References 1.1

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| Species from numbers | Species from word (incorrect) | Ref (word) | Desc |
| Acrasis rosea | Acrasis rosea | (1) | Life cycle in Brown & Silberman |
| Acytostelium | Acytostelium | (1) | Brown and Silberman: similar life cycle to dicty, but have acellular stalk. Baldauf and strassman: Group splits into smaller sorogens (fructifications), which each produce a stalk and fruiting body |
| Aeolosoma tenebrarum | Aeolosoma tenebrarum | (2-8) | Multiple Aeolosoma species use paratomy (Zattara), Elissen: ‘mostly’ reproduce asexually, Bell 1984: implies they are exclusively asexual. Marotta describe infrequent sex in genus. Arthur book (reproduction of marine inverts) sex is rare, reports contradictory, sexual specimens rarely found (pgs 217, 222) |
| Alaria marginata | Alaria marginata | (3, 9-12) | Nakahara and nakamura 1973: 13% of unfertilised eggs develop parthenogenetically. Large sporophyte, small, filamentous gametophyte Kraan 2020 (could this be split?). Seems likely that a. Marg also has parthenogenesis |
| amphibola crenata | amphibola crenata | (2, 6, 13-15) | Bennington 1979— thesis ch 5. Farnie 1919, 1924: hermaphrodite. Describes structure of reproductive organs. |
| Anabaena | Anabaena | (16, 17) | Schirrmeister 2011: section IV |
| anaperus sulcatus | anaperus sulcatus | (2, 6, 18) | Penis described in image of Beklemischev 1914. V. Little info on these— can all acoel worms split? |
| Anthoceros himalayensis Kashyap | Anthoceros himalayensis Kashyap | (3, 19, 20) | Mehra & Handoo 1953: forms large mats, has a ‘sterile’ form that grows gregarisouly, and resembles a species that only reproduces vegetatively. Discusses that plants are monoecious/protoandrous. Lang 1901: apospory, but not apogamy observed |
| apodotrocha progenerans | apodotrocha progenerans | (2-4, 6, 7, 21, 22) | Westheide describe sperm and oocytes, but no spawning observed (can we assume they have sex from that?) |
| apsilus vorax | apsilus vorax | (2, 6, 23, 24) | Arthur book, vol 1: “with the exception of the order Seisonidea, asexual reproduction is the most common method of reproduction and is found in all species”. Sex and asexual cycles in C vorax (Butler 1983) |
| Arthrospira | Arthrospira | (16, 17, 25) | <https://core.ac.uk/download/pdf/108388.pdf> and Schirrmeister 2011 |
| Ascophyllum nodosum | Ascophyllum nodosum | (3, 10, 26-28) | Kraberg 2007: reproduces both sexually and vegetatively from shoots. Wynne describes free-living form produced by fragmentation. |
| Asperococcus fistulosus | Asperococcus fistulosus | (10, 28) | Can’t find any info, either with older names. Descrptions of seeds? But sex vs asex? |
| Astrephomene gubernaculifera | Astrephomene gubernaculifera | (29-32) | in simpler volvocine algae, all cells switch to reproductive and start new colonies |
| Astrephomene perforata | Astrephomene perforata | (29-32) | Could describ reproduction in volvocine algae as budding: growth of a propagule from a single cell within the body, and then splitting off. |
| Bacillus subtilis | Bacillus subtilis | (33) | Branda 2001: Forms films and fruiting bodies, could film split up? Doesn’t really form individuals… |
| Basichlamys sacculifera | Basichlamys sacculifera | (29-32) | Previously belonged to gonium |
| Botryocladia wynnei | Botryocladia wynnei | (3, 10, 34) | Many red and brown algae are cultivated by taking pieces and growing them: does this happen in nature? (At least one of references here describes how fish can cause fragmentation, which species was this? |
| caenorhabditis elegans | caenorhabditis elegans | (2, 6) | Can self-fertilise, but not parthenogenesis, and not fission. Diploscapter pachys (another nematode) can reproduce parthenogenetically |
| Callinectes sapidus | Callinectes sapidus | (2, 6) | Hines: females mate once and store sperm. Some crayfish can be parthenogenetic, but can’t see any crabs |
| Calothrix | Calothrix | (16, 17) | Schirrmeister 2011: section IV |
| Candida albicans | Candida albicans | (3, 35) | Forms hyphae, but cells all remain viable. Sex in Hickman 2013 |
| Canis familiaris | Canis familiaris | (2, 6) |  |
| Carpomitra costata | Carpomitra costata | (3, 10, 36) | Orfanidis describes the gametophyte, but nothing really about life cycle |
| Chlamydomonas reinhardtii | Chlamydomonas reinhardtii | (29-32) |  |
| Chlorogloeopsis | Chlorogloeopsis | (16, 17) | Schirrmeister 2011: forms shortish trichomes, can release single cells, groups or fragment into short, section V |
| Chondromyces crocatus | Chondromyces crocatus | (37) |  |
| Chordaria flagelliformis | Chordaria flagelliformis | (3, 10, 38, 39) | Black whip algae. Can’t see any useful info. Peters 1992 discusses sex in chordaria |
| Chordaria linearis | Chordaria linearis | (3, 10, 28, 39) | Wynne book: heteromorphic cycle without sexuality. Peters 1992 show sex and parthenogenesis in C. linearis too |
| chordodasys antennatus | chordodasys antennatus | (2, 6, 40) | Can’t see any reports, but macrodasiyds referred to as pretty homogeneous in Teuchert. Gonads and sperm described in Reiger 1974 |
| Cladostephus spongiosus verticillatus | Cladostephus spongiosus | (3, 10, 41) | Gibson 1994: parthenogenesis and sex, but “importance of vegetative reproduction not known and requires investigation”.  Algaebase: unattached forms that are produced by fragmentation |
| Clostridium | Clostridium | (42) | Harshey 1994: Swarming, cells remain viable (still viable during the stalk? |
| Colpomenia sinuosa | Colpomenia sinuosa | (3, 10, 43, 44) | Kogame 1997: vague terms used that aren’t v. helpful. Toste 2003 for C. sinuosa: sexual/asexual |
| Conocephalum conicum | Conocephalum conicum | (3, 45, 46) | Paton: pg 26, budding. Is a website that describes fragmentation, but they reference this book and can’t se it |
| conocyema polymorpha | conocyema polymorpha | (2, 6, 47) | Simple animals, 10-40 cells. Endosymbionts (of octopuses?) Have asexual stage in hosts (appears to reproduce clonally, single cells produced within organism then released— could this be described as budding?) Same authors describe cell lineages in another paper. Determined not to be budding, as we didn’t in the volvocine algae…  FURUYA 2003 |
| Crinalium magnum | Crinalium magnum | (16, 17) | Schirrmeister 2011: forms trichomes, but not heterocysts, section 3 |
| Croomia pauciflora | Croomia pauciflora | (3, 48) | Li et al 2008: sexually by cross pollination & asexual by spreading rhizome |
| Cutleria | Cutleria | (10, 28, 49) | Yamanouchi 1912: describes life cycle, including gametangia and spores. Also describes parthenogenetic reproduction. No discussion of fragmentation either the flat micro or upright macro thallus |
| cyanea cyanea | cyanea cyanea | (3) | Cyanea capillata (lions mane) buds of medusae like other when in polyp form (as many jellyfish). Can’t find C. cyanea as a species, is this a typo in Bell? No access to Hyman 1940 online to check |
| Cyathodium | Cyathodium | (3, 50, 51) | Vegetative branches observed: Allen & Korpelainen |
| Cyathodium foetidissimum | Cyathodium foetidissimum | (3, 50, 51) | Vegetative branches observed: Allen & Korpelainen |
| Dasybranchus caducus | Dasybranchus caducus | (2-4, 6, 7, 52) | Bookhout 1957: describes development from eggs, Arthur: functional gonoducts described; can’t see any description of asexual |
| Desmarestia antarctica | Desmarestia antarctica | (3, 10, 53, 54) | Can’t see anything on parthenogenesis.. but there are zoospores. Nothing on asexual reproduction. Moe & Silva 1989. Not determined whether parthenogenetic or sexual. However, apomixis observed in genus in Ramirez & Peters 1986 |
| Dictyosiphon hirsutus | Dictyosiphon hirsutus | (3, 10, 55) | Peters 1992: culture studies. Parthenogenetic gametes in culture, not clear if in nature. Can’t find records of fragmentation |
| Dictyostelium discoideum | Dictyostelium discoideum | (56-60) | Baldauf and strassman: dicty tend to only produce single. Bloomfield 2013: sex in dicty |
| Dictyostelium fasciculatum | Dictyostelium fasciculatum | (58-61) | Baldauf and strassman:group splits into multiple smaller sporogens in Ca. Bifurcatum, Sheikh 2018 for C. fasciculata |
| Dictyostelium minutum | Dictyostelium minutum | (57-59) | Baldauf & Strassman |
| Dictyostelium purpureum | Dictyostelium purpureum | (58-60) | Baldauf and strassman: dicty tend to only produce single. Bloomfield 2013: sex in dicty |
| Dictyota binghamiae | Dictyota binghamiae | (10, 62-64) | <https://www.centralcoastbiodiversity.org/mermaids-gloves-bull-dictyota-binghamiae.html> Has stolons and produces gametes. Bogaert 2020: discussed dictyota genus, asexual reproduction. Apomixis in a Korean species Hwang 2005. |
| dicyema typhus | dicyema typhus | (2, 6, 47) | No species specific data, but asexual/sexual cycles in all dycemids according to furuya 2003 |
| dicyemmenea abelis | dicyemmenea abelis | (2, 6, 47) | No species specific data, but asexual/sexual cycles in all dycemids according to furuya 2003 |
| dicyemmenea lameerei | dicyemmenea lameerei | (2, 6, 47) | No species specific data, but asexual/sexual cycles in all dycemids according to furuya 2003 |
| Dilsea natashae | Dilsea natashae | (3, 10) |  |
| Dinophilus gyrociliatus | Dinophilus gyrociliatus | (2-4, 6, 7, 65-67) | Zattara: paratomy in D. rostratus, parthenogenetic strains recorded by Beauchamp 1910 & Hartmann 1933 (see in Vandini 1965). No records of fission in d. Gyr that I can see. |
| Diurodrilus westheidei | Diurodrilus westheidei | (2-4, 6, 7) (68) | Architomy present in other dorvellids. BUT not sure whether diurodrilus is even an annelid? Kristensen 1995 describe sperm, but sex not definitively shown. Weird parasite things |
| Ducellieria chodatii | Ducellieria chodatii | (69) | See Hesse 1989: infer sex, as multiple zoospores infect a single pollen grain then can produce a resting spore ‘probably by a sexual process’(as in other oomycetes). Always seems to be a single cell released by aggregates (which grows to sporangium which releases aggregates). |
| Durvillaea antarctica | Durvillaea antarctica | (10, 70) (71) (72) | Southern bull kelp— appears to have direct development, only short haploid phase. Velasquez 2019. Maier 1997 discuss parthenogenesis in related species |
| Ectocarpus siliculosus | Ectocarpus siliculosus | (3, 10, 73-75) | Diffuse: most cells capable of cell division. Lee textbook. Can't see fragmentation? Mueller & Falk 1973: describe gametes. Isomorphous gametes, females drop and males swim. Charrier: parthenogenesis, mitospores as clonal reproduction. Searles 1980: sporophyte may reproduce asexually to produce unlimited sporophytes |
| Elachista fucicola | Elachista fucicola | (2, 6, 76) | Skinner 1983: van den Hoek describes E. Stellaris without sexual generation, Kylin showed direct life history, Koeman showed sexuality in fucicola. Skinner also describes stolon |
| entersostomula graffi | entersostomula graffi | (77) | Jones 1941 describes sexual organs, does not mention asexual reproduction anywhere |
| Escherichia coli | Escherichia coli | (78) | Fruiting body formation |
| Eudorina cylindrica | Eudorina cylindrica | (29-32) |  |
| Eudorina elegans | Eudorina elegans | (29-32) |  |
| Eudorina minodii | Eudorina minodii | (29-32) |  |
| Eudorina unicocca | Eudorina unicocca | (29-32) |  |
| Farlowia mollis | Farlowia mollis | (3, 10, 79) |  |
| Fischerella | Fischerella | (16, 17) | Schirrmeister 2011: section V |
| Fucus vesiculosus | Fucus vesiculosus | (3, 10, 80) | Tatarenkov discusses asexual morph. Overton shows that parthenogenesis can be induced, but it requires specific lab techniques to mimic fertilisation (so unlikely in nature?). But Nagasato 2000 show parthenogenic development in another fucus species |
| Fuirena ciliaris | Fuirena ciliaris | (3, 81) | Rodrigues 2009: images of rhizome spreading |
| Funaria hygrometrica | Funaria hygrometrica | (3, 82-84) | Chopra 1967: apogamy in funaria— development of sporophytes on gametophytes in culture |
| Gloeophycus koreanus | Gloeophycus koreanus | (3, 10) |  |
| Gonium multicoccum | Gonium multicoccum | (6, 31, 85, 86) | Harper 1912: discusses fragmentation in Gonium, but doesn’t specify the species. Hanschen 2017: all go through a single-celled bottleneck. Herron 2008: volvocine algae are facultatively asexual |
| Gonium octonarium | Gonium octonarium | (29-32) | Herron 2008 paper has good descriptions for the volvocine algae |
| Gonium pectorale | Gonium pectorale | (29-32) |  |
| Gonium quadratum | Gonium quadratum | (29-32) |  |
| Gonium viridistellatum | Gonium viridistellatum | (29-32) |  |
| Gymnoascus reessii | Gymnoascus reessii | (29-32) | not sure with fungi, can simply split hyphae into multiple pieces (fragmentation) and s'all good, but does this happen often naturally? In G. Reessii: asexual reproduction by conidia and gymnosperms |
| haliclystus haliclystus | haliclystus haliclystus | (3) (87) | May also be a typo? Can’t see anywhere, and can’t find Bell’s original citation. Haliclystus antarcticus can sexual and asexual by budding (Miranda 2010) |
| Halymenia asymmetrica | Halymenia asymmetrica | (3, 10, 88, 89) |  |
| Haplospora globosa | Haplospora globose (have prostrate system) | (3, 90) | Kuhlenkamp 1996 : fragments of Haplospora produced rhizoids at their basal ends in a similar manner, plus uprights from prostrate discs. Creeping rhizomes that can produce many uprights. Kuhlenkamp 1985: ‘sporophytes alternate with gametophytes without sexuality’. Isolated eggs developed normally, sperm are not attracted to eggs and fall and die. |
| Helminthostachys zeylanica | Helminthostachys zeylanica | (3, 91-93) (94) (95) | Manna 2013: low spore germination rate and preference of vegetative propagation. Whittier 1987 discusses sporophyte/gametophyte. Mazumder 2010 discusses sex in H zeylanica. |
| Heteroglossum carnosum | Heteroglossum carnosum | (3, 10) | Very little on heteroglossum. Nothing on WoS and next to nothing on GS. |
| Heteroralfsia saxicola | Heteroralfsia Saxicola | (3, 10, 96) | Kawai 1989, fig 23. |
| Himantothallus grandifolius | Himantothallus grandifolius | (3, 10, 97) | Wienke & Clayton describe parthenogenesis & gametes. Can’t see any record of vegetative growth |
| Hirudo medicinalis | Hirudo medicinalis | (2-4, 6, 7) | Hirudinidae can't reproduce asexually, |
| Hummia onusta | Hummia onusta | (3, 10) | Don’t have access to Fiore 1976: describes gametes in abstract, may describe parthenogenesis. Can find little else |
| Hydra vulgaris | Hydra vulgaris | (2, 6, 98, 99) | budding in hydra may be more akin to fragmentation in this definition: bud growth is driven by cell migration, rather than cell division. Can’t find reports of parthenogenesis, |
| Hymenophyllum tunbridgense | Hymenophyllum tunbridgense | (3, 100, 101) | Effective reproduction, at least under present conditions in great britain, seems to occur only vegetatively’. Mature gametophytes not observed, and young sporophytes not found. Richards 1972 |
| Isthmoplea sphaerophora | Isthmoplea sphaerophora | (3, 10, 102) | Rueness 1974: apomeiotically formed individuals. Propoagation by vegetative means regularly observed by ‘formation of downgrading rhizoids, distal portion then shed and continues growing’. This is somewhere between budding and fragmentation… closer to budding as in hydra |
| Kurogiella saxatilis | Kurogiella saxatilis | (3, 10, 103) | don’t have access to Kawai 1993, but abstract says they lack a gametophyte, and figures show direct development. Very little info otherwise |
| Laminaria dentigera | Laminaria dentigera | (3, 10, 104) | Laminaria digitata: Destombe shows male gametophytes fragments to reproduce. Life-cycle of general laminaria described in Bartsch 2008 |
| Leathesia difformis | Leathesia difformis | (10, 28) | Wynne Book: gametophytes can be formed by parthenogenesis, and form sporophytes when gametes fuse. |
| Lemna minor | Lemna minor | (3, 105) | Lemon 2001: vegetative reproduction |
| Lomandra hermaphrodita | Lomandra hermaphrodita | (3, 106) (107) | Ahmad 2014: lomandra longifolia, Kraus & Koch 2004: rhizomatous, wind pollenated. |
| loxosoma sultana | loxosoma sultana | (2, 6, 108) | Only one description: describes oocyte, sperm & few buds (assheton 1912) Appears that all Ectoprocta can bud, wiki. Perhaps with exception of L. isolata (Giere Meiobenthology) |
| Lumbricus terrestris | Lumbricus terrestris | (2-4, 6, 7, 109) | No fission in lumbricus from zattara, or in Cosin Earthworm chapter: cross fertilising hermaphrodite. However parthenogenesis is common in lumbricidae, observed in lumbricus eiseni (Reynolds 1974). *Lumbriculus* can reproduce by fission (Martinez 2006), so beware of potential confusion |
| Lyngbya aestuarii | Lyngbya aestuarii | (16) | Schirrmeister 2011: Section 3 |
| macrostomum gigas | macrostomum gigas | (2, 6, 110, 111) (112) (113) | Egger: exclusively sexually reproducing genus. Wudarski 2017: describes production of inseminated eggs in genus |
| Mammillaria elongata | Mammillaria elongata | (3, 114)  rhs.org.uk | [res.org.uk](http://res.org.uk) |
| Membranoptera subtropica | Membranoptera subtropica | (3, 10) |  |
| Methanosarcina mazei | Methanosarcina mazei | (115) | Not obligately multicellular: asexual cell division, and the laminar can be split and will regrow. |
| Microcoleus chthonoplastes | Microcoleus chthonoplastes | (16) | Schirrmeister 2011: section 3 |
| Microcystis aeruginosa | Microcystis aeruginosa | (116) | Schirrmeister 2011: Unicellular |
| microhydra rideri | microhydra rideri | (2, 6, 117) | Freshwater jellyfish: can bud polyps, frustules or medusae. Once mature, sperm or eggs released Folino-rorem 2015. No reports of parthenogenesis on WoS with new name. ‘Parthenogenesis may occur in Limnocodium’, but evidence is slight Fowler |
| Monoclea forsteri | Monoclea forsteri | (50, 118) | Cavers 1903: observe fragments regrowing |
| Morone saxatilis | Morone saxatilis | (2, 6, 119) | Gervasi 2015: some reports of hermaphroditism, but rare. No reports of parthenogenesis |
| Mus musculus | Mus musculus | (2, 6, 120) | Parthenogenesis can be induced in mouse, but embryos die after ~10 days? Kono 2004. (But some vertebrates do use parthenogenesis! Lizards, etc) |
| Myxococcus fulvus | Myxococcus fulvus | (37, 121) | Good review in Muñoz-Dorado 2016. Cells have coordinated growth in swarms, but form fruiting bodies by aggregation during starvation |
| Myxococcus xanthus | Myxococcus xanthus | (37, 121) | Good review in Muñoz-Dorado 2016. Cells have coordinated growth in swarms, but form fruiting bodies by aggregation during starvation |
| Nais variabilis | Nais variabilis | (2-4, 6, 7, 23, 122-124) | Lochhead and learner 1984 descibe sexual, 1983 for asexual, Parish 1981: most individuals asexual. Arthur: sexual specimens of naididae rarely found (Reproduction of marine invertebrates, v 3. pg 217) |
| neomenia carinata | neomenia carinata | (2, 6) (125) (126) (127) | Adults known to have gonads: Koren & Danielssen “Langs dyrets rugflade, I same renting som kjølen, I melee den of maven ligger Hermaphroditkjertelen”. Tullberg describes eggs in various stages of development. Eggs have been found (Thompson) |
| Nodularia | Nodularia | (16) | Section IV in Schirrmeister |
| Nostoc | Nostoc | (16, 17) | Schirrmeister 2011: section IV |
| notholca acuminata | notholca acuminata | (2, 6) (23, 128) | No reports of males, but males may only be present transiently in rotifers anyway— so need regular collections to find them. Virro 1993 reports sex in N. squamula. Arthur book, vol 1: “with the exception of the order Seisonidea, asexual reproduction is the most common method of reproduction and is found in all species”. |
| Ophioglossum palmatum | Ophioglossum palmatum | (3, 129) (130) (131, 132) (133) | Mesler 1975 describes gametophytes, which lead to sporophytes in O palmatum (but says that apogamy cannot be rules out). Whittier 2011 describes ophioglossum pendulum gametophytes. McMaster 1996 describes vegetative spread by rhizome in ophioglossum pusillum. |
| Oscillatoria sancta | Oscillatoria sancta | (16) | Schirrmeister 2011: section 3 |
| Pandorina colemaniae | Pandorina colemaniae | (29-32) |  |
| Pandorina morum | Pandorina morum | (29-32) |  |
| pedicillina echinata | pedicillina echinata | (2, 6, 134-136) | Cambridge natural history, vol 2: pg 487 image of budding individuals forming colony. Costello 1957 pg 49 describe eggs. Hyman 1951— sometimes hermaphroditic, sometimes dioecious |
| Periplaneta americana | Periplaneta americana | (2, 6, 137) | Katoh: facultative parthenogenesis |
| Petermannia cirrosa | Petermannia cirrosa | (3) | Very little info, fruits described.[https://bie.ala.org.au/species/https://id.biodiversity.org.au/node/apni/2906802](https://bie.ala.org.au/species/https:/id.biodiversity.org.au/node/apni/2906802) |
| Physarum polycephalum | Physarum polycephalum | (138, 139) | Howard 1931: life history of physarum |
| Pinus monophylla | Pinus monophylla | (3)  fs.fed.us (140) | can be propagated without seed, but is it naturally occurring? Fryxell |
| Pisione remota | Pisione remota | (2-4, 6, 7, 23) | Arthur: complex reproductive system for copulation, sperm stored for months |
| Platydorina caudata | Platydorina caudata | (29-32) |  |
| Pleodorina californica | Pleodorina californica | (29-32) |  |
| Pleodorina illinoisensis | Pleodorina illinoisensis | (29-32) |  |
| Pleodorina indica | Pleodorina indica | (29-32) |  |
| Pleodorina japonica | Pleodorina japonica | (29-32) |  |
| Pleurobrachia | Pleurobrachia | (2, 6) | No indication of which species Bell refers to. Apparently self-fertile hermaphrodites, can’t see any reports of asex in pleurobrachia. |
| Pocheina flagellata | Pocheina flagellata | (3) (141) | v. Little data, abstract in Olive, but no access to paper. |
| Pocheina rosea | Pocheina rosea | (1, 3) | This may actually be A. rosea (brown). Life cycle in Brown & Silberman |
| Pogonatum neesii | Pogonatum neesii | (3, 142) | Frey: protonemata can spread and produce multiple plants |
| Polysphondylium pallidum | Polysphondylium pallidum | (58, 143) | Baldauf and strassman:group splits into multiple smaller orogens |
| Polysphondylium violaceum | Polysphondylium violaceum | (58, 60) | Baldauf and strassman:group splits into multiple smaller sporogens |
| Polytrichum commune | Polytrichum commune | (3, 142, 144) | Frey: rhizoid that then disintegrates to leave separate ramets. Mickiewicz 1975, vegetative multiplication and regeneration. Van Der velds 2001 show sex based on microsats in genus. Gemmae common— are they found here? |
| Pomatoceros triqueter | Pomatoceros triqueter | (2-4, 6, 7, 145, 146) | Arthur: sex ratio description, protandrous. Cotter 2003, |
| Ptilophora scalaramosa | Ptilophora scalaramosa | (3, 147) | Can’t find much info about reproduction. Tronchin et al 2004: discuss male/female reproductive structures, nothing about asexual reproduction |
| pycnophyes frequens | pycnophyes frequens | (2, 6, 148-150) | Spermatophores observed in genus, but not sex not observed (herranz 2014). Blake 1930 describes sexes in species, but not sex |
| Ralfsia verrucosa | Ralfsia verrucosa | (3, 10, 151, 152) | Forms crust, lives in symbiosis with a limpet. Scraps of filaments could remain after crust disappearance and formed early recruitment (Kain 2008). Can’t see gametes mentioned, but spores are produced by small erect thalli. No mention of macrothallus present that I can find. Nelson 1982: “As noted previously,the life histories of Ralfsiaceae/Lithodermatace which have been examined to date show two basic patterns—either a directtypewith- out evidenceof sexuality,or onewhich showsthe cruststo be stagesin the life historyof plantsin the Scytosiphonal“ |
| rastrognathhia macrostoma | rastrognathhia macrostoma | (2, 6, 153, 154) | Gnathostomulids: simultaneous hermaphrodites, eggs rupture through body wall! (Wiki) can’t really find much. Nielsen 2011: all species are hermaphrodites (Animal evolution: interrelationships of the living phyla). Kristensen 1977— describe oocytes and sperm |
| rhabditis monhystera | rhabditis monhystera | (2, 6, 155, 156) | Sex described in genus in shakes 2011 & Felix 2004. See also table at Nigon VM, Félix MA. History of research on C. elegans and other free-living nematodes as model organisms. In: WormBook: The Online Review of C. elegans Biology [Internet]. Pasadena (CA): WormBook; 2005-2018. [Table], Table 3. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK453431/table/nematodeshistory_table3/> |
| rhopalura granosa | rhopalura granosa | (2, 6, 157) | Parasite with sexual/asexual stages: Atkins 1933 |
| Rivularia | Rivularia | (29-32) (158) | Vasishta 1961: always reproduce vegetatively through hormogonia. Algaebase: reproduction by disintegration of trichomes whithin colonies and heterocytes and by hormogonia, separating after the separation of the hair by the help of necridic cells and sometimes liberating from the colonies |
| Saccharomyces cerevisiae | Saccharomyces cerevisiae | (159) | Has sex, cels can bud— but can pseudohyphae fragment? Koschwanez 2011: clumps fragment |
| Sagittaria lancifolia | Sagittaria lancifolia | (3, 160) | Van Drunen: sexual vs asexual. Spreads by rhizomes |
| Salmo gairdneri | Salmo gairdneri | (2, 6, 161) | Parthenogenesis can be recreated in many externally fertilising fish. Komen 2007 Parthenogenesis rarely reported in fish |
| Salpingoeca rosetta | Salpingoeca rosetta | (162-164) | Fairclough 2010: colonies form through cell division of slow swimmers. Dayel 2011: chain colonies can reproduce by fragmentation, long colonies susceptible to sheer stress. Levin 2013: describe sexual and asexual life-cycles |
| Sarconema scinaioides | Sarconema scinaioides | (3, 165) | Papenfuss & edelstein 1974: tips break off and develop new branches |
| Schimmelmannia dawsonii | Schimmelmannia dawsonii | (3, 10, 166, 167) | Can find v. Little on schimmelmannia. Chihara 1972 describe alternating gametophyte and sporophyte, so assumed to have sex. Filamentous/crustose forms that could fragment? Good review of LHs by umezaki 1989/searles 1980/need to get west hommersand scanned. Seems that red algae don’t tend to have any asexual means, but have crustose or filamentous stages that can split? |
| Schizosaccharomyces pombe | Schizosaccharomyces pombe |  |  |
| Schmitzia hiscockiana | Schmitzia hiscockiana | (3, 10, 168) | Schirrmeister 2011: section IV |
| Scytosiphon lomentaria | Scytosiphon lomentaria | (3, 169) | Clayton 1978: cylindrical forms produced asexually, gametophytes observed, and fragments of crustose form used to produce cultures |
| Selenipedium palmifolium | Selenipedium palmifolium | (3, 170) | Cribb: rhizome, hobbyists propagate by dividing after flowering |
| Sorogena stoianovitchae | Sorogena stoianovitchae | (171, 172) | Aggregative fruiting body formation. Lasek-nesselquist and Katz 2001: “Bursaria is the only colpodea |
| Sphacelaria bipinnata | Sphacelaria bipinnata | (3, 10, 173) | Propagules described in Lee textbook life-cycle fig (appears to be a parasite of fucus?) |
| Sphaerobolus stellatus | Sphaerobolus stellatus | (3, 174) | Geml 2004, thesis describes sex and Asexual spores. But again, can fungi just fragment? |
| Sphagnum recurvum | Sphagnum recurvum | (3, 175-177) | Frey: same disintegration of rhizome |
| Spirulina | Spirulina | (16, 17) | section 3 Schirrmeister 2011 |
| spongilla lacustris | spongilla lacustris | (2, 6, 178-180) | Manconi: growth and then fragmentation into gemmules throughout the year, leaving patches behind that grow again. Simpson & Gilbert: describe sexual reproduction (but do not directly observe fertilisation). Gilbert: unfertilised eggs implant, but do not develop. |
| Starria zimbabweensis | Starria zimbabweensis | (16, 17) | Schirrmeister 2011: section 3 |
| Streptomyces antibioticus | Streptomyces antibioticus | (181) | Not obligately multicellular: asexual cell division, and the laminar can be split and will regrow. |
| Streptomyces coelicolor | Streptomyces coelicolor | (181) | Not obligately multicellular: asexual cell division, and the laminar can be split and will regrow. |
| Streptomyces griseus | Streptomyces griseus | (181) | Not obligately multicellular: asexual cell division, and the laminar can be split and will regrow. |
| Symphyogyna brongniartii | Symphyogyna brongniartii | (182, 183) | McCormick: symphyogyna aspera has lateral spreading (fig 1+2). Cavers 1903: on asexual reproduction: most marchantiales reproduce by spreading, some by gemmules, apogamy & apospory appear rare |
| Symploca | Symploca | (16, 17) | section 3 Schirrmeister 2011 |
| Syringoderma phinneyi | Syringoderma phinneyi | (3, 10, 184) | Henry Müller 1983: describe gamete formation and apogamous parthenogenesis. No apparent fragmentation |
| Tetrabaena socialis | Tetrabaena socialis | (29-32, 86) | Tetrabaena and gonium colonies can fragment: hanschen |
| Trichodesmium erythraeum | Trichodesmium erythraeum | (16, 17) | Schirrmeister 2011: section 3 |
| Trichoplax adhaerens | Trichoplax adhaerens | (2, 6, 185, 186) | Image of splitting in Srivastrava 2008. Sex not observed in culture, but genetic evidence of sexual reproduction in Signorovitch 2005. Oocytes often observed in degenerating animals |
| turbanella cornuta | turbanella cornuta | (2, 6, 23, 187) | Gastrotricha reproduction not all that well studied— macrodasiyds simultaneous hermaphrodites (wiki). While freshwater gastrotrichs are parthenogenesis (wiki). Sperm and reproductive organs are described in Teuchert 1977, and reproduction in Giese vol 1(Hummon) |
| valvognathia pogonostoa | valvognathia pogonostoma | (2, 6, 153, 188) | Gnathostomulids: simultaneous hermaphrodites, eggs rupture through body wall! (Wiki) can’t really find much. Nielsen 2011: all species are hermaphrodites (Animal evolution: interrelationships of the living phyla). Kristensen 1978— describe oocytes and sperm |
| Volvox africanus | Volvox africanus | (29-32, 86) | In volvox, immature colonies grow from single cells within the adult and then burst out-- this is a bottleneck, but does it really represent a bud where we know the 1st cell? |
| Volvox aureus | Volvox aureus | (29-32, 86) |  |
| Volvox barberi | Volvox barberi | (29-32, 86) |  |
| Volvox carteri f. kawasakiensis | *Volvox carteri* f. *kawasakiensis* | (29-32, 86) | Asymmetrical cell division determines reproduction (cell-cell interactions?) |
| Volvox carteri f. nagariensis | *Volvox carteri* f. *nagariensis* | (29-32, 86) |  |
| Volvox carteri f. weismannia | *Volvox carteri* f. *weismannia* | (29-32, 86) |  |
| Volvox dissipatrix | Volvox dissipatrix | (29-32, 86) |  |
| Volvox gigas | Volvox gigas | (29-32, 86) |  |
| Volvox globator | Volvox globator | (29-32, 86) |  |
| Volvox obversus | Volvox obversus | (29-32, 86) |  |
| Volvox rousseletii | Volvox rousseletii | (29-32, 86) |  |
| Volvox tertius | Volvox tertius | (29-32, 86) |  |
| Volvulina boldii | Volvulina boldii | (29-32, 86) |  |
| Volvulina compacta | Volvulina compacta | (29-32, 86) |  |
| Volvulina pringsheimii | Volvulina pringsheimii | (29-32, 86) |  |
| Volvulina steinii | Volvulina steinii | (29-32, 86) |  |
| Wolffia arrhiza | Wolffia arrhiza | (3, 105, 140, 189) | Fryxell 1967: G, and says that they rarely flower. But Schmitz and Kelm 2017 describe flowering |
| Wolffia microscopica | Wolffia microscopica | (3, 105, 190, 191) | Sree et al 2015: description of plant, flowering, vegetative & sex |
| Yamadaella caenomyce | Yamadaella caenomyce | (3, 192) | Wynne & Huisman discuss reproductive structures— but no discussion of vegetative reproduction. Not much info otherwise |
| Yamagishiella unicocca | Yamagishiella unicocca | (31, 32) |  |
| Zeacarpa leiomorpha |  | (29-32) |  |
| Zoothamnium alternans |  | (3, 10, 193) | Forms colonies, single cells become motile and swim off to start new colonies. Fauré-fremiet 1930, summers 1938. Conjugation described in Summers 1938, but seems rare (assume this is similar to sex). |

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