

NEW SPECIES OF *PACHNODUS* (GASTROPODA: ENIDAE) FROM SEYCHELLES

J. GERLACH¹

(Accepted for publication, May 21st 1994)

Abstract: The genus *Pachnodus* (Enidae) from Seychelles is reviewed and descriptions of a hybrid form, *P. niger* × *P. velutinus*, and the new species *P. beckettii* and *P. oxoniensis* are given.

Key words: Seychelles, Mahé Praslin, Silhouette, *Pachnodus*, Enidae, hybrid, taxonomy.

INTRODUCTION

The genus *Pachnodus* (Enidae) is endemic to the Seychelles islands. Several species of the genus have been described by many collectors in the last 150 years. The first of these was by Dufo in 1840, who collected three species from Mahé; *Bulimus ornatus*, *B. niger* and *B. strigilosus* Férussac. Subsequent collectors generally described all species similar in appearance to Dufo's original description of *Pachnodus ornatus* as this species. Pfeiffer (1841) listed two new species (*Bulimus fulvicans* and *B. velutinus*) but the description of the former is too vague to determine the species. Nevill (1868) listed three forms; *Bulimus fulvicans*, *B. fulvicans* var. *nigra* and *Bulimus velutinus*, whereas Martens (1898) recorded *Bulimus (Pachnodes) velutinus* and four varieties of *B. ornatus*; *ornatus*, *niger*, *fulvicans* and *biornatus*. Sykes (1909) only listed two species (*Pachnodus ornatus* and *P. velutinus*) but Barnacle (1968) included three species (*P. ornatus*, *P. fulvicans* and *P. velutinus*) in his list.

Most of the confusion surrounding the species of the genus was cleared by Van Mol & Coppo (1980) who described two subgenera; *Pachnodus* containing *P. velutinus* (Pfeiffer), *P. lionneti* Van Mol & Coppo and *P. niger* (Dufo), and *Nesiocerastus* containing *P. ornatus* (Dufo), *P. silhouettanus* Van Mol & Coppo, *P. fregatensis* Van Mol & Coppo and *P. kantilali* Van Mol & Coppo. In the process of their revision they changed the type locality of *P. ornatus* from Mahé to Praslin, on the basis of the apparent absence of a species on Mahé resembling the type description of this species.

In 1990 the *Nesiocerastus* species on Praslin was described as a separate species, *P. prasinus* Gerlach, following the rediscovery of a species on Mahé that is identifiable as *P. ornatus*.

The genus *Pachnodus* according to the current classification (Van Mol & Coppo 1980) comprises eight species divided into two subgenera; *Pachnodus* (*P. velutinus*, *P. lionneti*, *P. niger*) and *Nesiocerastus* (*P. ornatus*, *P. prasinus*, *P. silhouettanus*, *P. fregatensis*, *P. kantilali*). The subgenera are distinguished by the following characters (Van Mol & Coppo 1980):

Pachnodus Globosely conical shell; 5 whorls; mouth edge not significantly expanded. Epiphallus short, without ornamentation. Spermathecal duct generally short; spermatophore short, without toothed ornamentation.

Nesiocerastus Ovately conical shell; 6 whorls; mouth edge expanded into a lip. Epiphallus

¹ Department of Zoology, South Parks Road, Oxford, OX1 3PS.

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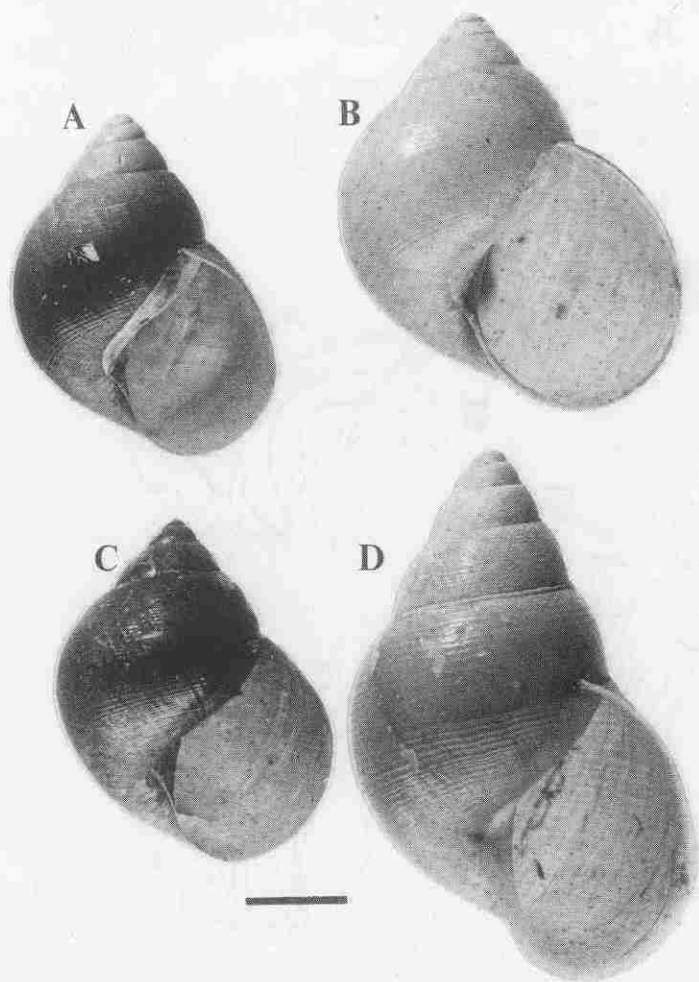


Fig. 1. Shells of: A. *P. niger subfuscus* n. ssp. B. *P. beckettii* n. sp. C. *P. niger* × *velutinus* comb. nov. D. *P. oxoniensis* n. sp. scale bar = 10mm

Comparisons: This form differs from the nominate subspecies on Mahé in general colouration, the shell and body being lighter than the typically black Mahé individuals. The relative proportion of the shell dimensions also differ (given in mm below):

		Mahé	Praslin
Height	range	12.2–16.7	10.8–15.1
	mean	14.5	12.5
	sd.	1.4	1.4
	n	6	4
Diameter	range	7.6–10.6	8.7–13.2
	mean	9.0	10.7
	sd.	1.0	1.4
	n	6	4

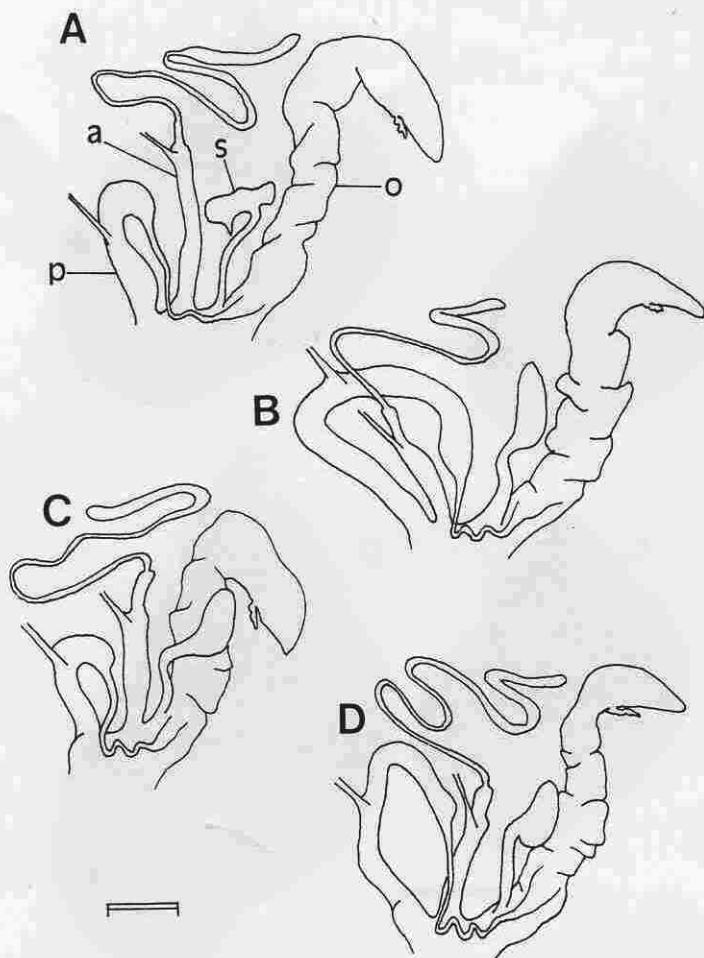


Fig. 2. Reproductive anatomy of: A. *P. velutinus* B. *P. niger* C. *P. beckettii* D. *P. niger* × *velutinus* scale bar = 5mm
key: a = appendix, o = spermooviduct, p = penis, s = spermatheca

Mouth height	range	8.8-9.1	8.8-10.7
	mean	9.0	9.9
sd.	0.4	0.9	0.9
n	6	4	4

There are no significant differences in the reproductive anatomy of the two forms. The radula formulae of the two forms are clearly distinct, as are the shape of the teeth:

	Mahé	Praslin
Formula	181+11+1C+11+181	162+14+1C+14+162

In the absence of any clear differences in reproductive anatomy these populations cannot be considered distinct species. However, the marked differences in their radulae indicate

that the populations have diverged sufficiently to merit subspecific status. Accordingly the Mahé form is the nominate subspecies on account of its original description (Dufó 1840).

Material studied: 4 specimens; 4/7/90 (1 holotype in the British Museum (Natural History) – BMNH 1993–083), 9/1/93 (3 measured but not collected).

Etymology: The subspecific name *subfuscus* refers to the dull colour of this form.

Pachnodus (Pachnodus) beckettii n. sp.

Shell (Fig. 1): Shell globosely conical with a slight depression near the mouth edge of the last whorl in some specimens; thin (0.05–0.1 mm thick) but strong in most specimens although one population (Montagne Planeau) has very fragile shells often damaged in handling. Surface dull with well defined fine spiral ridges and faint irregular radial ones, both variable in number. Five whorls in addition to the two of the protoconch. Apex blunt; slight suture on the last whorl. Columella edge partially covering the 1–1.5 mm wide umbilicus. In most specimens there is a very slight reflection of the mouth edge, in a few specimens this becomes much enlarged producing a distinct lip 1–1.5 mm wide, this is never thickened. Colouration light grey or beige.

Dimensions:

Height	range = 12.5–14.3mm mean = 13.4 sd. = 0.8 n = 12
Diameter	range = 10.8–12.1mm mean = 11.3 sd. = 0.7 n = 12
Mouth height	range = 6.9–10.3mm mean = 8.7 sd. = 1.2 n = 12

Body: Body colouration fawn; tail keel slightly lighter; mantle grey with white markings; pallal cavity border light beige or off-white with some white markings; rectum banded black and white.

Anatomy: Radula (Fig. 3): Formula = 209+11+1C+11+209

Reproductive anatomy (Fig. 2): Penis short and strongly curved over; retractor muscle attaches 3/4 of the way up the penis; appendix long. Spermatheca simple in shape with a short duct. Spermatophore simple in shape, similar to that of *P. velutinus*.

Distribution: Mahé; Montagne Planeau (600 m, primary forest patches), Mount Sebert (450–550 m, forest invaded by exotic plants), La Reserve & Brullée (250–500 m, primary palm forest). This species is largely arboreal, being found on shrubs, trees and occasionally on the ground.

This species appears to be most closely related to *P. velutinus* which it resembles in the colouration of the border of the pallal cavity and the banded pattern on the rectum. Both species have short, curved penes and relatively long appendices. They differ in the penial retractor muscle of *P. velutinus* attaching lower down than in *P. beckettii* and the spermatheca are highly distinct. The radulae are also distinctive:

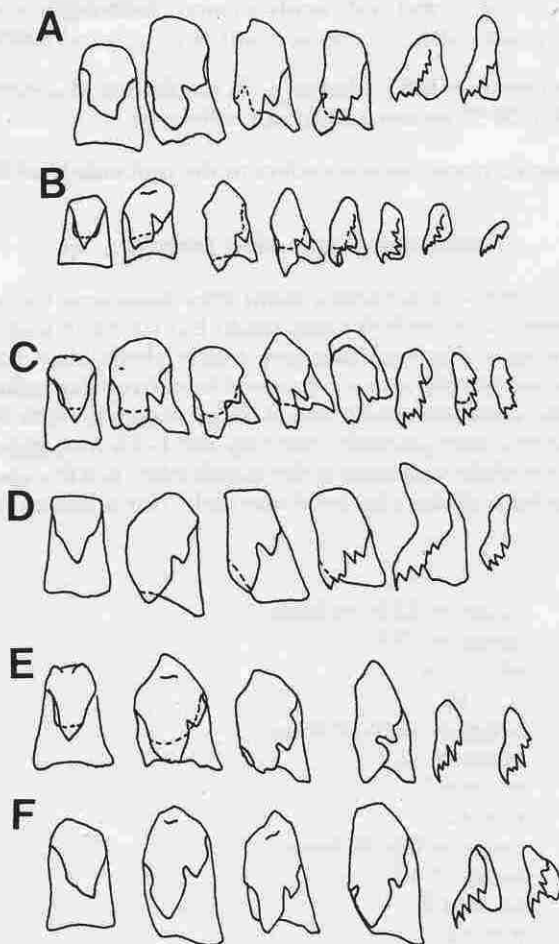


Fig. 3. Radula teeth of (tooth numbers given after each species): A. *P. velutinus* (C,1,9,10,25,100) B. *P. lionneti* (C,1,9,11,12,25,100,150) C. *P. n. niger* (C,1,9,12,16,25,100,160) D. *P. niger subfuscus* (C,1,925,30,100) E. *P. niger* × *velutinus* (C,1,9,12,25,100) F. *P. beckettii* (C,1,9,12,25,100)

	Formula
<i>P. beckettii</i>	209+11+1C+11+209
<i>P. niger niger</i>	181+11+1C+11+181
<i>P. niger subfuscus</i>	162+14+1C+14+162
<i>P. velutinus</i>	220+11+1C+11+220
<i>P. lionneti</i>	174+11+1C+11+174

Material studied: 12 specimens; 21/7/87 (1 holotype and 2 paratypes in the British Museum (Natural History) – BMNH 1993–082), 1/4/88–1/1/90 (9 specimens in the Nature Protection Trust of Seychelles collection).

Etymology: This species is named after Mrs. E. Beckett, a naturalist of Seychelles.

Pachnodus (Pachnodus) niger × *velutinus*

Shell (Fig. 1): Shell globosely conical; strong but variable in thickness (0.05–1.5mm); surface dull or shiny; spiral and radial ridges variable in number. 5 whorls in addition to the 1.5–2 of the protoconch; ornamented with fine regular radial ridges at the sutures. Apex blunt; umbilicus open (1–1.5mm wide), partially covered by the columella; mouth edge sometimes slightly relaxed but never a true lip. Colouration dark reddish brown or black, specimens with fawn shells are very rare.

Dimensions:

Height	range = 9.9–14.9mm mean = 11.84 sd. = 1.3 n = 20
Diameter	range = 9.5–14.0mm mean = 11.9 sd. = 1.3 n = 20
Mouth height	range = 6.5–11.3mm mean = 8.8 sd. = 1.3 n = 20

Body: Body usually dark grey or black, often lighter on the sides; central region of sole distinctly lighter. Very rare fawn specimens have a pinkish fawn central part of the sole. Mantle grey or brown with white markings; mantle cavity border is off white or beige with distinct pinkish tinge; rectum banded black and white.

Anatomy: Radula (Fig. 3): Formula = 188–192+11+1C+11+188–192 the number of marginals appears to be variable.

Reproductive anatomy (Fig. 2): Penis long; retractor muscle attaches approximately half-way up its length; appendix shorter than the penis. Spermathecal duct short. The spermatophore has not been observed.

Distribution: Mahé; Trois Frères & Le Niol (250–650m), Mare aux Cochons (250–450m), Mount Coton (400–600m), Casse Dent (370m), Morne Blanc (400–667m), Copolia (400–497m), Grande Anse (150–350m), Bernica (Montagne Palmiste) (100–250m) – all forest areas with exotic plant invasion. This form is found both on vegetation and on the ground.

This form cannot reliably be distinguished from *P. velutinus* or *P. niger* on shell characteristics, as it covers the range of variation found in both species. The black and white banding on the rectum would place it in the *P. velutinus*, *P. beckettii* group whereas its reproductive anatomy suggests close affinity to *P. niger*. The radula formula is highly variable, this is the only *Pachnodus* taxon to show any variation in formula. These differences indicate that it is a distinct form, either an undescribed species intermediate between all the Mahé species or a hybrid. Hybridization seems to be the most likely origin as its characters are intermediate without any evidence of derivation. It has been observed mating with individuals of both *P. velutinus* and *P. niger*, producing viable offspring (pers. obs.) and occupies a geographical position between the two species presumed to be parental.

Material studied: 30 specimens; 1/1/87 (2 specimens in the British Museum (Natural History) – BMNH 1993–085), 30/7/87–10/1/90 (28 specimens in the Nature Protection Trust of Seychelles collection).

Pachnodus (Nesiocerastus) oxoniensis n. sp.

Shell (Fig. 1): Shell ovately conical, >2 mm thick and strong; slightly shiny and crossed by numerous spiral ridges and radial growth lines. Some specimens have a satiny appearance. 6 whorls with an additional 2 smooth or radially ridged ones on the protoconch; slight sutural ridge present. Apex blunt; umbilicus covered by the reflexed columella; strong mouth edge lip up to 3 mm wide. Colouration variable from black with an orange band at the top of each whorl through orange and pink forms to an almost white colour.

Dimensions:

Height	range = 27.8–30.0mm mean = 28.8 sd. = 1.0 n = 8
Diameter	range = 15.2–18.1mm mean = 16.5 sd. = 1.0 n = 8
Mouth height	range = 14.1–14.9mm mean = 14.6 sd. = 0.5 n = 8

Body: Body colour varies with shell colour. Pale shelled forms fawn or beige; grey tentacles; beige soles. Black shelled forms black with grey central foot region. Mantle beige with white markings; rectum white in all forms. In pale forms pallial cavity border beige, black outside and white inside in black forms.

Anatomy: Radula (Fig. 5): Formula = 183+9+1C+9+183.

Reproductive anatomy (Fig. 4): Penis long; epiphallus ribbed just over half its length. Penis approximately four times as long as appendix; retractor muscles joined. Spermatophore not observed but believed to be typical of the subgenus as no specific variation has been recorded in other members.

Distribution: Silhouette; Mount Pot a eau (500–621m, primary mist forest), Mount Dauban (600–720m, primary mist forest), *Pisonia sechellarum* forest (450–520m, primary forest). Found on vegetation 1.5–4m above the ground.

Comparisons: This species has a broad, thick shell as is found in *P. ornatus* and *P. praslinus*. It differs from the latter in the penial and appendicular retractor muscles being joined. It differs from *P. ornatus* in having ribbing on the upper part of the penis only and in the retractor muscle attaching higher up. The radula is distinct:

	Formula
<i>P. oxoniensis</i>	183+9+1C+9+183
<i>P. ornatus</i>	157+9+1C+9+157
<i>P. praslinus</i>	152+9+1C+9+152
<i>P. silhouettanus</i>	156+9+1C+9+156
<i>P. fregatensis</i>	107+9+1C+9+107
<i>P. kantilali</i>	162+9+1C+9+162

Material studied: 8 specimens; 1/4/90 (1 holotype and 1 paratype in the British Museum (Natural History) – BMNH 1993–084), 2/4/90–8/9/90 (6 specimens in the Nature Protection Trust of Seychelles collection).

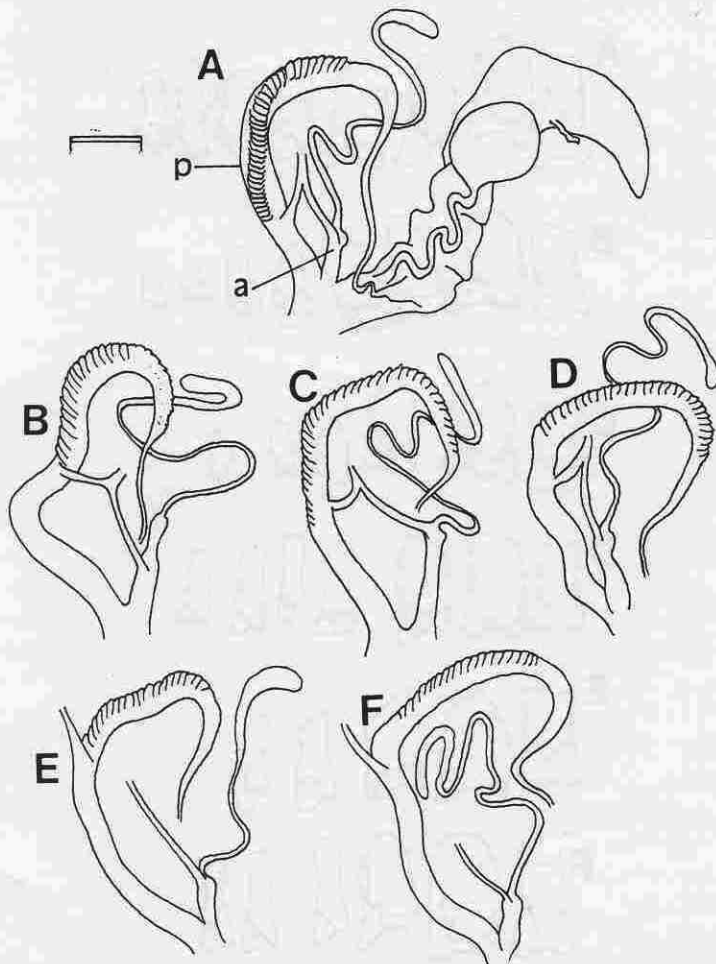


Fig. 4. Reproductive anatomy of: A. *P. ornatus* B. *P. oxoniensis* C. *P. kantilali* D. *P. fregatensis* E. *P. prasinus* F. *P. silhouettanus* scale bar: 5 mm key: a = appendix, p = penis.

Etymology: This species is named after the Oxford University Silhouette Expedition 1990 which discovered the species.

An additional species of the subgenus *Nesiocerastus* is recorded from La Digue. Five bleached subfossil shells have been collected. No live specimens have been located and this form may be extinct. The shells appear to belong to an undescribed species, approaching *P. prasinus*. It is not appropriate to describe this species until such time as a thorough search has been made on La Digue to determine if any live specimens remain.

Notes on colouration: In several species (*P. lionneti*, *P. niger* × *velutinus*, *P. ornatus*, *P. silhouettanus*, *P. kantilali* and *P. oxoniensis*) a variety of colour forms have been recorded. The shell and body patterns are affected by the physiological condition of the animal. Colour changes have been observed in captivity, presumably as a result of dietary changes and ageing effects. The form with the most distinctive changes is *P. ornatus* var. *biornatus* where a consistent lightening of

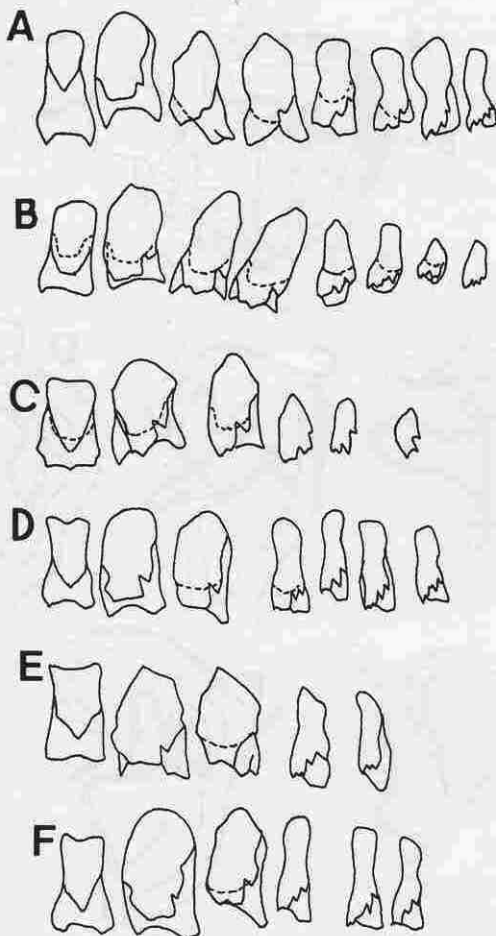


Fig. 5. Radula teeth of (tooth numbers are given after each species): A. *P. prasinus* (C,1,9,11,25,75,110,150) B. *P. silhouettanus* (C,1,8,9,25,75,100,150) C. *P. fregatensis* (C,1,9,25,75,100) D. *P. kantilali* (C,1,9,25,75,100,145) E. *P. ornatus* (C,1,9,25,100) F. *P. oxoniensis* (C,1,9,12,25,100)

the external colouration was recorded. A similar change was recorded in one specimen of the typical *P. ornatus*. These changes take place over a time span of between a week and a month.

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