

Two European
nudibranchs new to
the Gulf of Maine.
When did they
arrive?

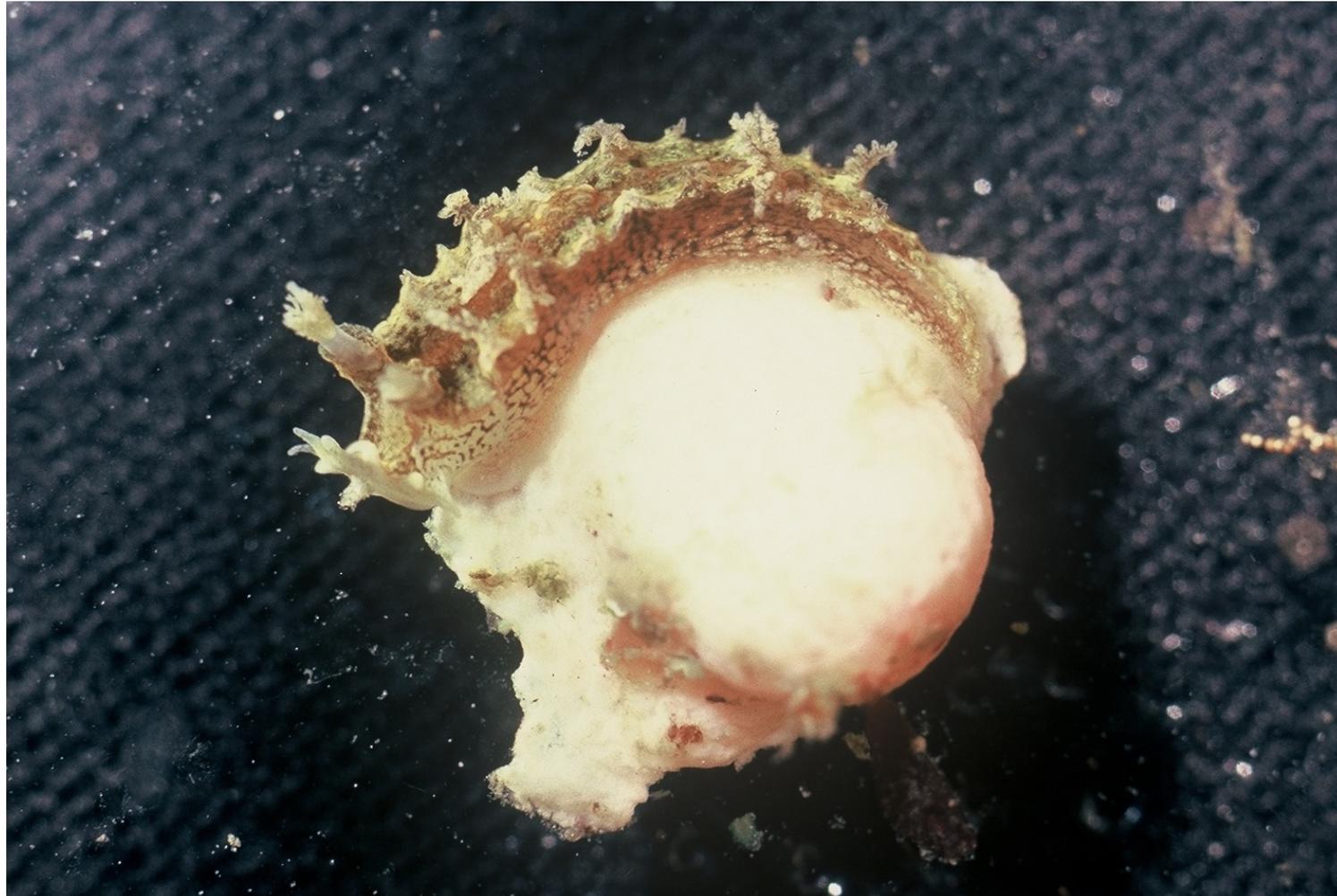
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The nudibranch fauna of the Gulf of Maine

- As with many other marine invertebrate groups, the nudibranch fauna of the GOM is rather limited.
- A surprising number of the known species also occur in Europe.
- Many species likely have amphi-atlantic distributions, but it is also likely that some are cryptic introductions.
- Two species have been documented as more recent arrivals and are the subject of this presentation.

Tritonia plebeia
G. Johnston,
1828

- Allmon and Sebens, 1988, Marine Biology.
- First observed in Massachusetts Bay in 1983 on rock walls feeding on the soft coral *Alcyonium digitatum*.
- Common for a few years and gone by 1986.
- Observed by Harris in 1985 at Cape Neddick and Isles of Shoals.
- None seen after that for many years.



*Tritonia
plebeia*
from
Cape
Neddick
1985

Eastport, Maine. 2011

Tritonia plebeia had not been seen or reported since 1985.

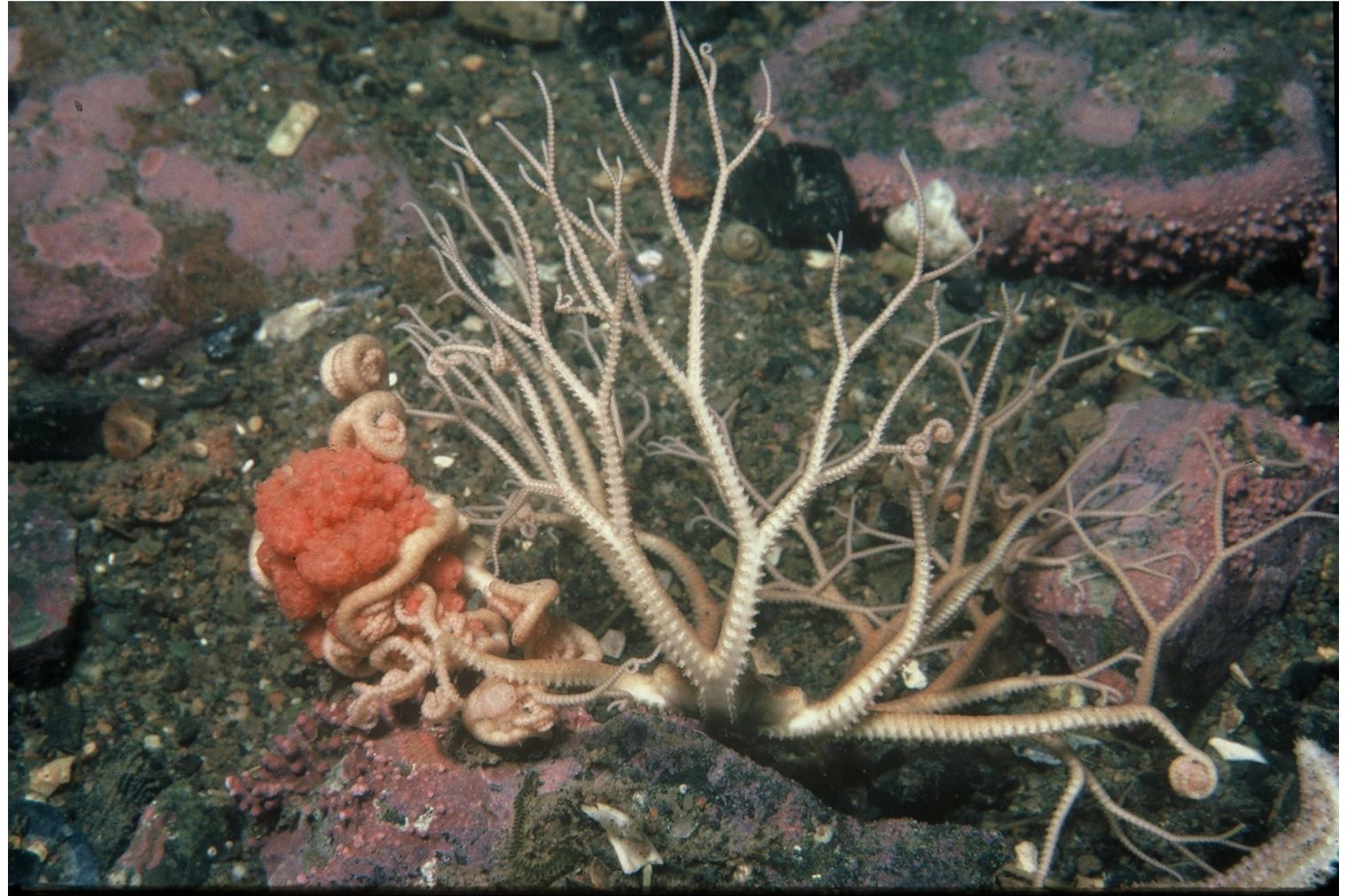
I have an urchin recruitment site in Eastport and also photograph nudibranchs and other invertebrates while diving there.

I always check the *Gersemia rubiformis* to see if I can photograph juvenile *Gorgonocephalus arcticus*.

Juvenile
basket star
on *Gersemia*



Adult
Gorgonocephalus
arcticus with
Gersemia



Instead,
there was
Tritonia
plebeia



Specimens
with egg
masses



Continued presence.



Tritonia plebeia was common for a couple of years and soft coral populations became sparse. It is still present in the Eastport region.



It is likely present further south on *Gersemia*, but at depths that most divers do not visit regularly.



T. plebeia can have significant impacts on its soft coral prey populations and there is no information on how it may be impacting *Gersemia* populations in deeper water.



Alex Shure, who found the second species will be looking for it this summer in Massachusetts Bay.

Two alternative hypotheses.

This represents a new and second introduction of *Tritonia plebeia* from Europe.

Instead, the members of the original introduction switched to *Gersemia* from *Alcyonium*, which is deeper and persisted and spread without being detected.

Tritonia plebeia is cryptic and not likely to be observed unless divers were looking for it or at least studying *Gersemia* populations. No such studies.

My bias – persisting and switching.



The second
introduction
– *Doris
pseudoargus*



Egg masses
and mating
Doris
pseudoargus

An example of Citizen Science

- In 2017, underwater photographer, Alex Shure, discovered a population of *Doris pseudoargus* on a rocky ledge, Paddock Rock, off Cape Ann, Massachusetts.
- There were a number of individuals and egg masses, which suggests the species had been present for some time.
- They were feeding on the sponge *Isodictya palmata* at a depth below 13m.
- In Europe, *Doris pseudoargus* is a generalist sponge predator with a wide geographical and depth distribution.

In Europe, they commonly feed on *Halichondria panicea*, which is also common in the Gulf of Maine



Present and spreading.

- In 2017, a likely specimen was reported from Nova Scotia with no ecological data available.
- Specimens have been observed at a number of sites in Massachusetts Bay and the Isles of Shoals.
- They have twice been collected intertidally from the north end of the Cape Cod Canal by Marine Biological Laboratory collectors more recently.
- There was no sign of them at Paddock Rock in 2016 and no reports before that.
- Since most early sightings were deeper, the timing for their introduction is unknown.

Implications

- Prior to the appearance of *Doris pseudoargus*, there was only one sponge eating nudibranch known from the Gulf of Maine, *Cadlina laevis*, and it is a specialist on *Halisarca* sp.
- *Doris pseudoargus* is both large and a generalist sponge predator introduced to a system with few sponge predators at shallower depths.
- Sponges were already dealing with competition from introduced colonial tunicates and climate change.
- This new sponge predator could have significant impacts on suspension feeding communities and awaits study.

Further considerations

- Both of these species appeared as substantial populations, which begs the question of when they were actually introduced.
- *Tritonia plebeia* was observed both times by scientists (Sebens and then Harris), but *Doris pseudoargus* was discovered by a recreational diver (Shure) who was interested enough to seek verification of his discovery.
- Even with increased awareness of invasive species, there is little effort or funding to actually study the ecology of invasive species, particularly in the marine environment.