shenkar and Loya, 2008) |
| Megalodicopia hians | 175-190 | - | Overall egg diameter range | (Havenhand et al., 2006) |
| Metandrocarpa taylori | 300 | - | Egg diameter when released from ovary* | (Haven, 1971) |
| Molgula citrina | 210 | - | Egg diameter | (Jeffery and Swalla, 1992, Berrill, 1945, Swalla and Jeffery, 1990) |
| Molgula manhattensis | - | 220 | Width of one day old juvenile | (Bullard and Whitlatch, 2004) |
| Molgula occulata | 80-100 | - | Egg diameter | (Jeffery and Swalla, 1992, Berrill, 1945, Swalla and Jeffery, 1990) |
| Molgula oculata | 80 | - | Egg diameter | (Lindquist et al., 1992, Berrill, 1945, Swalla and Jeffery, 1990) |
| Molgula pacifica | 160-180 | - | Egg diameter | (Bates, 2002) |
| Molgula tectiformis | 150 | - | Fertilised egg diameter * | (Tagawa et al., 1997) |
| Oikopleura dioica | 76 | - | Egg diameter | (Strathmann et al., 2002) |
| Oikopleura dioica | 80 | - | Egg diameter | (Miller and King, 1983) |
| Phallusia mammillata | 120 | - | Egg diameter * | (Lemaire et al., 2008) |
| Phallusia mammillata | 100-120 | - | Embryo diameter | (Robin et al., 2011) |
| Polycarpa cryptocarpa kroboja | 150 | - | - | (Chen and Dai, 1998) |

| Species | Egg (µm) | Larvae (µm) | Comments | References |
|---------------------|-------------|-------------|--|--|
| Pyrua praeputlialis | 270-310 | - | Egg diameter range | (Manríquez and Castilla, 2010) |
| Pyura fissa | 150 | - | Approximate egg diameter | (Marshall and Keough, 2003a) |
| Pyura sp. | 150 | - | Maximum oocyte diameter | (Rao, 1959) |
| Pyura squamulosa | 160 | - | Diameter of ovum | (Millar, 1951) |
| Pyura stolonifera | 250-350 | - | Egg diameter range | (Marshall et al., 2002) |
| Styela canopus | 230.4-336.0 | 600–900 | Egg diameter range, tadpole length range | (Huang et al., 2003) |
| Styela clava | 150 | - | Ripe ova size | (McClary et al., 2008) |
| Styela clava | - | 290 | Width of one day old juvenile | (Bullard and Whitlatch, 2004) |
| Styela plicata | 150 | - | Approximate egg diameter | (Marshall and Keough, 2003a) |
| Symplegma reptans | 220 | - | Oocyte maximum diameter | (Sugimoto and Nakauchi, 1974) |
| Trididemnum solidum | - | 2,000-3,000 | Tadpole larvae length | (Lindquist et al., 1992, Berrill, 1945, Swalla and Jeffery, 1990) |

Note: Smallest value was recorded when available, * indicates that size was an approximate value.

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