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# Abnormality of Shell-Plates in *Chiton cumingsii* Frembly, 1827 (Mollusca: Polyplacophora: Chitonidae)

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**KEY WORDS:** Polyplacophora, Chitonidae, *Chiton cumingsii*, abnormality

**ABSTRACT** Shell abnormatity is illustrated and described for the first time for *Chiton cumingsii* Frembly, 1827. One hypomerism specimen with 7 valves is reported. The other specimen shows an interesting defect, the head valve is injured in the anterior part and has developed a new insertion plate under the already existing one.

**RIASSUNTO** Per la prima volta sono descritte ed illustrate anormalità della conchiglia in *Chiton cumingsii* Frembly, 1827. Viene riportato un'individuo con 7 valve. Un altro individuo mostra la seguente anomalia: la placca di testa è danneggiata nella parte anteriore ed ha sviluppato una nuova placca sotto quella esistente. I risultati vengono discussi alla luce di altre segnalazioni bibliografiche.

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## INTRODUCTION

Shell abnormality in chitons is a well known phenomenon, reported by several authors for different species. Within the teratology of the Polyplacophora we differentiate four cases of abnormality (TAKI, 1932; DELL'ANGELO & TURSI, 1990):

*hypomerism* – less than the regular eight plates

*hypermerism* – more than the regular eight plates (so far only 9-valved specimen are known)

*coalescens* – the coalescence (connection) of a plate with the adjacent plate (in most cases with the reduction, or partly reduction of the plate)

*splitting* – the division of a plate in different parts (in most cases at least one of the parts build a coalescence )

DELL'ANGELO & TURSI (1990) presented a complete list of previously reported abnormal species. According to this work no record of abnormality has ever been mentioned from *Chiton cumingsii* Frembly, 1827, although this is a common species.

## MATERIAL

The material investigated belongs to the molluscan collection of the Zoological State collection Munich (ZSM) and are registered under the numbers „20000381" and „20000600". Both specimens are dry preserved and lack their soft parts.

A regular grown specimen of *Chiton cumingsii*, which was used for comparision with the 7-valved specimen (ZSM 20000381), is registered under the ZSM number „20000466". It was collected in 1919 in Valparaiso, Chile and is also dry preserved, without soft parts.

## DESCRIPTION

*Chiton cumingsii* Frembly, 1827
Fig. 1

One specimen belonging to the Zoological State collection Munich (ZSM 20000381) was collected in Chile and is part of the Flossmann collection, which became property of the ZSM in 1915.

It measures 41 x 24.5 mm, is flat and dry preserved with the soft part lacking. It is a hypomerism specimen in which the 7 plates are of regular form and size. Comparision with a regular grown specimen (ZSM 20000466) of the same size shows, that in the 7-valved specimen nearly all plates are somewhat larger than in the 8-valved one. (see Table 1)

*Chiton cumingsii* Frembly, 1827
Fig. 2 (A-C)

This specimen (ZSM 20000600) shows an abnormality which better should be interpreted as defect, because none of the terms used in teratology characterises the features investigated in this specimen.

The animal belongs to the Dr. W. Blume collection (Nr. 6546) and is labeled as „*Chiton (Chiton* Sect. *Radsia) cumingi* Fremb".

The locality mentioned on the original label ( „Ind. occ." ) surely based on the handwritten „West Indien" on the articulamentum of the tail valve. Both interpretations are wrong, as the species never was found in the Caribbean Sea. It lives along the western coast of South America from Peru southwards to Chile.

The specimen (the head valve has been removed) measures 38.8 x 26.3 mm, is flat preserved and lacks the soft part.

The tegmentum on the head valve is defect by having a superficial incision (see Figs. 2B-C). The inner shell layer (articulamentum) is visible in form of insertion plate (8 slits). The interior surface appear normal except for the valve-defect which is showing through. The articulamentum of head valve shows 15 distinct slits.

## DISCUSSION

TUCKER and GIESE (1959) have shown that few species belon-

ging to the class Polyplacophora are able to repair their valves when they are defect. The process is rather complex and differs in the degree of perfection from species to species. The time needed for the repair seems to depend on the weight of the injured valve and also on the form of violation.

DELL'ANGELO and PALAZZI (1983) have described an abnormal duplication of tegmentum and articulamentum (insertion teeth) in *Callochiton septemvalvis* (Montagu, 1803) [as *Callochiton achatinus* (Brown, 1823)], which seems to be the same case as in the herein described second specimen of *Chiton cumingsii* Frembly, 1827 (ZSM 20000600) (Fig. 2). The valve-defect possibly was caused by an injured girdle in the juvenil specimen. Since the soft parts of the head are situated directly under the valve, the repair of this part might be of great value. The specimen, however, only produced a thin nacreous layer of articulamentum which covers the defect internally, but it was not able to repair the valve completely.

A similar defect was observed in the tail valve of a specimen of *Ischnochiton tridentatus* Pilsbry, 1893, also present in the ZSM (19990473).

The form of abnormality described above seems rather rare, as only four species are reported so far – *Callochiton septemvalvis* (see DELL'ANGELO and PALAZZI, 1983; BASCHIERI, DELL'ANGELO & PALAZZI, 1992 [*Callochiton septemvalvis euplaeae*]), *Chiton (Rhyssoplax) etruscus* (see DELL'ANGELO & FORLI, 1995), *Ischnochiton tridentatus* and *Chiton cumingsii* (this report).

| Number | 7-valved 41 x 24.5 | | 8-valved 40.5 x 23.7 | |
|---|---|---|---|---|
| | l | w | l | w |
| I | 7.8 | 16.7 | 6.8 | 14.2 |
| II | 7.1 | 19.1 | 5.2 | 16 |
| III | 3.3 | 21.4 | 4.1 | 17.2 |
| IV | 5.2 | 20.1 | 3.8 | 17.8 |
| V | 5.5 | 20.8 | 4.7 | 17.7 |
| VI | 4.6 | 19.2 | 4.5 | 17.7 |
| VII | - | - | 3.9 | 17 |
| VIII | 8.6 | 16.5 | 7.3 | 15.2 |

Table 1. *Chiton cumingsii* Frembly, 1827, valve dimensions, l – length, w - width (all measurements are in mm)

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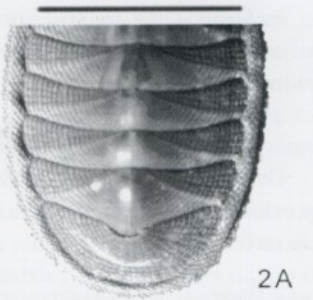
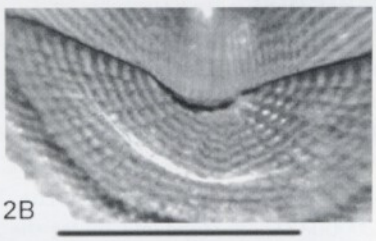
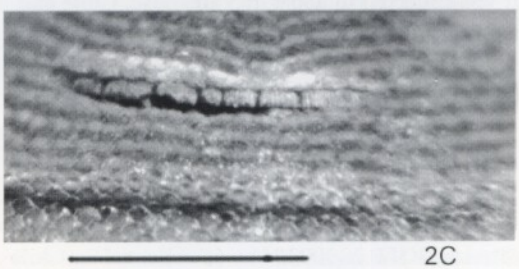
Figs 1 *Chiton cumingsii* Frembly, 1827 (ZSM 20000381), dorsal view (scale bar 2 cm)







Figs. 2 *Chiton cumingsii* Frembly, 1827 (ZSM 20000600); A. dorsal view (scale bar 2 cm); B. close up of the head valve, showing the defect in dorsal view (scale bar 1cm); C. detail of the defect, showing the insertion plate, frontal view (scale bar 0.5 cm)