Histology of the ovaries

Stage I: Recovery and renewal of nutritive phagocytes. The acini were full with storage cells (nutritive phagocytes) and small numbers of dark blue stained (hematoxilinophilic) isolated germinal cells (diameter <10 µm) along the acinal walls. Clusters of proliferating oogonia were also present. Nutritive phagocytes contained eosinophilic droplets and filled the gonad lumen forming a dense meshwork across the acinus (thickness <160 µm) (Online Resource 1-I, Table 2).

Stage II: Growing ovary. Vitellogenesis had begun in the ovary; early and mid-vitellogenic oocytes had increased in size (diameter 10-20 µm) and formed a continuous layer of cells along the wall of the acinus. Some previtellogenic oocytes were also present. Nutritive phagocytes still occluded the lumen and were full with eosinophilic droplets (thickness 140-150 µm). The oocytes detached from the wall and gradually replaced nutritive phagocytes in the lumen (Online Resource 1-II, Table 2).

Stage III: Premature. The vitellogenic oocytes were still growing (20-30 µm) in the lumen until they accumulated and matured. Nutritive phagocyte tissue was greatly reduced (thickness 80-140 µm) surrounding the vitellogenic oocytes at the periphery of the acinus. The first fully grown late vitellogenic oocytes and ova were seen at this stage, indicating the completion of vitellogenesis. Ova also accumulated in the lumen (Online Resource 1-III, Table 2).

Stage IV: Mature. The lumen was full with densely packed full-grown oocytes (diameter >30 µm). The nutritive phagocyte layer was reduced to a thin layer at the acinus wall (thickness 30-80 µm) and was largely devoid of eosinophilic material. The oocytes were all mature and primary oocytes were absent from the germinal layer (Online Resource 1-IV, Table 2).

Stage V: Partly spawned. The ova were loosely packed and separated by spaces vacated by released ova. There were still some mature oocytes (diameter >30 µm) within the lumen, however the acinus showed a depressed shape due to muscular contraction during spawning. The acinus walls were very thin at this stage and the nutritive layer was greatly reduced or absent (thickness ≤30 µm) (Online Resource 1-V, Table 2).

Stage VI: Spent. The lumen was largely empty except for a few unspawned, relictic ova and some nutritive tissue. There were some newly developing oocytes at the acinus walls (diameter ≤10 µm) but no evidence of oogonial proliferation. The nutritive phagocyte layer was very thin along the acinal walls and remnant ova were being reabsorbed by the nutritive phagocytes. The nutritive phagocyte layer became
more conspicuous and accumulated cells with basophilic and eosinophilic droplets (thickness ≤30 µm) (Online Resource 1-VI, Table 2).
Online Resource 1. Histological sections of *Diadema* aff. *antillarum* ovaries: Stage I: recovering ovary with nutritive phagocytes (NP) filling lumen; small previtellogenic oocytes (PO) are present along acinal wall; few remnant ova (R) in lumen. Stage II: growing ovary with more abundant previtellogenic (PO) and early vitellogenic oocytes (EV) along acinal wall; nutritive phagocytes (NP) filling lumen. Stage III: premature ovary with many mid-late vitellogenic oocytes accumulating in lumen (VO); nutritive phagocyte layer reduced (NP). Stage IV: mature ovary filled with vitellogenic oocytes (VO) and some full-grown oocytes (O); nutritive phagocytes (NP) are reduced to thin layer along acinal wall. Stage V: partly spawned ovary with spaces vacated by spawned ova (VS); late vitellogenic oocytes (VO) and some remnant ova (R) found in lumen; thin nutritive phagocyte layer (NP). Stage VI: spent ovary with many vacant spaces in lumen (VS); relict ova (R) being absorbed by nutritive phagocyte layer (NP), phagocyte layer increasing in thickness.