First Record of Pelagic Aeolid Nudibranch *Glaucus atlanticus* Forster, 1777 (Gastropoda: Glaucidae) in the Intertidal Zone of SiaoLiouciou off Southwestern Taiwan Island

臺灣新記錄種海洋性裸鰓類動物—大西洋海神海蛞蝓在小琉球潮間帶的出現

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Abstract

Glaucus atlanticus Forster, 1777, a pelagic aeolid nudibranch which has been found in temperate and tropical oceans throughout the world, is reported herein as a newly recorded species to inhabit the intertidal zone of SiaoLiouciou, Taiwan. The morphological differences to its related congeneric species, its geographical distribution as well as the environmental conditions of its occurrence are discussed.

摘 要

大西洋海神海蛞蝓(*Glaucus atlanticus* Forster, 1777)是一種原分布於全球熱帶至溫帶海域漂浮的海洋性裸鰓類動物，是臺灣的新紀錄物種，首次在臺灣的琉球嶼潮間帶出現。有關本種與同屬近似種間之形態差異、地理分布和出現的環境條件，將在本文中加以討論。

Key words : new record, nudibranch, *Glaucus atlanticus*, SiaoLiouciou, Taiwan

關鍵詞：臺灣新紀錄、裸鰓類、*Glaucus atlanticus*、小琉球、臺灣

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Introduction

There are two groups of pelagic aeolid nudibranchs. The Fionidae Gray, 1857 has only one species, which is not a zooplankton and lives on floating objects. The other group is of the subfamily, Glaucinae Gray, 1827, a true pelagic form, which has the ability to swim, and is the subject fauna of this paper. Members of Glaucinae are the blue sea slugs and are found in tropical and temperate oceans throughout the world (Miller 1974). They float upside down and use their long cerata and a gas bubble in their stomach to maintain buoyancy. The colonial floating cnidarians are their main food (Valdés and Campillo 2004).

Two genera were erected in the subfamily Glaucinae: *Glaucus* Forster, 1777 and *Glaucilla* Bergh, 1860, each with one species, *Glaucus atlanticus* Forster, 1777 and *Glaucilla marginata* Bergh, 1860, respectively. However, some authors recognize *Glaucilla* as a synonym of *Glaucus*, because these two sister monotypic genera are related and provide the same information. *Glaucus* is regarded as the single valid genus within the family Glaucidae, and with two species *Glaucus atlanticus* Forster, 1777 and *Glaucus marginatus* (Bergh 1860) (Keen 1971; Gofas *et al*. 2001; Valdés and Campillo 2004; Burn 2006).

In our recent intertidal monitoring study in the near-shore waters of SiaoLiouciou on 24 January 2012, 55 individuals of *G. atlanticus*, a newly recorded species of pelagic aeolid nudibranch from Taiwan, were observed and photo-vouchered, but no specimen was preserved. This species is a well-known circumtropical species. Finding this species in SiaoLiouciou, particularly in the intertidal zone as compared to open oceanic environments, provides interesting information on the zoogeographic distribution of this species.

Glaucus atlanticus has a flattened, slender and elongate body, of which both sides have three groups of wing-like cerata (Fig. 1). The first group of cerata is larger with a short stalk. The other two groups are smaller and sessile. The most dorsal ceras is largest in size with the others decreasing ventrally in each group. The cerata are conical, tapering and fragile. There are about 81 papillae of cerata in total. The species' head is short and not distinctly separated from the body. Oral tentacles and rhinophores are short and smooth. Its foot is broad with rounded anterior

corners, extending to the posterior end of the body. The anus and renal pore lie between the second and third groups of cerata, with the renal pore more proximate to the second group. The reproductive organs open on the right side of the body near the first group of cerata (Fig. 3).

The body hue of *G. atlanticus* is silver gray, with the lower edge of the cerata electric-blue (Fig. 1). The dorsum is silver but dark blue on its ventral surface. The central portion of the foot is silver in color, with border bands of bright blue that join together at the head and near the posterior end of the foot (Fig. 2, 3).

The sister species—*G. marginatus* which is closely related to *G. atlanticus* has not yet been found in Taiwan. The differences between them are thus: (1) the body size of *G. marginatus* is smaller (approximately 0.5 in adults) than that of *G. atlanticus* (Ross and Quetin 1990), (2) *G. marginatus* has up to four groups of cerata on both sides. The first two groups of cerata are pedunculate with a long stalk, while the last two groups are sessile and partially fused. A clearly distinguishable feature is that the body of *G. marginatus* is shorter, with the cerata arranged in uneven lines, one over the other, whereas they are arranged as a single series in *G. atlanticus* (Valdés and Campillo 2004).

Glaucus atlanticus is seldom seen in intertidal zones or near shore as it is pelagic except during periods of on-shore winds when they can be found floating in coastal waters, sometimes being washed into the intertidal zone. They float partially by means of an air bubble that they have swallowed and stored in their stomach and can move toward prey or mates with their cerata, making slow swimming movements. They eat various drifting prey including the toxic siphonophore *Physalia utriculus*, as well as the chondrophores, *Velella velella* and *Propita pacifica* (Bayer 1963; Thompson and Bennett 1970; Lalli and Gilmer 1989).

Individuals of *G. atlanticus* were found in the Duzeiping intertidal zone located in the northwestern part of SiaoLiouciou Island during the period from 24 to 27 January 2012. The water temperature (0-5 meters deep) and air temperature were 24.3℃, 18.8℃ (24/1); 24.4℃, 17.9℃ (25/1); 24.8℃, 18.4℃ (26/1) and 24.6℃, 20.4℃ (27/1). The wind speed and direction from 24 to 27 January were 4.2 m/sec., NW; 4.9 m/sec., NW; 3.5 m/sec., N and 3.0 m/sec., N. respectively. They were washed into the intertidal zone with their prey, *Physalia physalisn* and *Porpita pacifics*. Some were found with egg strings excreted from the opening of their reproductive organs (Fig. 3). This suggests that they had abundant food supply (Ross and Quetin 1990).

The find of this extremely rare species in SiaoLiouciou suggests that the populations of this species have dispersed from the circumtropical area by the central Kuroshio Current further into the Taiwan Strait.

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Fig. 1. *Glaucus atlanticus* floats upside down; its foot is always dorsal.

Fig. 2. *Glaucus atlanticus*, the back of the animal, being silver, may provide a way of hiding from undersea predators as it floats upside down.

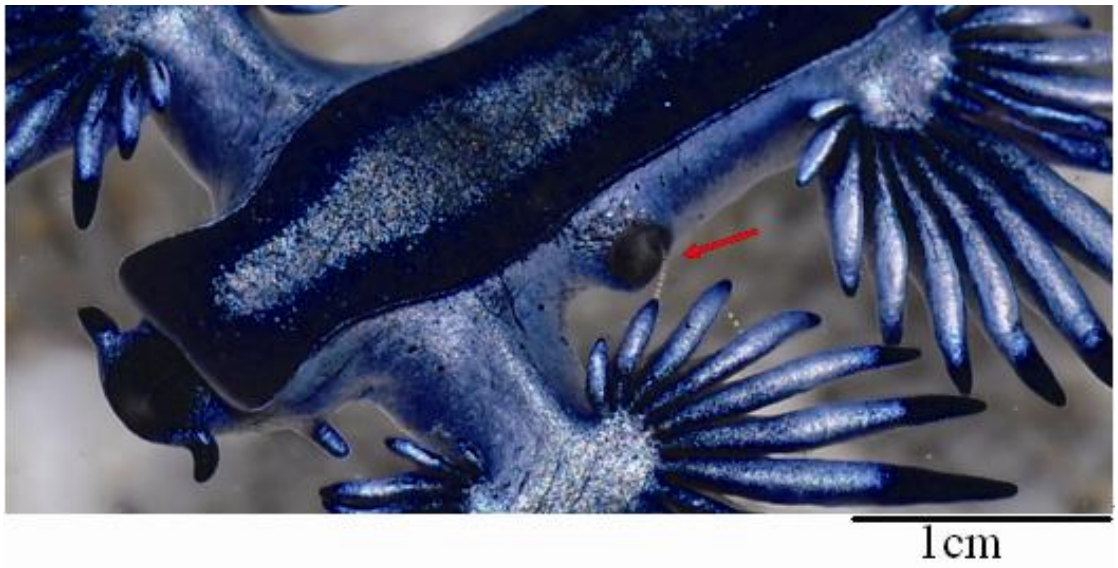

Fig. 3. *Glaucus atlanticus* is hermaphrodite; the red arrow designates the opening of its reproductive organs which can receive a partner's sperm, or release fertilized eggs (egg strings).

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