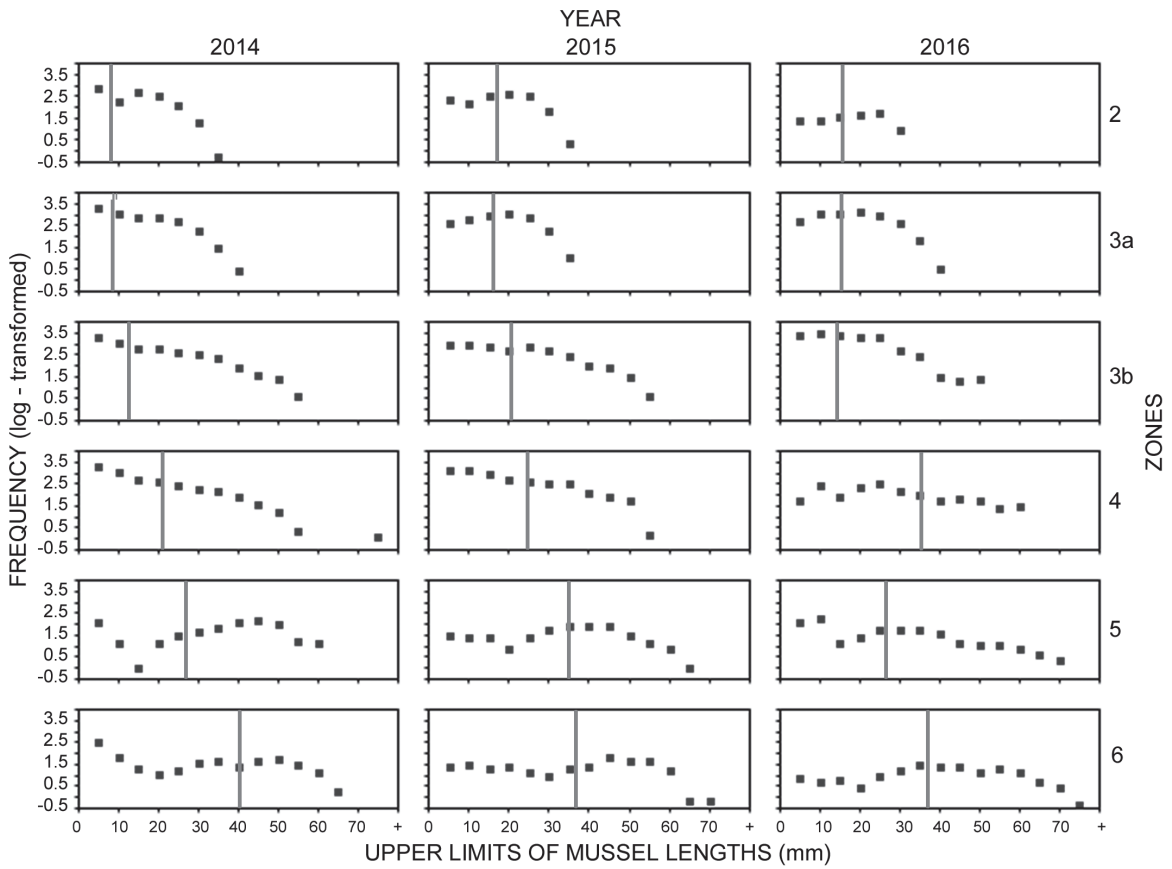
# Supplementary Information

**Impacts of alien 'ecosystem engineers' overwhelm interannual and seasonal shifts in rocky-shore community composition on Marcus Island, South Africa**

S Sadchatheeswaran, GM Branch, CL Moloney and TB Robinson

*African Journal of Marine Science* 2018, 40(2): 137–147.
https://doi.org/10.2989/1814232X.2018.1462729




**Supplementary Figure S1:** Log-transformed size-frequencies for lengths of the alien mussel *Mytilus galloprovincialis* in each shore zone, averaged across seasons within one year (2015/2016), as monitored at Marcus Island, Saldanha Bay, South Africa. Mean lengths of the mussel are indicated by grey lines

**Supplementary Table S1:** Changes in zonation notation between 1980 and 2016, necessitated by changes in the characteristic species and the number of shore zones. The alien mussel *Mytilus galloprovincialis* is excluded from the zone nomenclature and the lists of characteristic species so as to keep the terminology as consistent as possible

| 1980 | Characteristic species | 2001 | Characteristic species | 2012 | Characteristic species | 2014–2016 | Characteristic species |
|---|---|---|---|---|---|---|---|
| *Porphyra* zone | *Porphyra capensis* | Zone 1 | *P. capensis* | Zone 1 | *P. capensis* | Zone 1 | *P. capensis* |
| *Ulva* zone | *Ulva* spp. | Zone 2 | *Ulva* spp. | Zone 2 | *Ulva* spp. | Zone 2 | *Ulva* spp. |
| *Granularis* zone | *Scutellastra granularis* | Zone 3 | *S. granularis* | Zone 3 | *Balanus glandula* | Zone 3a | *B. glandula* |
| Algal-turf zone | *Caulacanthus* sp. | NA | Zone absent | | | Zone 3b | *S. granularis* |
| *Gigartina* zone | *Gigartina* spp. | Zone 4 | *Gigartina* spp. | Zone 4 | *Gigartina* spp. | Zone 4 | *Gigartina* spp. |
| *Aulacomya* zone | *Aulacomya atra* | Zone 5 | *A. atra* | Zone 5 | *A. atra* | Zone 5 | *A. atra* |
| *Choromytilus* zone | *Choromytilus meridionalis* | Zone 6 | Seaweed mix | Zone 6 | Seaweed mix | Zone 6 | Seaweed mix |

**Supplementary Table S2:** List of all invertebrates recorded during the three-year (2014–2016) biomonitoring programme at Marcus Island, Saldanha Bay, South Africa, including their respective taxonomic class, mean (whole wet) body mass (BM) (g individual$^{-1}$) and/or biomass (B) (g m$^{-2}$). Sources for mass measurements: GMB and TBR refer to the authors' unpublished data; 'Blamey' refers to LK Blamey, University of Cape Town; MI refers to measurements carried out on Marcus Island on 19 October 2013

| Scientific name | Class | BM | B | Source | Scientific name | Class | BM | B | Source |
|---|---|---|---|---|---|---|---|---|---|
| *Hymeniacidon perlevis* | Demospongia | 25.00 | 6 666 | GMB; MI | *Mytilus galloprovincialis* | Bivalvia | – | 25 800 | MI |
| *Anthothoe stimpsoni* | Anthozoa | 7.00 | – | GMB | *Semimytilus algosus* | Bivalvia | – | 12 900 | MI |
| *Bunodosoma capensis* | Anthozoa | 10.00 | – | GMB | *Chiton nigrovirescens* | Polyplacophora | 1.00 | – | GMB |
| *Bunodactis reynaudi* | Anthozoa | 26.00 | 18 200 | Blamey; MI | *Ischnochiton bergoti* | Polyplacophora | 0.50 | – | GMB |
| *Corynactis annulata* | Anthozoa | 3.00 | – | GMB | *Afrolittorina knysnaensis* | Gastropoda | 1.98 | – | MI |
| *Pseudactinia flagellifera* | Anthozoa | 26.00 | – | GMB | *Burnupena* spp.[2] | Gastropoda | 3.07 | – | MI |
| *Gunnarea gaimardi* | Polychaeta | 2.00 | – | GMB | *Trochia cingulata* | Gastropoda | 2.70 | – | Blamey |
| *Balanus glandula* | Maxillopoda | 0.30 | 3 192 | MI | *Nucella squamosa* | Gastropoda | 4.70 | – | Blamey |
| *Chthamalus dentatus* | Maxillopoda | 0.20 | – | GMB | *Oxystele antoni* | Gastropoda | 2.80 | – | MI |
| *Notomegabalanus algicola* | Maxillopoda | 0.20 | – | GMB | *Onchidella maculata* | Gastropoda | 0.30 | – | GMB |
| *Octomeris angulosa* | Maxillopoda | 1.50 | – | Blamey | *Crepidula porcellana* | Gastropoda | 2.00 | – | Blamey |
| *Tetraclita serrata* | Maxillopoda | 0.80 | – | GMB | *Cymbula granatina* | Gastropoda | 9.00 | – | MI |
| *Cyclograpsus punctatus* | Malacostraca | 1.20 | – | GMB | *Cymbula miniata* | Gastropoda | 5.00 | – | GMB |
| Black sea cucumbers[1] | Holothuroidea | 7.00 | – | GMB | *Dendrofissurella scutellum* | Gastropoda | 4.00 | – | GMB |
| *Thyone aurea* | Holothuroidea | 9.00 | – | GMB | *Fissurella mutabilis* | Gastropoda | 0.80 | – | GMB |
| *Henricia ornata* | Asteroidea | 9.00 | – | GMB | *Helcion* spp.[3] | Gastropoda | 0.85 | – | Blamey |
| *Parvulastra exigua* | Asteroidea | 2.13 | – | TBR | *Scutellastra argenvillei* | Gastropoda | 15.00 | – | GMB |
| *Callopatiria granifera* | Asteroidea | 12.00 | – | MI | *Scutellastra barbara* | Gastropoda | 7.17 | – | MI |
| *Parechinus angulosus* | Echinoidea | 5.88 | – | GMB | *Scutellastra cochlear* | Gastropoda | 6.23 | – | MI |
| *Aulacomya atra* | Bivalvia | – | 25 800 | MI | *Scutellastra granularis* | Gastropoda | 7.02 | – | MI |
| *Choromytilus meridionalis* | Bivalvia | – | 51 600 | MI | *Siphonaria* spp.[4] | Gastropoda | 2.59 | – | MI |
| *Lasaea adansoni turtoni* | Bivalvia | 0.10 | – | GMB | | | | | |

[1]Black sea cucumbers include *Aslia spyridophora*, *Pentacta doliolum*, *Pseudocnella insolens*, *Pseudocnella sykion* and *Roweia frauenfeldii.*
[2]*Burnupena* spp. includes *B. lagenaria* and *B. rotunda.*
[3]*Helcion* spp. includes *H. dunkeri* and *H. pruinosus.*
[4]*Siphonaria* spp. includes *S. capensis* and *S. serrata*.

**Supplementary Table S3:** List of all seaweeds monitored on Marcus Island, Saldanha Bay, South Africa, from 2014 to 2016. Sources for mass measurements: GMB and TBR refer to the authors' unpublished data; MI refers to measurements carried out on Marcus Island on 19 October 2013

| Scientific name | Class | Mean whole wet biomass (g m$^{-2}$) | Source |
|---|---|---|---|
| Bioslime | NA | 56 | TBR |
| *Ulva* spp.[1] | Ulvophyceae | 1 010 | MI |
| *Cladophora contexta* | Ulvophyceae | 2 752 | TBR |
| *Ecklonia maxima* | Phaeophyceae | 17 323 | TBR |
| *Laminaria pallida* | Phaeophyceae | 7 100 | MI |
| *Leathesia marina* | Phaeophyceae | 500 | GMB |
| *Porphyra capensis* | Bangiophyceae | 1 100 | MI |
| *Ahnfeltiopsis complicata* | Florideophyceae | 3 478 | MI |
| *Caulacanthus* sp. | Florideophyceae | 5 333 | MI |
| *Ceramium* spp.[2] | Florideophyceae | 11 457 | TBR |
| *Champia lumbricalis* | Florideophyceae | 12 970 | MI |
| *Gigartina* spp.[3] | Florideophyceae | 55 000 | MI |
| *Mazzaella capensis* | Florideophyceae | 6 521 | TBR |
| *Pachymenia orbitosa* | Florideophyceae | 3 980 | MI |
| *Plocamium cornutum* | Florideophyceae | 8 515 | MI |
| *Pterosiphonia cloiophylla* | Florideophyceae | 8 515 | GMB |
| *Spongites yendoi* | Florideophyceae | 90 | MI |
| *Tayloriella tenebrosa* | Florideophyceae | 2 741 | MI |
| Upright coralline spp.[4] | Florideophyceae | 10 411 | MI |

[1]*Ulva* spp. includes *U. intestinalis* and *U. rigida.*
[2]*Ceramium* spp. includes *C. flaccida*, *C. arenarium* and *C. capense.*
[3]*Gigartina* spp. includes *Gigartina polycarpa* and *Sarcothalia stiriata.*
[4]Upright coralline spp. includes *Arthrocardia* spp. and *Corallina officinalis*.