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New contributions on *Cumanotus cuenoti* Pruvot-Fol, 1948 and *Cumanotus beaumonti* (Eliot, 1906) (Gastropoda: Flabellinidae) in the Iberian Peninsula

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Abstract: Sampling works carried out at Ría de Arousa (Galicia, NW Spain) have resulted in the discovery of numerous specimens of *Cumanotus cuenoti*, Pruvot-Fol, 1948, which is the first record for the Iberian Peninsula and the southernmost one known for this species. In the case of *Cumanotus beaumonti* (Eliot, 1906), appearances confirm the existence of stable populations in our work area.

Introduction: *Cumanotus cuenoti* Pruvot-Fol, is a species that can be considered very rare: since its description from Arcachon (France) in 1948, there have only been two unique records at the same locality (Tardy, J. & Gantes, H., 1980 y Rudman, W.B., The Sea Slug Forum, 2006). This is therefore the first record for the Iberian Peninsula.

Cumanotus beaumonti (Eliot, 1906) is another species also considered very rare. Since its first description at the beginning of the previous century, only four records can be found in literature, all located in the British Isles and Norway (Picton, B.E. , 1991), Mediterranean sea (Turk, T., 2005) and recently in Galicia, Spain (Díaz Agras et al. 2010).

Although initially it was believed that *Cumanotus cuenoti* could be a juvenile stage of *Cumanotus beaumonti* (Eliot, 1906), both species are now accepted.

Systematics:

OPISTHOBRANCHIA Milne Edwards, 1848
NUDIBRANCHIA Blainville, 1814
Familia FLABELLINIDAE Bergh, 1889

Cumanotus cuenoti Pruvot-Fol, 1948
Plate 2

A total of about 30 specimens of 8 to 10 millimetres and numerous spawn coils were found by visual inspection by scuba dive in a mussel farm polygon located at Palmeira, with coordinates 42º 34' 05'' N and 8º 56' 32'' W during April 2012.

The inspection was carried out from 0 to 15 metres deep. Some of the specimens were photographed. All were located on the hydrozoan *Ectopleura dumortieri* (van Beneden, 1844) (Plate 4) whose colonies are located in shallow waters, from 0 to 2 metres deep and in the first 5 metres of the mussel culture ropes, with their egg masses (Plate 6). In this case the hydrozoan species on which it appears agrees with the one described by Tardy and Gantes. It has been observed and confirmed that *Cumanotus cuenoti* has swimming ability using their cerata, which move from front to back in synchronized movements in conjunction with contractions of the body.

Cumanotus beaumonti (Eliot, 1906)
Plate 3

The discovery of this species in Galicia was made by visual inspection by diving in experimental culture cages of Atlantic salmon, *Salmo salar* (Linné, 1758) that were initially located in the surroundings of the Lobeiras islands (Ría Arousa, Galicia, Spain), at a depth of 15-20 metres. The salmon were directly brought from Norway in the tanks of an adapted vessel, so it is supposed to have served as input vector of *Cumanotus* in our waters. In the dives done in April 2009, there were about a hundred specimens over hydrozoan colonies of *Ectopleura larynx* (Ellis & Solander, 1786) that exclusively covered the surface of the nets of the cages, which is new information about this species feeding, as existing records indicate that this species feeds on the hydrozoan *Corymorpha nutans* M. Sars, 1835. Afterwards, experimental cages were removed from that place and between March and April 2012 further inspections were performed in the same area to verify if it could just be an occasional colonization. After a series of exploration dives a total of 20 specimens between 20 and 30 mm were located as well as their egg masses (Plate 7), placed in numerous mussel rafts over the same species of hydrozoan, confirming that there are stable populations in our work area. Like the previous species, it possesses ability to swim, not by contractions of the body but only by the movement of their cerata.

Geographical distribution: In the case of *Cumanotus cuenoti* exclusively limited to the locality of Arcachon, on the French Atlantic coastline. There is no evidence about other records of this species anywhere else, so its distribution area is considerably extended from the original, this being the first record for the Iberian Peninsula and the southernmost one found for the species.

In the case of *Cumanotus beaumonti*: it has been cited in northern Europe and the Mediterranean Sea, so our area is within its known range (Plate 1).

Discussion: Different studies proposed the idea that *C. cuenoti* can be considered a synonym of *C. beaumonti,* arguing that the first one could be a juvenile phase of the second. In part, this hypothesis arises from the fact that specimens of both species had never been found in the same place at the same time. In the Ria de Arosa, both species develop their life cycle on the same structure without any apparent mixing between them. In both cases, numerous egg ribbons as well as individuals of each species were found, being able to corroborate what is described by different authors concerning the significant differences between their ovigerous masses (Picton, B. E., 1991; Tardy J. et Gantes, H., 1980). Morphological differences between them and among their spawning masses are evident in this manner, taking into account that the observations are based on a large number of specimens.

Another characteristic of these species which has been reported previously is the feeding specificity they appear to exhibit. In the case of *C. beaumonti*, all available information indicates that *Corymorpha nutans* is the only species of hydraria that serves as nourishment (McDonald,G. and Nybakken; Picton, B.E., 1991; Picton, B.E. & C.C. Morrow (1994); J.W; Turk, T., 2005). However, in Galician waters all individuals observed appeared on another species with similar characteristics, *Ectopleura larynx*, much more abundant in the area.

C. cuenoti preferably feeds on *Ectopleura dumortieri* hydroids, but developed well on *Tubularia indivisa* facies (Tardy & Gantes, 1980). These two species of hydroids, are very common as colonizers of floating structures. However, each one is distributed differently according to their requirements, with *Ectopleura dumortieri* colonizing surface areas (between 0 and 5 metres in our case), and *Ectopleura larynx* appearing from 10 m depth onwards. Based on the observations, it seems plausible to assume that the depth distribution found in nudibranchs is ultimately determined by the depth distribution of their prey.

Adaptation to the environment is given by the fact that individuals were able to find an accessible and suitable alternative source of nourishment, demonstrating the specificity of this species to its prey is not as rigid as it might appear, showing some alimentary adaptability.

Finally, we comment the fact that as well as in the months of March-April, we have direct observation data of the species with the above characteristics, in dives out of this season of the year in the same areas. Yet, in some cases, we just located the *Cumanotus beaumonti* egg masses, but never adult specimens, which could indicate a change of habits in the species outside the spring period. Picton (1991) proposed the hypothesis that these animals, after exhausting food resources in an area might be able to disperse while searching for new pastures. Another explanation for the absence of records at certain times of the year is the one proposed by Tardy and Gantès, who note the morphological similarities of *Cumanotus* and *Cerberilla* cerata and suggest they might be able to burrow into the sediment.

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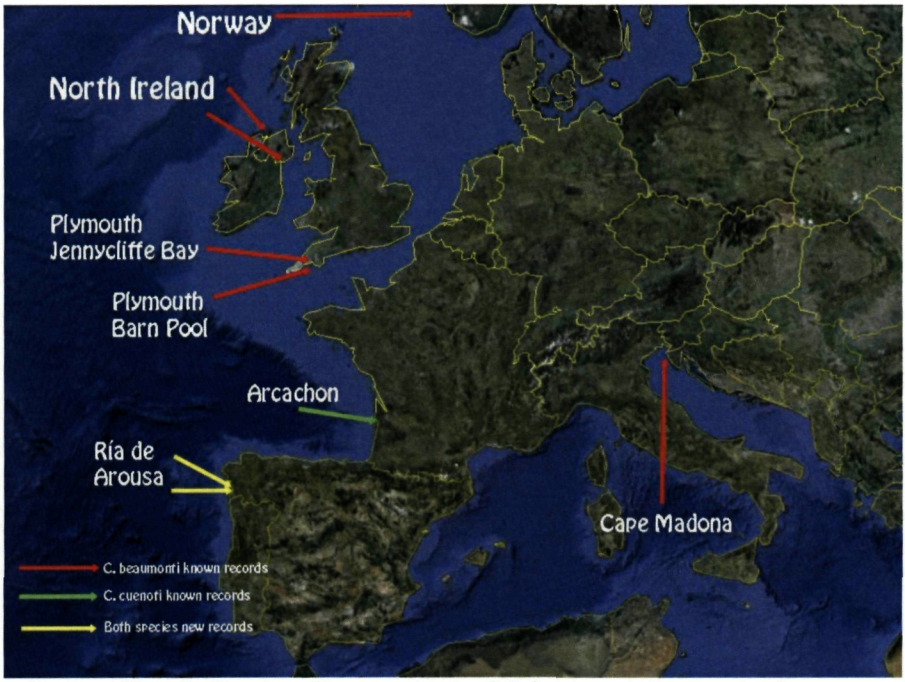

Plate 1: Situation of known records of *C. beaumonti*, *C. cuenoti* and new records in Galicia (NW Spain)

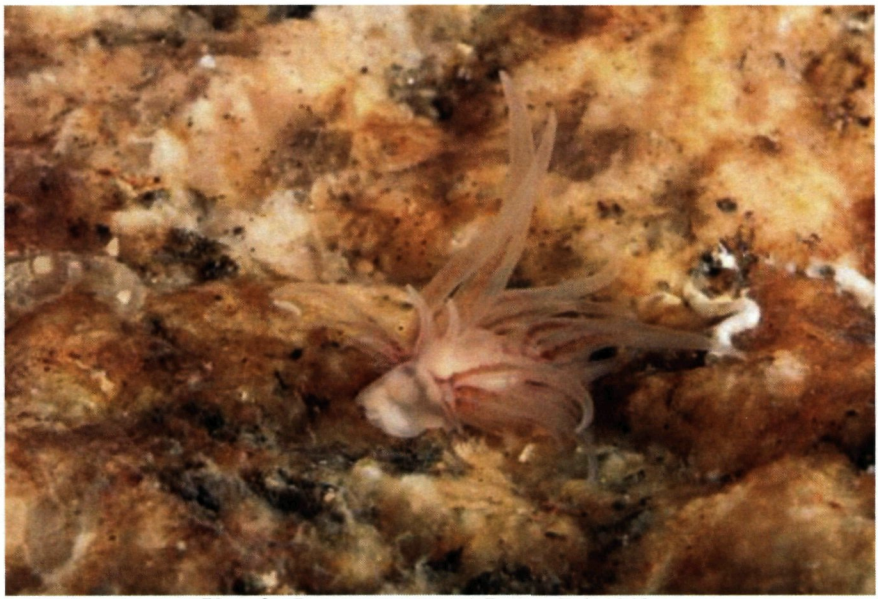

Plate 2: *Cumanotus cuenoti* Pruvot-Fol, 1948.

Plate 3: *Cumanotus beaumonti* (Eliot, 1906).

Plate 4: *Cumanotus cuenoti* Pruvot-Fol, 1948 on the hydrozoan *Ectopleura dumortieri* (van Beneden, 1844)

Plate 5. *Cumanotus beaumonti* (Eliot, 1906) on *Ectopleura larynx* (Ellis & Solander, 1786)

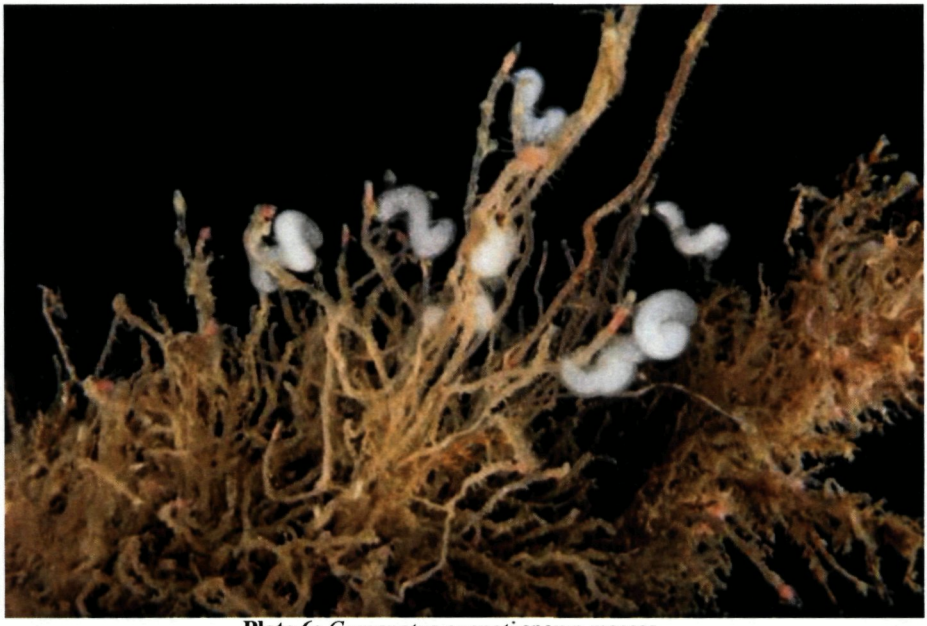

Plate 6: *Cumanotus cuenoti* spawn masses.

Plate 7: *Cumanotus beaumonti* spawn mass.

All the photos were taken in the Ría de Arousa.