SCAMIT Workshop

19-20 March 2012

Presentation by Beth Horvath, Research Associate, SBMNH

Taxonomic Issues for some of the California Bight's more "problematic" Gorgonian Genera

Pertinent Genus Name Changes/Issues for California species

- Many specimens identified as being in the genus *Clavularia* may well be in the genus *Anthothela*. This is still under study.
- The genus *Muricella* is being questioned.
- *Lophogorgia* was definitively synonymized with *Leptogorgia*; the latter is the correct genus.
- Status of *Eumuricea pusilla* still unknown.
- *Euplexaura marki* may actually be a valid species of Red Whip along our coast.
- Not all "Red Whips" are *Leptogorgia chilensis*!!

Pertinent Genus Name Changes/Issues Continued

- While the genus *Muricea* is certainly valid, the number of species in the genus is in question; the status of species present in CA waters is under study. (UPDATE: This survey is nearly complete; more information to be made available in the near future.)
- The genus *Psammogorgia* is now only valid for two species (not seen in CA); all other species in the genus are now determined to be in the genus *Swiftia*.
- *Placogorgia* may well be present in our area; we have some few records of its presence and we need more collection events to establish range.

Pertinent Genus Name Changes/Issues Continued

- The genus *Filigella* may not apply to species in our area. Those that might belong in that genus from CA are in the genus *Thesea*.
- The new species of *Leptogorgia* (*L. filicrispa*) I recently described is still an "unknown" in terms of abundance and distribution.
- A variety of genera are present in CA waters, at depth, from the Family Primnoidae: *Callogorgia, Parastenella, Plumarella, Primnoa* and *Narella.*
- Also true for the Family Isididae: *Acanella, Isidella, Keratoisis* and *Lepidisis*.
- The number of species in all is continuing to grow!!

A Case of Missing Types!

- Type for the CA *Muricella*: *M. complanata*, has not been located, presumed missing (was collected on an *Albatross* expedition, but . . .).
- Type for *Leptogorgia chilensis* is missing; Breedy and Guzmán could not locate it.
- Type for *Eumuricea pusilla*, housed at NMNH, is in deplorable condition—& the only specimens!
- Type for *Euplexaura marki* of questionable ID, based on coll. location; and unknown repository status!
- Type for local *Thesea* (*T. filiformis*) has unknown repository status.

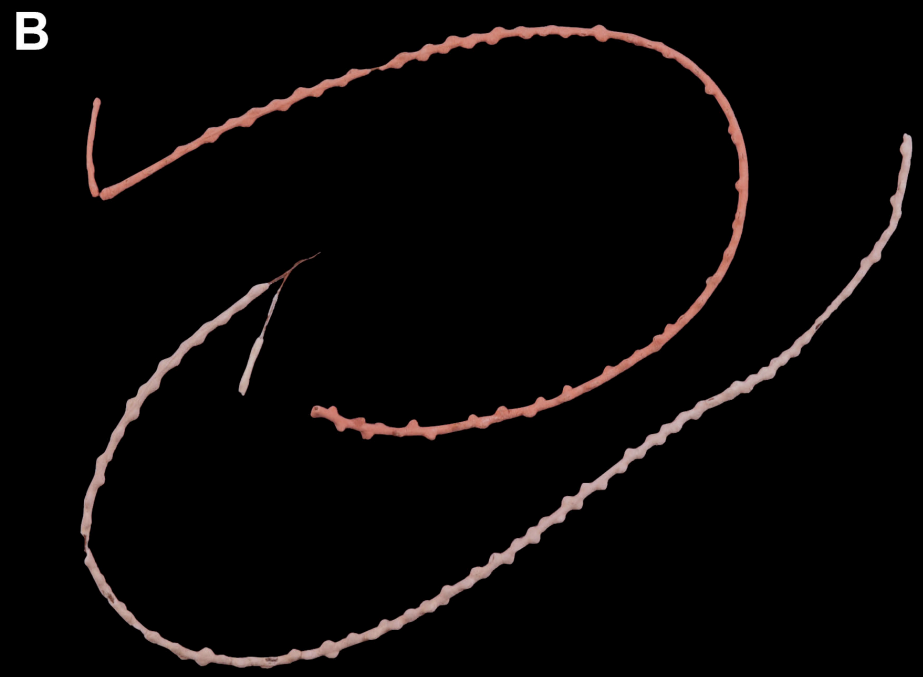
Questionable Types

- Types for *Muricea* species are accessible (NMNH and YPM), but their identification may be of some question. All types will need to be examined and compared to "known" forms in the comparison I am presently conducting.
- Types for some of the *Swiftia* species have erroneous data locality.

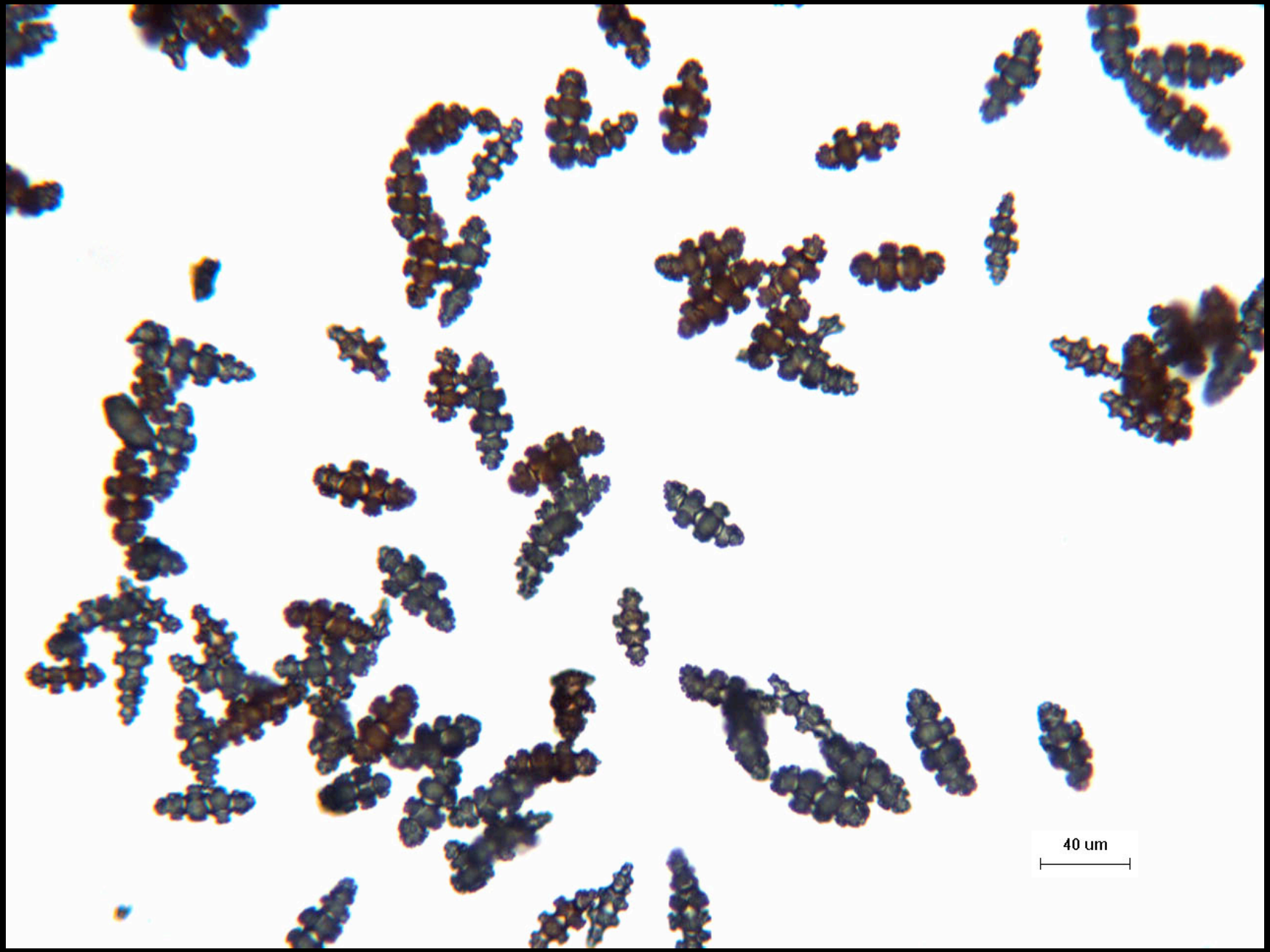
A Problematic Species

- To date, *Leptogorgia filicrispa* has not been seen in situ; there is no information on its abundance, geographic distribution, or extent of its presence in the CA Bight itself.
- Many more records of sighting are needed, along with more collection events, to develop a better understanding of this species and its ecological contributions to areas where found.
- Your help in locating this species in your local, So. CA collection events, is definitely needed.

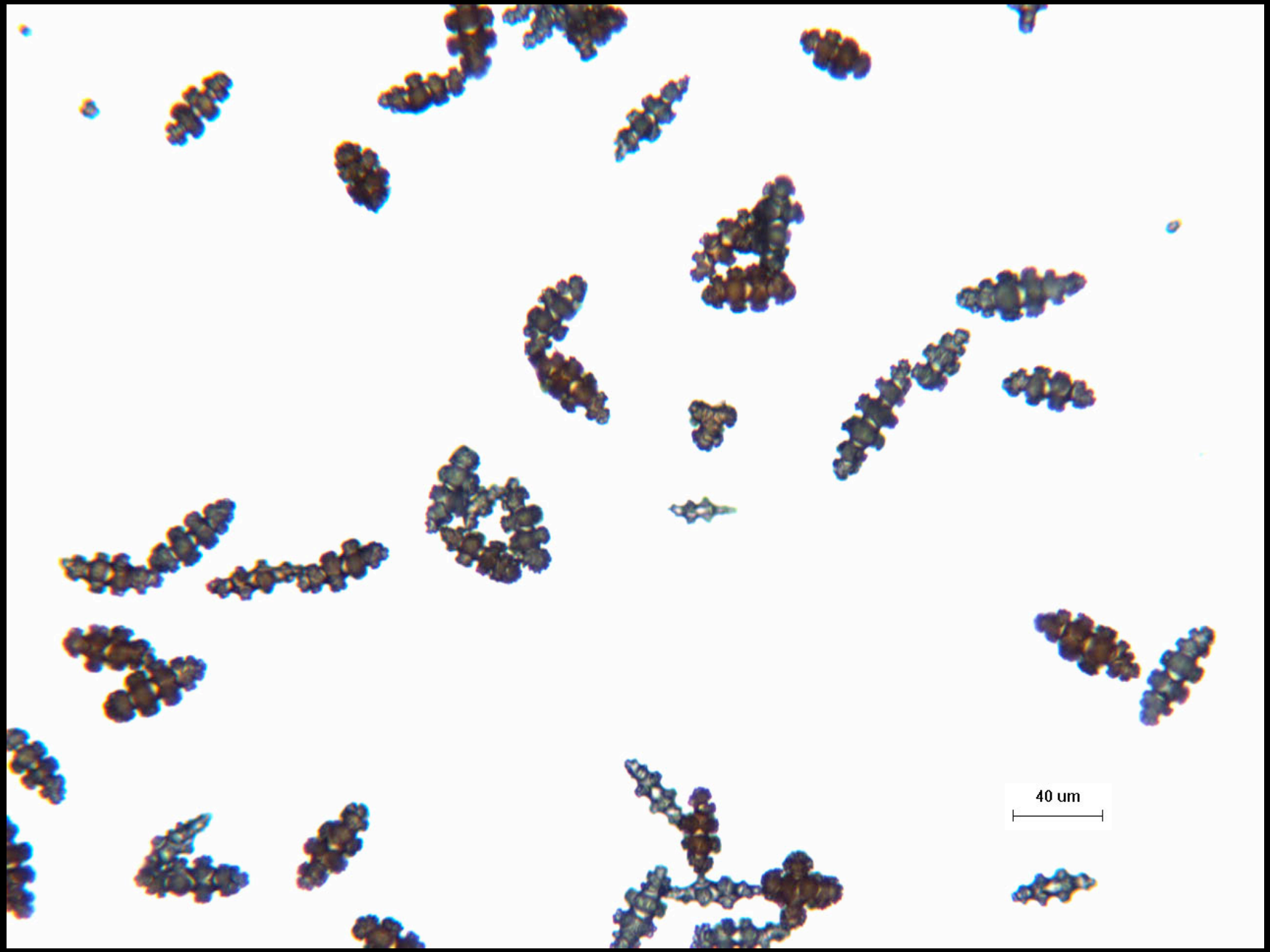
PBSW, Vol. 124:1, 08 April 2011, P.
Sadeghian, for E. Horvath



PBSW, Vol. 124: 1, 08 April 2011, P. Sadeghian, for E. Horvath



PBSW, Vol 124:1, 08 April 2011, E. Horvath



PBSW, Vol. 124:1, 08 April 2011, E. Horvath

Unusual living strategy

- What is at issue for *L. filicrispa*, and local species from the genus *Thesea*, is the un-characteristic life strategy: living free, as long thin strands, with no apparent attachment structure, on a soft, sandy bottom. We know this is true for species of *Thesea*, and based on an extremely similar overall colony form and appearance, would seem to be equally true for *L. filicrispa*.

Unusual characteristics

- Both genera, with species exhibiting this form, often consist of long strands with each end terminating in a pointed “arrowhead” shape. Thus, no apparent attachment base.
- The tangled nature of colonies in both genera examined may imply a preference for areas with a distinct bottom current. In the case of an *L. filicrispa* colony in the NMNH collection, the strands numbered in the 100s, and all were so tangled together as to form what looked like a large shredded-wheat biscuit!

What could account for this?

- I was initially struck by the overall appearance resembling a large “tumbleweed;” could a few strands (bearing a small attachment base, usually to a small rock) then provide a “seed” or “nucleus” for other strands to gather around? The gathering strands could be rolled together by a local, bi-directional bottom current, thus incorporating more and more thin strands together into a tumbleweed bush-like structure, without any attachment(?)

In Comparison to *Thesea*

- I have not seen any colonies of *Thesea* with strands tightly tangled and bundled, but all colonies in this genus seem to be composed of many strands loosely tangled together, and always on a flat, sandy bottom, and again, without any apparent attachment structure.
- This thin, thread-like form is unusual for a gorgonian.

An Atlantic Counterpart

- Bayer (1952) noted that *Leptogorgia stheno*, an Atlantic species, is normally unattached to any substrate.
- In point of fact, *L. filicrispa* (Pacific) and *L. stheno* (Atlantic) share so many characteristics in common that they appear to be "twin species."
- While the genus *Thesea* is decidedly different, particularly in terms of the sclerites, the *Thesea* species are indeed sharing similar colony form with the above-mentioned *Leptogorgia*.

An Environmental Factor?

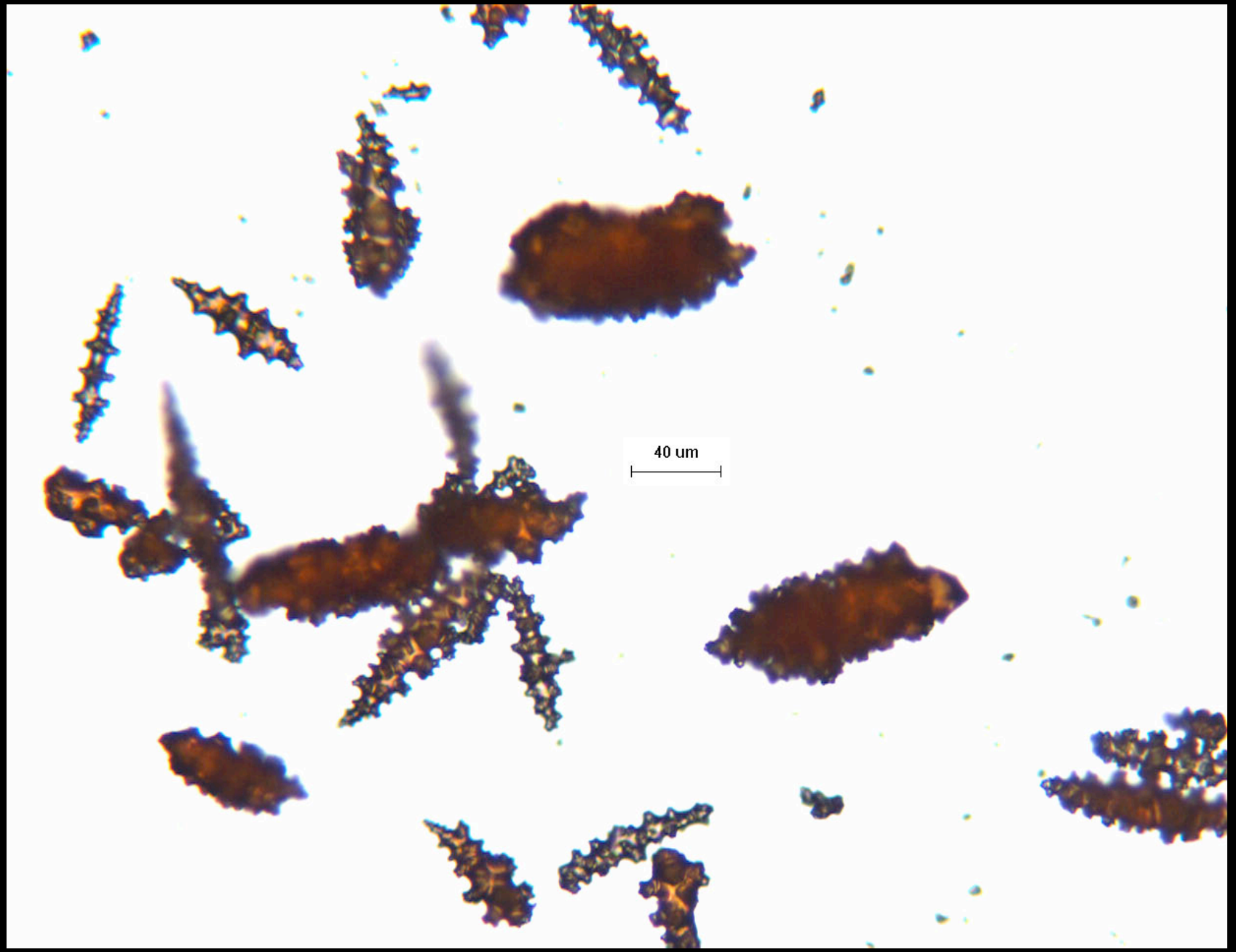
- That then leads us to the conclusion that *L. filicrispa, L. stheno* and all the species of *Thesea* share a common lifestyle.
- Questions then center around why they would prefer this strategy over the more typical, upright "fan," and what then are their preferred foods? What about all the sediment that may get stirred up? On that note: it has been reported that whip-like shape is common in colonies where water flow is turbulent, especially in circular basins (Grigg).

A New Discovery

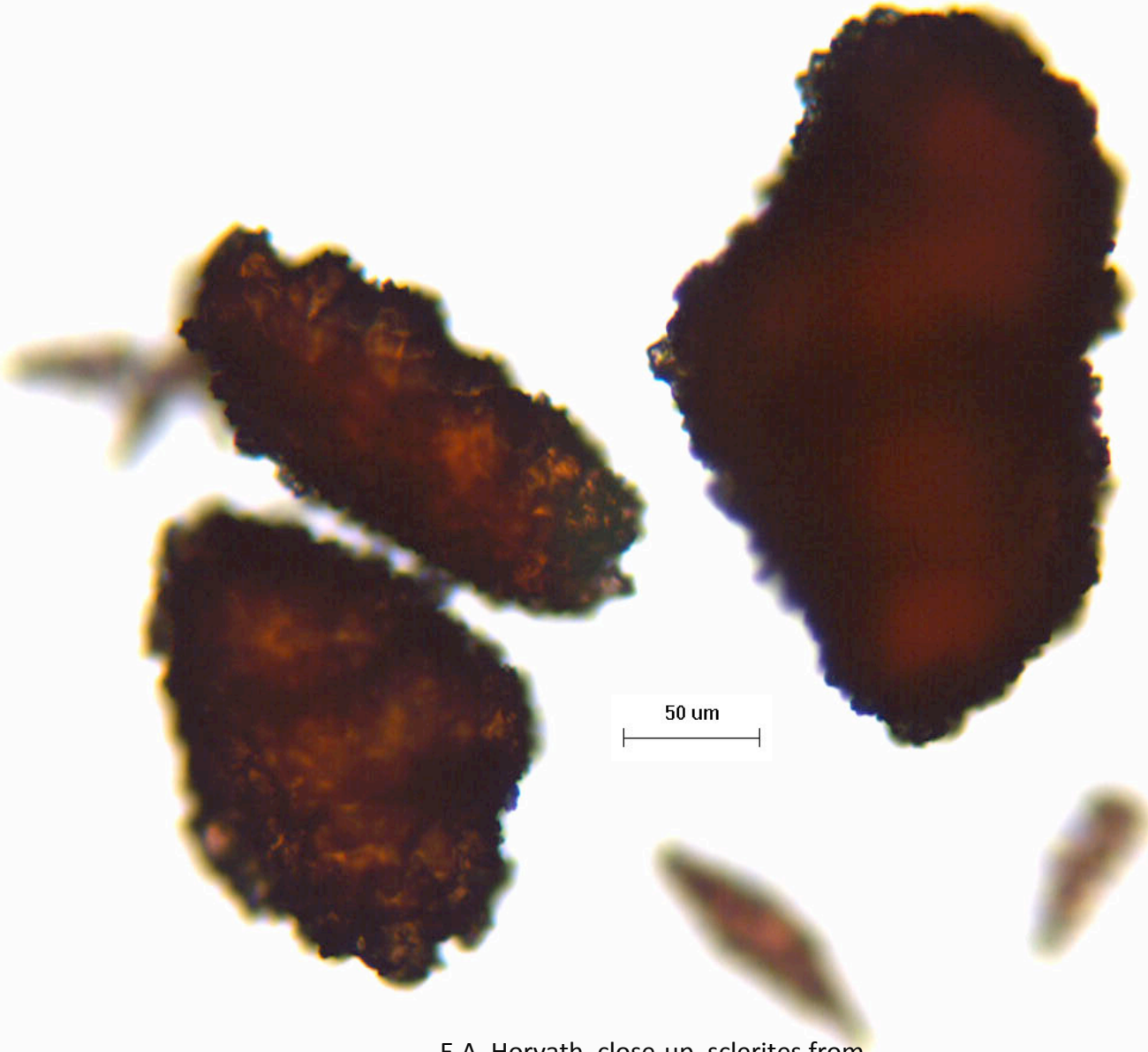
- John Ljubenkov provided me with two specimens that he had identified as, possibly, *Heterogorgia tortuosa* at our March workshop.
- I have examined these specimens. I am not certain these belong to the genus *Heterogorgia*, but appear to be instead from the genera *Eugorgia*/*Leptogorgia*!!
- A sclerite type that I found is virtually identical to a type seen in *Eugorgia daniana*.
- It is presumed that they exhibit the unusual, free-living habit (likely not attached to any substrate), with the long, thin-strand body form of *L. filicrispa* and *Thesea* spp.
- Further study will be done on these, and further updates will be reported in the near future.

On the ID of *Thesea* spp.

- Members of the genus do have a very characteristic sclerite type, referred to as "large spheroidal bodies." They may not always be abundant, but they are always present in a sclerite array.



E.A. Horvath, array from *Thesea*



E.A. Horvath, close-up, sclerites from
Thesea

E.A. Horvath, possible *Thesea* sclerite array

Photo: John Ljubenkov

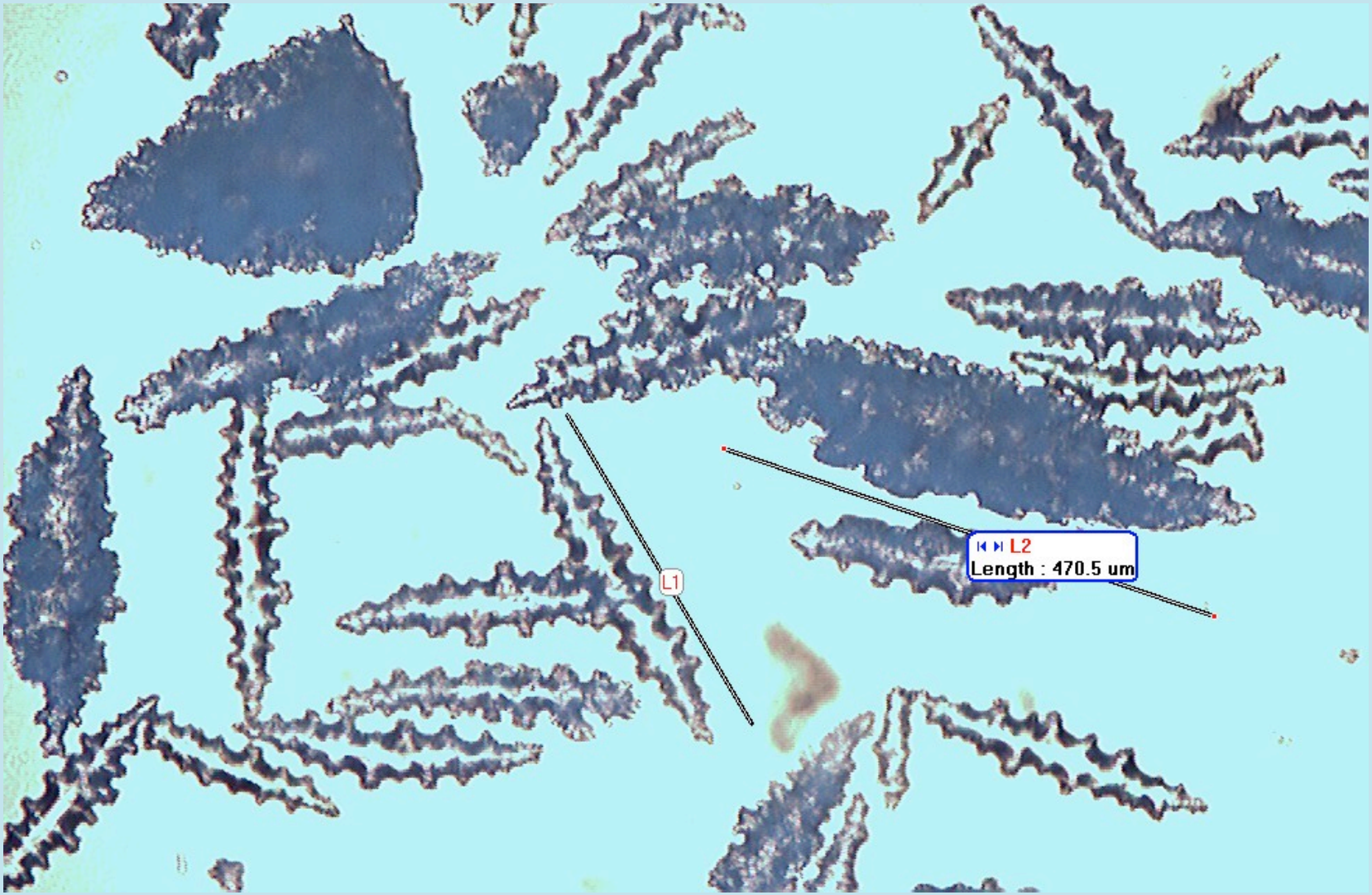


Photo: John Ljubenkov

Erroneous ID
Regarding genus *Heterogorgia*

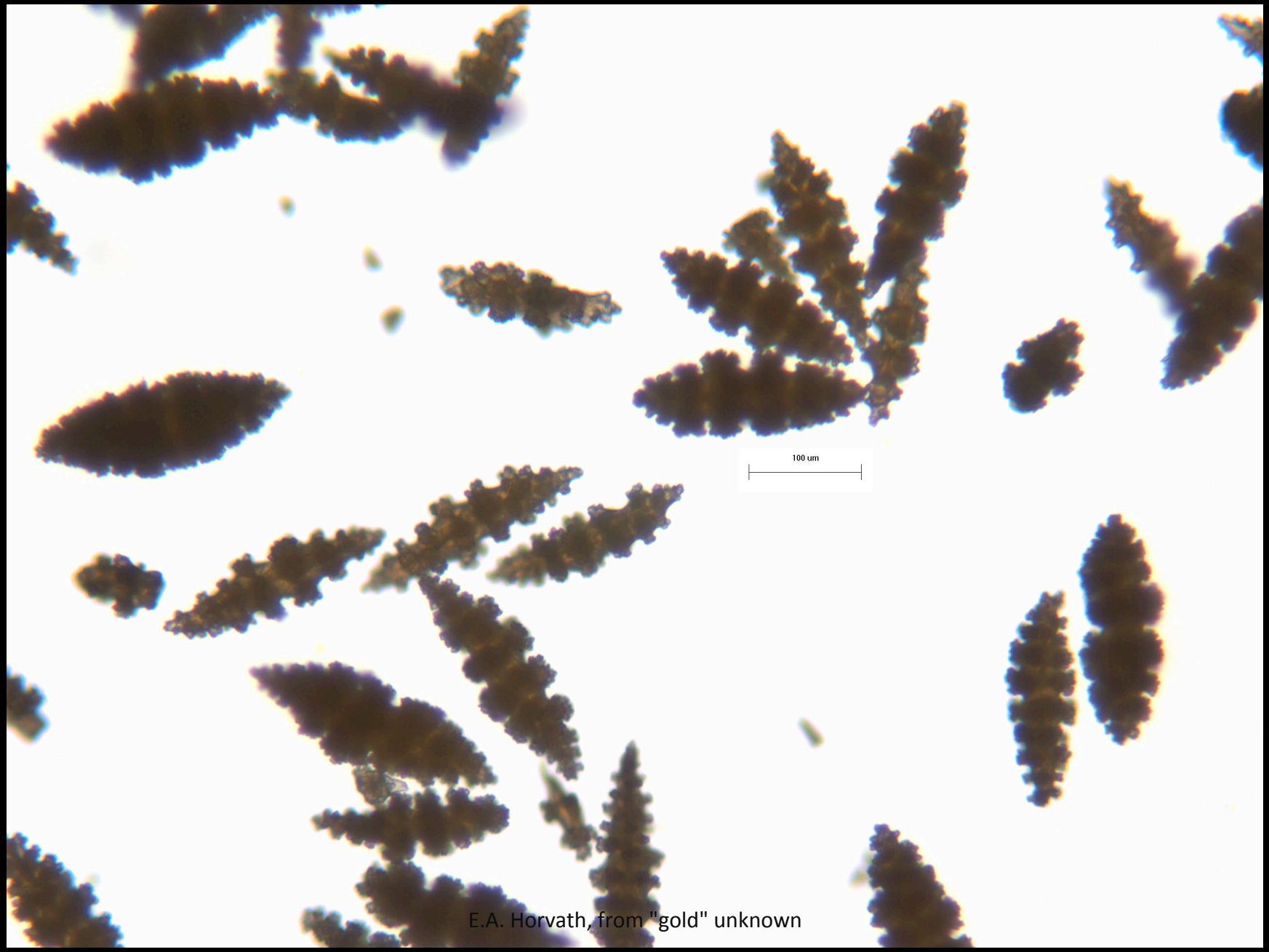
- I am not sure how this occurred, but Harden (1979) mistakenly identified species in the genus *Heterogorgia* as *Thesea*. However, species of *Heterogorgia*, from what I have seen:
- --have a small attachment base and stand erect off the bottom.
- --bear a distinct 8-lobed rim on the distal end of the calyx, with spinous rods projecting from the lobes forming a “bristling barricade” as described by Bayer (1981).

Heterogorgia Cont'd.

- --have some branching, although often not extensive, and the branches are of uniform diameter, slightly bent out into a broad curve, to ones being very crooked (species characteristic); branch diameter is broader than that seen in any *Thesea*. Branch tips blunt or obtuse, but not "arrowhead shaped."
- --are usually a shade of bright yellow.
- --have NO "spheroidal body" sclerites.

A new, unresolved situation

- The Museum has no more than a dozen specimens, bright yellow in color, that were, at first thought to be a species of Thesea, but there are NO spheroidal bodies.
- HOWEVER, the sclerites that are seen do NOT fit the characteristic forms that one should be seeing in *Heterogorgia* (the other genus I considered), as described in the recent review by Breedy and Guzmán on the *Heterogorgia*.



E.A. Horvath, from "gold" unknown

A Problematic "Group"
Red Whip Gorgonians

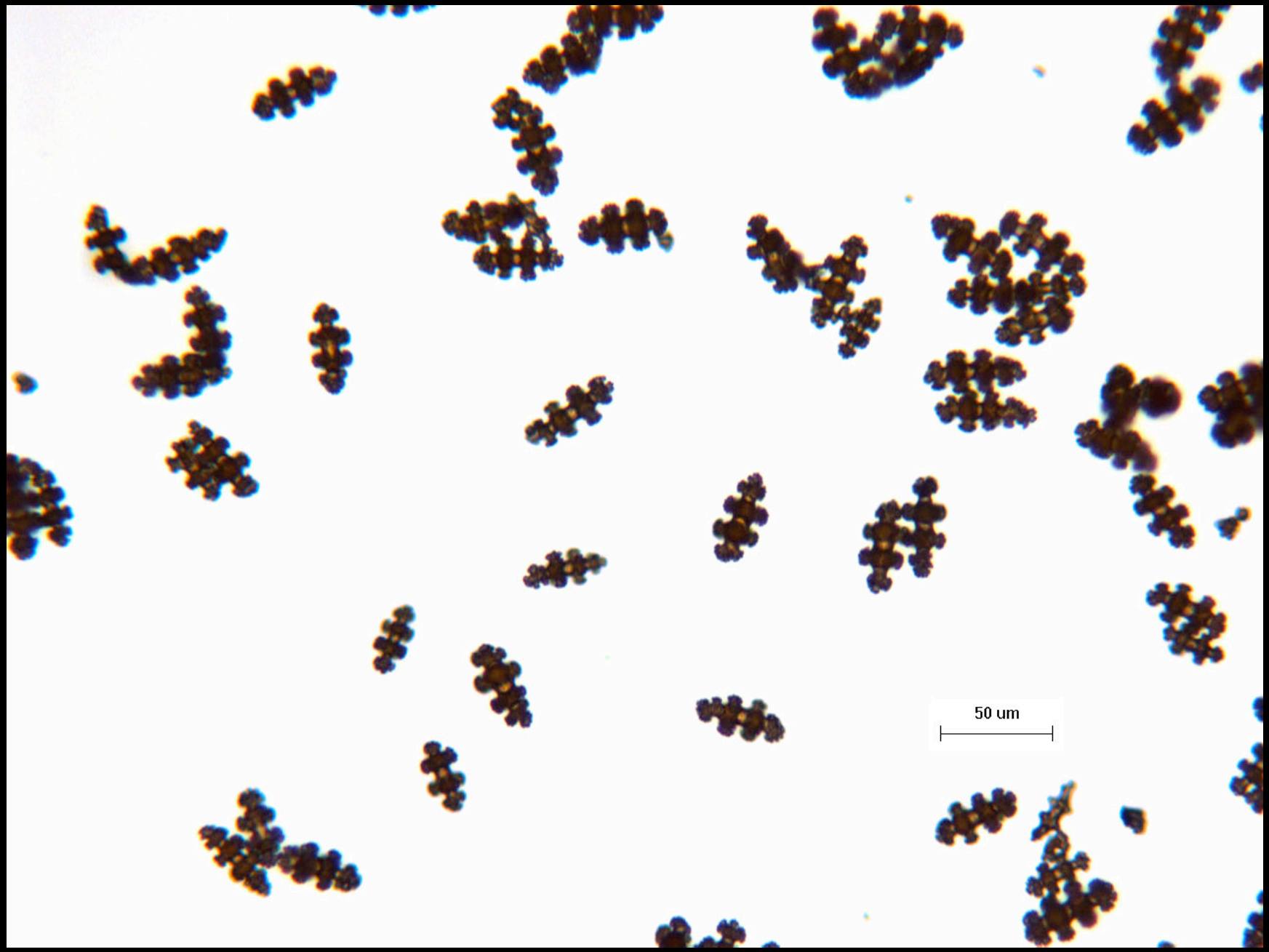
- While not an official taxonomic grouping, many gorgonian species are discussed together based on a colony appearance.
- Now—by "whip" gorgonian, I am referring to those with long, slender branch configurations AND little to no branching off of a primary stem. However, some that usually have multiple branch strands (ie: *Leptogorgia chilensis*), can be seen as colonies with very little branching.

The Red "Whips" Continued

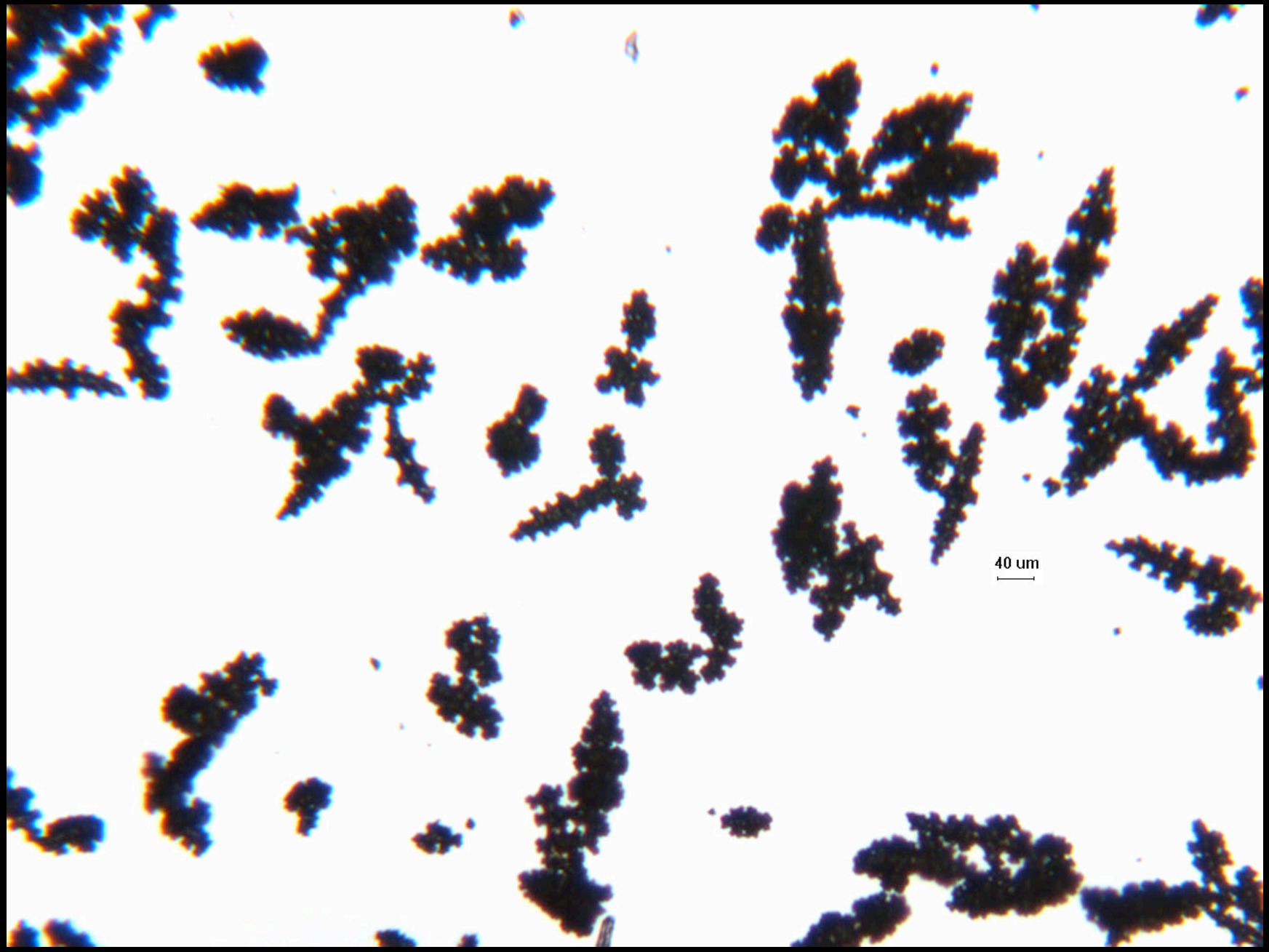
- Red whip gorgonians collectively, include the following genera and/or species:
- 1. *Leptogorgia chilensis* (minimal to moderate branching; common in southern end of Bight).
- 2. Members of the genus *Swiftia*, including, the species *Swiftia simplex* (minimal branching); southern/central CA.
- 3. The species known as the "Red Licorice Gorgonian" (MBARI), *Euplexaura marki*. This latter may well be a valid species, although not many researchers make mention of it these days. MBARI videographers have confused it with *S. simplex*, on occasion. Likely more common in northern end of Bight, and continuing on into coastal waters of northern CA, Oregon, WA, and Alaska(?)

PHOTO: MARY WICKSTEN--MOST LIKELY
Leptogorgia chilensis

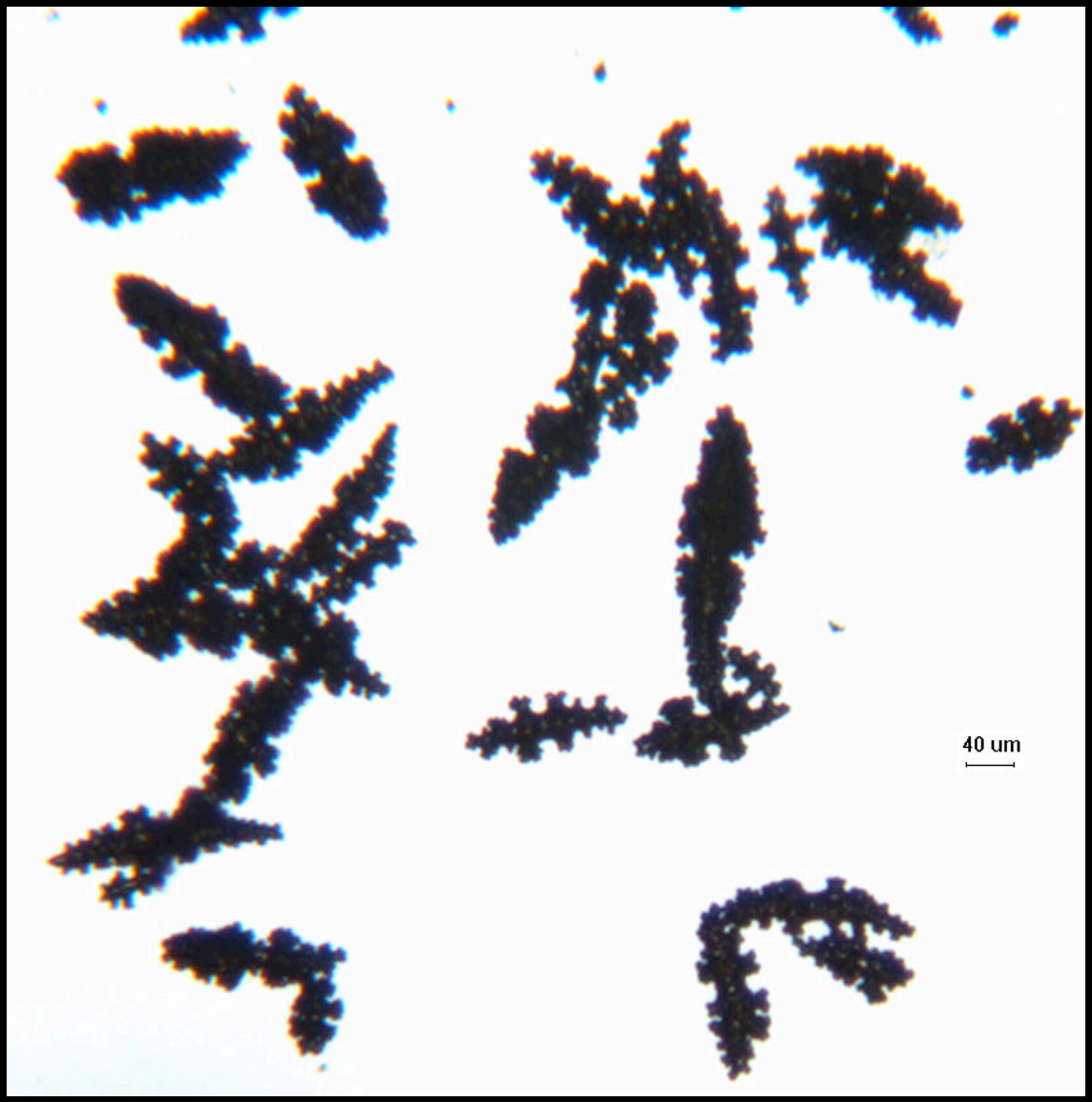
Photo: West Coast Groundfish Bottom Trawl Survey Program, NOAA Fisheries--
Possible *Euplexaura marki*



E. A. Horvath, array from *L. chilensis*



E.A. Horvath, array from *Euplexaura marki*



E.A. Horvath, array from *Euplexaura marki*

But . . .

- But here's a "kicker:" *Euplexaura marki* and *Swiftia spauldingi* may be the same species!
- Both have the characteristic sclerites that I have pointed out, both are bright red with white polyps, and both range from a multi-branched fan, to colonies with very little branching.
- To add further confusion, *E. marki* is described as having white, OR pale, bright yellow polyps.

And then there is . . .

- *Swiftia simplex*, which has the same basic coenenchyme color (although to my mind, it is far more in the range of a dull "brick-red/ pink") AND the polyps are the SAME color as the coenenchyme, and of course, the sclerites are VERY different!
- Check out the following—without a look at the actual sclerites, how could you actually know what they are?!

Photo: West Coast Groundfish Bottom Trawl Survey Program, NOAA Fisheries--Can you see any difference?

Photo: John Butler, NOAA--Note polyps and coenenchyme appear to be the same color; however, sclerites say something different!

Photo: West Coast Groundfish Bottom Trawl Survey Program, NOAA Fisheries

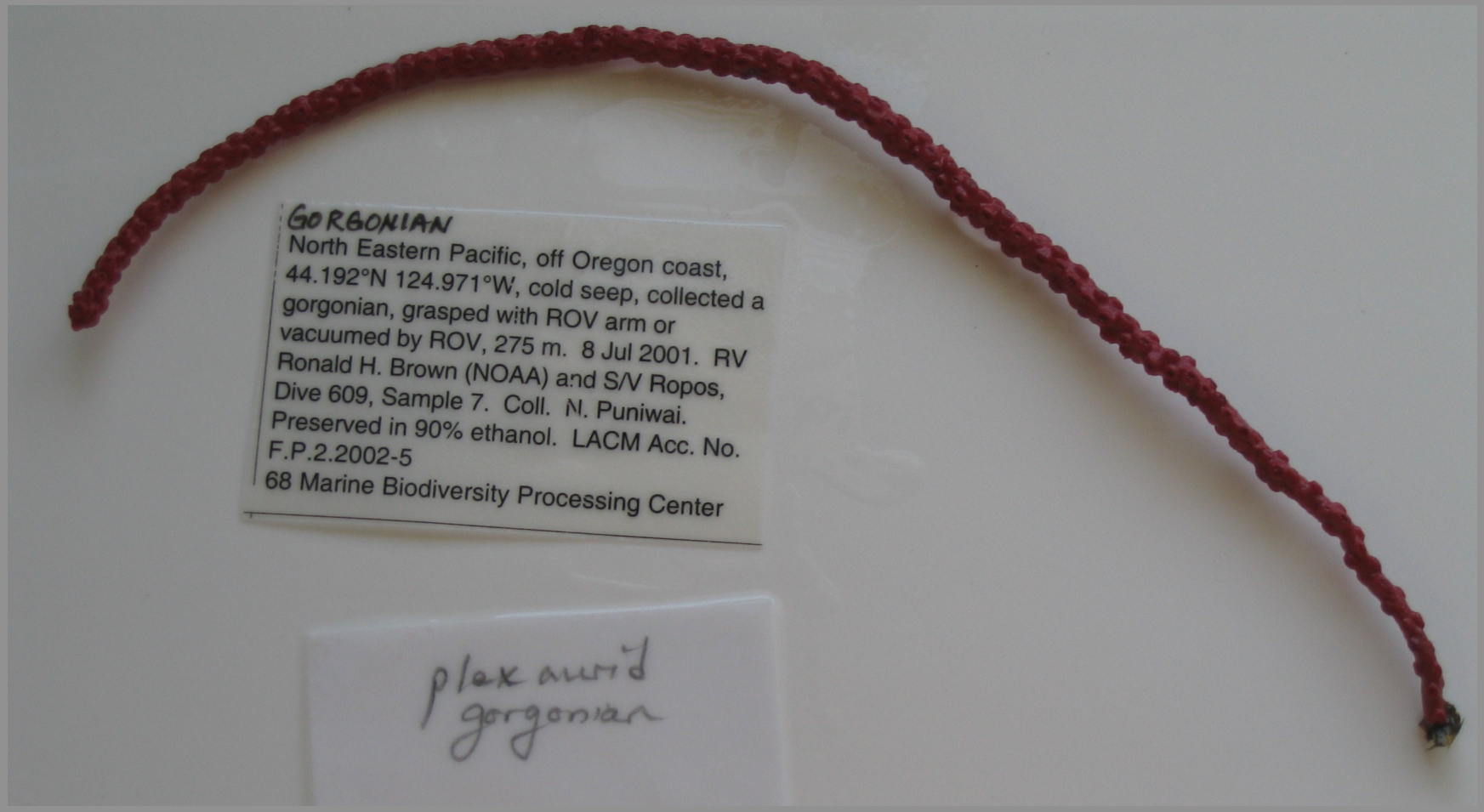


Photo: West Coast Groundfish Bottom Trawl Survey Program, NOAA fisheries

Photo: West Coast Groundfish Bottom Trawl Survey Program, NOAA Fisheries

E.A. Horvath, array from *Swiftia simplex*

And then there are the CA *Muricea*

- It has been presumed that there are generally two common species, *Muricea californica* and *Muricea fruticosa* in southern CA waters. The former is commonly identified as having yellow polyps and the latter, white polyps.
- Based on examinations of sclerites (a project still in process: UPDATE—nearly completed), the sclerites from *M. californica* are typically smaller in size, and bear more torch-like spines and spiny processes ("teeth").

CA *Muricea* Continued

- The sclerites of *M. fruticosa* are larger, and while there are some projections, seem to be, overall, “rounder” and more robust.

But what about this?!

- Anecdotal comments, from several unknown sources, stating that sometimes a single *Muricea* colony will have polyps of both colors?
- Has anyone seen this? Is there documented instances of this occurring?
- New discovery from recent survey: It would appear that *M. californica* can have polyp colors that range from a bright gold to pale yellow to cream to white! *M. fruticosa* always has white polyps.

Photo: Mary Wicksten

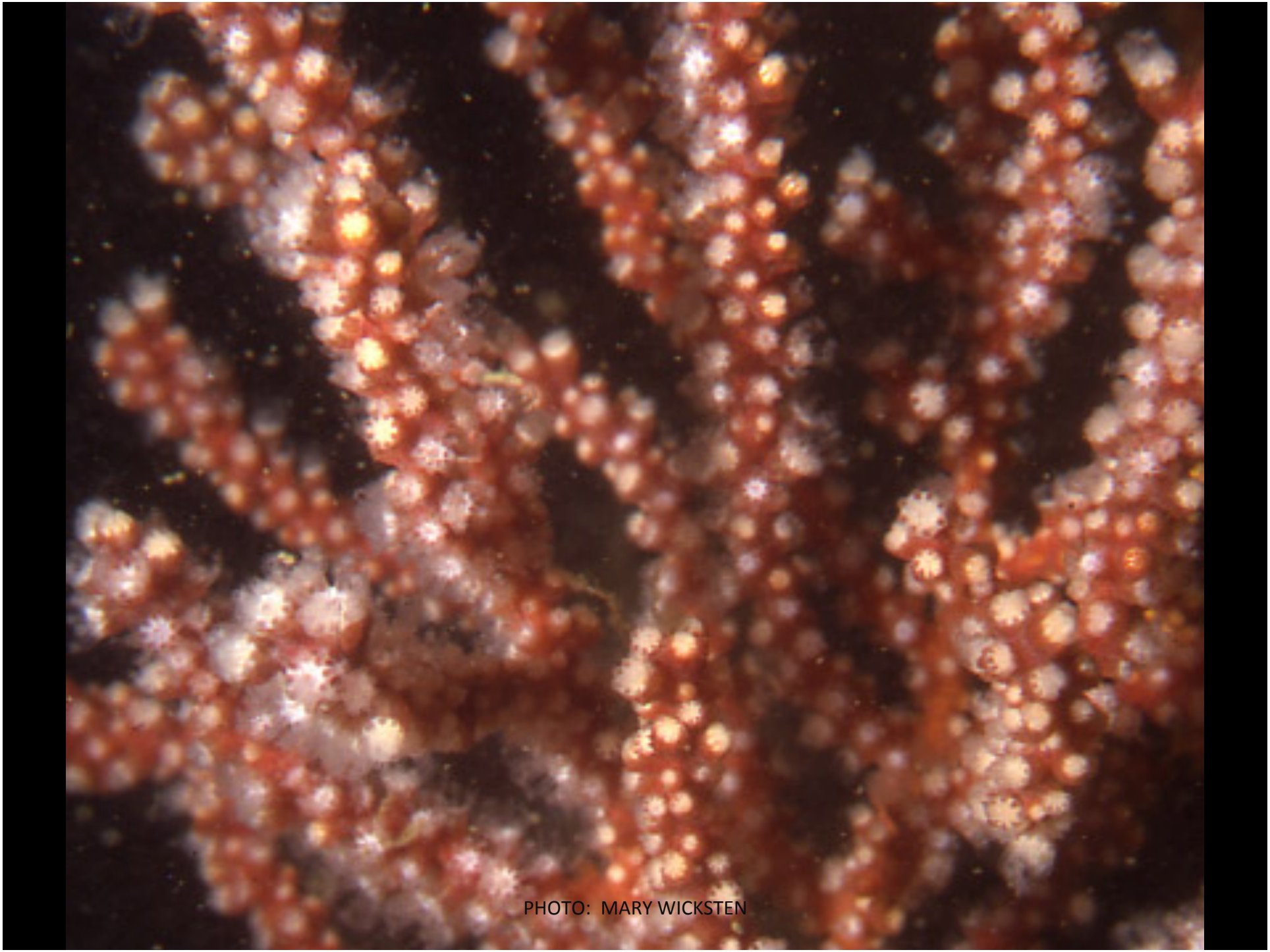


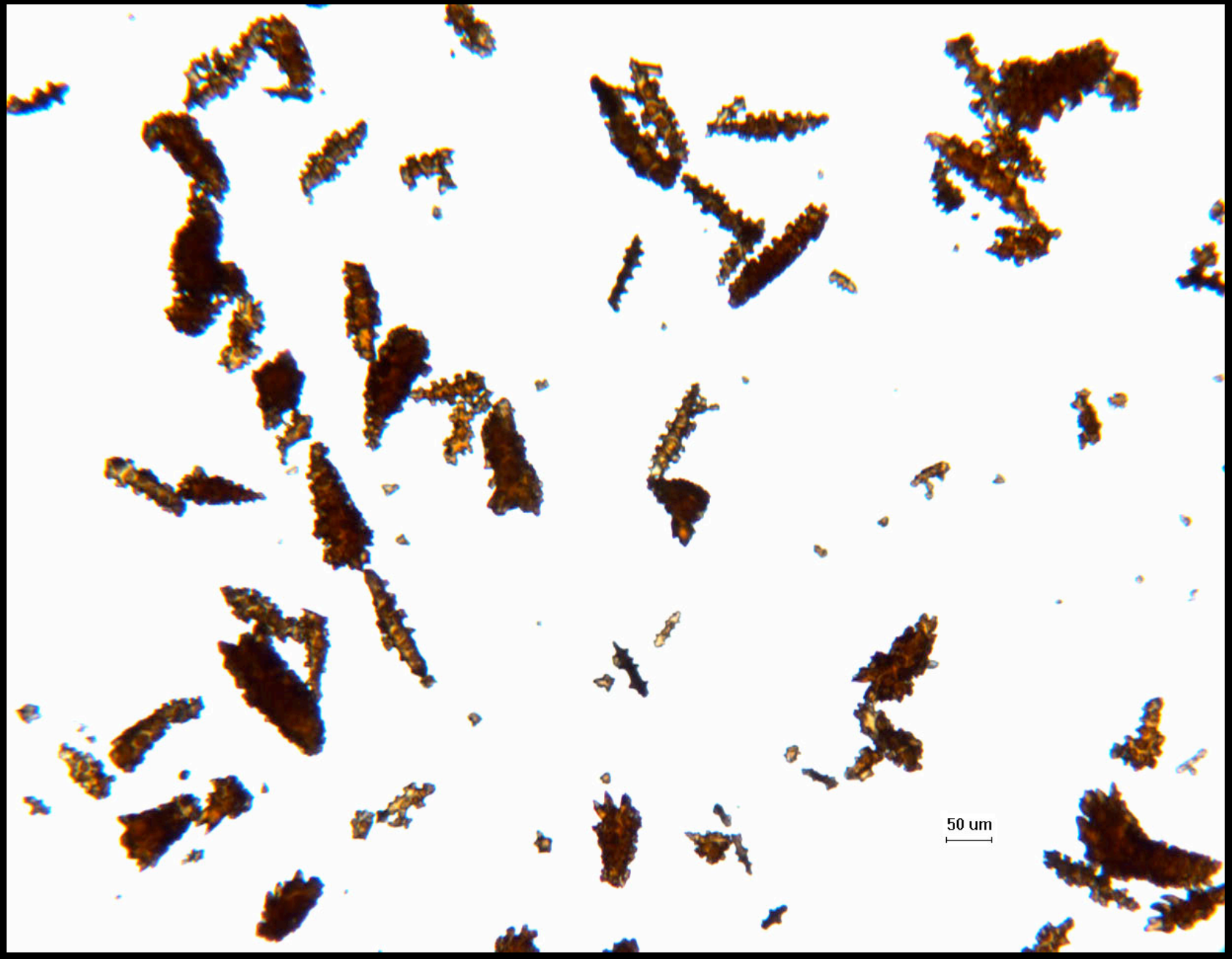
PHOTO: MARY WICKSTEN

Additionally . . .

- An apparent synonymy was proposed as existing between *M. californica* and *Muricea appressa*.
- Also—an argument that *M. californica* should be called *M. appressa* because the latter name was proposed by Verrill (1864) and it was only in 1931 that the name *M. californica* was proposed by Aurivillius.
- As well—Harden (1969) commented that he thought sclerites he examined, comparing them to descriptions found in the literature for various species, showed a "correspondence between the

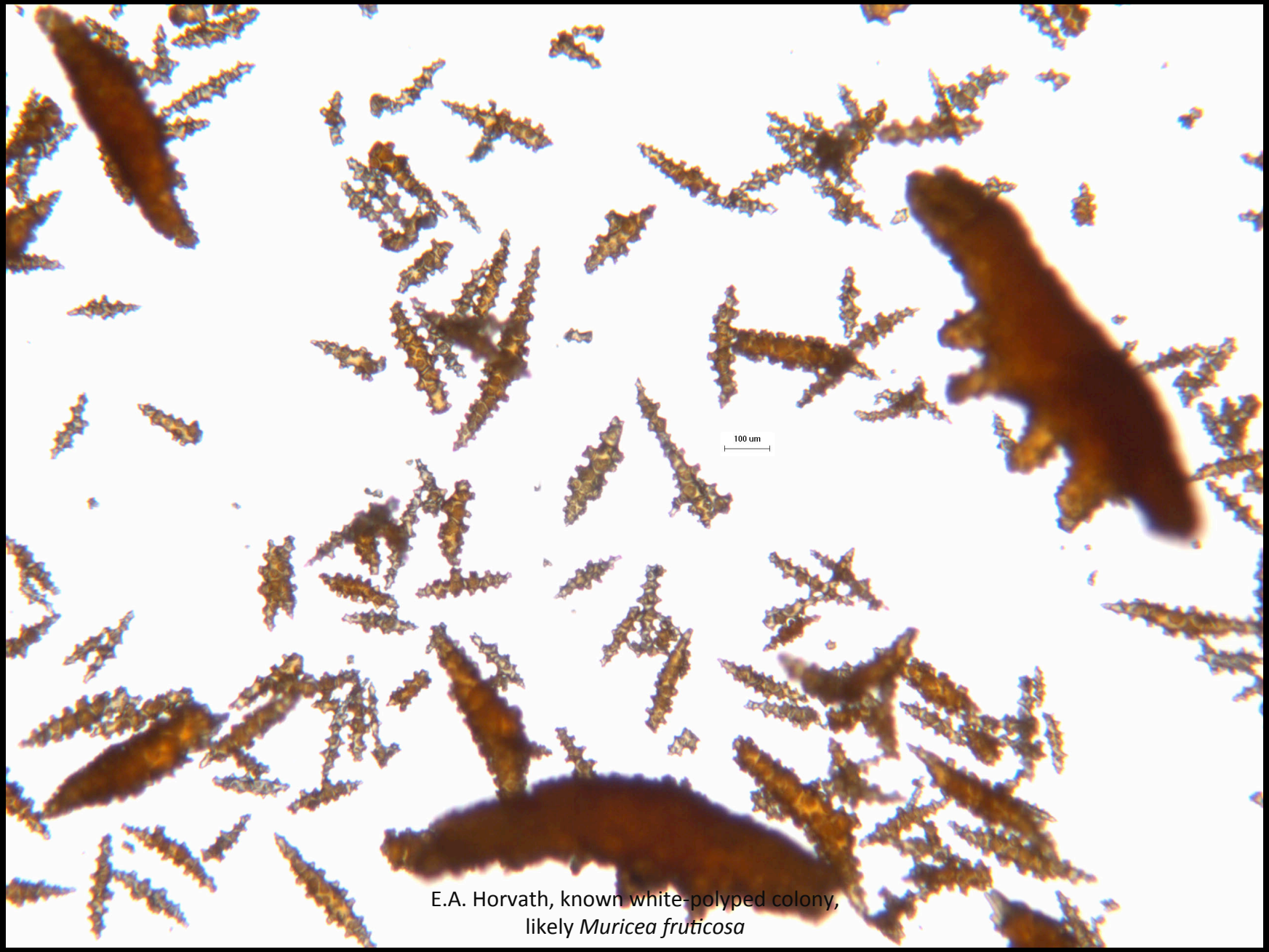
Muricea Cont'd: Additionally

- yellow polyp colonies" (he examined) "and *M. appressa* (Verrill, 1864) and *M. nariformis* Aurivillius (1931); and a correspondence between the white polyp colonies" (he examined) "and *M. fruticosa* (Verrill, 1868) and *M. californica* Aurivillius (1931)." Note the latter: by sclerite form, *M. fruticosa* and *M. californica* (at least some colonies) have sclerites that group them together with "white polyp colonies," according to Harden. Current survey being completed indicates that white polyp-bearing colonies could be **either** *M. fruticosa* or *M. californica*—sclerites, along with calyx shape and orientation, will distinguish one species from the other.



E.A. Horvath, array from likely *M. californica* specimen

E.A. Horvath, known *M. californica* specimen



E.A. Horvath, known white-polyped colony,
likely *Muricea fruticosa*

E.A. Horvath, possible *M. fruticosa*

A Word to the Wise

- We know that colony form (planar or bushy), diameter of branches, color of polyps, calyx size and form, etc. can vary as a result of gorgonian colonies responding to environmental conditions, such as changes in current flow, temperature, sediment presence, etc.
- And yes—while the actual sclerites are somewhat "protected" by the coenenchyme, they too are somewhat "plastic" in response to environment. Still, they are the BEST means to identification!

What is Needed!

- More samples, in all of the problematic genera and species, WITH clear and detailed records of collecting location, in situ context (one entire colony vs. more than one, etc.), along with accurate notation of live polyp color.
- These samples should come from areas where they are well-known, and also from areas not extensively looked at or collected from before.
- And where the h . . . are the original (but missing) types!

What is Needed, Cont'd:

- "On the spot" records of polyp color immediately upon collection.
- Storage preferably frozen, or in 70% ETOH.
- Good slide prep arrays, with focus on all "odd" or unusual sclerite forms, but certainly, one should always get the diversity of sclerite forms in the arrays. Note/record sizes of sclerites.
- Good digital photos of the overall array and specific sclerite forms.

Key Element in Identification: The Sclerite Prep

- Materials:
- --Three small bottles, one each of Chlorox Bleach, Tap Water, and 70% ETOH
- --Pipette for each bottle
- --Deep-well Depression Slide
- --“Wash Jar”
- --Small coenenchyme sample from specimen in question.

The Sclerite Prep Process

- 1. Small sample into deep-well depression.
- 2. Enough drops of bleach to completely cover; if wet sample, will not take long to dissolve. If dry, will take much longer and will generate lots of bubbles/foam. This can be pipetted off, and a new round of bleach added to the well.
- 3. Eventually, once you have sufficient sclerites accumulating in the bottom of the well, pipet off as much of the bleach as is possible.

Sclerite Prep Process, Cont'd.

- 4. Now—pipet in enough water to completely cover sclerites; swirl by working the depression slide to fully "wash" sclerites.
- 5. Pipet off water; add another "bath" of water and let sit for a few minutes.
- 6. Swirl and pipet off water again. Can do a third water wash, if you are wanting to make certain that all bleach is removed.
- 7. Now—pipet off as much of the water as possible.

Sclerite Prep Process, Cont'd.

- 8. Now—pipet in ETOH to completely cover sclerites; swirl to "wash" as above.
- 9. Pipet off the ETOH, and then add another "bath" of ETOH; let sit for a few minutes. Then swirl, and pipet off.
- 10. Do a third "wash" of ETOH; let sit for a few minutes. Then—
- 11. Pipet up both ETOH and the sclerites, and drop onto a clean microscope slide; you may need to pipet sclerite material and ETOH from depression well in several stages. Continue to drop on to the slide.
- 12. Now—tilt and turn the slide to get the ETOH bearing the sclerites to cover about two-thirds the length of the slide, and to make sure that sclerites spread evenly and don't clump. This will also insure a thin alcohol film on the slide.

Sclerite Prep Process, Cont'd.

- 13. Let the alcohol evaporate off; when dry, sclerites on the slides can then be carefully "brushed" (with a fine paint brush and a steady hand) so as to more evenly distribute the sclerites.
- Notice! NO maceration of coenenchyme to help loosen up the sclerites from the tissue during the bleach dissolving process!!
- Notice! NO cover-slips; when these are applied they can break the sclerites, or at least, chip off some of the projections.

And finally . . .

- What do you think the following is? . . . .
- It was found at Point Lobos, Carmel Bay . . . (a bit far north on the coast for what it most generally looks like!) and is rather commonly seen . . .
- And at greater than "normal" depth!
- Could it really be *Eugorgia rubens*?!
- The folks at NMFS up in Santa Cruz, CA would like to know an identification, with certainty.

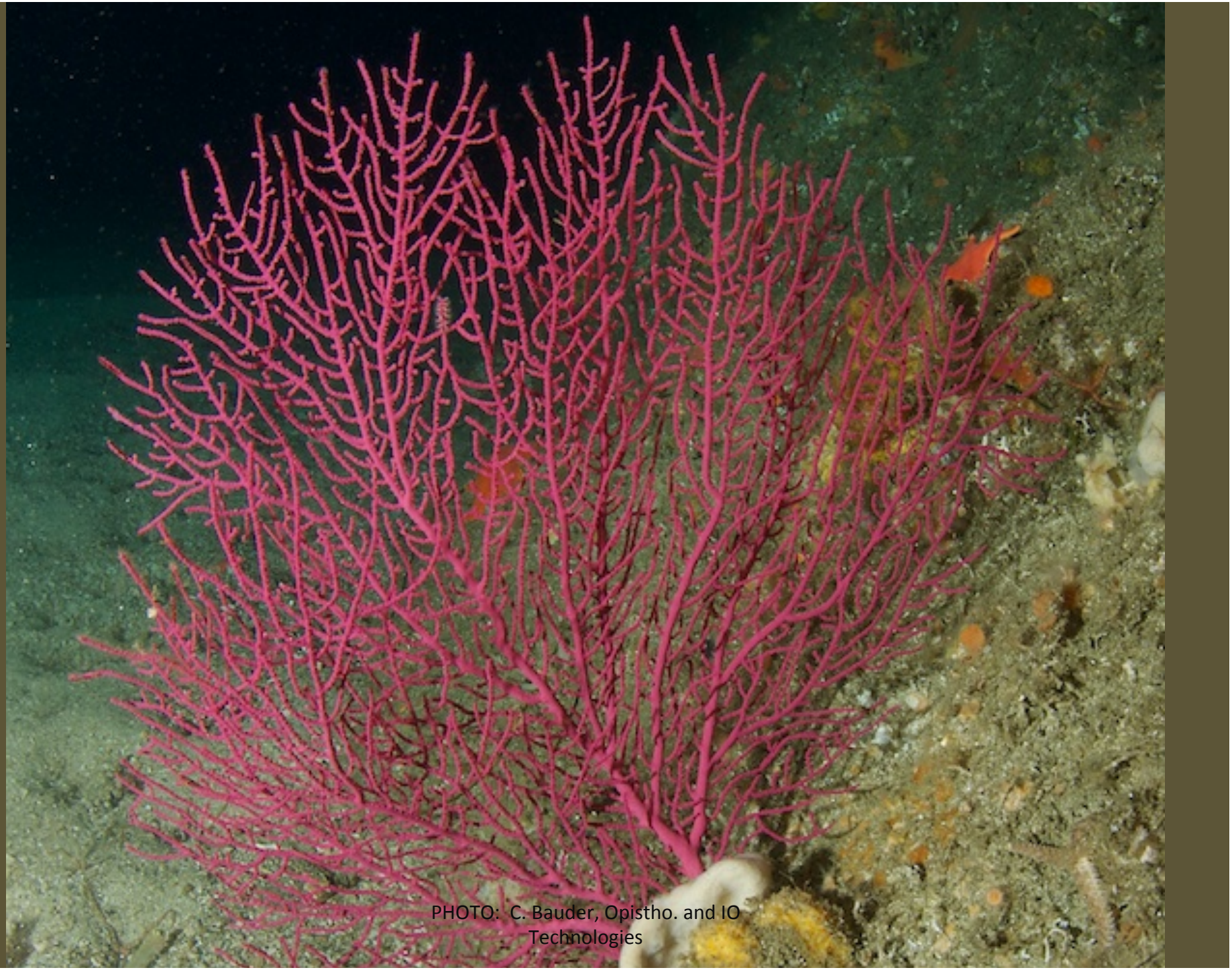


PHOTO: C. Bauder, Opistho. and IO Technologies

And thus . . .

- Welcome to the “end” of this round of the “telling of the CA gorgonian nightmare!”

Perhaps a drink is in order!!