

## Two new occurrence records for the Hawaiian Islands of invasive octocorals (Cnidaria: Anthozoa: Octocorallia: Malacalcyonacea) reported in Pearl Harbor: *Unomia stolonifera* (Gohar, 1938) and *Capnella* cf. *spicata* (May, 1899)<sup>1</sup>

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In 2020, an unidentified xeniid octocoral was reported in Pearl Harbor by contractor divers doing routine survey work. In 2022, coordination between several organizations and government agencies, including Bishop Museum, led to the visual identification of the xeniid coral as *Unomia stolonifera* (Gohar, 1938) followed by genetic confirmation in 2023 as well as the detection and identification of an additional octocoral species found growing in an adjacent patch as *Capnella* cf. *spicata* (May, 1899). Neither species have been previously reported in Pearl Harbor surveys (Coles *et al.* 1997, 2009; Coles, 2006) and represent two new occurrence records for the greater Hawaiian Islands.

Both species are regarded as invasive. *Unomia stolonifera* is of particular concern due to the rapidity and destructiveness of its spread on Venezuelan coral reefs following its introduction there in the early 2000s (Ruiz-Allais *et al.* 2014, 2021). The Hawai‘i Invasive Octocorals Working Group, including the Bishop Museum, was formed with the mission to support developing, implementing, and maintaining a collaborative, inter-agency action plan guided through adaptive management, with the goal of eradicating or containing invasive octocorals in Pearl Harbor and creating a long-term, accessible record for future use. The octocorals currently remain confined to Pearl Harbor and have not yet been reported beyond the harbor entrance (Hawai‘i Invasive Octocorals Working Group, pers. comm., 15 June 2023).

Both *U. stolonifera* and *C. spicata* are common aquarium species. *Unomia stolonifera* is commonly referred to as “Pulsing Xenia” and *Capnella spicata* is known as the “Kenya Tree Coral” (Cleveland Metroparks Zoo; Gay 2023; Ulrich III). The illegal aquarium trade was the vector of introduction for *U. stolonifera* to Venezuela (Ruiz-Allais *et al.* 2021). Since both species were found growing together *in situ* close to shore in Pearl Harbor (Fig. 1), it is most likely that the source of introduction here was likely similar, in this case aquarium release.

### Xeniidae

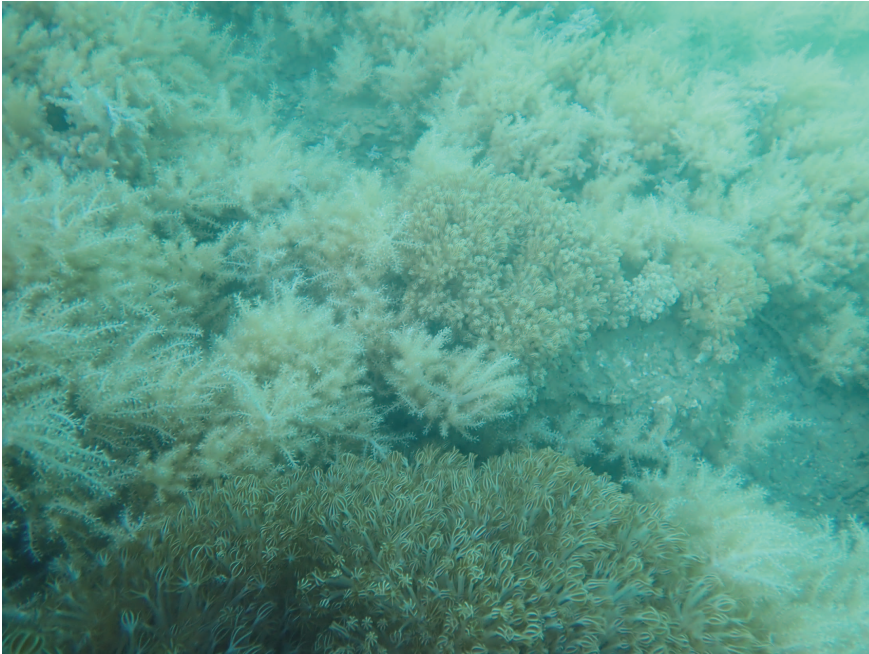
#### *Unomia stolonifera* (Gohar, 1938)

#### New state record

*Cespitularia stolonifera* Gohar, 1938: 483-485

*Unomia stolonifera* has been confirmed as a new record for the Hawaiian Islands. While it was first reported to the U.S. Navy in 2020 following marine biological surveys of Pearl Harbor, anecdotal evidence from regular users of the area suggests a presence as early as

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**Fig. 1.** Two invasive octocorals, *Unomia stolonifera* and *Capnella cf. spicata* growing on hard substrate less than 1 meter depth in Pearl Harbor, south of Bishop Point, 16 May 2023.

2017 (Hawai'i Invasive Octocorals Working Group, pers. comm., 15 June 2023). Six samples were collected by Pearl Harbor Naval Shipyard Dive Locker divers and were identified through examination of sclerite morphology and molecular analysis (ZMTAU Co38081, Accession# MT482554.1).

*Unomia stolonifera* was initially described by Gohar in 1938 and assigned the name *Cespitularia stolonifera*. In 2021, Beneyahu *et al.* revisited the species and moved it to the new genus *Unomia* after phylogenetic analysis and examination of microstructures with scanning electron microscopy. In the aquarium trade, the species is often conflated with *Xenia elongata* Dana (Gay 2023).

*Unomia stolonifera* occurs natively in the western Indo-Pacific around Indonesia (Beneyahu *et al.* 2021, GBIF). It has not been previously recorded in Hawai'i and its distinctive appearance as well as its abundance immediately set it apart to surveyors.

Material examined was preserved in 95% ethanol and deposited at the Bernice Pauahi Bishop Museum (BPBM). Prior to these specimens, neither *U. stolonifera* nor its synonyms had been catalogued in the Bishop Museum collection from Hawai'i, or any other region.

*Material examined:* HAWAIIAN ISLANDS: **O'ahu:** Pearl Harbor, south of Bishop Point, hard substrate, 1 colony: 2 Feb 2022, hand collected, PHNSY Dive Locker divers (BPBM D2844). As above (BPBM D1845-D2849).

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**Capnellidae*****Capnella* cf. *spicata*** (May, 1899)**New state record***Eunephthya spicata* (May, 1899)*Ammothea spicata* May 1899: 140

Found growing in a smaller patch adjacent to *U. stolonifera* in Pearl Harbor, *Capnella* cf. *spicata* represents another new state record. The species was detected as distinct from the neighboring *U. stolonifera* colonies initially through gross morphology before confirmation via molecular analysis in early 2023 (NCBI JX124371.1).

*Capnella spicata* was originally described as *Ammothea spicata* by May in 1899 before a generic revision in 1904 placed it in *Capnella* (Kükenthal). The genus *Capnella* was previously in the family Nephtheidae (Gray 1862) but was revised and placed in the new family Capnellidae by McFadden, van Ofwegen & Quattrini (2022).

*Capnella spicata* is native to the Indo-Pacific, its range extending from the tropics of the east coast of Africa to the Western Pacific, but was not previously known to occur within the Hawaiian Islands (GBIF). Due to the taxonomic revisions (past and future) involving this species (Utinomi 1960; McFadden & Ofwegen 2012), a more specific geographic distribution is difficult to confirm.

Six samples from Pearl Harbor were collected for analysis, preserved in 95% ethanol and deposited at BPBM. Prior to this collection, this species was not represented in Bishop Museum's collection.

*Material examined:* HAWAIIAN ISLANDS: **O'ahu:** Pearl Harbor, south of Bishop Point, hard substrate, 1 colony: 16 May 2023, hand collected, *Navy PHNSY divers* (BPBM D2935). As above (BPBM D2936-D2940).

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