NEMOURIA

Occasional Papers of the Delaware Museum of Natural History

NUMBER 42 OCTOBER 25, 2000

THREE NEW CHITONS OF THE GENUS *LEPIDOZONA* PILSBRY, 1892 (POLYPLACOPHORA: ISCHNOCHITONIDAE) FROM THE ALEUTIAN ISLANDS

Roger N. Clark*

ABSTRACT. The genus *Lepidozona* Pilsbry, 1892 in Aleutian waters is discussed. In addition to the three species already recorded from the area, *L. trifida* (Carpenter, 1864), *L. ima* Sirenko, 1975, and *L. allyni* (Ferreira, 1977), three new species, *L. baxteri*, *L. beringiana* and *L. attuensis* are described, and the range of one additional species, *L. abyssicola* (Smith & Cowan, 1966) is extended west into the region. The new species are compared to known members of the genus from the Aleutians, as well as to *L. lindbergi* (Yakovleva, 1952) from the Russian, Kurile Islands.

Key words: Chiton, Ischnochitonidae, *Lepidozona*, Aleutian Islands.

INTRODUCTION

The genus *Lepidozona* Pilsbry, 1892 has a worldwide distribution, and contains more than 50 known species. Kaas and Van Belle (1987) reviewed the genus globally, and divided its members into two subgenera based on the number of slits in the intermediate valves. The members of the subgenus *Lepidozona* (*sensu stricto*) have a single slit per side. Members of the subgenus *Tripoplax* Berry, 1919 have two or more slits per side. In their review, Kaas and Van Belle recorded five species from Alaska, including two, *L. (T.) allyni* and *L. (T.) ima* from the Aleutians.

The distributions of Alaskan taxa, particularly those of the Aleutian Islands, have remained poorly defined. Berry (1917) first recorded three species of

*Field Associate in Malacology, Natural History Museum of Los Angeles County, 900 Exposition Boulevard, Los Angeles, California 90007, U.S.A., email: insignis@cdsnet.net
Mailing Address: 1839 Arthur Street, Klamath Falls, Oregon 97603-4617

Serial Publication
ISSN 0085-3887

Lepidozona (as a subgenus of *Ischnochiton* Gray, 1847) in Alaskan waters, but placed two other species in the genera *Ischnochiton* Gray, 1847 and *Ischnoradsia* Shuttleworth, 1853 (again as subgenera of *Ischnochiton*). Smith and Cowan (1966) described *Ischnochiton abyssicola* from the Gulf of Alaska and remarked on its affinities with *Ischnochiton trifidus*, suggesting that both species should perhaps be placed in the subgenus *Tripoplax*. Ferreira (1977) described *Ischnochiton allyni* from Amchitka Id. in the Aleutians and suggested that his new species might be a member of *Lepidozona*, or perhaps *Gurjanovillia* Yakovleva, 1952 (now recognized as a synonym of *Tripoplax*). Baxter (1987) recorded only *L. allyni* (as *Gurjanovillia*) from the Aleutians, but used *Lepidozona*, *Tripoplax*, *Ischnochiton*, and *Stenosemus* Middendorff, 1847 for other taxa presently assigned to this genus. Sirenko (1975) described *L. ima* from the vicinity of the Commander Is., west of the Aleutians. Clark (1991) reported *L. scabricostata* (Carpenter, 1864) from the Gulf of Alaska, and *L. ima* and *L. trifida* from the Aleutians.

Presently seven species of *Lepidozona* are known from the Aleutian Islands, all of them members of *Tripoplax*: *L. (Tripoplax) abyssicola* (Smith & Cowan, 1966), *L. (T.) allyni* (Ferreira, 1977), *L. (T.) ima* Sirenko, 1975, *L. (T.) trifida* (Carpenter, 1864), *L. (T.) beringiana* new species, *L. (T.) baxteri* new species, and *L. (T.) attuensis* new species.

MATERIALS AND METHODS

Chitons were collected intertidally by hand and to a depth of 18 m by SCUBA. Deep-water specimens (85-350 m) were collected during National Marine Fisheries Service triennial Aleutian Islands Trawl Surveys (1994 & 1997) carried out by the chartered fishing Vessels F/V Vesteraalen and F/V Dominator. Collections were made by otter trawl and by small dredges consisting of a heavy mesh bag (open at the tail end), with a small (12.5 mm) mesh liner, tied at the tail end and held open by a heavy chain at the mouth hung from the foot rope of the otter trawl, just behind the 35 cm "roller gear" (rock rollers).

National Marine Fisheries Service data are recorded in the material sections by a series of numbers: vessel number, cruise number, and haul number. For example 23-971-199 would be 23, F/V Dominator, Cruise 971 (1997-1) (some vessels do more than one cruise per year), Haul (or trawl) number 199. Vessel number 23 is the F/V Dominator, vessel 94 is the F/V Vesteraalen, and vessel 57 is the F/V Morning Star. Additional survey data are available upon request to Dr. Gary Stauffer, division director, Resource Assessment and Conservation Engineering Division, National Marine Fisheries Service, Alaska Fisheries Science Center, 7600 Sand Point Way NE, Bin C-15700, Bldg. 4, Seattle, Washington 98115, U.S.A.

The specimens were relaxed in cool seawater, tied flat and preserved in 75% ethanol. The valves of disarticulated specimens were cleaned in household bleach, rinsed in distilled water and dried. Radulae and girdle fragments were mounted on scanning electron microscope (SEM) stubs, sputter coated with gold-palladium for 2 minutes and examined at 10 kv, with a Hitachi S-2100 scanning electron microscope at the Department of Biology at Southern Oregon University.

Abbreviations used in the text are: CAS, California Academy of Sciences; DMNH, Delaware Museum of Natural History; LACM, Los Angeles County Museum of Natural History; NMFS, National Marine Fisheries Service; NMFS-AB, Auke Bay Laboratory; OS&S, Of Sea and Shore Museum; RMNH, National Museum of Natural History, Leiden; RNC, the author's collection; SBMNH, Santa Barbara Museum of Natural History; SOU, Southern Oregon University; UAF, University of Alaska, Fairbanks; USNM, United States National Museum (Smithsonian); and ZISP, Zoological Institute, Saint Petersburg.

SYSTEMATICS

Class: POLYPLACOPHORA Gray, 1821
Family: ISCHNOCHITONIDAE Dall, 1889
Genus: *Lepidozona* Pilsbry, 1892

Chitons of small to medium size (10-60 mm), terminal valves and lateral areas of intermediate valves with radial ribs or rows of pustules; central areas of valves with longitudinal ribs, often crossed by similar but smaller riblets forming a lattice; interior of valves (articulamentum) with sutural plate, separated (often obscurely) from the sutural laminae by small notches or slits; insertion plate slit formula is many/one or more/many; dorsal surface of girdle with convex, usually ribbed or striated scales, often with a nipple-like process at the apices.

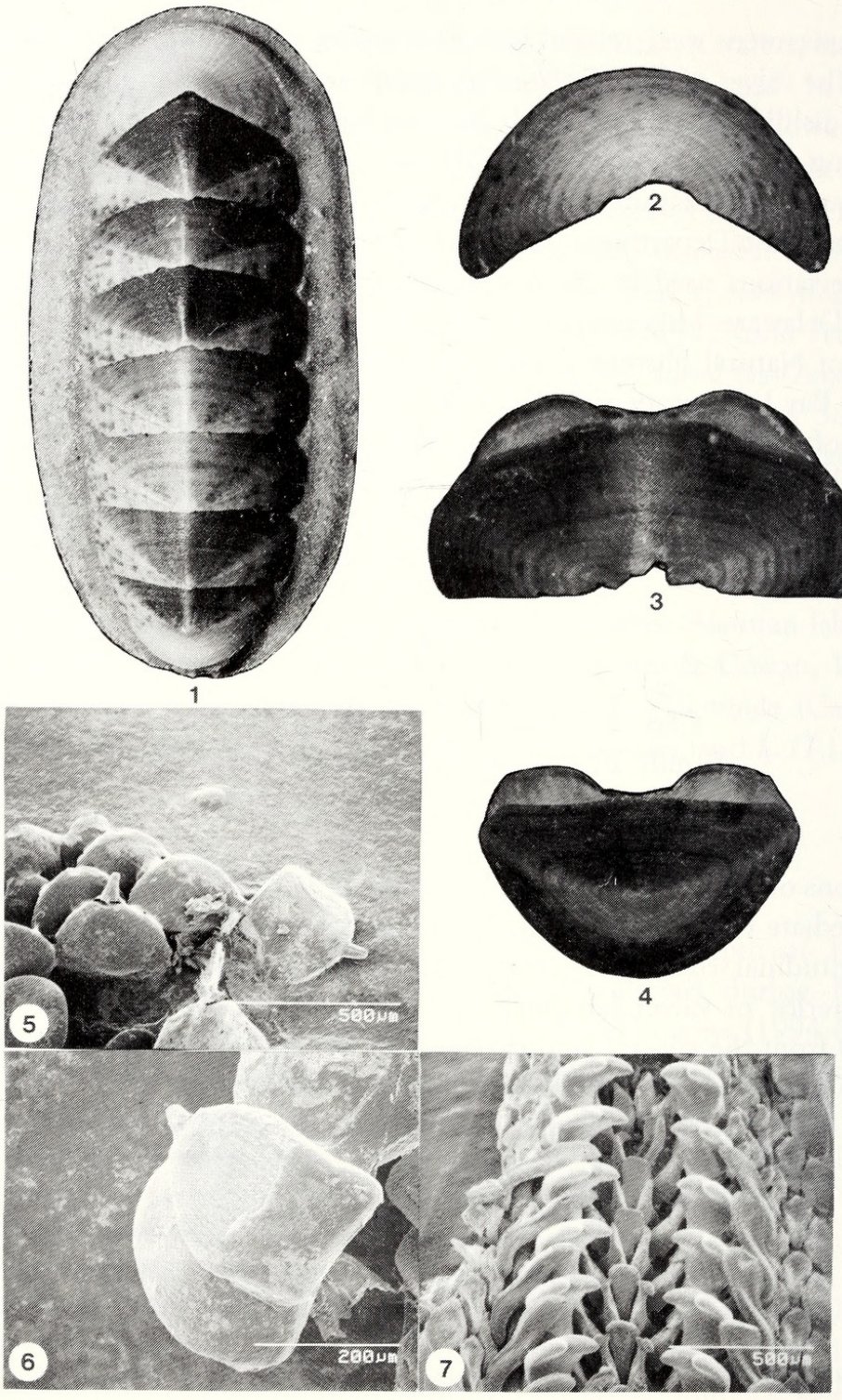
Aleutian Islands species: *Lepidozona (Tripoplax) trifida, L. (T.) abyssicola, L. (T.) ima, L. (T.) allyni, L. (T.) beringiana* n. sp., *L. (T.) baxteri* n. sp., *L. (T.) attuensis* n. sp.

Lepidozona (Tripoplax) beringiana new species

(Figures 1-7)

Lepidozona (Tripoplax) ima Sirenko; Clark, 1991: 93 (in part) non *L. ima* Sirenko, 1975.

Diagnosis: Chitons of medium size (to 4.5 cm), oval to elongate-oval in outline, Tegmentum brick red, often with paler terminal and lateral areas, and darker specks. Girdle with small (275 μm x 225 μm) scales, slightly bent and striated along the upper half, topped with a long mammillation about 35 μm in length.



Figures 1-7. *Lepidozona (Tripoplax) beringiana* new species. **1.** Whole animal, paratype, RNC 2993; 30.0 mm x 14.5 mm. **2-4.** Paratype, RNC 3010. **2.** Head valve, width 10.2 mm. **3.** Intermediate valve five, width 12.0 mm. **4.** Tail valve, width 9.0 mm. **5-7.** Holotype, LACM 2798. **5,6.** Dorsal girdle scales. **7.** Radula.

Description: Body (Fig. 1) oval in outline, valves microgranular, carinated, unbeaked, side slopes slightly convex; tegmentum brick red often with darker specks, terminal and lateral areas often paler; girdle light brown to reddish.

Head valve (Fig. 2) semicircular and bearing about 40 low, faint, rounded radial ribs capped by a row of very minute (0.1 mm in diameter), low, rounded granules (often obsolete), especially on older portion of shell; posterior margin widely V-shaped; insertion plate with 15-17 slits.

Intermediate valves (Fig. 3) oblong in outline, central areas with very fine pitting; lateral areas well-defined, slightly raised, cut by two or three shallow sulci into three or four low, rounded (often bifurcated) ribs frequently bearing a few very minute granules like those on the head valve; insertion plates with 2-4 slits.

Tail valve (Fig. 4) semicircular, slightly elongated posteriorly; mucro central, post-mucronal slope straight to slightly concave; insertion plate with 15 slits.

Interior of valves (articulamentum) white; sutural laminae short, slightly rounded, connected across the jugal sinus by a narrow, concave jugal plate notched at the sides; insertion teeth short and sharp, those on the head valve smooth, those on the tail valve slightly rugose.

Girdle about 1/4 as wide as fifth valve at intermediate valves, much narrower at ends; dorsal side covered with overlapping scales (Figs. 5 & 6) slightly longer than wide, up to about 275 µm x 225 µm, with about 18 striations along the upper half and capped by a long nipple about 35 µm in length; ventral surface covered by radiating rows of elongated, rectangular, transparent scales of about 100 x 20 µm; margin of girdle with long, slender spicules up to 500 µm long.

Radula (fig. 7, holotype) 8 mm in length and bearing about 30 mature rows of teeth; rachidian tooth spatulate, distally dilated, distal edge about 90 µm wide; blade of major lateral teeth relatively large and heavy, bicuspid, the inner denticle much longer than the outer one.

Gills holobranchial, adanal, 30 per side.

Type locality: South of Semisopochnoi Island, Rat Islands, Aleutian Islands, Alaska (51°53.34'N, 179°45.58'E), 121 m.

Material examined: Type material: Holotype, LACM 2798 (leg. Rae Baxter, 7 September 1986); twenty paratypes: 1, LACM 2799 (disarticulated valves only), from type locality; 1, LACM 2800, W of Amatignak Island, Andreanof Islands, Aleutians (51°14.46'N, 179°11.84'W), 241 m (leg. Rae Baxter, 17 August 1986); 1, ZIAS 2149, W of Kiska Island, Rat Islands, Aleutians (52°04.29'N, 177°15.33'E), 91 m (leg. RNC, 31 July 1997) (NMFS 23-971-199); 1 USNM 880313, (also from W of Kiska); 1, CAS 120751, S of Tanaga Island, Andreanof Islands, Aleutians (51°44.50'N, 178°07.68'W), 95 m (leg. RNC, 15 July 1997) (NMFS 23-971-137); 1, DMNH 210608, Petrel Bank (near type locality) (52°19.18'N, 179°50.08'E), 116 m (leg. RNC, 21 July 1997) (NMFS 23-971-162);

1, SBMNH 345415, S of Tanaga (as above) (NMFS 23-971-137); 1, RNC 1216, Petrel Bank, N of Semisopochnoi Island, Rat Islands, Aleutian Islands, Alaska (52°10.60'N, 179°43.77'E), 92 m (leg. RNC, 10 July 1994) (NMFS 94-941-151); 4, RNC 2992, S of Tanaga (as above) (NMFS 23-971-137); 2, RNC 3010, Petrel Bank (near type locality) (52°19.18'N, 179°50.08'E), 116 m (leg. RNC, 21 July 1997) (NMFS 23-971-162); 3, RNC 3016, W of Kiska Island, Rat Islands, Aleutians (52°04.29'N, 177°15.33'E), 91 m (leg. RNC, 31 July 1997) (NMFS 23-971-199).

Additional material: 2, RNC 2993, S of Tanaga Island, Andreanof Islands, Aleutians (51°46.69'N, 178°10.59'W), 89 m (leg. RNC, 17 July 1997) (NMFS 23-971-141); 1, RNC 2994, SSW of Tanaga Island, Andreanof Islands, Aleutians (51°43.17'N, 178°17.23'W), 215 m (leg. RNC, 17 July 1997) (NMFS 23-971-142); 1, RNC 3005, SE of Kiska Island, Rat Islands, Aleutians (51°53.86'N, 178°20.82'E) 143 m (leg. RNC, 28 July 1997) (NMFS 23-971-185); 1, RNC 3006, E of Kiska Island, Rat Islands, Aleutians (52°03.44'N, 178° 18.62'E), 352 m (leg. RNC, 29 July 1997) (NMFS 23-971-187); 1, RNC 3021, W of Buldir Island, Aleutians (52°19.77'N, 175°48.56'E), 226 m (leg. RNC, 9 August 1997) (NMFS 23-971-241).

Distribution: Endemic to the central Aleutian Islands, Alaska [178°W (near Tanaga Island) to 175°E (W of Buldir Island)] (Fig. 30).

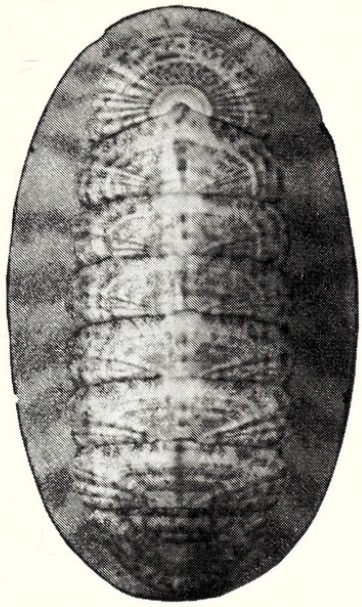
Habitat: Lives at 85-352 m on cobbles, bivalve shells (*Chlamys* sp.) and bryozoans.

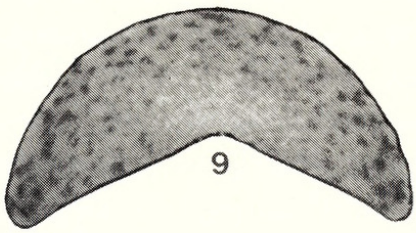
Remarks: This species was originally thought to be *Lepidozona (Tripoplax) ima* (Clark, 1991: 93). Close examination revealed it instead to be distinct, and morphologically more similar to *L. (T.) allyni* (Figs. 25 & 26). These two species are characterized by the very long mammillation on the girdle scales. *L. (T.) beringiana* is also similar to *L. (T.) lindbergi* (Yakovleva, 1952) of the Kurile Is. (Fig. 27), but may be distinguished by the fine pitting of the central areas and the differently proportioned girdle scales.

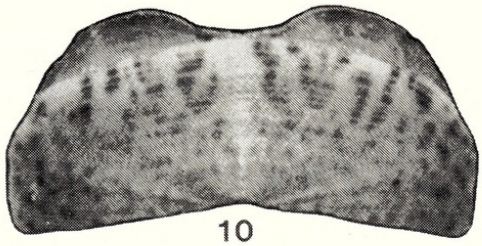
Lepidozona (Tripoplax) baxteri new species
(Figs. 8-14)

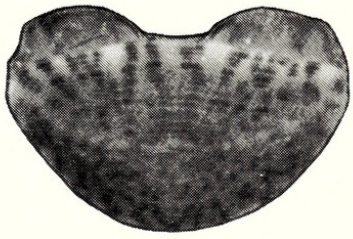
Diagnosis: Chitons of medium size (to 3.5 cm), oval to elongate-oval in outline, valves whitish or tan with speckles or concentric rings of reddish-brown or (rarely) pink. Girdle with small (325 µm x 250 µm) scales bearing 22-25 striations, with slight, if any mammillation.

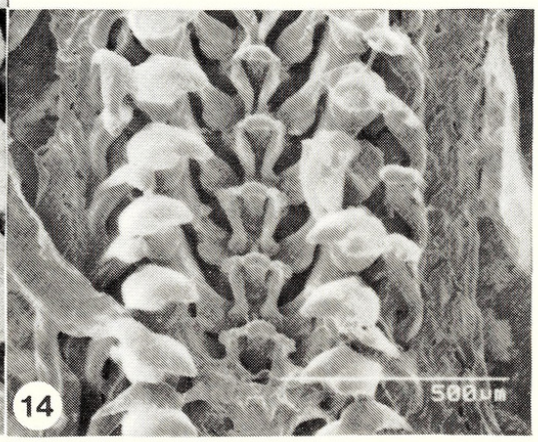
Description: Body (Fig. 8) (holotype) oval in outline; valves microgranular, carinated, unbeaked (juveniles may be slightly beaked), side slopes convex; tegmentum whitish to tan or light brown, with dark brown, reddish-brown or











Figures 8-14. *Lepidozona (Tripoplax) baxteri* new species. **8.** Whole animal, holotype, LACM 2796; 27.5 mm x 16.0 mm. **9-11.** Paratype, LACM 2797. **9.** Head valve, width 9.0 mm. **10.** Intermediate valve five, width 10.5 mm. **11.** Tail valve, width 7.6 mm. **12-14.** Paratype, RNC1230. **12, 13.** Dorsal girdle scales. **14.** Radula, RNC 1230 (25 mm specimen).

(rarely) pink-lavender speckles and/or concentric rings; girdle unicolored whitish to light brown, or with alternating bars of reddish-brown and tan.

Head valve (Fig. 9) semicircular, bearing 21-27 low, faint ribs capped by an often incomplete or obsolete row of minute (about 80-100 μm in diameter), widely-spaced granules, three to eight in a series; interstices are granular, posterior margin widely V-shaped; insertion plate with 15 slits.

Intermediate valves (Fig. 10) oblong in outline, central areas with fine pitting, lateral areas with three or four radiating, sub-triangular ribs capped by an often incomplete or obsolete row of minute granules of the same nature and number as those on the head valve; insertion plates with 2 slits.

Tail valve (Fig. 11) semicircular; mucro post-central, post-mucronal area flattened and bearing about 18 faint or obsolete radiating ribs of the same nature as those on the head and lateral areas; insertion plate with 15 slits (teeth prone to splitting).

Interior of valves (articulamentum) white, translucent; sutural laminae short, thin, sharp, connected across the jugal sinus by a narrow, concave jugal plate, slightly notched at the sides in juveniles, but not in adults; insertion teeth short, solid, smooth; those of head valve blunt, rugose on the anterior side, those of the tail valve still rather blunt, but somewhat sharper.

Girdle nearly one half as wide as fifth valve at sides, much narrower at ends; dorsal side covered with overlapping, bent, near-pentagonal scales, wider than long (Figs. 12-13), (imperceptibly mammillated) and bearing 22-25 striations, reaching about 325 μm x 250 μm; ventral surface covered with radiating rows of elongated, rectangular, transparent scales of about 100 x 20 μm; marginal spicules slender, cylindrical or nearly cylindrical to about 220 μm long.

Radula (Fig. 14) 8 mm long and bearing about 33 mature rows of teeth; rachidian tooth relatively small, oblong, about 108 μm long, working edge about 70 μm wide; blade of major lateral teeth bicuspid, the inner cusp much longer than the outer one.

Gills holobranchial, adanal, about 30 per side in specimens 24 mm or greater in length.

Range of morphological variation: In some specimens the granules on the ribs and sometimes the ribs themselves are obsolete. Although most specimens are whitish to tan with speckles and/or concentric rings of reddish-brown, in a few specimens the reddish-brown is replaced with pinkish or pale lavender; some specimens are uniform whitish.

Type locality: Eider Point, west side of entrance to Unalaska Bay, Bering Sea side of Unalaska Island, Aleutian Islands, Alaska (53°57'40"N, 166°35'30"W).

Material Examined: Type material: Holotype, LACM 2796 and 100+ paratypes (leg. RNC, 21 June 1993); other paratypes: 10, LACM 2797; 4, USNM 880161;

4, CAS 105915; 4, SBMNH 143146; 4, ZISP 1935; 3, UAF Mo-5570; 60+, RNC 1230; 1, H.L. Strack Coll.; 2, B. Dell Angelo Coll.; 4, H. Saito Coll.; 3, R.A. Van Belle Coll.; 2, D.J. Eernisse Coll.; 2, OS&S Coll.

Additional material: 2, LACM 152676; and 6, RNC 3160, Channel at south end of Amacknak Island (Dutch Harbor), Unalaska Bay, Unalaska Island, Alaska, 10-15 m.

Distribution: Known so far from only two localities within Unalaska Bay, Unalaska Island, Aleutian Islands, Alaska (Fig. 30).

Habitat: Lives at 0-15 m on cobbles encrusted with bryozoans, resting on or slightly buried in sand.

Remarks: This species somewhat resembles *Lepidozona ima* (Figs. 23-24) but may be distinguished by the unique color patterns of the valves, larger (dorsal) girdle scales, which bear many more striations (22-25 compared to 12-14 in *L. ima*), and relatively smaller (central and minor lateral) teeth of the radula.

Lepidozona (Tripoplax) attuensis new species
(Figs. 15-21)

Diagnosis: Chitons of small size (to 2.5 cm), oval in outline; valves whitish with a few faint, rusty-orange, longitudinal markings; head valve, lateral areas, and post-mucronal area of tail valve with numerous, low, rounded, radiating ribs, lacking pustules or granules. Girdle with relatively large, smooth, imperceptibly mammillated scales.

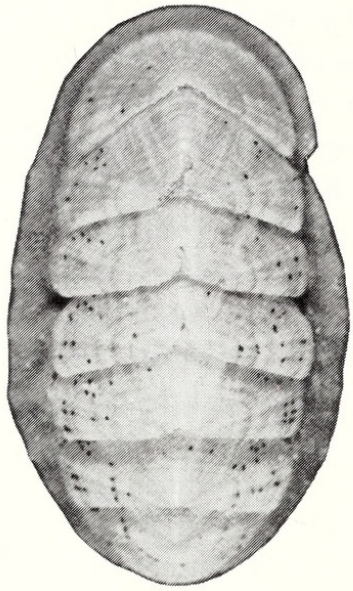
Description: Body (Fig. 15) oval in outline; valves granular, subcarinated, unbeaked, side slopes slightly convex; tegmentum whitish (holotype) or whitish with pale rust sub-jugal stripe and a few faint rust mottlings on the central areas; girdle uniformly whitish.

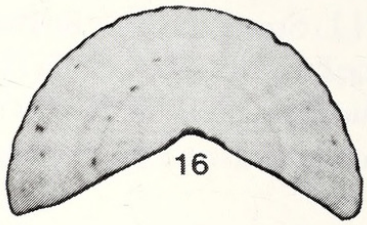
Head valve (Fig. 16) semicircular, posterior margin widely V-shaped; bearing 23-26 low, rounded, radiating ribs; insertion plate with 15-17 slits.

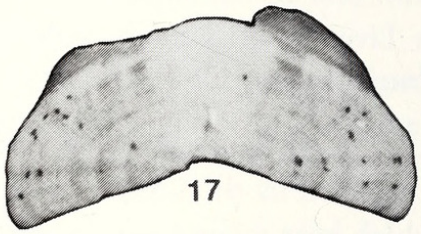
Intermediate valves (Fig. 17) oblong, central areas with fine pitting; lateral areas slightly raised, defined by three to four low, rounded ribs (nearly obsolete on some valves of the holotype) crossed by concentric growth lines; insertion plates with 2 slits.

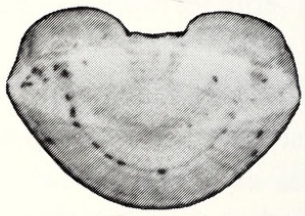
Tail valve (Fig. 18) semicircular, mucro central, post-mucronal slope slightly convex; post-mucronal area bearing about 14 low, rounded, well spaced radiating ribs or undulations; insertion plate with 14-15 slits.

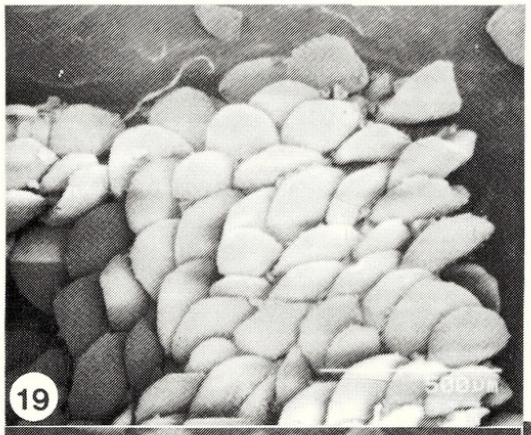
Interior of valves (articulamentum) white; sutural laminae fairly short, rounded at edges, connected across the jugal sinus by a concave jugal plate, sometimes notched at sides; insertion teeth very short and blunt, those on the head valve smooth, the ones on the tail valve rugose on the anterior side.

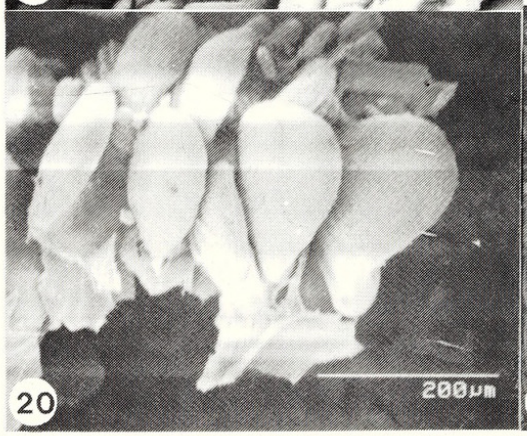


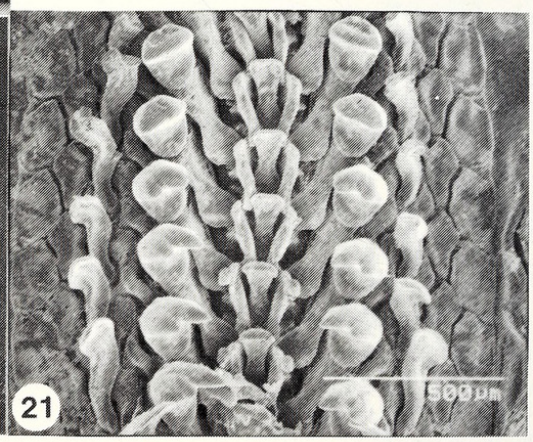












Figures 15-21. *Lepidozona (Tripoplax) attuensis* new species. **15-18.** Paratype RNC 317; 12.0 mm x 12.0 mm. **15.** Whole animal (note: valve five is lost, this is not an aberrant, seven-plated specimen). **16.** Head valve, width 8.0 mm. **17.** Intermediate valve four, width 9.0 mm. **18.** Tail valve, width 6.5 mm. **19-21.** Holotype, LACM 2801. **19, 20.** Dorsal girdle scales. **21.** Radula.

Girdle about 1/4 as wide as fifth valve at sides, much narrower at ends; dorsal side covered with smooth, bent, proximally rounded scales (Figs. 19 & 20), about 275 µm long and 150 µm wide; ventral surface covered with radiating, rectangular, transparent scales of about 100 x 20 µm; marginal spicules slender, bluntly pointed, about 150 µm in length.

Radula (Fig. 21) 7.8 mm long (in the 21 mm holotype) and bearing about 30 mature rows of teeth; rachidian tooth oblong, about 265 µm long, constricted in the middle to about 60 µm and broadening again at the base, working edge about 130 µm wide; blade of major lateral teeth bicuspid, the inner cusp about twice as long as the outer one.

Gills holobranchial, adanal, 26 per side in the holotype (curled length ca. 23 mm) and 25 per side in the paratype (21 mm long).

Type locality: Murder Point, Massacre Bay, Pacific side of Attu Island, Near Islands, Aleutian Islands, Alaska (52°47.6'N, 173°11.0'E).

Material Examined: Type material: Holotype, LACM 2801 and one paratype, RNC 317 (leg. David R. Lindberg, 20 July 1979; intertidal).

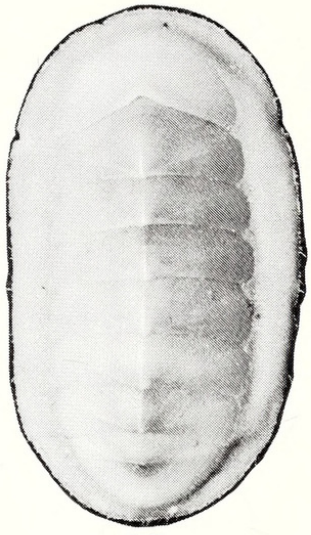
Distribution: Known so far only from the type material.

Remarks: This species is very similar to *Lepidozona ima* (Figs. 23-24), especially in the characters of the radula. *L. attuensis* differs from *L. ima* by the prominent radial ribs on the valves, which lack pustules, the larger, smooth, differently proportioned girdle scales, and fewer gills. Also *L. ima* is usually found much deeper (100-250 m).

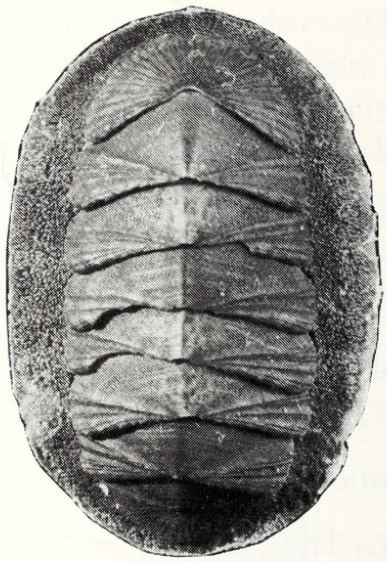
DISCUSSION

The chiton fauna of the Aleutian Islands is very rich and diverse, containing 35 known species [including one as yet undescribed species (unpublished notes)]. The genus *Lepidozona* with seven species makes up 20% of this fauna. Five of these (71%) are endemic to the Aleutian faunal province. Two of these *L. (Tripoplax) attuensis* and *L. (T.) baxteri* appear to be short range endemics, restricted to a single island or island group. These species appear to be divisible into two (natural?) groups based on their dorsal girdle scales. Group one contains species with mammillated scales, *L. (T.) allyni* and *L. (T.) beringiana*. Group two contains species with non-mammillated scales, *L. (T.) abyssicola, L. (T.) ima, L. (T.) baxteri, L. (T.) attuensis*, and *L. (T.) trifida*.

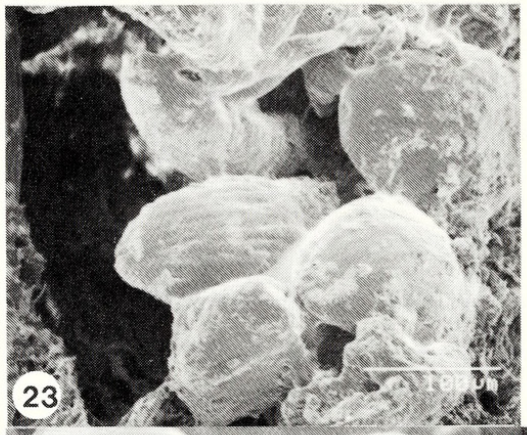
The radula of *Lepidozona (Tripoplax) allyni* (Fig. 25) described from Amchitka Island, in the Aleutians was described and illustrated (drawn) as having unicuspid major lateral teeth. However, a study of the paratypes as well as another specimen

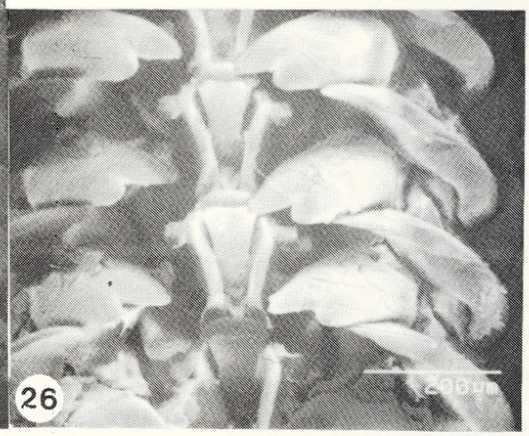


22

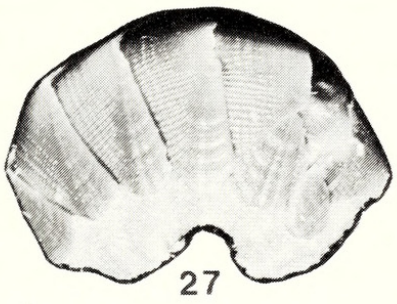


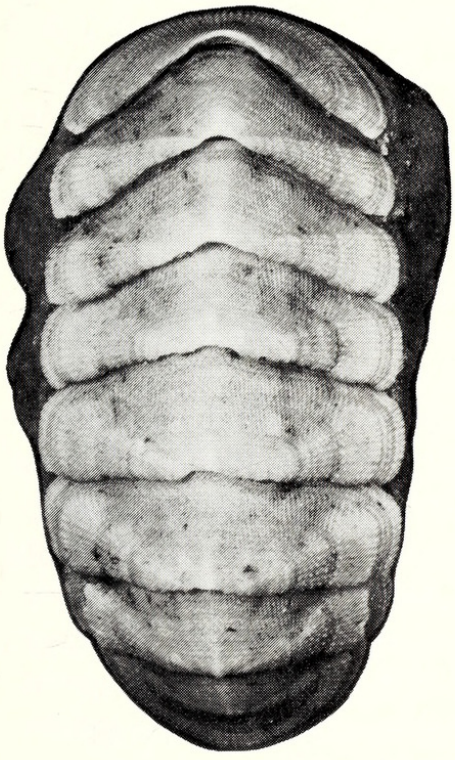
25

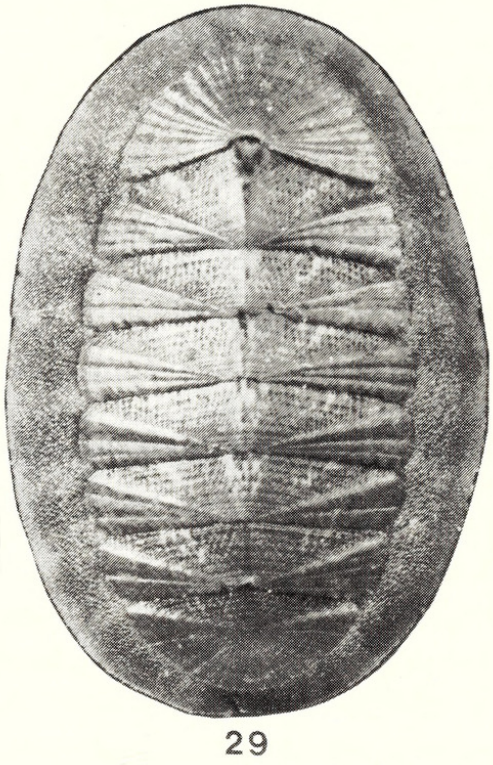




Figures 22-26. *Lepidozona* spp. **22-24** *Lepidozona (Tripoplax) ima* Sirenko, 1975. **22.** Whole animal, RNC 3172 (Stalemate Bank, W of Attu Id., 114 m); 18.5 mm x 10.5 mm. **23-24.** Specimen from near Cooper Id., Commander Is., Russia, 130-200 m; RNC 2363. **23.** Dorsal girdle scales. **24.** Radula. **25-26.** *Lepidozona (Tripoplax) allyni* (Ferreira, 1977). **25.** Whole animal. Amchitka Id., 25 m (topotype), AB 73-25. **26.** Radula. Paratype, CAS 016564.







Figures 27-29. *Lepidozona* spp. **27.** *L. (Tripoplax) lindbergi* (Yakovleva, 1952), RNC 120; whole animal, Simushir Id., Kurile Is., Russia, 50-60 m; curled, ca. 20.0 mm. **28.** *L. (T.) abyssicola* (Smith & Cowan, 1966), RNC 3106; whole animal, near Farallon Is., California, 2750 m; curled, ca. 50 mm. **29.** *L. (T.) trifida* (Carpenter, 1864); RNC 2417; whole animal, Ketchikan, Alaska, 25 m; 35 mm x 24 mm.

taken with the types (but apparently not seen by Ferreira) in the collection of the National Marine Fisheries Service, Auke Bay, Alaska Laboratory (AB 73-25) revealed that the major lateral teeth of this species are in fact bicuspid (Fig. 26). It is not known whether Ferreira erred in his description, or if the radula of the holotype was aberrant, because the slide containing the holotype's radula could

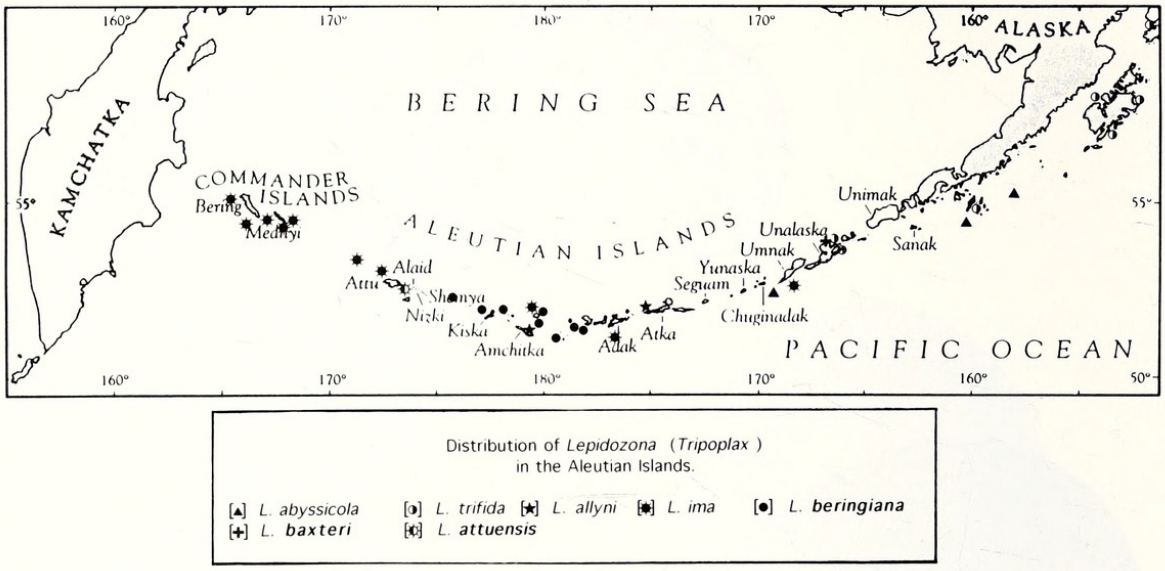


Figure 30. Map of Aleutian Islands showing distributions of *Lepidozona* species.

not be found (E. Kools, pers. comm., 18 March, 1996). However, due to the bicuspid condition of the paratypes and other material, Ferreira's description must be amended.

Three specimens of *Lepidozona (T.) allyni* were collected at a depth of 15 m off the point at the east side of the entrance to Crescent Bay, Atka Island, Aleutian Islands (52°02'15"N, 175°14'00"W), on the bottom of stones resting on sand (leg. RNC, 8 July 1997). One of these has been deposited as a voucher (LACM 152584); the remaining two were retained (RNC 3026). Additionally a single curled juvenile (length ca. 6.0 mm) taken at 18 m at Kiska Island, Aleutian Islands, was found in the collection of the United States National Museum (USNM 208587). The new records extend the known range of the species approximately 125 km to the west, and 375 km to the east.

As already discussed in the species descriptions, *Lepidozona (Tripoplax) ima* is morphologically similar to both *L. (T.) baxteri*, and *L. (T.) attuensis*, but differs in the details of the valve sculpture, girdle scales and radula. *L. (T.) ima* and its girdle scales and radula are illustrated in Figs. 22-24.

Smith & Cowan (1966: 8) described the tegmental coloration of *Lepidozona (Tripoplax) abyssicola* (Fig. 28) as dark reddish-brown. However this description is misleading, because the reddish-brown (or blackish) appearance is due to deep sea deposits present on most specimens. The tegmentum of this species is white. The range of *L. (T.) abyssicola* is here extended west into the eastern Aleutian Islands, to south of Samalga Pass (west end of Umnak Island) (52°36.2'N, 169°25.2'W) based on a single specimen (CAS 120748), trawled, F/V Morning Star, 199 m on rocks (NMFS Gulf of Alaska Trawl Survey, 57-991-3). The new record extends the known range approximately 825 km to the west.

Lepidozona (Tripoplax) trifida is also found in the (eastern) Aleutians, and although it probably would not be confused with any of the other members the genus due to the unique sculpturing of its valves [broad, flattened radial ribs (three on lateral areas) separated by distinct sulci], it is illustrated for comparison (Fig. 29).

ACKNOWLEDGMENTS

For their help in various aspects of this work I thank James H. McLean (LACM), Darlene H. Southworth (SOU), Boris I. Sirenko (ZISP), Elizabeth Kools (CAS), Bruce L. Wing (NMFS-AB), Nick Hindman (Dutch Harbor, Alaska), Eric Brown, Robin Harrison, Robert Lauth, Mike MacEwan and Michael Martin (NMFS, Seattle), the captains and crew of the F/V Dominator and the F/V Vesteraalen, and Douglas J. Eernisse (California State University at Fullerton) for critically reading the manuscript.

LITERATURE CITED

Baxter, R. 1987. *Mollusks of Alaska.* Shells and Sea Life Inc., Bayside, California. 163 pp.

Berry, S.S. 1917. Notes on west American chitons-I. *Proceeding of the California Academy of Sciences*, Fourth Series, 7(10): 229-248.

Berry, S.S. 1919. Notes on west American chitons II. *Proceedings of the California Academy of Sciences*, Fourth Series, 9(1): 1-36, pls. 1-8.

Carpenter, P.P. 1864. Supplementary report on the present state of our knowledge with regard to the Mollusca of the west coast of North America. *Report British Association Advancement Science*, 517-686.

Clark, R.N. 1991. Notes on the distribution, taxonomy and natural history of some north Pacific chitons (Mollusca: Polyplacophora). *The Veliger*, 34(1): 91-96.

Ferreira, A.J. 1977. A new species of chiton from the Aleutian Islands (Mollusca: Polyplacophora). *The Veliger*, 20(1): 27-29, figs. 1-5.

Gray, J.E. 1847. Additional observations on chitons. *Proceedings of the Zoological Society of London*, 15: 126-127.

Kaas, P. & R.A. Van Belle. 1987. *Monograph of Living Chitons. Vol. III.* Dr. Backhuys Publisher, Rotterdam. 302 pp.

Middendorff, A.T. von. 1847. Beitrage zu einer Malacozoologia Rossica. *Mem. Sci. nat. Acad. imp. Saint Petersburg*, 6(1): 1-151, pls. 1-14.

Pilsbry, H.A. 1892-1894. Polyplacophora. *In*: G.W. Tryon, Jr. (ed.) *Manual of Conchology*. 14(53-54): 1-128, pls. 1-30 (1892); 14(55-56): 129-350 + i-xxxiv,

pls. 31-68 (1893); 15(57): 1-64, pls. 1-10 (1893); 15(58): 65-132, pls. 11-17 (1894).

Shuttleworth, R.J. 1853. Diagnosen neur Mollusken. 4, Ueber den Bau der Chitoniden, mit Aufzahlung der die Antillen und die Canarischen Inseln bewohnenden Arten. *Mitt. naturf. Ges. Bern*, 286-291: 169-207.

Sirenko, B.I. 1975. On the taxonomy of the genus *Lepidozona* Pilsbry. *Biologya Belogo Morya Moskva*, 3: 13-28, figs. 1-6 (in Russian).

Smith, A.G. & I.McT. Cowan. 1966. A new deep-water chiton from the northeastern Pacific. *Occasional Papers of the California Academy of Sciences*, No. 56, 15 pp.

Yakovleva, A.M. 1952. Shell bearing mollusks (Loricata) of the seas of USSR. *Keys to the fauna of USSR*. Academy of Sciences, USSR, no. 45, 127 pp. [English translation, Jerusalem, 1965].

Published by the

DELAWARE MUSEUM OF NATURAL HISTORY
P.O. Box 3937, Wilmington,
Delaware 19807-0937, U.S.A.