New Records of Chitons (Mollusca: Polyplacophora) from Hawaii, including the Description of a New Species of
Weedingia Kaas, 1988

Enrico Schwabe¹* and Cory Pittman²

¹Department of Mollusca, Bavarian State Collection of Zoology, Muenchhausenstrasse 21, D-81247 Muenchen, Germany
²Box 23, Fairfield, WA 99012, USA

Abstract: Extensive examination of sand samples and re-evaluation of collected material allow us to present for the first time the occurrence of four genera of Polyplacophora which were previously unknown from Hawaiian waters. Leptochiton sp. and Ischnochiton sp. are identified from isolated valves only. Lucilina cf. pacifica (Leloup, 1981) and Weedingia poulayi n. sp. are also represented by numerous isolated valves but their occurrence is confirmed by complete specimens. The latter, a species new to science, is described herein. It is morphologically distinguishable from its three congeners by a round tail valve with terminal mucro, a characteristic so far unknown for this genus. With the record of these four taxa, the shallow water chiton fauna of the Hawaiian Islands is increased from previously recorded five species belonging to four genera within four families to nine species belonging to eight genera within six families. While the genus Weedingia is a typical representative of the Polynesian fauna, the genus Ischnochiton is confirmed for the first time.

Keywords: Polyplacophora, Pacific Ocean, systematics, diversity

Introduction

Around sixty years after James Cook “discovered” and named the Sandwich Islands (the current Hawaiian Islands) (Bouchet, 2011), the first mention of a chiton from this isolated archipelago occurred in the literature (Jay, 1839: 37). Unfortunately, Chiton inornatus, a manuscript name given by Nuttall, was never described and lacks any indication that would make an allocation to a known species possible. When Gould (1846) described his Chiton petaloideas (now in Stenoplax) from the Sandwich Islands this island group revealed its first record of its Polyplacophoran fauna. Around 30 years later Pease (1872) raised the number of chitons originally described from Hawaii to three with Acanthochites armatus and A. viridis, which are now placed under Acanthochiton. Despite an extensive examination of the malacofauna of this island group at the beginning of the 20th century (for more information see Bouchet, 2011) it took a century for the next native species (Rhyssoplax linsleyi Burghardt, 1973) to be added. In 1979, Kay compiled the first comprehensive work on marine molluscs from Hawaii with around 1000 species (966 shelled molluscs), including the four above mentioned chitons as the sole members of the group.

The most recent compilation of marine sea shells by Severns (2011) shows an increase in the number of shell-bearing molluscs to 27.5% since Kay (1979) (Bouchet, 2011). And, what about the chitons? Anseeuw (2011) summarized our present knowledge and added the last known chiton

* Corresponding author: enrico.schwabe@zsm.mwn.de
from Hawaii (Plaxiphora kamehamehae Ferreira & Bertsch, 1979) making a total of five species.

Extensive examinations of sediment and the near shore fauna by one of us (CP) yielded four more taxa, previously unknown from Hawaii, which are presented herein.

Material and Methods

Sediment samples and specimens were collected by Cory Pittman, students and colleagues during several field trips to Hawaii. Isolated valves were handpicked from sediment and sent to Enrico Schwabe for either identification or verification. The single wet preserved sample was sent, on request, by the Florida Museum of Natural History (FLMNH) where it is deposited. This sample and additional valves from French Frigate Shoals were the only material with original georeferences. All other localities were searched for in several sources (World Wide Web, Google Earth or maps) and their locations are approximated (in brackets). Remaining samples belong to the private collection of Cory Pittman. Material treatment for scanning electron microscopy follows Schwabe & Ruthersteiner (2001).

Systematics follows Sirenko (2006), except for the genus Lucilina. For this we follow Schwabe et al. (2008).

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**Fig. 1.** Newly recorded Hawaiian species based on complete animals. A–D. Weedingia paulayi n. sp., holotype (FLMNH UF 415631), from French Frigate Shoals; A, dorso-lateral view of the specimen, in fresh condition; B, left lateral view, preserved specimen; C, dorsal view, anterior portion, preserved specimen; D, dorsal view, posterior part, preserved specimen. E. Lucilina cf. pacifica (Leloup, 1981), specimen from Maui, Hekili Point, dorsal view. Scale bars: A–D = 1 mm; E = 500 μm.
Systematics

Class Polyplacophora Gray, 1821
Subclass Neoloricata Bergenhayn, 1955
Order Lepidopleurida Thiele, 1909
Suborder Lepidopleurina Thiele, 1909
Family Leptochitonidae Dall, 1889

Genus *Leptochiton* Gray, 1847

*Type species:* *Chiton cinereus (sensu)* Montagu 1803 (*non* Linnaeus, 1767) = *Leptochiton asellus* (Gmelin, 1791), subsequently designated by Gray (1847).


*Leptochiton* sp.

(Fig. 2)

*Material:* Maui, Maalaea Bay (20°45′55″N, 156°29′12″W), beach drift, leg. Cory Pittman 1987; 2 intermediate valves, 1 tail valve (3 valves in total).

*Description:* Valves minute and very fragile. Intermediate valves very short and at least 3 times wider than long (figured valve measures 500 × 1730 μm). Anterior and posterior margins straight, side margins well-rounded (Fig. 2A). Valves round-backed and not keeled. Lateral areas hardly elevated but distinctly marked by their sculpture (Fig. 2B). Length of tail valve only half

![Fig. 2. *Leptochiton* sp. from Maui, Maalaea. A. Dorsal view of intermediate valve. B. Close-up of Fig. 2A, showing the ornamentation of lateral area and pleural area. C. Dorsal view of tail valve. D. Left lateral view of tail valve. Scale bars: A = 500 μm; B–D = 100 μm.](image-url)
the width (measuring 600 × 1360 μm). Outline semicircular with a well-rounded posterior margin and a straight anterior margin with a shallow depression in the otherwise slightly anterior extending jugal area (Fig. 2C). Muro centrally located, not swollen and backward directed while postmucronal slope steep and strongly concave (Fig. 2D). Sculpture very pronounced (Fig. 2B) with strongly elevated commarginally arranged granules in lateral and postmucronal areas. Each granule has a nearly central situated megalae aesthetes surrounded by three microae aesthetes, two laterally situated and one towards the valve’s middle. Pleural and antemucronal areas more flattened, drop-shaped granules arranged longitudinally and connected giving a ribbed appearance. Jugal areas not smooth, but less distinctly ornamented. Total number of longitudinal ribs 30 in the illustrated intermediate valve (Fig. 2A), while about 20 in tail valve (Fig. 2C). Articulamentum thin and white with apophyses being very short and widely separated. Distances between apophyses 2.1 times wider than their maximum width.

**Remarks:** The illustrated valves have more or less the same size. If we simplify this and calculate the same measurements for all valves (the girdle, usually very small in this genus, is neglected since the overlapping zone of the last seven valves should be similar) the total species size would be around 4.4 mm. Based on this calculation and the available material, the present species superficially resembles *Leptochiton cancelloides* Kaas, 1982 which was described from the Philippines in a depth of around 130 m. That species is around 6 mm long, but the tail valve is longer than in the present material and the number of longitudinal rows in the central area of the intermediate valves is c. 50. If the above mentioned calculation is realistic, these characteristics could be the result of the larger size of its type material. General valve shape and granulation of our material is similar to *L. cancelloides*. The present material also resembles *L. norfolcensis subtropicalis* (Iredale, 1914) (compare Kaas & Van Belle 1985) except for the shallow notch in the anterior margin of the tail valve which is straight in that species. Also, the granulation is arranged radially in the lateral areas in *L. norfolcensis subtropicalis* but commarginally in the present material.

Recently Sirenko & Schwabe (2011) described a minute leptochitonid from Sri Lanka, which looks like a much younger stage of the present species. Compared to the herein presented species their *L. muelleri* attains only half the calculated size, the anterior margin of the tail valve is straight (and shows no depression) while the muro is situated more anteriorly.

Another similar, but much smaller, species is *L. periscitus* Kaas, 1991 which was described from New Caledonia from a depth of 110 m. This species differs from our material in being carinated, having narrower and more extended apophyses and having slightly elevated lateral areas.

More material would be necessary for a final identification but the first occurrence of the genus *Leptochiton* in Hawaiian waters is still noteworthy enough. The nearest record of a leptochitonid to Hawaii is, so far, the abyssal record of *Leptochiton belknapi* Dall, 1878 15° north of Hawaii (see Schwabe, 2008, for details).

Order Chitonida Thiele, 1909
Suborder Chitonina Thiele, 1909
Family Ischnochitonidae Dall, 1889

Genus *Ischnochiton* Gray, 1847

**Type species:** *Chiton textilis* Gray, 1828, by subsequent designation (Gray 1847, as “*Chiton textile*” Gray, 1828).

**Distribution:** Except for the northern Atlantic and the Arctic Oceans, worldwide. Eocene–Recent.
Ischnochiton sp.
(Fig. 3)

Material: French Frigate Shoals (23°53′N, 166°14′W), sand sample at 4.6 m, leg. Cory Pittman, Oct 16, 2006; 5 head valves, 23 intermediate valves, 7 tail valves (35 valves in total).

Description: Color tan to brownish, isolated brighter freckles occur especially at apical zones. Head valve (Fig. 3A) semicircular, posterior margin straight, slightly notched in middle, width wider than length, anterior slope straight (Fig. 3B). Intermediate valve (Fig. 3C) rectangular, round backed, not keeled (Fig. 3D), posterior margin straight, apex not indicated, anterior margin straight (slightly extended in the middle), side margins well rounded, side slopes straight, lateral and jugal areas hardly traceable, moderately elevated (dorsal elevation in illustrated valve 0.3). Tail valve (Fig. 3E, F) more than semicircular, only slightly wider than long, posterior margin well rounded, anterior margin straight (slightly backwards directed), diagonal ridge hardly

![Fig. 3. Ischnochiton sp. from French Frigate Shoals. A. Dorsal view of head valve. B. Left lateral view of head valve. C. Dorsal view of intermediate valve. D. Intermediate valve in profile. E. Dorsal view of tail valve. F. Left lateral view of tail valve. Scale bars = 100 μm.]
indicated, micro slightly behind the middle, flat and anteriorly directed, postmucronal slope steep and straight. Tegmentum all over granulated; granules arranged quincuncially; dense in head valve, lateral areas and postmucronal area; central area and antemucronal area with less dense granulation giving the surface a pitted appearance. Growth lines visible in head valve, lateral areas and postmucronal area. Articulamentum solid, porcellaneous white to translucent (sometimes tegumentum coloration shines through). Apophyses short, widely separated and trapezoid. Slit formula: 8/1/9 (with minute secondary incisions). Slits short (sometimes hardly visible) with slit rays clearly present. Slits slightly thickened, heterogeneous in width, roughened on the outside.

**Remarks:** The general valve shape, slit numbers and slit peculiarities lead us to place the valves in the genus *Ischnochiton* following Kaas & Van Belle (1990) but we failed to attribute the material to a known species. The only other member of the family occurring in Hawaii is *Stenoplax petaloides* (Gould, 1846) which differs in having a semicircular tail valve with a straight anterior margin (slightly depressed in the middle), a backwards directed micro, a higher dorsal elevation, less raised lateral areas and short grooves in the pleural areas. The over-all sculpture is much weaker.

Family Chitonidae Rafinesque, 1815

Genus *Lucilina* Dall, 1882

**Type species:** *Chiton confossus* Gould, 1846 [= *Chiton lamellosus* Quoy & Gaimard, 1835], subsequently designated by Pilsbry (1893 in 1892–1894).

**Distribution:** Tropical and subtropical waters of the Indo-Pacific, Neogene–Recent.

*Lucilina cf. pacifica* (Leloup, 1981)

(Figs. 1E, 4, 5)

*Tonicia indica* var. *pacific* – Leloup 1981: 41, pl. 3, fig. 2.

**Material:** Maui, Hekili Point (20°48′39″N, 156°37′17″W), under *Porites rus* Forskål, 1775 colony, about 2 m, leg. student of Cory Pittman, 1986; 5 dried juvenile specimens, not exceeding 2 mm, soft parts dried and unfeasible. Maui, Makuleia Bay (21°00′45″N, 156°38′36″W), beach drift, leg. Cory Pittman, 1984; 4 head valves, 15 intermediate valves, 1 tail valve (20 valves in total) (+ 6 valves of *Stenoplax petaloides*). Maui, La Perouse Bay (20°35′53″N 156°25′14″W), beach drift, leg. Cory Pittman, 1986, 3 head valves, 26 intermediate valves, 2 tail valves (31 valves in total).

**Description:** Juvenile specimens examined do not exceed 2 mm, elongate oval in outline. Coloration reddish to ferruginous (Fig. 1E). Dorsal elevation quotient ranged from 0.45 to 0.48 in three examined valves making the species moderately to highly elevated. Valve profile carinated to subcarinated. Tegmentum sculpture microperforated with very faint longitudinal grooves along the diagonal ridge of intermediate valves. Growth marks clearly visible in head valve, lateral areas and postmucronal area. Ocelli (diameter about 25 μm) distributed in the anterior half of lateral and postmucronal areas and in the posterior half of the head valve. Head valve semicircular (Fig. 5A), with a straight posterior margin which is hardly notched. Intermediate valves rectangular with slightly raised lateral areas and protruding apices (Fig. 5A, C). Tail valve semicircular (Fig. 5A), postmucronal area straight, position of micro anterior (Fig. 5C). Perinotum (Fig. 5E, F) dorsally covered with densely arranged, slightly bent, obtusely pointed scales with up to 5 strong radial ribs. Visible parts of the scales about 18 μm in width.

The examined isolated valves show some more details. Color tan to dirty white. Larger
**Fig. 4.** *Lucilina* cf. *pacific* (Leloup, 1981) from Maui, La Perouse Bay. **A.** Dorsal view of head valve. **B.** Dorsal view of intermediate valve. **C.** Dorsal view of tail valve. **D.** Left lateral view of tail valve. **E.** Close-up Fig. 4B, showing grooves of pleural area. **F.** Close-up of Fig. 4B, showing ocelli. Scale bars: A–D = 500 μm; E = 100 μm; F = 50 μm.

Intermediate valves have more distinct longitudinal grooves along the diagonal ridges (Fig. 4B), up to 10 per side, with the lateral ones longest (reaching the anterior valve margin) and getting shorter towards the undefined jugal region. Tail valve with postmedian not swollen but slightly backwards directed macro (Fig. 4C, D). Articulamentum solid and white, with 8 slits in the head valve and one in intermediate valves. Slits in the available tail valves not countable due to condition but partly present. Teeth solid and broad with a strongly pectinated outer surface and slightly thickened slit rays indicated (but more obsolete) in tail valve. Apophyses solid and widely separated, not connected by a jugal sinus, triangular in intermediate valves, rectangular in tail valves.

**Remarks:** The present material most resembles *Lucilina pacifica* (Leloup, 1981). The material Leloup (1981) listed is all larger than our juveniles, which undoubtedly belong to the same species as the isolated valves. The examined isolated valves are all larger than the juveniles, more
carinated and, in the case of the tail valves, show a more postmedian position of the muro. It is hard to calculate a size for the species. Leloup’s largest specimen is 10 mm. Grooves in the lateral area and the general outline of the valves fit very well to our material but we are unable to detect the distinct rows of ocelli in the head and tail valves. Further, especially fully grown, material may verify our identification which, at the present stage, has to remain tentative.

Suborder Acanthochitonina Berghayn, 1930
Family Hemiarthridae Sirenko, 1997

Genus Weedingia Kaas, 1988

*Type species:* Weedingia alborosea Kaas, 1988, by original designation.
**Distribution:** Polynesia. Recent.

*Weedingia paulayi* n. sp.
(Figs. 1A–D, 6–8)

**Type material:** Holotype (FLMNH UF 415631), French Frigate Shoals, 23.8732°N 166.2348°W, reef crest, 1–4 m, leg. Cory Pittman, 16 Oct 2006, ca 5 mm (strongly curled), preserved in 95% Ethanol, now partly disarticulated.

**Additional material:** Maui, Makuleia Bay (21°00′45″N, 156°38′36″W), beach drift, leg. Cory Pittman, 1984–85; 2 head valves, 18 intermediate valves, 11 tail valves (31 valves in total). Maui, off Makena (20°41′N, 156°27′W), sand sample, leg. Pauline Fieni, 1998, sorted by Cory Pittman; 6 intermediate valves, 3 tail valves (9 valves in total).

**Fig. 6.** *Weedingia paulayi* n. sp., holotype (FLMNH UF 415631), from French Frigate Shoals. **A.** Dorsal view of head valve. **B.** Dorsal view of valve ii. **C.** Valve ii in profile. **D.** Dorsal view of tail valve. **E.** Left lateral view of tail valve. **F.** Close-up of Fig. 6D, showing granule arrangement in antemucronal area. Scale bars = 100 μm.
**Type locality:** Hawaii, French Frigate Shoals, 23.8732°N 166.2348°W, reef crest, 1–4 m.

**Etymology:** The species is named after our friend Gustav Paulay, an expert on Indo-Pacific bivalves, keen collector and one of the most patient persons we’ve met. He has considerably extended our knowledge about species biodiversity in the Pacific.

**Diagnosis:** Small size; valves solid and sculptured with fine ribs of rounded granules except for smooth and clearly indicated jugal areas; tail valve rounded; macro terminal; apophyses large and widely separated; perinotum with short, strongly ribbed, obtuse-pointed scales; hyponotum with elongate, smooth, sharp-pointed scales; radula with a tricuspid second lateral; articulumentum with slitless, well-developed insertion plates.

**Description of holotype:** Size, circa 5 × 2.2 mm (strongly curled) (Fig. 1A–D); greyish-white with irregularly arranged ferruginous dots (mainly at valve margins in valve II at jugal area); dorsum subcarinated (Fig. 6C) and moderately elevated (dorsal elevation quotient of valve II

![Fig. 7. Weedingia paulayi n. sp., holotype (FLMNH UF 415631), from French Frigate Shoals. A. Dorsal view of valve ii, showing pleural area and jugal area sculpture. B. Ventral girdle scales. C. Dorsal girdle scales. D. Detail of dorsal girdle, showing club-shaped spicule. E. Empty ringshaft needle cup of dorsal girdle. F. Anterior portion of radula. Scale bars: A = 100 μm; B, F = 50 μm; C–E = 10 μm.](image_url)
Head valve (Fig. 6A) semicircular, posterior margin straight, unnotched in the middle. Second valve (Fig. 6B), trapezoid, slightly shorter than wide, posterior margin straight at both sides of the clearly protruding apex, anterior margin straight, jugal area clearly distinguishable from pleuralateral area, slightly elevated. Tail valve (Fig. 6D, E) roundish, as long as wide, posteriorly rounded, anterior margin about straight, mucro terminal and slightly overhanging, postmucronal area steep and very short, slightly concave behind the posteriorly directed mucro.

Pleurolateral area and antemucronal area (Fig. 6F) with longitudinal rows of granules appearing as ribs (7 in second valve at both sides of the wedge shaped, smooth, clearly highlighted jugal area; about 5 in tail valve). Longitudinal “ribs” always reaching the valve margins, slightly diverging laterally. Rib-forming granules irregular, same for the aesthetes pattern.

Articulamentum white and solid. Insertion plates well developed without any slits but with transverse slit rays under the jugal zone. Apophyses large and widely separated, trapezoid in second valve and in tail valve, laterally extended.

Perinotum (in situ measurements, see also under Remarks) wide and fleshy, extending suturally and densely covered with elongate-conical, obtusely pointed, slightly overlapping, strongly both sides ribbed scales measuring 22 × 16 μm (up to 10 ribs per scale) (Fig. 7C). Towards the margin there are club-shaped straight spicules (Fig. 7D) up to 30 × 14 μm which are distally sculptured by up to six strong ribs. Margin with a dense fringe of straight, long spicules (Fig. 1A). Hyponotum (Fig. 7B) with elongated flat scales that are distally sharp-pointed, overlapping, arranged in radial rows, outward directed, about 34 × 14 μm.

Radula 1.7 mm in length with 0.95 mm occupied by the cartilage (55%) and 40 rows of teeth, 25 of them mineralized (63%). Central tooth measuring 25 × 8 μm, rectangular-elongate (Fig. 8B) and parallel sided, with a smooth, slightly bent blade. First lateral (Fig. 8B) widely wing-shaped at the base, widely extended with a thickened knob at the antero-lateral corner. Second lateral (Fig. 8A) with a very slender shaft and thin lateral extensions, head with a tricuspid blade. Central denticle much longer than others. All denticles dorsally thickened. Major uncinal tooth (Fig. 8A) long, slender, spoon-like with a folded shaft.

Ctenidia merobranchial with 9 on both sides of the foot and the group of largest ctenidia (5–7) at the posterior half. Position of the nephridiopore and gonopore not discernible.

Remarks: There are only three congener of the new species but the latter is clearly distinguishable by the round tail valve with a terminal overhanging mucro. In addition, none of the other species has a jugal area with an acanthochitonid-like appearance (being slightly elevated).

Fig. 8. *Weedingia paulayi* n. sp., holotype (FLMNH UF 415631), from French Frigate Shoals. A. Detail of radula, showing tricuspid second lateral and major uncinal teeth. B. Detail of radula, showing central and first lateral teeth. Scale bars: A = 20 μm; B = 10 μm.
When the holotype was collected it was photographed in the lab (Fig. 1A). It shows a characteristic dense fringe of marginal spicles and (from the available picture) it seems that there are minute needles scattered among the dorsal scales. Surprisingly, in the fixed material (Fig. 1B–D), which was sent to the first author, neither marginal spicles nor traces (except for ringshaf needle cups, see Fig. 7E) of longer needles on the perinotum could be detected. We assume that sample handling somehow influenced this either by abrasion or by chemical attack.

Discussion

The remote Hawaii Islands have been, since their discovery, an object of intensive research leading Kay (1967) to postulate that “the marine mollusks of the Hawaiian Islands are among the best known of any insular marine fauna”. Surprisingly, the latest compilation of shell-bearing molluscs (Severs, 2011) shows that during the last three decades the known number of marine shell-bearing molluscs has increased to around 1300 species, about 27.5% more than the inventory published in Kay (1979). One of the most underrepresented groups among the marine molluscs was, and still is, the polyplacophorans. When Anseeuw (2011) listed the five species known so far from Hawaii he reflected a long process of species discovery within this group from 1846 to 1979 when the last chiton was described from Hawaii. This is five species found over one and a half centuries. But, are the chitons of this region really so low in diversity or are they simply overlooked and hardly sampled? The present study adds representatives of these exclusively marine molluscs from four different genera not previously recorded from Hawaii, nearly doubling the number of known species. Moreover, the occurrence of new genera may allow a bit more detailed look into how the chiton fauna of Hawaii has been influenced and what are the potential pathways for its evolution in this region. Fossil and archaeological records of chitons from Hawaii are unknown (so far) so we must assume a “young” colonisation, surely highly impacted by dispersal ability. Larval dispersal is sufficiently discussed in Bouchet (2011) and we may only add that the available information – scarcity in number – leads us to group chitons among those species that are not necessarily “good dispersers” (e.g., Strathmann & Eernisse, 1987; Hain & Arnaud, 1992; Yearsley & Sigwart, 2011). Kay (1979) demonstrated that the majority of the marine molluscs of Hawaii are more closely related to Indo-West Pacific species than to species of the South Pacific islands. An exception seems to be the co-occurring of Hawaiian and Polynesian taxa. This picture would fit well with the current system proposed for the Hawaiian Islands (see Severs, 2011: 32). Table 1 shows how this situation is reflected within the Polyplacophora. Of the nine species (if we neglect the deep sea species) verified from Hawaiian waters, three are considered endemic (but see below), three require further examination to clarify whether they are endemic and three also occur in Polynesian to Melanesian waters. On the genus level, it is only Weedlingia that is restricted to the Polynesian area: all other genera occur elsewhere in the Indo-Pacific. Worth mentioning, however, is that (in our opinion) the genus Ichnochiton has previously never been confirmed for the Polynesian area (first author’s pers. data). The nine shallow water species summarized here belong to eight genera within six different families. Prior to this study, the chiton fauna was comprised of five species belonging to four genera within four families making the following increments for the different taxa-levels: species – 44.5%, genus – 50% and family – 33.3%.

The new findings of different genera in Hawaiian waters show that the limited previous data has arisen from sampling artefacts. This is true for nearly all regions just coming into a better focus for specialists, especially for groups like chitons which have no commercial relevance. Particularly remote or less investigated regions like oceanic islands may show a considerable increase in chiton species numbers, when sampled, and that may greatly contribute to our understanding of species diversity in general and improve our understanding of chiton
Table 1. List of species occurring in Hawaiian waters or in deep water around the Hawaiian Islands (indicated by an asterisk). Sources are limited to the latest revisions. For taxa distribution, the Hawaiian Islands are not listed, only other regions where the taxa also occur. If a species is indicated as being "endemic" it only reflects our present knowledge.

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<tr>
<th>Family</th>
<th>Species</th>
<th>Source</th>
<th>Species distribution</th>
<th>Genera distribution</th>
<th>Family distribution</th>
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<tr>
<td>Ischnochitonidae</td>
<td>Ischnochiton sp.</td>
<td>Herein</td>
<td>Unknown</td>
<td>East Pacific Ocean, from Vancouver Island down to Peru; Indo-Pacific, from Japan to Sri Lanka; West Atlantic Ocean, from Florida down to Alagoas, Brazil (Kaas &amp; Van Belle, 1987)</td>
<td>Worldwide (Kaas &amp; Van Belle, 1987, 1990)</td>
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<tr>
<td>Chitonidae</td>
<td>Lucilina cf. pacifica (Leloup, 1981)</td>
<td>Herein</td>
<td>Tahiti (Kaas et al., 2006); Fiji (unpublished record FLNMH UF425792)</td>
<td>Tropical and subtropical waters of the Indian and Pacific Oceans (Schwabe et al., 2008)</td>
<td>Tropical and subtropical waters of the Indian and Pacific Oceans (Schwabe et al., 2008)</td>
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As seen in the present study and in some of the works cited above, new data often occur from sediment samples which contain isolated chiton valves. Although they may not substantiate the occurrence of a species at the collecting locality (due to transport by wave action) and thus can’t contribute to the knowledge of a species’ ecology, they indicate the presence of the species in the near vicinity, especially on islands which are surrounded by deep water since eurybathy in chitons seems to be limited to only a few species (Schwabe, 2008).

From this and previous data (see references above) we strongly recommend not including chitons in endemism calculations (e.g., Schwabe & Lozouet, 2006) as nearby localities may simply be under examined.

It is our hope that the new data on Hawaiian chitons will encourage other collectors to keep their eyes open for them so we may, in future, come back to Kay’s (1967) cited postulate with regard to chitons.

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**References**


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**ハワイ諸島産多板類の新記録とナンヨウヒザラガイ属 ** *Weedingia* の **1** 新種の記載

Enrico Schwabe · Cory Pittman

**要 約**

ハワイ諸島沿岸海底から採集した砂中より選別した多板類の殻板を調べた結果、同諸島では初記録となる **4** 属 **4** 種を確認した。このうちの **1** 種はフロリダ自然史博物館にも液浸標本 **1** 個体を見出せたので必要な分類形質を観察したところ、未記載種であることがわかり、新種として記載した。
Weedingia paulayi n. sp.

ホロタイプ：体長約5 mm、体幅2.2 mm（FLMNH UF 415631）。French Frigate Shoals、23.8732°N、166.2348°W、礁嶺（reef crest）、1～4 m。殻類厚く、殻表には明瞭に区別される平滑な背域を除いて丸い顆粒列がある。尾板は丸く、尾殻頂は後端。錦合板は互いに遠く離れる。着生個はよく発達するが齒隙を欠く。狭い肉帯を被う小棘は短く、先端は鈍く、強い肋をもつ。歯舌大側歯は3尖頭。いずれもポリネシアから知られる同属の3種とは尾板や背域の形態が異なることで明瞭に区別できる。

新記録種は次の3未詳種：Leptochiton sp. サメハダヒザラガイ属の1種、Ischnochiton sp. ウスヒザラガイ属の1種、Lucilina sp. アヤヒザラガイ属の1種。ハワイ諸島の浅海域にはこれまで4科4属5種の多板類が生息することが知られていたが、本研究によって6科8属9種が生息することが明らかとなった。