Note

**Velella velella** (Cnidaria: Hydrozoa) in the Bay of Ranobe, south-west Madagascar

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**Abstract:** *Velella velella* widely occurs in the tropical and temperate oceans of the world and the number of mass strandings of colonies is increasing. Although its historical presence in the south-western Indian Ocean is known, recent observations are limited to Tanzania, Mauritius and South Africa. This is the first record of *V. velella* from Madagascar and the Mozambique Channel since 1964. Given the perceived increase in gelatinous zooplankton abundance, the lack of recent reports from this area highlights the need to monitor its presence to help coastal communities face the negative consequences of potential blooms.

**Key words:** Madagascar, pleustonic, Porpitidae, *Velella velella*, zooplankton

*Velella velella* Linnaeus, 1758, commonly known as the “by-the-wind sailor”, is a pleustonic, open ocean species found globally in tropical and temperate oceans (Daniel 1976, Bieri 1977, McGrath 1985, Evans 1986, Mianzan & Girola 1990, Flux 2008, Gul 2015, Fig. 1A). It is a holoplagic colonial anthoathecate hydrozoan belonging to the family Porpitidae. Numerous nominal species of *Velella* Lamarck, 1801, have been described over the years, but all are now considered synonyms of a single species, *V. velella* (Calder 1988, Schuchert 2018).

This species feeds actively on diverse zooplanktonic prey including cladocerans, copepods and euphausiid larvae (Purcell et al. 2012, 2015, Zeman et al. 2018), and shows selection for fish eggs and larvae, making it a potential important predator and competitor of fish (Purcell et al. 2012). In addition, both *V. velella* colonies and medusae host symbiotic zooxanthellae that may provide supplementary nutrition. It is predated upon by a variety of oceanic vertebrate predators and specialised gastropods, especially by *Glaucus* sp. and *Janthina* sp. (Arai 2005, Lepoint et al. 2016, Phillips et al. 2017).

*Velella velella* is renowned for forming huge rafts at sea and for massive beach strandings that have been reported in many of the world’s oceans (Evans 1986, Flux 2008, Purcell et al. 2015, Pires et al. 2018) and may deposit up to 2.5 kg ash-free dry weight per metre of shoreline (Kemp 1986). This highlights its importance in open-ocean carbon cycling and in transport of pelagic production to landmasses (Purcell et al. 2012).

Despite the presence of 1,722 distinct records from the Indian Ocean (Fig. 1B) in the Ocean Biogeographic Information System (OBIS) and the Global Biodiversity Information Facility (GBIF), only about 2% of these (n=37) have been reported in the last 50 years, including 21 from the Australian west coast. About 98% of sightings (n=1,684) were reported before 1970, all but 6 recorded during the International Indian Ocean Expedition (IIOE) conducted in 1959–1965 and reported in the World Ocean Database 2009 (Baranova et al. 2009), though other records may be scattered throughout the literature and await incorporation into biogeographic databases. No occurrences of the species have been documented in Madagascar and in the Mozambique Channel since 1964, when the American research ship Anton Bruun surveyed the area as part of the IIOE.

On 19th August 2018, seven stranded colonies of *V. velella* were observed along the beach between the villages of Ifaty and Mangily (23°09′12.1″S, 43°36′44.4″E, Fig. 1B), in the Bay of Ranobe, south-west Madagascar, and one was observed in the same area on the 22nd. Only the latter was photographed (Fig. 2A–B) and measured using the software Fiji ImageJ (Schindelin et al. 2012), but it could not be collected. The size of the float was 46.2 mm × 24.4 mm.

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In addition, one colony of the hydroid Porpita porpita Linnaeus, 1758, was noticed floating in the lagoon close to the south pass (23°08′54.1″S, 43°34′34.3″E) on the 22nd.

A comprehensive description of V. velella is provided by Schuchert (2010). Briefly, the floating colonial polyp stage is characterised by an oval, chitinous float, with an upright triangular sail, and exhibits the typical blue pigmentation of neustonic organisms due to the presence of astaxanthin-proteins (Zagalsky & Herring 1977). The sail is oblique to the long axis of the float and creates two mirror-symmetric forms. On the underside of the float, the colony has a central large gastrozooid encircled by a band of gonozooids that are also able to feed, and a peripheral ring of tentacle-like dactylozooids involved in prey capture. The asexual colony visible at surface releases numerous bell-shaped medusae that sink into deep waters and reproduce sexually. The larvae then develop into the well-known polymorphic colonies while ascending to the surface (Woltereck 1904).

All stranded specimens found in Ifaty were right-sailing (i.e. drift to the right in the downwind direction, Calder 1988, Fig. 2B). This form is less commonly observed than the left-sailing form, with most of the sightings occurring on the western shores of the southern hemisphere (Flux 2008, Araya & Aliaga 2018). The presence of V. velella in the Bay of Ranobe may be the result of Southeast Trade Winds that blow every day during the austral winter.

After half a century since the last documented sighting of V. velella in Madagascar and in the Mozambique Channel, this recent observation confirms the presence of the
species in the area. Its abundance in tropical and temperate oceans and its importance as a predator and/or competitor of fish, suggest that the presence of this species in the Bay of Ranobe and along the south-west coast of Madagascar should be monitored. In fact, a mass occurrence may pose a risk to fish stocks already subject to high fishing pressure and to the thousands of people who rely on the sea as their only source of livelihood (Davies et al. 2009).

The lack of reports is not limited to this species, but more generally to gelatinous zooplankton, which are rarely documented along the African coasts. The perceived rise of gelatinous zooplankton in the world’s oceans, although not yet clear (Condon et al. 2012), can have deleterious consequences for coastal communities (Richardson et al. 2009). The paucity of scientific data has led scientists to involve citizens for a more comprehensive monitoring of this phenomenon (e.g. Jellywatch.org). However, these initiatives are mostly restricted to North America or Europe, with sightings from the southern hemisphere mainly from Australia and New Zealand. The impacts of gelatinous zooplankton blooms may be greater along the African coasts, where the survival of millions of people is closely linked to the sea. It is therefore necessary that these populations, and the numerous organisations and diving centres that operate there, are more involved in these projects.

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