

**Pyramidellidae**  
**Subfamily Turbonillinae**  
**Genus *Turbonilla***

**Species recorded from the SCB**

**By Tony Phillips**

**DCE**

**At the October 2010 SCAMIT meeting it was suggested by Pat LaFollette for us to take high quality, detailed photographs of our *Turbonilla*, *Pyrgiscus* and *Odostomia* species (don't forget scale bars, locality and depth information!) and share with him and with each other. If it is possible to assign it unequivocally to a described species, he will aid us in giving specimens names..... He also suggested we use Abbott 1974 as a primary resource.....**

Subgenera of *Turbonilla*  
(Oldroyd 1927 & Abbot 1974)

- *Bartschella* Iredale 1917 - valid genus
  - *Chemnitzia* d'Orbigny 1840 - *Turbonilla*
  - *Mormula* A. Adams 1863 - valid genus, not in subfamily Turbonillinae
  - *Pyrgiscus* Philippi 1841 - valid genus
  - *Pyrgolampros* Sacco 1892 - *Turbonilla*
  - *Strioturbonilla* Sacco 1892 – valid genus, not in subfamily Turbonillinae
  - *Turbonilla* Risso 1826 – valid genus
- \* WoRMS 2016 for subfamily Turbonillinae

# Genera listed under subfamily Turbonillinae (according to WoRMS 2016)

*Asmunda* Dall & Bartsch 1904

*Bacteridella* Saurin 1959

*Bartschella Iredale* 1916

*Bouchetmella* Penas & Rolan 2016

*Careliopsis* Morch 1875

*Colsyrnola* Iredale 1929

*Ebalina* Thiele 1929

*Eulimella* Forbes & M'Andrew 1846

*Exesilla* Laseron 1959

*Gispyrella* Laws 1937

*Hamarilla* Eames & Wilkins 1959

*Iphiana* Dall & Bartsch 1904

*Kleinella* A. Adams 1860

*Nisipyrgiscus* Robba 2013

*Nisiturris* Dall & Bartsch 1906

*Puposyrnola* Cossmann 1921

*Pyrgiscus Philippi* 1841

*Pyrgolidium* Monterosato 1884

*Pyrgostylus* Monterosato 1884

*Raoulostraca* Oliver 1915

*Syrnola* A. Adams 1860

*Turbolidium* Robba 2013

*Turbonilla* Risso 1826



**Considering the current state of uncertainty of the suprageneric classification, we have preferred not to add to the confusion, and have kept our work at the specific level. Therefore we shall use only the genus name *Turbonilla* for all the species included....(Penas & Rolan, 2010)**

**....as most of the turbonillids, the majority of species cannot yet be defensibly seated in an appropriate genus. All species previously allocated to *Mormula*, *Chemnitzia*, *Turbonilla*, *Pyrgiscus*, *Pyrgolampros*, and *Strioturbonilla* are being left at *Turbonilla* s.l. pending further information (Cadien, 2010)**

**...that an absence of general consensus about the definitions and boundaries of the genera and subgenera contributes to a much confused taxonomy. It has been necessary for most recent authors to shoehorn species into the “supertaxa” *Odostomia*, *Chrysallida*, and *Turbonilla* without any consideration of phylogenetic context. Our placement of species in *Turbonilla*, should be considered provisional, awaiting a revision of the taxon. (Lygre et al 2011)**

## **In order to make identification easier, the species were arbitrarily grouped into seven sections -**

1. Species without spiral sculpture and with axial ribs extending down to the base
2. Species without spiral sculpture and with axial ribs interrupted suddenly at the periphery of the last whorl
3. Species without spiral sculpture and with axial ribs on the last whorl which become attenuated towards the base until they disappear
4. Species with spiral sculpture restricted to the intervals between the axial ribs and not present on the complete whorl
5. Species with spiral sculpture restricted to the intervals between the axial ribs, present on the complete whorl, and with axial ribs extending down to the base
6. Species with spiral sculpture restricted to the intervals between the axial ribs, present on the complete whorl, and with axial ribs that are suddenly interrupted on the periphery of the last whorl
7. Species with spiral sculpture visible both in the intervals and on the ribs

# **Genus *Turbonilla***

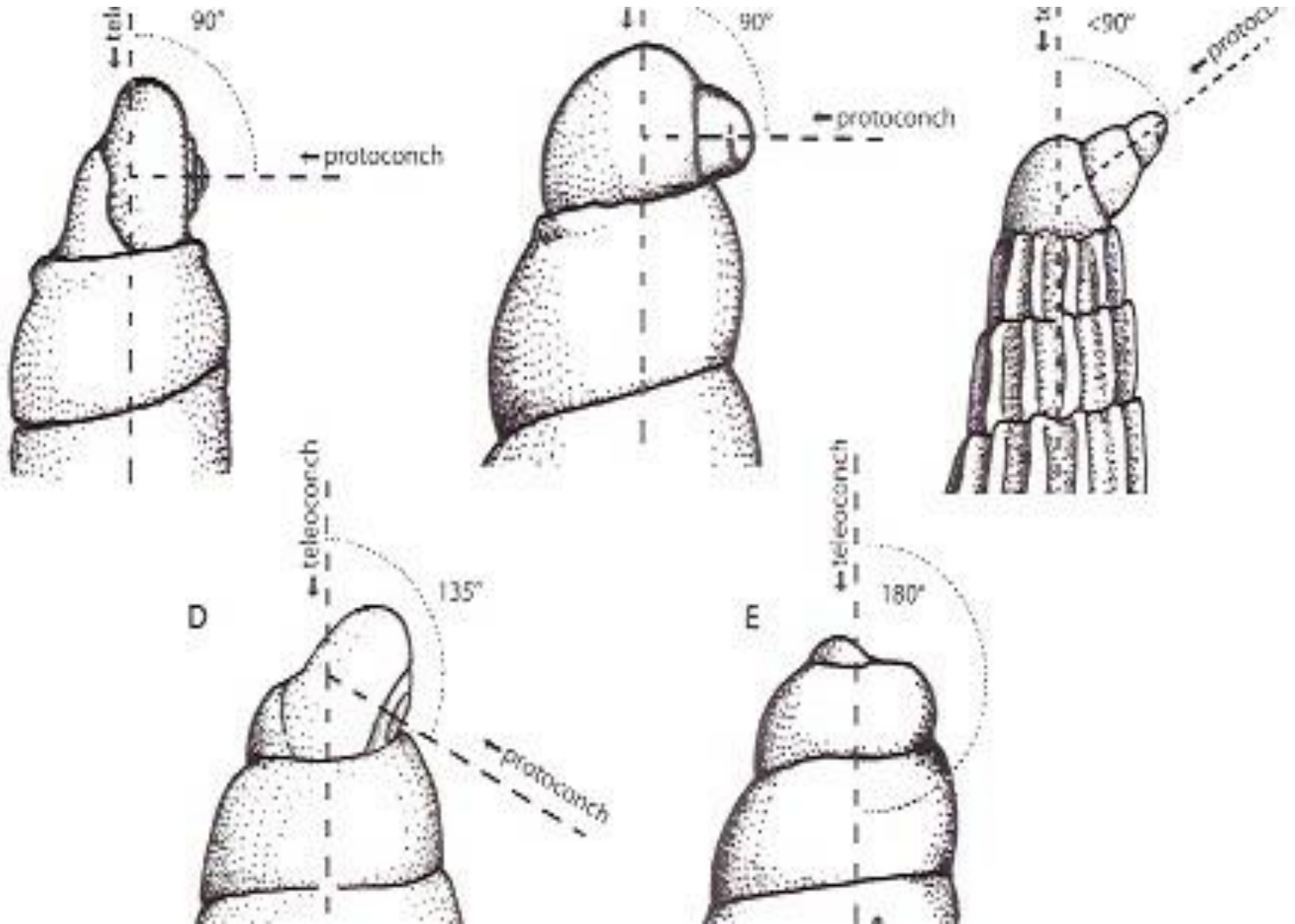
## **Characters for identification**

utilized by T. Phillips

- 1. Protoconch (if present)**
- 2. Whorls rounded or shouldered**
- 3. Axial ribs without spiral sculpture**
- 4. Axial ribs with spiral sculpture in intervals**
- 5. Axial ribs stop at periphery of last whorl**
- 6. Axial ribs extend extend beyond periphery of last whorl towards base**
- 7. Spiral sculpture restricted to intervals between the axial ribs**
- 8. Spiral sculpture visible both in the intervals and on the ribs**
- 9. Spiral striations on whorls, spiral sculpture absent**
- 10. With strong axial ribs and spiral sculpture, the junction of which is usually nodulose**
- 11. Spiral striations present or absent on base of last whorl**
- 12. Inner lip with plications or inner lip smooth**

# Characters for Identification

## 1. Protoconch



# Characters for Identification

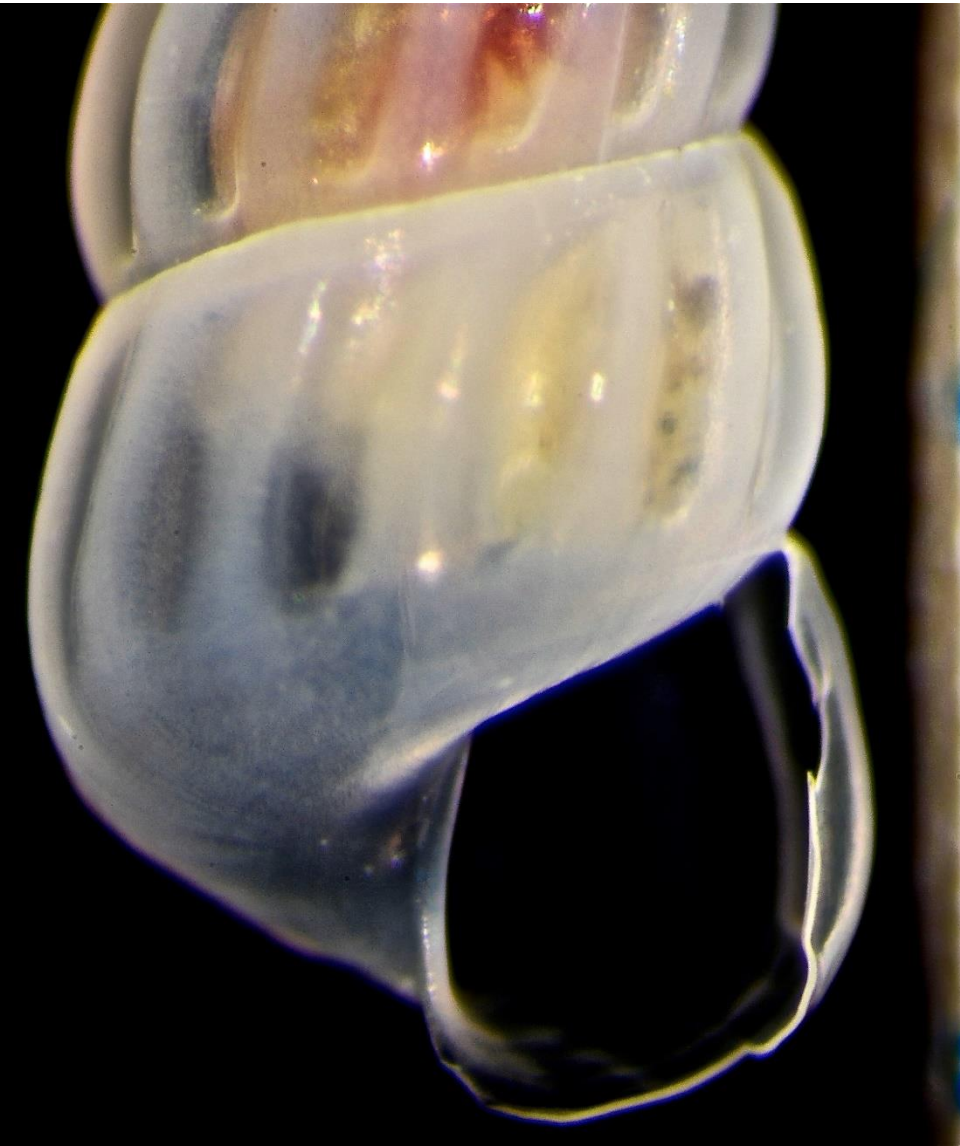
## 2. Whorls rounded or shouldered





# Characters for Identification

## 3. Axial ribs without spiral sculpture





# Characters for Identification

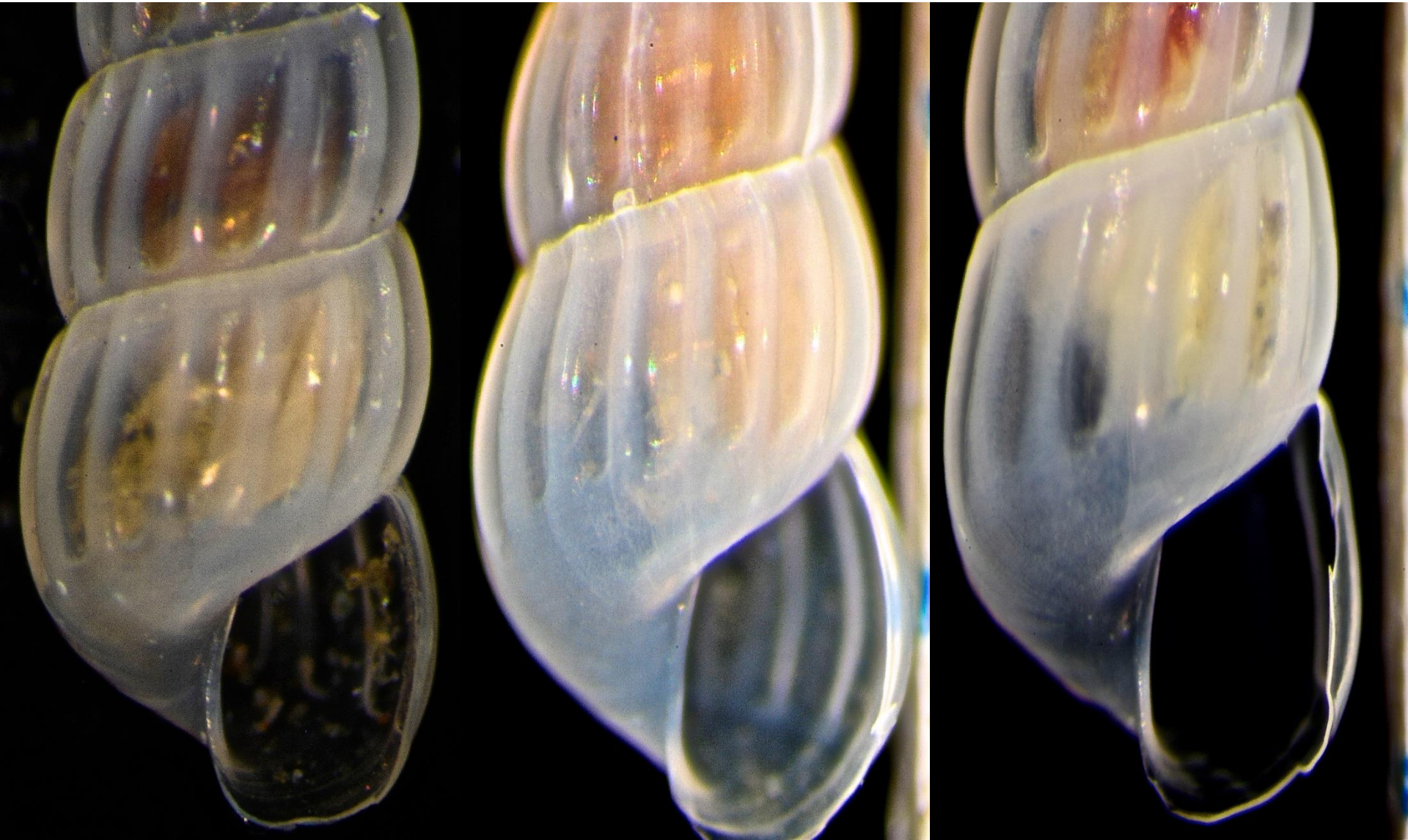
## 4. Axial ribs with spiral sculpture





# Characters for Identification

## 5. Axial ribs stop at periphery of last whorl





# Characters for Identification

**6. Axial ribs extend beyond periphery of last whorl toward base**





# Characters for Identification

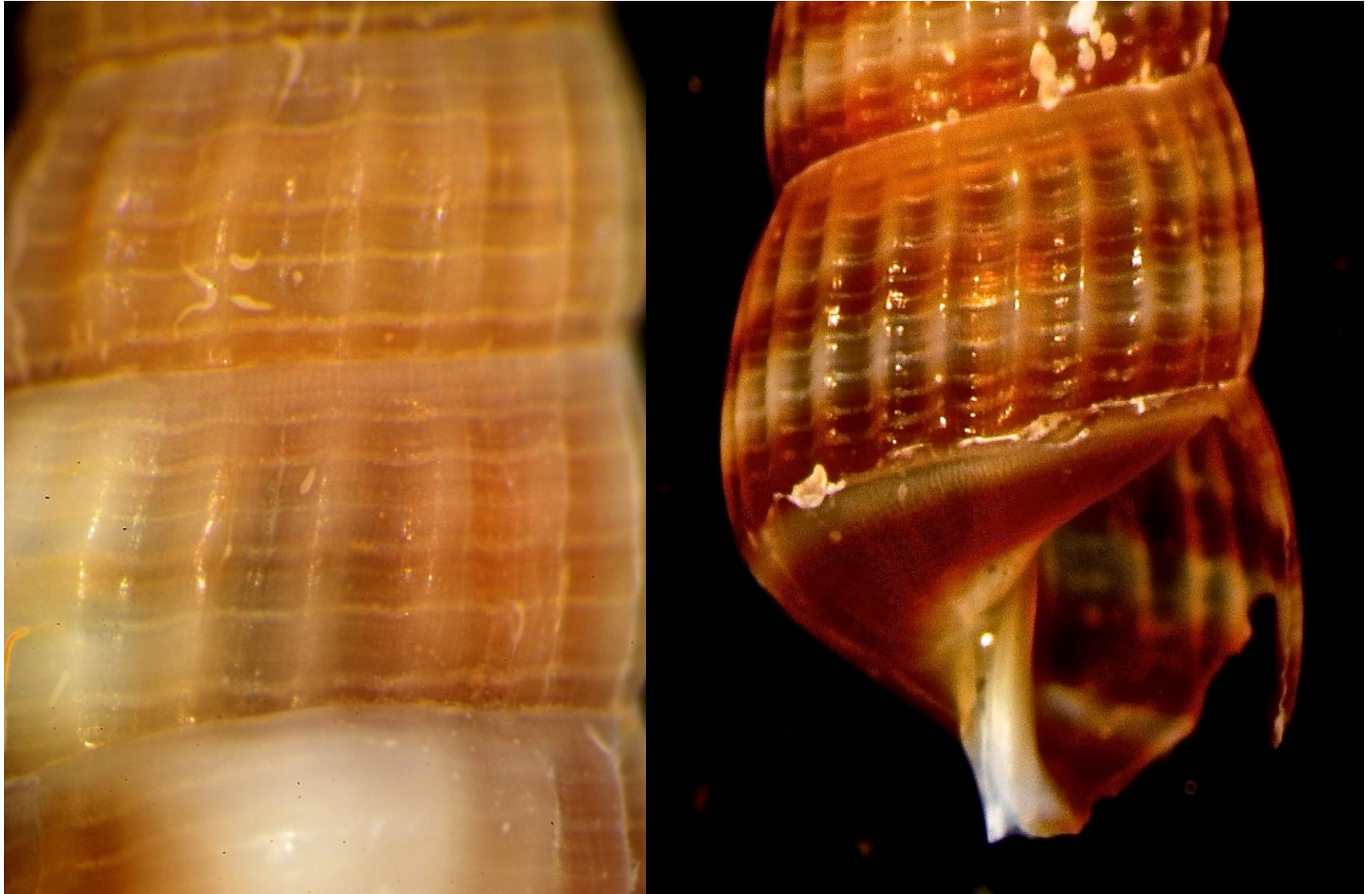
## 7. Spiral sculpture restricted to intervals between ribs





# Characters for Identification

## 8. Spiral sculpture visible both in the intervals and on the axial ribs





# Characters for Identification

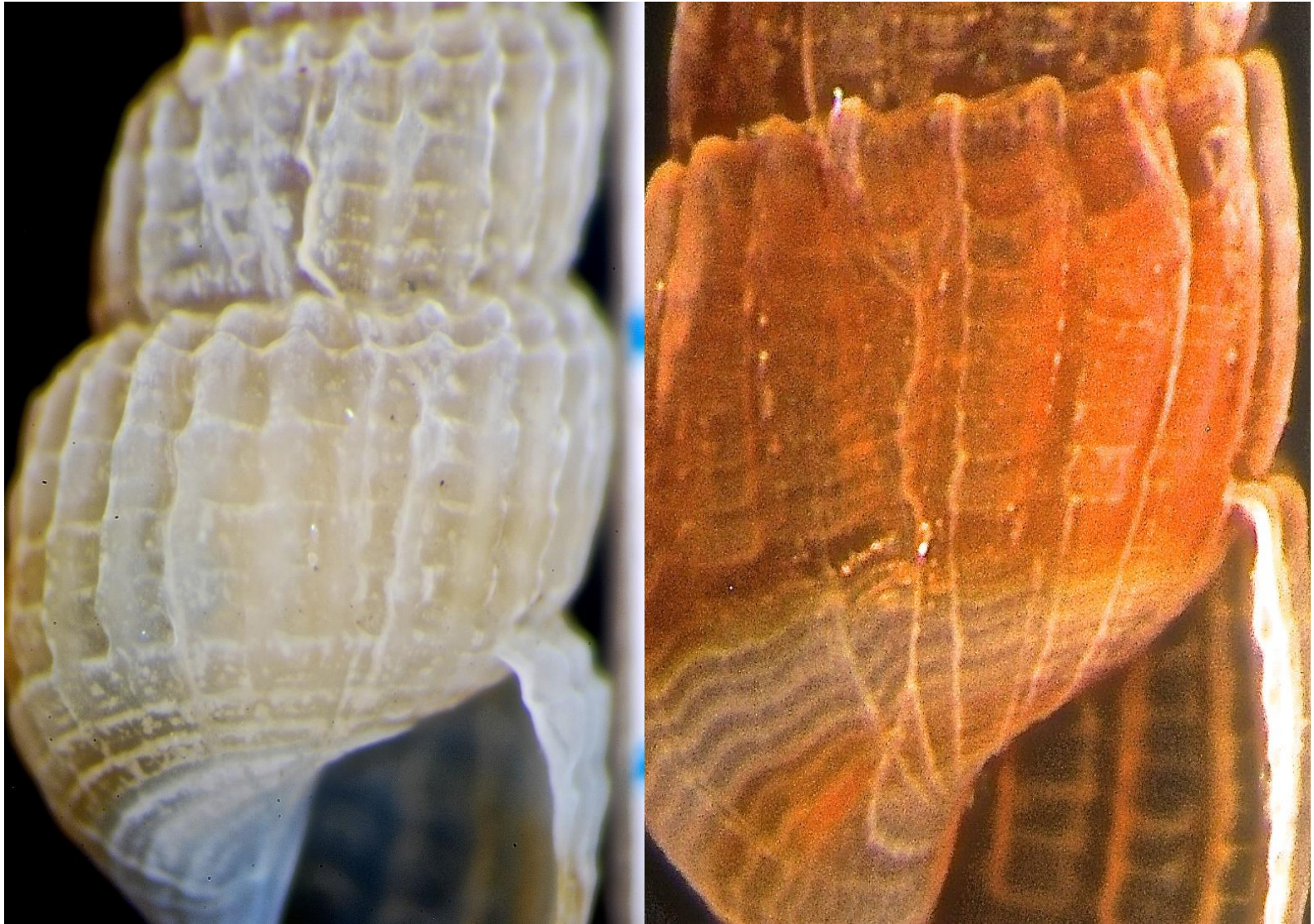
## 9. Spiral striations on whorls, spiral sculpture absent





# Characters for Identification

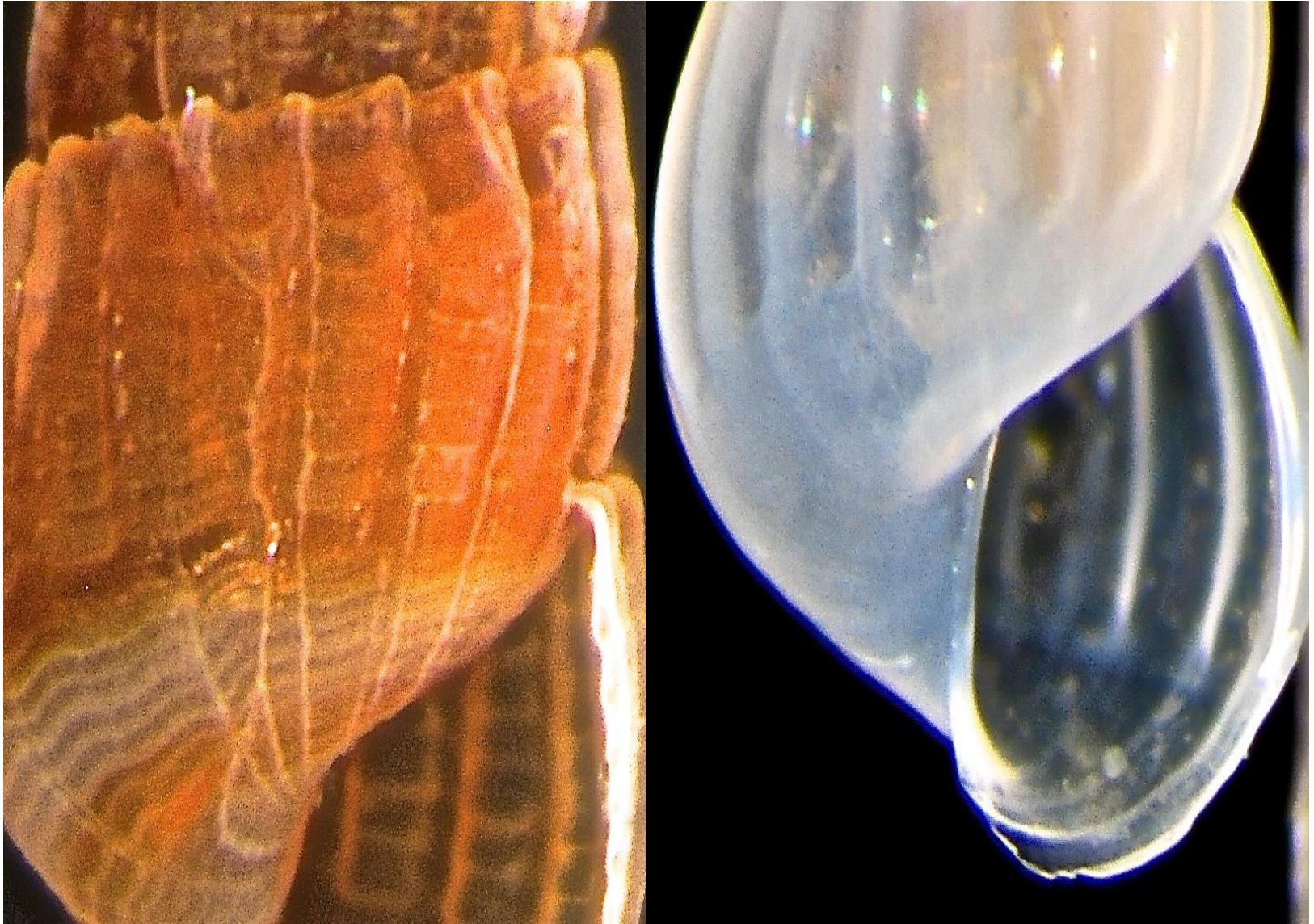
**10. With strong axial ribs and spiral sculpture, the junction of which is usually nodulose**





# Characters for Identification

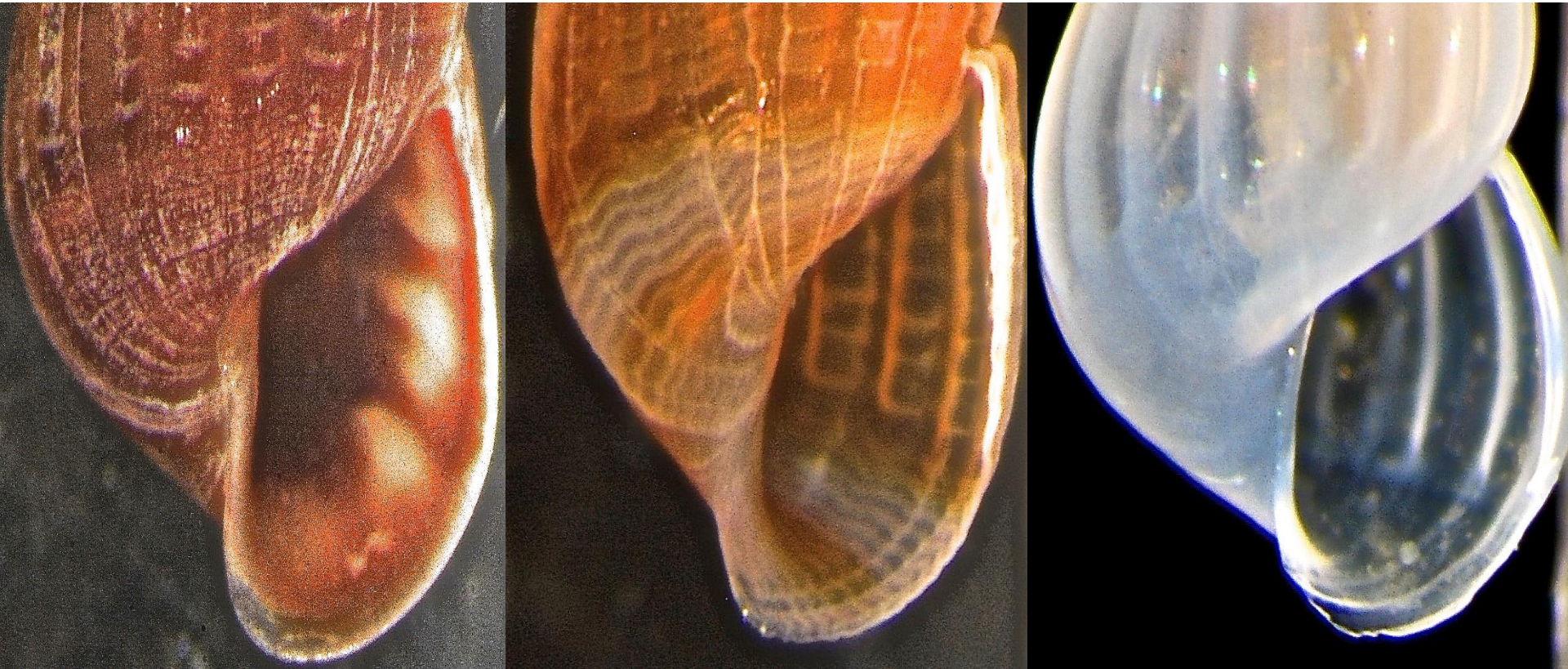
## 11. Spiral striations present or absent on base on base of last whorl





# Characters for Identification

## 12. Inner lip with plications or inner lip smooth



**All species and provisionals listed in this presentation are grouped within subgenera of *Turbonilla* (for convenience) as listed by Abbot 1974. All speciated *Turbonilla* were identified by Pat LaFollette after reviewing an earlier version of this presentation in 2015 or at the 2010 SCAMIT meeting. All provisional species (Phillips 2016) are based on the combination of characters utilized by me to make distinctions between these provisionals.**

# **Subfamily Turbonillinae**

## **Genus *Turbonilla* Risso 1826**

generalized species grouping per Abbott 1974

***Bartschella* Iredale 1917**

***Turbonilla laminata* (Carpenter 1864)**

***Turbonilla tenuicula* (Gould 1853)**

***Turbonilla* sp 13 Phillips 2016**

***Chemnitzia* d'Orbigny 1840**

***Turbonilla santarosana* Dall & Bartsch 1909**

***Turbonilla* sp 1 Phillips 2016**

***Turbonilla* sp 2 Phillips 2016**

***Mormula* A. Adams 1863**

***Turbonilla tridentata* (Carpenter 1864)**

***Turbonilla* sp 12 Phillips 2016**

# **Subfamily Turbonillinae**

## **Genus *Turbonilla* Risso 1826**

generalized species grouping per Abbott 1974

***Pyrgiscus* Sacco 1892**

***Turbonilla signae* Dall & Bartsch 1909**

***Turbonilla weldi* Dall & Bartsch 1909**

***Turbonilla* sp A SCAMIT 1988**

***Turbonilla* sp 3 Phillips 2016**

***Turbonilla* sp 4 Phillips 2016**

***Turbonilla* sp 5 Phillips 2016**

***Turbonilla* sp 6 Phillips 2016**

***Turbonilla* sp 7 Phillips 2016**

***Turbonilla* sp 11 Phillips 2016**

***Pyrgolampros* Sacco 1892**

***Turbonilla chocolata* (Carpenter 1864)**

***Turbonilla* sp 8 Phillips 2016**

***Turbonilla* sp 9 Phillips 2016**

***Turbonilla* sp 10 Phillips 2016**

# *Bartschella* Iredale 1917

- “*Turbonilla*’s with well-rounded whorls, marked with strong axial ribs and strong spiral cords, the junction of which are usually subnodulose.” (Abbott 1974)



# ***Turbonilla laminata* (Carpenter 1864)**

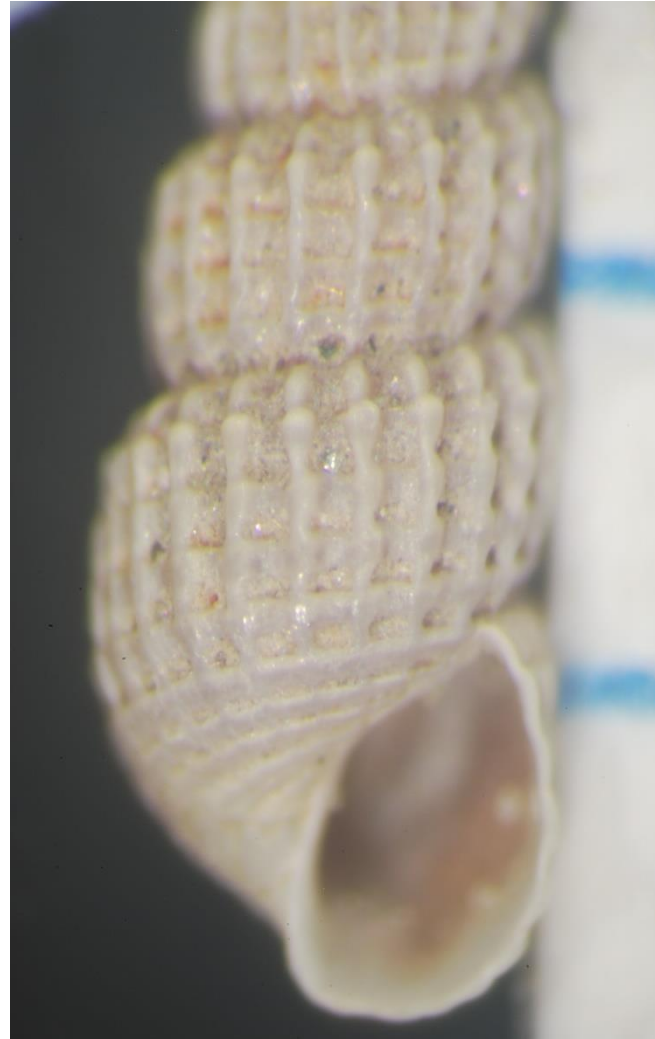
*Turbonilla* sp HYP4 1998



**DN2 15m SMB 1998**

# *Turbonilla laminata* (Carpenter 1864)

*Turbonilla ?andrewsi* MBC 2002



Redondo 2002 MBC

# *Turbonilla laminata* (Carpenter 1864)

*Turbonilla* sp F (?almo) MBC 1992

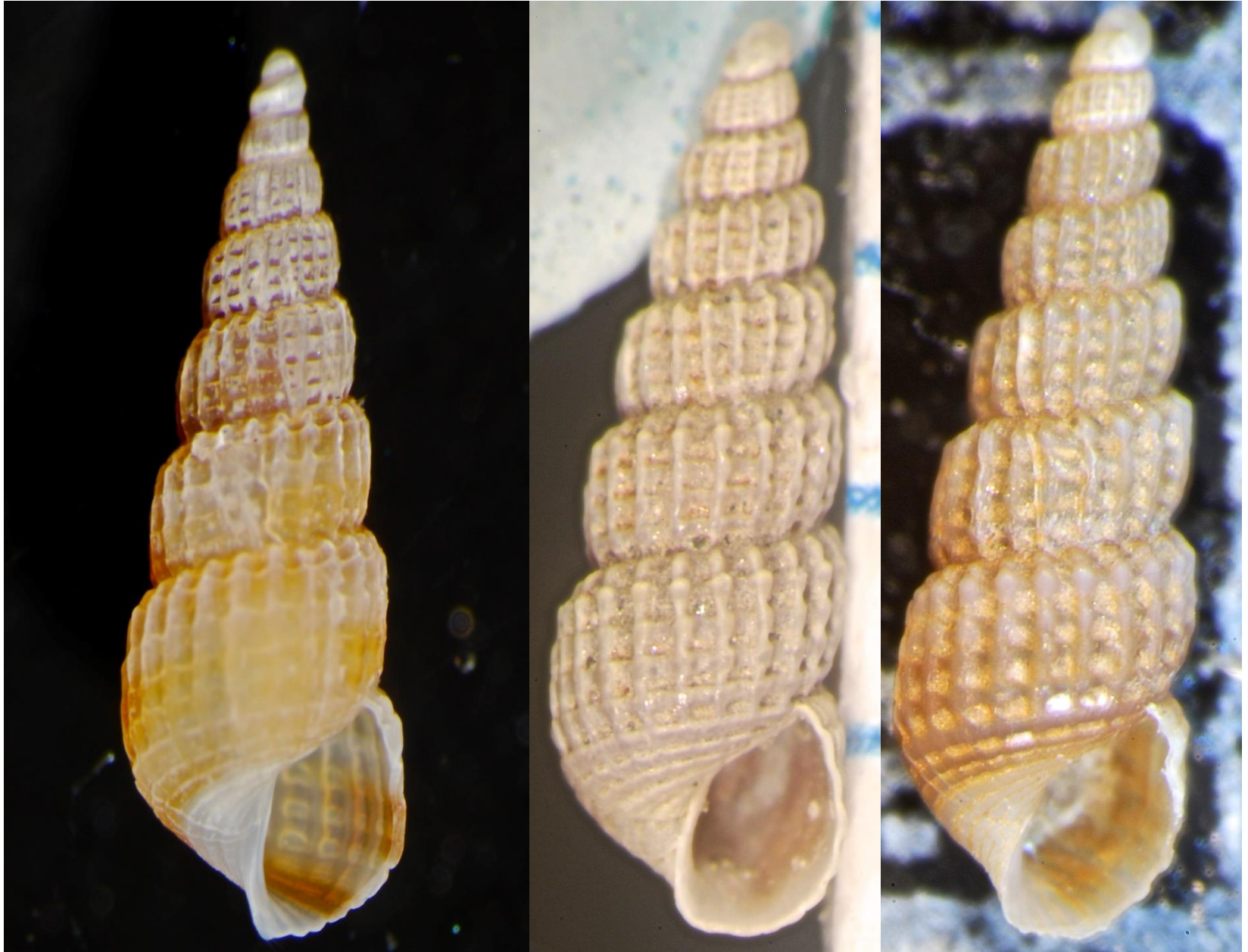


Goleta 30m 1992

Mission Bay 1971



*Turbonilla laminata* (Carpenter 1864)



# ***Turbonilla laminata* (Carpenter 1864)**

*Turbonilla* sp HYP4 Phillips 1998

*Turbonilla* sp F (?*almo*) MBC 1971

?*Turbonilla andrewsi* MBC 2002

- Color yellowish-brown/white in bands, 5 mm
- Whorls rounded/shouldered
- 22-23 axial ribs
- 5 spiral cords, incised sculpture squarish
- Junction axial ribs/spiral cords slightly nodulose
- Ribs extend over periphery onto base
- 6 spiral striations on base
- San Diego – Goleta 10-97 m



# *Turbonilla tenuicula* (Gould 1853)

*Turbonilla* sp DC2 Phillips 2015



Mission Bay 15m 2015

# *Turbonilla tenuicula* (Gould 1853)

MBC 1971



MBC Mission Bay 1971

# *Turbonilla tenuicula* (Gould 1853)

*Turbonilla* sp DC2 Phillips 2015

MBC 1971

- **Shell reddish-brown with white bands; 4 mm**
- **Whorls rounded/shouldered**
- **Aperture auricular shaped**
- **18 - 22 axial ribs**
- **Axial ribs strongly shouldered**
- **Spiral sculpture present**
- **Junction axial ribs/spiral cords nodulose**
- **9 spiral cords, incised sculpture slits**
- **Spiral striations on base**
- **Axial ribs extend over periphery onto base**
- **Mission Bay to SMB 5 – 20 m**



# *Turbonilla* sp 13

*Turbonilla* sp K MBC 1973



OCSD 7m 1973

# *Turbonilla* sp 13

*Turbonilla* sp K MBC 1973

- Shell light chestnut/reddish, 6 mm
- Whorls rounded
- Aperture auricular shaped
- 26 – 28 axial ribs
- 8 spiral cords, incised sculpture rectangular
- Junction axial ribs/spiral cords nodulose
- Ribs extend over periphery onto base
- Spiral striations on base
- Orange County 7 m

# *Chemnitzia* d'Orbigny 1840

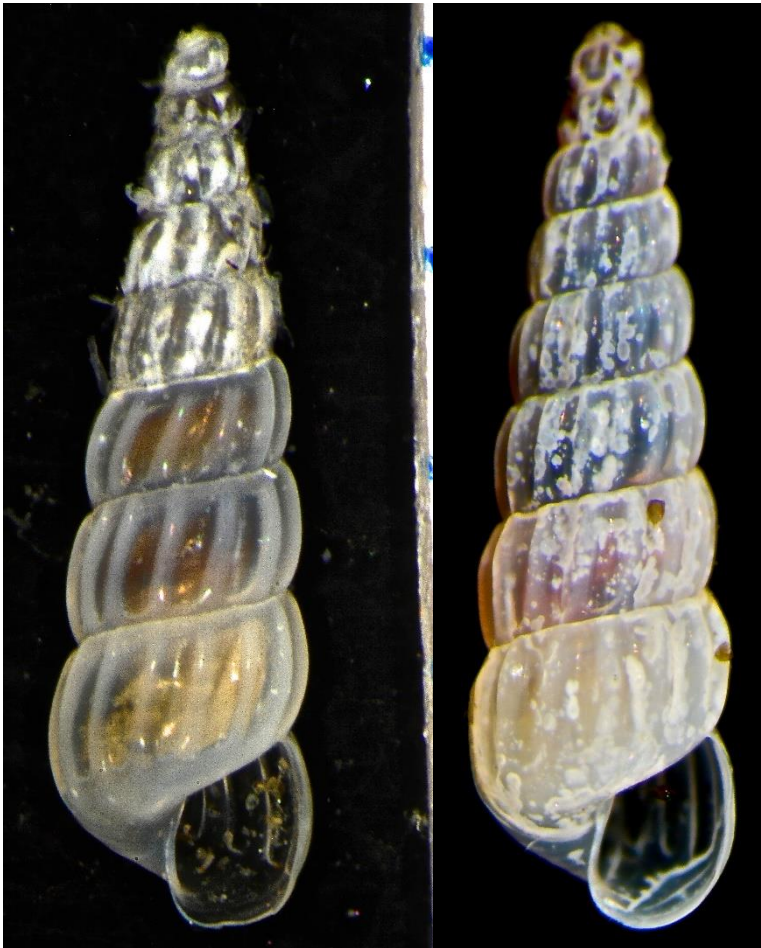
- “*Turbonilla*’s without spiral sculpturing, having prominent axial ribs which fuse or terminate at the periphery. Intercostal areas sunken. Base smooth.” (Abbott 1974)



# *Turbonilla santarosana* (D & B 1909)

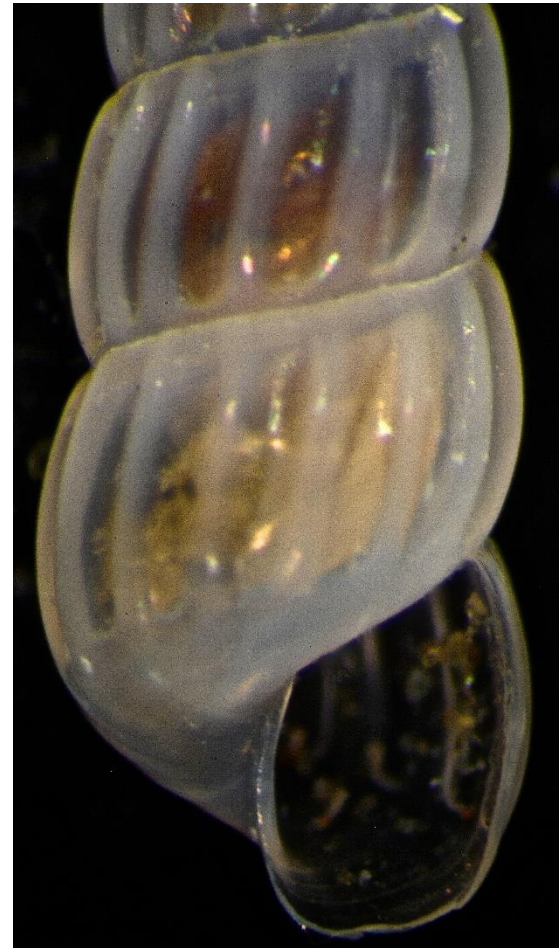
*Turbonilla* sp SD1 Barwick 1995

*Turbonilla* sp HYP2 Phillips 1996



SMB 61m 2011

SMB 16m 1999



# ***Turbonilla santarosana* (D & B 1909)**

***Turbonilla* sp SD1 Barwick 1995**

***Turbonilla* sp HYP2 Phillips 1996**

- **Shell opaque-white, 6 mm**
- **Whorls rounded**
- **Aperture auricular shaped**
- **16-18 axial ribs**
- **No spiral sculpturing**
- **Axial ribs terminate at periphery of base**
- **Intercostal areas between axial ribs sunken**
- **No spiral striations on base**
- **San Diego, Orange County, LAH, SMB-Goleta  
3-70 m**

# *Turbonilla* sp 1 Phillips 2016

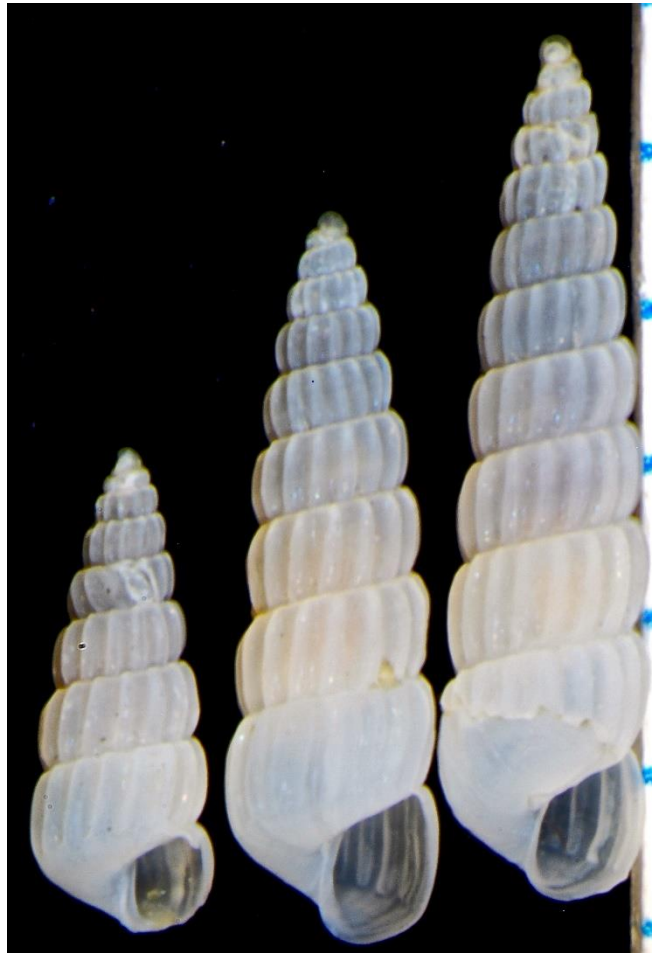
*Turbonilla* sp HYP3 Phillips 1996



D1 (SMB) 75m SMB 1996

# *Turbonilla* sp 1 Phillips 2016

*Turbonilla* sp HYP3 Phillips 1996



HM2 (LAH) 10m 2011

# ***Turbonilla* sp 1 Phillips 2016**

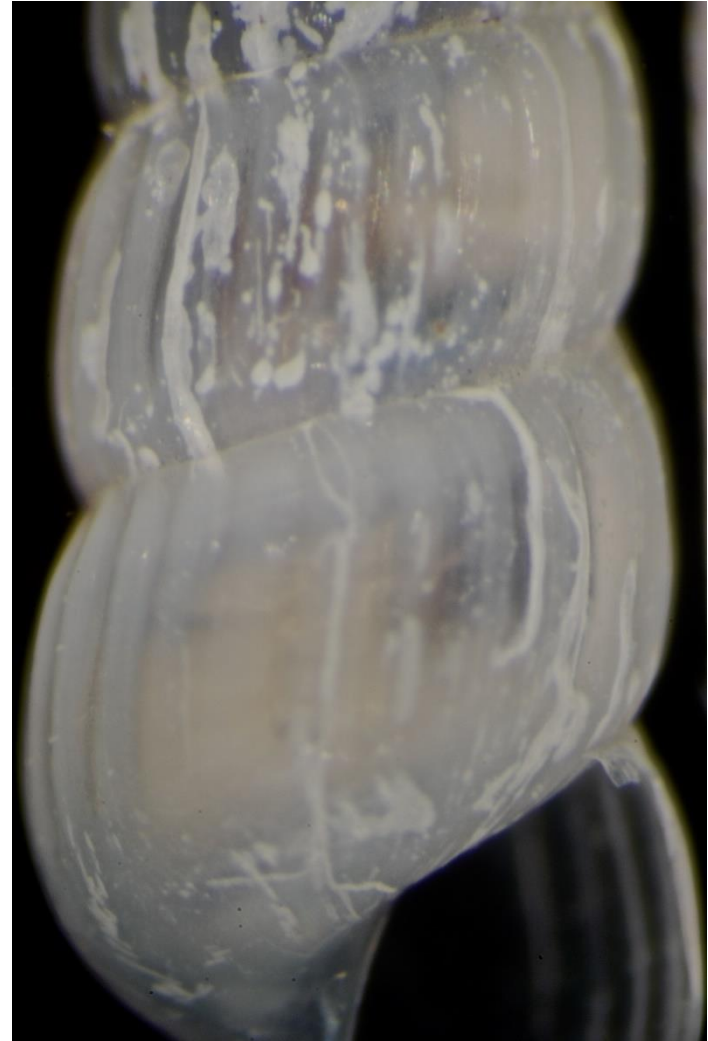
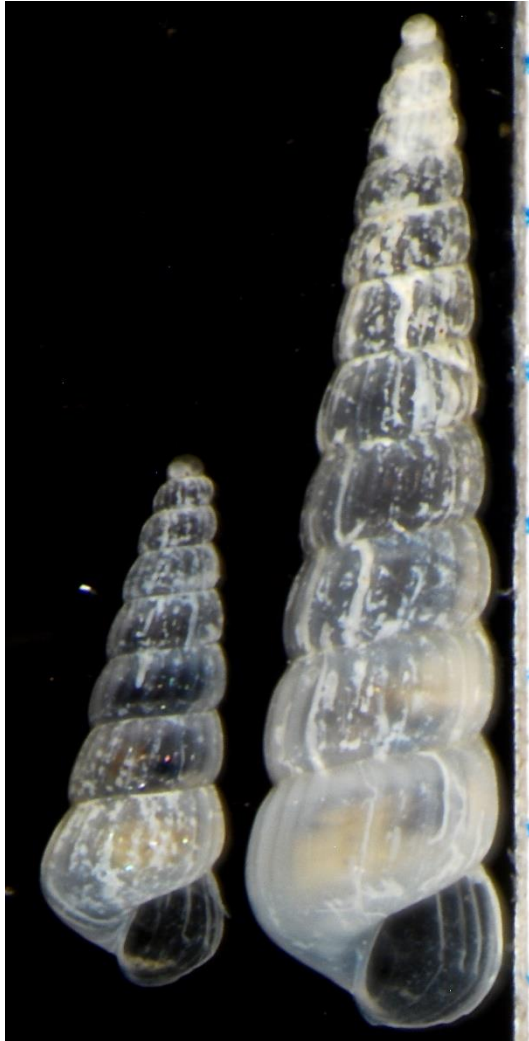
***Turbonilla* sp HYP3 Phillips 1996**

- **Shell opaque-white, 6 mm**
- **Whorls rounded/slightly shouldered**
- **Aperture auricular shaped**
- **14-16 axial ribs**
- **No spiral sculpturing**
- **Axial ribs terminate at periphery of base**
- **Intercostal areas between axial ribs sunken**
- **No spiral striations on base**
- **LAH – SMB 10 -75 m**



# *Turbonilla* sp 2 Phillips 2016

*Turbonilla* sp HYP8 Phillips 2011



Oxnard (SMB) 30m 2011

# *Turbonilla* sp 2 Phillips 2016

*Turbonilla* sp HYP8 Phillips 2011



SMB (USGS) 105m 1997



SMB FA17 97m 2010

# ***Turbonilla* sp 2 Phillips 2016**

***Turbonilla* sp HYP8 Phillips 2011**

- **Shell opaque-white, 8 mm**
- **Whorls rounded**
- **Aperture auricular shaped**
- **24-26 axial ribs**
- **No spiral sculpturing**
- **Axial ribs terminate at periphery of base**
- **Intercostal areas between axial ribs sunken**
- **No spiral striations on base**
- **SMB 30-105 m**

# ***Mormula* A. Adams 1864**

- **“*Turbonilla*’s having axial ribs and deeply incised spiral lines; also irregularly disposed varices on the outer surface, which usually mark internal lirations on the outer lip, or internal lirations of the outer lip only. Sculpture never nodulose.” (Dall and Bartsch 1909)**



# *Turbonilla tridentata* (Carpenter 1864)

*Turbonilla* sp DCE1 Phillips 2015



Malibu (SMB) 10m 2015



Goleta 30m 2015



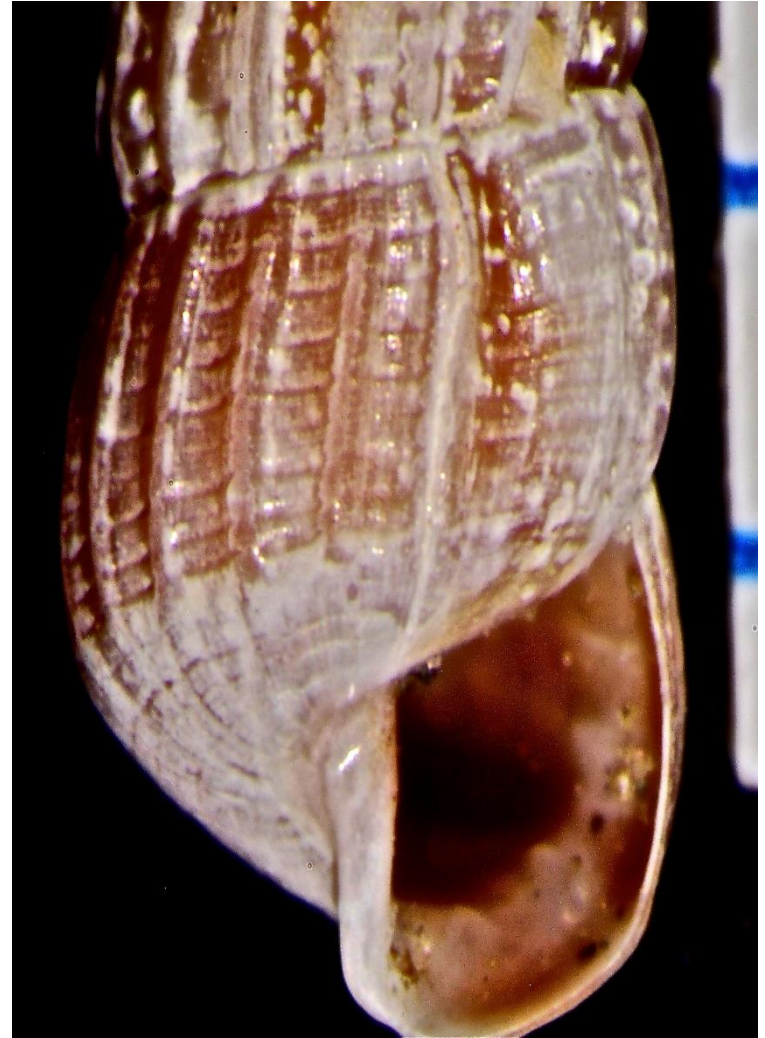
# ***Turbonilla tridentata* (Carpenter 1864)**

***Turbonilla* sp DCE1 Phillips 2015**

- **Shell brownish-red, 6 mm**
- **Whorls rounded**
- **Aperture auricular shaped**
- **22 axial ribs**
- **Spiral sculpture present, 6 slits per intercostal area**
- **Axial ribs extend over periphery onto base**
- **Spiral striations on base**
- **3 strong internal lirations within outer lip**
- **Malibu (SMB) to Goleta 10 – 30 m**

# *Turbonilla* sp 12 Phillips 2016

*Mormula* sp 2 Phillips 2015



SMB FA17 97m 2010

# ***Turbonilla* sp 12 Phillips 2016**

***Mormula* sp 2 Phillips 2015**

- **Shell brownish-red, 10 mm**
- **Whorls rounded**
- **Aperture auricular shaped**
- **20 axial ribs**
- **Spiral sculpture present, 8 slits per intercostal area**
- **Axial ribs extend over periphery onto base**
- **Spiral striations on base**
- **4 strong internal lirations within outer lip**
- **SMB 97m**



# *Pyrgiscus* Philippi 1841

- “*Turbonilla*’s having strong spiral incised grooves as well as axial ribs. Summits of the whorls not strongly shouldered.” (Abbott 1974)

# *Turbonilla signae* (D & B 1909)

*Turbonilla* (*Pyrgiscus*) sp HYP2 Phillips 2006

*Turbonilla* sp M MBC 1979



A2N (SMB) 15m 2005

# *Turbonilla signae* (D & B 1909)

*Turbonilla* (*Pyrgiscus*) sp HYP2 Phillips 2006

*Turbonilla* sp M MBC 1979



A2 (SMB) 15m 2005



# ***Turbonilla signae* (D & B 1909)**

***Turbonilla* (*Pyrgiscus*) sp HYP2 Phillips 1996**

***Turbonilla* sp M MBC 1979**

- **Shell yellow-brown/white bands, 5 mm**
- **Whorls rounded**
- **Aperture auricular shaped**
- **20 axial ribs**
- **Spiral sculpture present, 19-20 deep slits per intercostal area; intercostal areas deep**
- **Axial ribs extend onto base**
- **Spiral striations on base**
- **SONGS - SMB 15 – 97 m**

# *Turbonilla weldi* (D & B 1909)

*Turbonilla* sp GOL1 Phillips 2014



Goleta B6 30m 2014

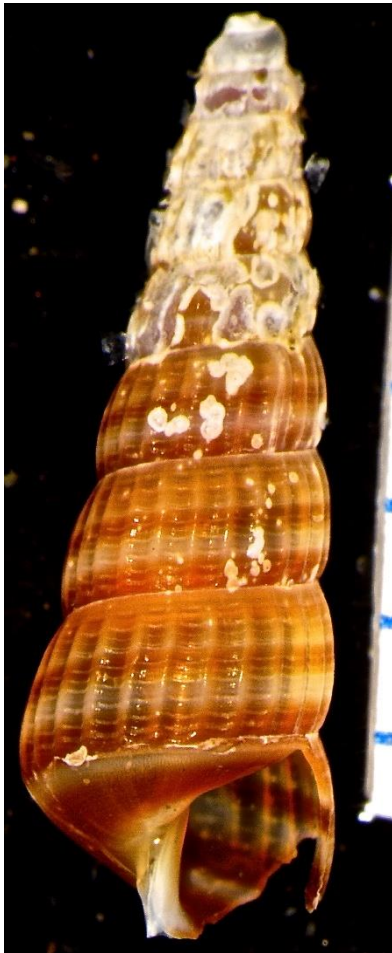
# ***Turbonilla weldi* (D & B 1909)**

***Turbonilla* sp GOL1 Phillips 2015**

- **Shell chestnut/yellowish brown/white in bands, 9.5 mm**
- **Whorls rounded**
- **Aperture auricular shaped**
- **24 axial ribs**
- **9-10 spiral cords, incised sculpture rectangular**
- **Junction axial ribs/spiral cords not nodulose**
- **Ribs extend over periphery onto base**
- **Spiral striations on base**
- **SMB - Goleta 30 – 97 m**



# *Turbonilla* sp A SCAMIT 1988



A3 (SMB) 16m 2011

# ***Turbonilla* sp A SCAMIT 1988**

- **Shell chestnut brown/white in bands, 15 mm**
- **Whorls rounded**
- **Aperture auricular shaped**
- **25-28 axial ribs**
- **Spiral sculpture present, 9 slits per intercostal area, extend over axial ribs**
- **Axial ribs extend onto base**
- **No spiral striations on base**
- **San Diego – Goleta 10 – 70 m**

# *Turbonilla* sp 3 Phillips 2016

*Turbonilla* (*Pyrgiscus*) sp HYP4 Phillips 2006



A2 (SMB) 16m 2008



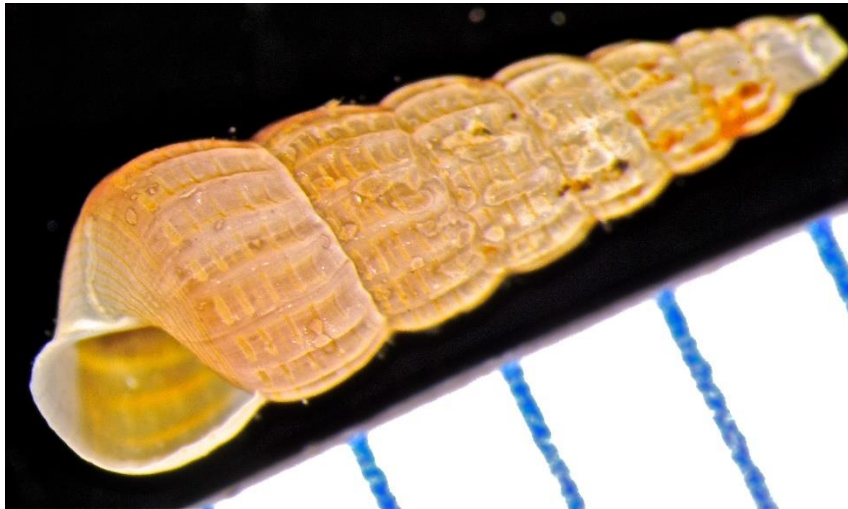
# ***Turbonilla* sp 3 Phillips 2016**

***Turbonilla (Pyrgiscus) sp HYP4 Phillips 2006***

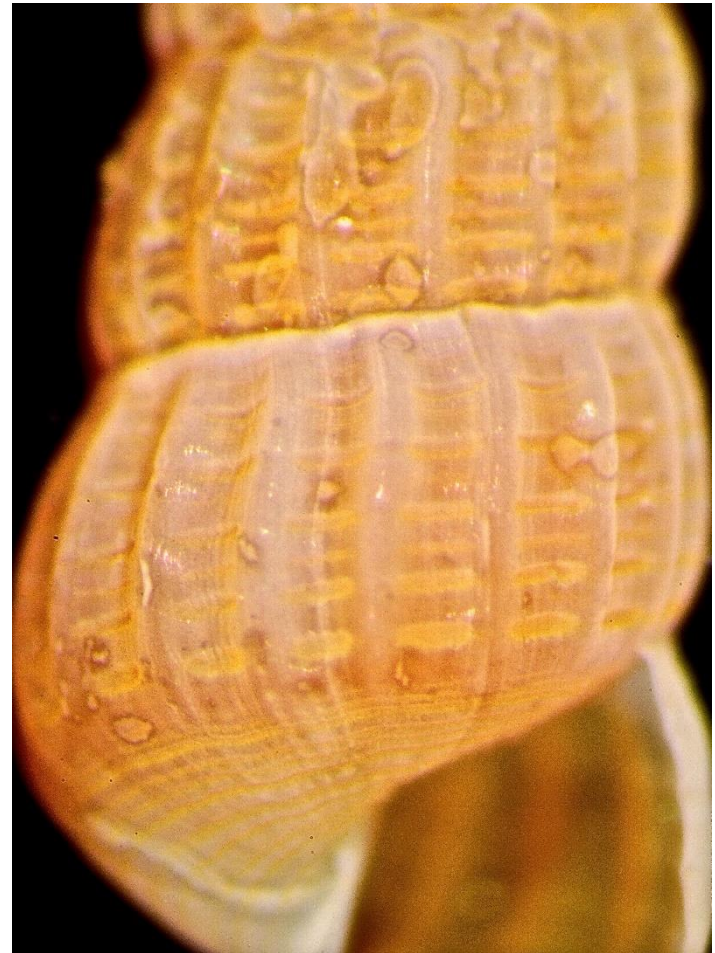
- **Shell yellowish-brown, 4.5 mm**
- **Whorls rounded**
- **Aperture auricular shaped**
- **26-28 weak axial ribs**
- **Spiral sculpture present, 8 slits per intercostal area**
- **Axial ribs extend onto base**
- **Spiral striations on base**
- **A2 (SMB) 16m**

# *Turbonilla* sp 4 Phillips 2016

*Turbonilla (Pyrgiscus)* sp HYP3 Phillips 2005



A2 (SMB) 15m 2005



# ***Turbonilla* sp 4 Phillips 2016**

***Turbonilla (Pyrgiscus)* sp HYP3 Phillips 2005**

- **Shell yellowish-brown, 5 mm**
- **Whorls rounded**
- **Aperture auricular shaped**
- **18-20 axial ribs**
- **Spiral sculpture present, 7 slits per intercostal area**
- **Axial ribs extend onto base**
- **Spiral striations on base**
- **SMB - Goleta 16m – 30 m**



# *Turbonilla* sp 5 Phillips 2016

*Turbonilla* sp OC1 Phillips 2012



OCSD 17m 2012

# *Turbonilla* sp 5 Phillips 2016

*Turbonilla* sp OC1 Phillips 2012



SLO 10m 2013

# ***Turbonilla* sp 5 Phillips 2016**

***Turbonilla* sp OC1 Phillips 2012**

- **Shell chestnut brown/white bands, 5 mm**
- **Whorls rounded**
- **Aperture auricular shaped**
- **20-22 weak axial ribs**
- **Spiral sculpture present, 19-20 shallow slits per intercostal area; intercostal areas shallow**
- **Axial ribs extend onto base**
- **Spiral striations on base**
- **Orange County – San Luis Obispo 10-30m**



# *Turbonilla* sp 6 Phillips 2016

*Turbonilla* sp HYP7 2004



A3 16m 2004

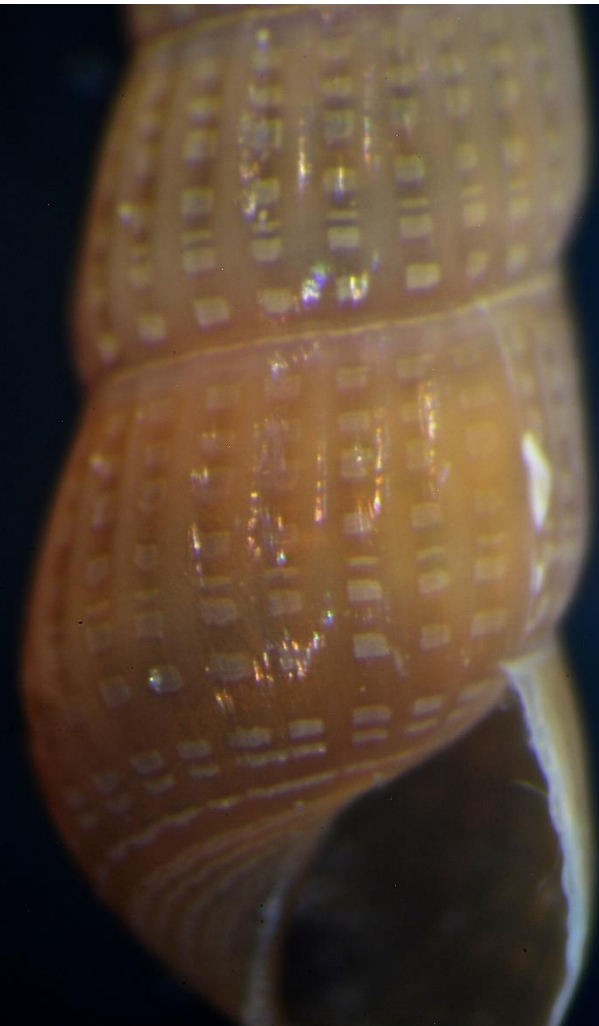


Oxnard 30m 2012

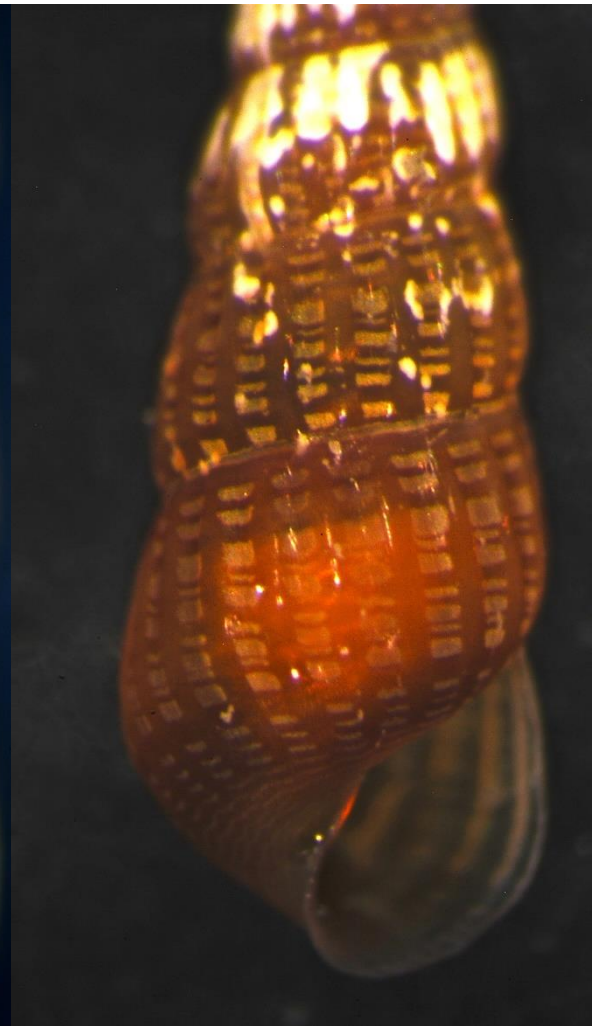


# *Turbonilla* sp 6 Phillips 2016

*Turbonilla* sp HYP7 Phillips 2004



Avila 10m 2012



B'13 SMB 16m



A3 16m 2004

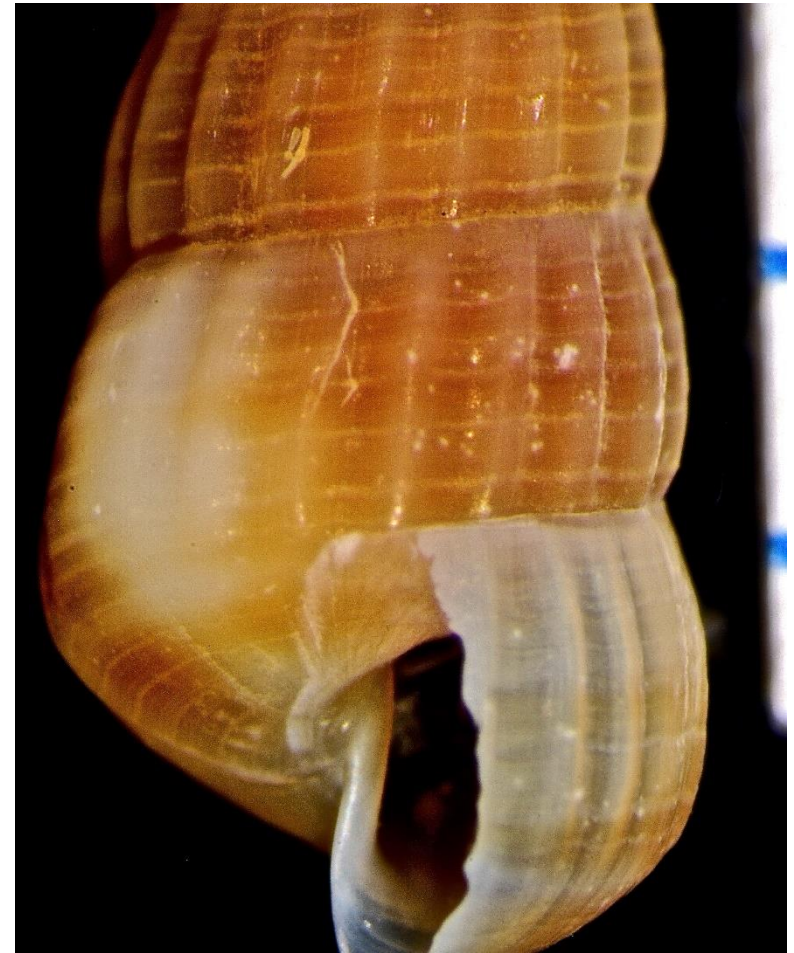
# ***Turbonilla* sp 6 Phillips 2016**

***Turbonilla* sp HYP7 Phillips 2004**

- **Shell reddish to yellowish brown, 5 mm**
- **Whorls rounded**
- **Aperture auricular shaped**
- **18 - 22 weak axial ribs**
- **Spiral sculpture not sunken or slit-like, appears as if painted on; intercostal area with 9 thin and thick bands**
- **Axial ribs extend just over periphery**
- **Spiral striations on base**
- **Orange County, SMB – Avila 10-100m**

# *Turbonilla* sp 7 Phillips 2016

*Turbonilla* (*Pyrgolampros*) sp HYP1 Phillips 2004



MDR (SMB) 15m 2004

# ***Turbonilla* sp 7 Phillips 2016**

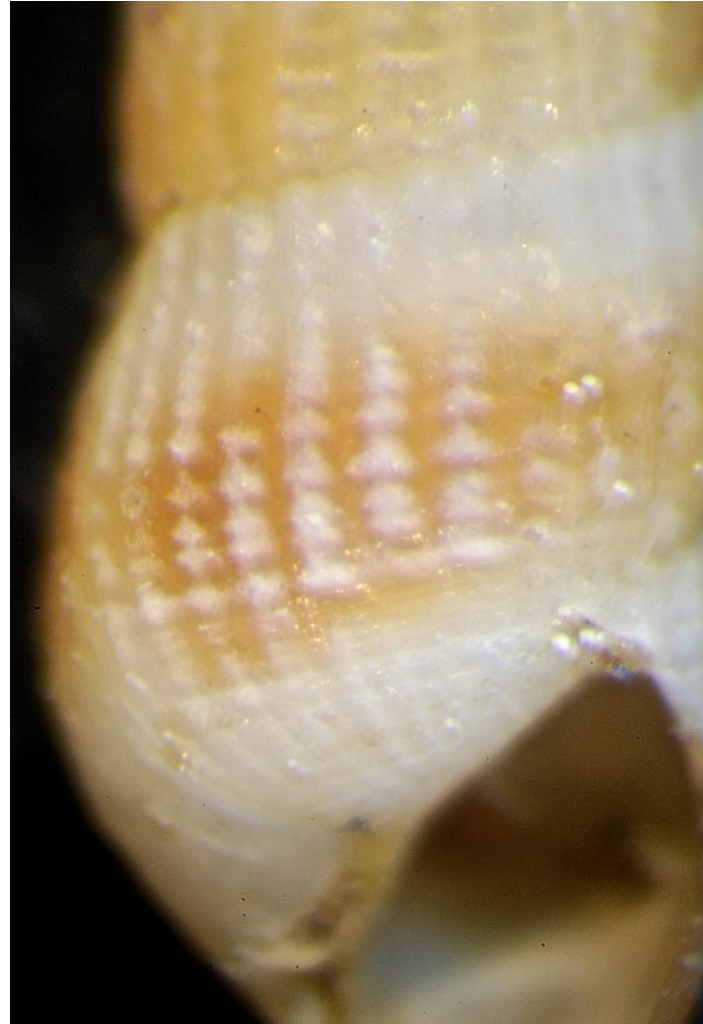
***Turbonilla (Pyrgolampros) sp HYP1***

- **Shell yellowish-brown with white patches, 7 mm**
- **Whorls rounded**
- **Aperture auricular shaped**
- **20 strong axial ribs**
- **Spiral sculpture not sunken or slit-like, not restricted to intervals, continues over ribs**
- **Axial ribs extend just over periphery**
- **Spiral striations on base**
- **Marina del Rey (SMB) 15m**



# *Turbonilla* sp 11 Phillips 2016

*Turbonilla* sp I MBC 1971



OCSD K-1 7m 1973

# ***Turbonilla* sp 11 Phillips 2016**

***Turbonilla* sp I MBC 1973**

- **Shell with yellowish-brown and white bands, 6 mm**
- **Whorls rounded**
- **Aperture auricular shaped**
- **28 – 30 strong axial ribs**
- **Spiral sculpture present, 12-13 sunken spiral slits per intercostal area**
- **Axial ribs extend to base**
- **Spiral striations on base**
- **Orange County 7m**

# *Pyrgolampros* Sacco 1892

- “Brown to yellow *Turbonilla*’s with low, broad axial ribs that gradually disappear over the periphery and base of the last whorl. Spiral striations present. Surface covered with a thin periostracum. Intercostal spaces not grooved out or sunken.” (Abbott 1974)

# *Turbonilla* sp 8 Phillips 2016

*Turbonilla* sp SMB5 Phillips 2010



B5 (SMB) 45m 2010



# *Turbonilla* sp 8 Phillips 2016

*Turbonilla* sp SMB5 Phillips 2010



FA17 (SMB) 97m 2010

# ***Turbonilla* sp 8 Phillips**

***Turbonilla* sp SMB5 Phillips 2010**

- **Shell yellowish to reddish brown, 8 mm**
- **Whorls rounded**
- **Aperture auricular shaped**
- **20 strong axial ribs**
- **Spiral sculpture absent**
- **Spiral striations present**
- **Axial ribs extend onto base**
- **Spiral striations on base**
- **SMB 45-97m**

# *Turbonilla* sp 9 Phillips 2016

*Turbonilla* sp Mont2 Phillips 2014



Monticeto 10m 2010

# ***Turbonilla* sp 9 Phillips 2016**

***Turbonilla* sp Mont2 Phillips 2014**

- **Shell yellowish-brown, 5.5 mm**
- **Whorls round/squared**
- **Aperture auricular shaped**
- **20 weak axial ribs**
- **Spiral sculpture absent**
- **Spiral striations present**
- **Axial ribs extend onto base**
- **Spiral striations present on base**
- **Monticeto 10m**



# *Turbonilla* sp 10 Phillips 2016

*Turbonilla* sp Mont1 Phillips 2014



Monticeto 10m 2014

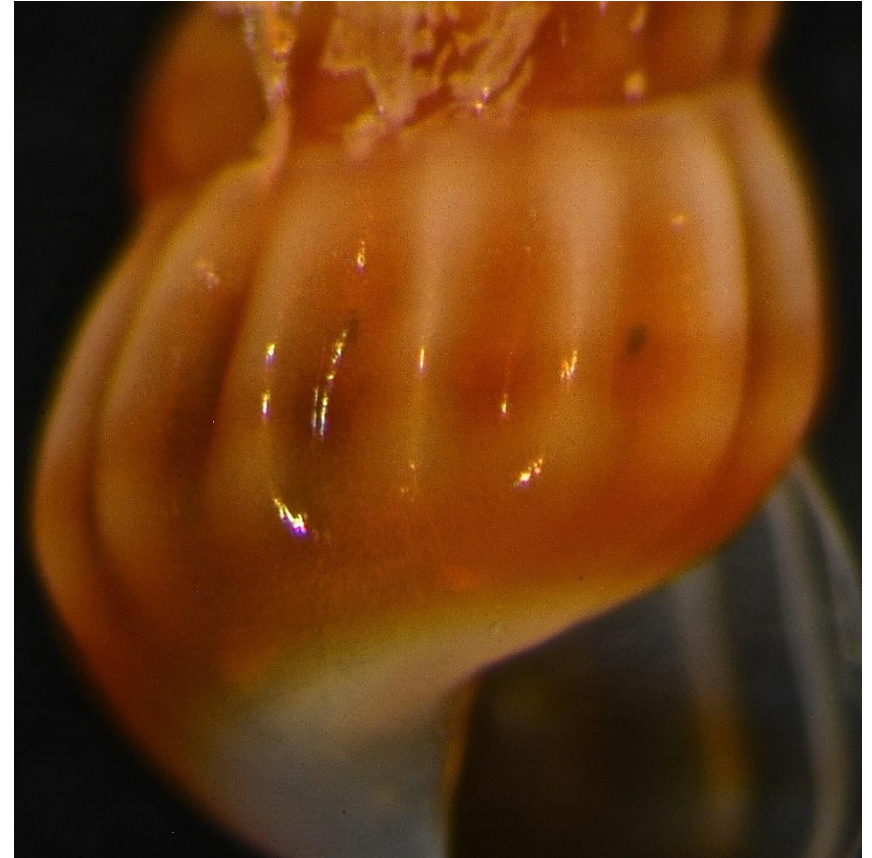
# ***Turbonilla* sp 10 Phillips 2016**

***Turbonilla* sp Mont1 Phillips 2014**

- **Shell reddish-brown, 7 mm**
- **Whorls rounded**
- **Aperture auricular shaped**
- **25 axial ribs, intercostal spaces narrow**
- **Spiral sculpture absent**
- **Spiral striations present**
- **Axial ribs extend onto base**
- **Monticeto 10m**

# *Turbonilla chocolata* (Carpenter 1864)

*Turbonilla* sp LAH1 Phillips 2010



HM13 (LAH) 16m 2013

# *Turbonilla chocolata* (Carpenter 1864)

*Turbonilla* sp LAH1 Phillips 2010



HM10 (LAH) 24m 2010



# *Turbonilla chocolata* Carpenter 1864

*Turbonilla* sp O MBC 1982



SERRA 30m 1982

# ***Turbonilla chocolata* (Carpenter 1864)**

*Turbonilla* sp LAH1 2010/SMB1 2001 in part

*Turbonilla* sp O MBC 1982

- **Shell reddish-brown/white bands, 4mm**
- **Whorls rounded**
- **Aperture auricular shaped**
- **14-16 axial ribs**
- **Spiral striations present**
- **Spiral sculpture absent**
- **Axial ribs extend onto base**
- **LAH, SMB - Goleta 10-30m**

# *Turbonilla chocolata* (Carpenter 1864)

*Turbonilla* sp SMB1 Phillips 2001 in part



Oxnard 30m 2014



# *Turbonilla chocolata* (Carpenter 1864)

*Turbonilla* sp SMB1 Phillips 2001 in part



Oceanside 30m

2014



# *Turbonilla chocolata* (Carpenter 1864)

*Turbonilla* sp SMB1 Phillips 2001 in part



SMB B7 46m 2009

# *Turbonilla chocolata* (Carpenter 1864)

*Turbonilla* sp SMB1 Phillips 2001 in part



SMB FA17 97m 2010



# *Turbonilla chocolata* (Carpenter 1864)

*Turbonilla* sp L MBC 1981



Goleta 30m 1992

# ***Turbonilla chocolata* (Carpenter 1864)**

*Turbonilla* sp SMB1 Phillips 2001 in part

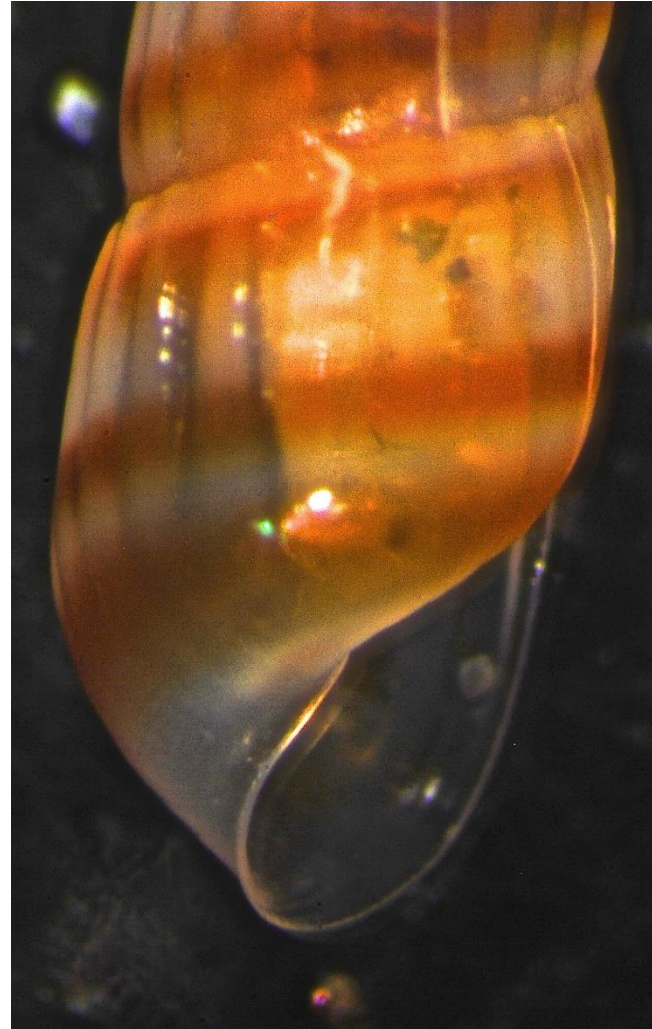
*Turbonilla* sp L MBC

- **Shell reddish-brown/white bands, 5 mm**
- **Whorls rounded**
- **Aperture auricular shaped**
- **20-24 strong axial ribs**
- **Spiral striations present**
- **Spiral sculpture absent**
- **Axial ribs extend onto base**
- **Oceanside to Goleta 15-75m**



# *Turbonilla chocolata* (Carpenter 1864)

*Turbonilla* sp SMB4 Phillips 2011



Oceanside 30m 2014

# *Turbonilla chocolata* (Carpenter 1864)

*Turbonilla* sp SMB4 Phillips 2011



SMB D1 75m 2011



# *Turbonilla chocolata* (Carpenter 1864)

*Turbonilla* sp SMB4 Phillips 2011



SMB A3 16m 2011

# *Turbonilla chocolata* (Carpenter 1864)

*Turbonilla* sp SMB4 Phillips 2011



Zuma 17m 2011



# ***Turbonilla chocolata* (Carpenter 1864)**

***Turbonilla* sp SMB4 Phillips 2011**

- **Shell reddish-brown/white-opaque bands, 4 mm**
- **Whorls rounded**
- **Aperture auricular shaped**
- **20 weak axial ribs**
- **Spiral striations present**
- **Spiral sculpture absent**
- **Axial ribs extend onto base**
- **Oceanside to Zuma 15-75m**

*Turbonilla chocolata* (Carpenter 1864)



# Literature

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