Field Notes on the Occlupanids of Santa Cruz County, California

by Karen Andrews August, 2016

Abstract: Four previously undescribed species of occlupanid are described and named (*Patulastoma palpataphoides, Porrectofrontus occlusolanum, Porrectofrontus microstoma*, and *Sphaeropanis formosus*). *Patulastoma palpataphoides* may belong to a previously undiscovered subfamily of Corrugatidae. New light is shed on the habits of *Cardioris cirrhosoma, Aspericardis lehmeri, Constricula rugosa,* and *Rugoris rotumanus*.

1. New Species, and Possible New Subfamily of Corrugatidae Discovered

On a scientific expedition on August 9, 2016, an exciting new species of occlupanid was discovered at Hernandez Market in Santa Cruz, CA, clinging to mesh bags of "Gallitos Kidz Ice Pops."



Occlupanid discovered Aug. 9, 2016



Bag of "Gallitos Kidz Ice Pops" with occlupanid attached

At first blush, it was assumed that this specimen was a new species of the family Tridentidae, as the specimen has three dential processes within the oral groove, which is the stated distinguishing characteristic of the family. However, all of the Tridentids have a central dential process that is rectangular or "squared off," similar to the dential process of a Haplognathid; whereas this specimen has a pointed central dential process, roughly shaped like an isosceles triangle that curves at the base. Additionally, the right and left dential processes of all Tridentids are each roughly shaped like irregular trapezoids, with the shorter leg on the top and the longer leg on the bottom; whereas this specimen has right and left dential processes shaped exactly like its central dential process -- like an isosceles triangle that curves at the base. These differences led to doubt that this specimen represents a species in the family Tridentidae.

Oral Grooves of Tridentids



Admordorsum grongingensis



Dinonexus brutus



Paximadia prehendus



Captospinula liptoni



Scalpriscapula mustafa

The family that displays dentition most similar to the newly discovered specimen is the Corrugatidae. Just like this specimen, all of the Corrugatids have three dential processes, and those dential processes are all roughly triangular, and curve towards the base. Examination of the structure of dentition leads to the conclusion that this new specimen is a member of the family Corrugatidae.

Oral Grooves of Corrugatids



Collatus mysteriosa



Constrictula rugosa



Rugoris imparidecussatus



Rugoris rotumanus

However, the official description of the family Corrugatidae is "three wavy indentations is a constricted oral groove." The new specimen does indeed have "three wavy indentations," but has a far less constricted oral groove than any of the Corrugatids that have been identified previously.



Measurements of new specimen of occlupanid

The most relevant measurement in comparing constriction of the oral groove is the distance between the tips of the right and left dential processes. The distance between the tips of the right and left dential processes measures 1.0 mm for *Constrictula rugosa, Genevertonicus quimbyi,* and *Rugoris rotumanus,* the three species of Corrugatidae available to this researcher. By contrast, this measurement is 4 mm for the new specimen – four times wider than any of the measured species of Corrugatidae. For context, *Palpatophora utiliformis,* the most common variety of occlupanid, usually measures 5.5 mm between the tips of the right and left dential processes. So the new specimen has an oral groove that is much less constricted than any other Corrugatid discovered to date, and is, in fact, nearly as wide as most occlupanids.

The evidence seems to point to the conclusion that this new specimen is a member of a previously undiscovered subfamily of Corrugatidae, a subfamily that is characterized by three triangular dential processes in an open, unconstricted oral groove.

I propose calling this new species *Patulastoma palpatophoides*, or "Open mouth, like the *Palpatophors*," because the species has an open, unconstricted oral groove, and because its external morphology matches that of several species of *Palpatophor*.

2. Porrectofrontus sp.

Santa Cruz is the site of greater diversity within the genus *Porrectofrontus* than has previously been documented by the Holotypic Occlupanid Research Group (HORG). Three specimens are shown below.



Porrectofrontus specimens collected in Santa Cruz county. Photo by author.

Specimen A (which was found on the floor of this researcher's mother's kitchen), is clearly an example of *P. mechadeus*.



P. mechadeus, photo by HORG



Santa Cruz Porrectofrontus specimen A

The external morphology is identical to the specimen pictured by HORG, and the size and shape of the oral groove are identical.

However, specimens B and C, though having identical external morphology as *P. mechadeus* (33mm by 25mm), both have a noticably smaller oral groove, as diagramed below.



Specimen A (*P. mechadeus*)





Specimen B

Specimen C

Measurement	Specimen A	Specimen B	Specimen C	
Apex of Oral Groove to Tips of Oral Hooks	10.5 mm	8.0 mm	5.5 mm	
Between Tips of Dential Processes	7.0 mm	6.5 mm	6.0 mm	
Between Bases of Dential Processes	9.5 mm	8.5 mm	8.0 mm	

Table 1: Summary of Oral Groove Measurements for Porrectofrontus Specimens

It is clear that in occlupanids, differences in the measurement from the apex of the oral groove to the tips of the oral hooks is indicative of species differentiation. Pairs of species of occlupanid whose morphology differs only in the size of the oral groove include *Cardioris amplifolium* and *C. cirrhosoma*, *Cyrtogergum albus* and *C. viridis, Ortholongus belluscriptorum* and *O. minornotatus*, and *Admordorsum aotearoa* and *A. groningensis*, among others. Therefore, specimens B and C are most likely representatives of heretofore undescribed species of occlupanids.

This researcher is not the first occlupanologist to collect and document these species. The occlupanologist who goes by the *nom de plume* "Creativitches" posted a photo on May 28, 2015, a portion of which is shown below, that clearly shows a green specimen with similar dimensions to specimen B, and red and white specimens with similar dimensions to specimen C. Creativitches stated, "You will note from the photographs below that five specimens (three species: two with two color morphs each) still lack conclusive identification. I will be writing soon to the Holotypic Occlupanid Research Group soon to request some clarification and to potentially provide new species descriptions." (The third species referenced in this quote has since been described and given the name *Quadratopalpus ilex*.) As Creativitches has not yet formally described these species of *Porrectofrontus*, I believe it is now time to do so.



Segment of photograph by Creativitches, found at https://creativitches.wordpress.com/2015/05/28/improved-occlupanid-curation-system/

I would like to suggest that specimen B, with a measurement of 8.0 mm from the apex of the oral groove to the tips of the oral hooks, be named *Porrectofrontus occlusolanum* (stretched front, closing potato), because the specimen of this species was collected from a bag of organic potatoes.



Specimen B (*Porrectofrontus occlusolanum*) on the bag of potatoes from which it was collected.

I would also like to propose that specimen C, with a measurement of 5.5 mm from the apex of the oral groove to the tips of the oral hooks, be named *Porrectofrontus microstoma* (stretched front, small mouth), descriptive of its relatively small oral groove. (Thanks are due to Ben, this researcher's generous neighbor, who has donated three specimens of this species for scientific study.)

3. Sphaeropanis specimen

This researcher was excited and surprized to discover a beautiful specimen of what appeared at first glance to be *Sphaeropanis hollandium* in the junk drawer of her boyfriend's kitchen in an unincorporated area in Santa Cruz County, CA, USA, as previously this species has been observed only in Holland, South Africa, and Botswana. However, after further examination of the dimensions of the oral groove, the research team finally concluded that this specimen is another, previously undescribed species of the genus *Sphaeropanis*.



Sphaeropanis specimen discovered in Santa Cruz county, CA



S. hollandium as pictured by HORG

As with the *Porrectofrontus* species described above, this new specimen of *Sphaeropanis* has identical external morphology to *S. hollandium* (22 mm by 26 mm). However, the size and proportions of the oral groove are noticably dissimilar. This researcher unfortunately was unable to closely examine a specimen of *S. hollandium* to take accurate measurements, so was forced to estimate the measurements of *S. hollandium* by magnifying and measuring the official HORG photo of the specimen in their collection.



Estimated measurements of S. hollandium on photo from HORG



Measurements of Sphaeropanis specimen from Santa Cruz county

Measurement	S. hollandium	Sphaeropanis	
	(estimated)	specimen	
Top Edge to Bottom Edge	22.0 mm	22.0 mm	
Apex of Oral Groove to Bottom Edge	12.0 mm	10.0 mm	
Apex of Oral Groove to Tips of Oral Hooks	7.5 mm	6.0 mm	
Between Tips of Left and Right Dential Processes	5.5 mm	6.0 mm	
Between Bases of Left and Right Dential Processes	7.5 mm	7.5 mm	

Table 2: Summary of Measurements for S. hollandium and Sphaeropanis Specimen

The widths of the oral grooves of these two specimens are approximately equal, as the measurement between the bases of the left and right dential processes is approximately 7.5 mm in both specimens. The relevant difference between the specimens is the depth of the oral groove, as represented by both the measurement from the apex of the oral groove to the tips of the oral hooks (*S. hollandium* is approximately 1.5 mm longer than the *Sphaeropanis* specimen) and the measurement from the apex of the occlupanid (*S. hollandium* is approximately 2.0 mm longer than the *Sphaeropanis* specimen). This difference of depth of the oral groove is significant enough to make it apparent that the specimen found in Santa Cruz is a representative of a previously undescribed species of *Sphaeropanis*.

I would like to name this new species *Sphaeropanis formosus* (sphere bread, finely shaped), because of the pleasing proportions of this unusually handsome occlupanid.

4. Speculations on Localized Variants of Cardioris cirrhosoma

Official HORG documents say of *C. cirrhosoma*, "Often found in orderly clusters in bulk bagged aisles. Though seen in other colors, is commonly bright orange." This statement lacks precision, but seems to imply that this species has been primarily observed in colonies in bulk bagged aisles, in which all or nearly all of the specimens inhabitting the colony are orange in color.

C. cirrhosoma has a thriving colony in Santa Cruz, CA. This colony exhibits radically different characteristics from those colonies described by HORG. The Santa Cruz colony is not in a bulk bagged aisle, but exists exclusively on bags of bread and buns. Additionally, every single specimen collected or observed in Santa Cruz to date is green.

The current state of research seems to indicate that *C. cirrhosoma* exists primarily in colonies containing only a single color variant, with single-color colonies of orange and green described (or implied) in the scientific literature. This is in stark contrast to most occlupanids that show variations in color. For example, *Palpatophora utiliformis*, the most common of occlupanids, is nearly always found in colonies containing from three to five different color variants, with specimens of all colors filling identical biological niches with approximately equal success.





Green *C. cirrhosoma* on bags of round bread with pink labels, and on bags of whole wheat bread with orange labels, at Staff of Life store in Santa Cruz, CA, August, 2016

C. cirrhosoma not only has primarily colonies of one color, but the current research supports the hypothesis that certain colors are found exclusively in certain habitats (i.e., orange *C. cirrhosoma* live in bulk bagged aisles), and other colors are found exclusively in other habitats (i.e., green *C. cirrhosoma* live on bags of bread and buns). Further research is required to test whether this hypothesis universally holds true. If so, this may indicate that divergent evolution is at work within this species, with each color variant coming to inhabit and be increasingly adapted to different niches in different habitats.

5. Aspericardis lehmeri

Previous research into the Occlupanid species, *Aspericardis lehmeri*, has documented only two individual members of the species. Official documents from HORG have requested occlupanologists to keep watch for this species. It is therefore worthy of note that this researcher, in June of 2016, discovered a thriving colony of *A. lehmeri* in the citrus of the produce section of the Trader Joes in Santa Cruz, CA. There were many dozens of individuals, which were involved in symbiotic relationships with a variety of citrus fruits, including lemons, limes, grapefruit, and oranges (both Valencia and navel). Subsequent visits to the site of the colony over the next month found that the colony was continuing to thrive, with a relatively stable population.



Colony of A. lehmeri amongst citrus fruits



Specimen of A. lehmeri collected from Santa Cruz colony



A. lehmeri on a bag of lemons



A. lehmeri on a bag of grapefruit

6. Observations of Constricula rugosa

The official website of the Holotypic Occlupanid Research Group (HORG) says of this species, "Little is known about its life and habits. And when we say little we mean zilch." Therefore this researcher was delighted to find several specimens of *C. rugosa* clinging to mesh bags of potatoes in the Trader Joes in downtown Santa Cruz, California in July, 2016. All observed specimens were red, with purplish-blue markings, matching the coloration of the holotypic specimen preserved in the HORG collection.



C. rugosa discovered in Santa Cruz county, CA



C. rugosa as pictured by HORG



C. rugosa on a bag of potatoes, purchased from Trader Joes in Santa Cruz, CA, July, 2016



7. Observations of Rugoris rotumanus

The HORG website states of *R. rotunamus*, "There are no records of this mysterious and striking member of the Corrugatidae." This is no longer the case, as this researcher was so fortunate as to discover a specimen of *R. rotumanus* on a mesh bag of organic juice oranges purchased at the Whole Foods in Santa Cruz, California in July, 2016. The collected specimen is identical to the holotypic specimen, being solid white, lacking any markings.



R. rotumanus discovered in Santa Cruz county, CA



R. rotumanus as pictured by HORG





R. rotumanus on a bag of oranges, purchased from Whole Foods in Santa Cruz, CA, July, 2016