



Explanation of Figures 33 to 48

Figures 33–38. *Acila (Truncacila) grahami* Squires & Saul, sp. nov. Figure 33. Paratype RBCM.EH2003.012.0003, Locality 3, right valve, $\times 4.4$. Figure 34. Paratype RBCM.EH2003.011.0001, Locality 3, right valve, $\times 3.2$. Figure 35. Paratype CAS 69082.01, CAS loc. 69082, rubber peel of right valve, $\times 2.4$. Figure 36. Holotype RBCM.EH2003.011.0002, Locality 3, posterior view of left valve, $\times 4.2$. Figure 37. Paratype RBCM.EH2003.011.0003, Locality 3, posterior view of right valve, $\times 4$. Figure 38. Holotype RBCM.EH2003.011.0002, Locality 3,

shells). Chevrons bisected by line extending from slightly anterior of umbo to anterior part of ventral margin (rarely center); ribs anterior to bisecting line 12 to 30, ribs posterior to bisecting line 22 to 33. Total number of ribs on disk of each valve usually approximately 50; ribs narrow to moderately wide, with interspaces approximately $\frac{1}{2}$ to $\frac{1}{2}$ as wide, except anterior of chevron-bisecting line, where ribs become slightly wider and more widely spaced. Escutcheon moderately prominent, slightly sunken, and bounded by shallow groove crossed by ribs continuous with ribs on disk; ribs slightly stronger on inflated central part of escutcheon area. Anterior hinge with 16 teeth, posterior hinge with 9 teeth.

Dimensions of holotype: Left valve, height 9 mm, length 10.8 mm.

Holotype: RBCM.EH2003.011.0002.

Type locality: Loc. 3, north end of Hornby Island, British Columbia, 49°32'57"N, 124°41'40"W.

Paratypes: RBCM.EH2003.011.0001, RBCM.EH2003.011.0003, RBCM.EH2003.012.0001 to RBCM.EH2003.012.0003, RBCM.EH2003.013.0001, RBCM.EH2003.014.0001, and CAS 69082.01.

Geologic age: Late middle Campanian to early late Maastrichtian.

Distribution: UPPER MIDDLE TO LOWER UPPER CAMPANIAN: Cedar District Formation, upper part, west shoreline of Denman Island off east coast of Vancouver Island, British Columbia. LOWER UPPER CAMPANIAN: Jalama Formation, Santa Barbara County, southern California. UPPERMOST MIDDLE CAMPANIAN TO LOWERMOST UPPER CAMPANIAN: Moonlight Formation?, north end of Shale Hills, southwest side of Antelope Valley, eastern Temblor Range, Kern County, south-central California. UPPERMOST CAMPANIAN OR LOWER MAASTRICHTIAN: Northumberland Formation, Collishaw Point, north end of Hornby Island, east coast of Vancouver, British Columbia. UPPER UPPER CAMPANIAN TO POSSIBLY LOWER MAASTRICHTIAN: Rosario Formation at Punta Banda, near Ensenada, Baja California. UPPER LOWER TO LOWER UPPER MAASTRICHTIAN: Moreno Formation, Ortigalita Creek, Merced County and Ciervo Hills, Fresno County,

central California; Moreno Formation, Marca Shale Member, Fresno County, central California.

Discussion: This new species is based on 18 specimens: five left valves, 10 right valves, and three with conjoined valves. The best preserved ones are from the Northumberland Formation.

The new species is most similar to *Acila* (*Truncacila*) *haidana*, but the new species differs by having a more variable shape, narrower interspaces between the ribs, and having the line bisecting the chevrons located more anteriorly on the ventral margin.

Acila (*Truncacila*) *grahami* is similar to *Acila piura* Olsson (1931:35, pl. 2, figs. 9, 10, 14) from the upper Oligocene Heath Formation of northern Peru. The new species differs from *A. piura* by having a narrower chevron angle, more variability in the width of the interspaces between the ribs, and more ribs (22 to 33 versus 17) posterior to the bisecting line.

Whiteaves (1879:162) reported *Nucula* (*Acila*) *truncata* Gabb, 1864, from the northwest side of Hornby Island. He provided no type numbers nor any illustrations of any specimens, and none is part of any known museum collection. It is most likely, however, than any acilids found there would be *A. (T.) grahami*, because the type locality of this species is at the north end of Hornby Island.

Etymology: The species is named for Raymond Graham who collected many of the specimens and who informed the authors about them.

Acila (*Truncacila*) *rosaria* Squires & Saul,
sp. nov.

(Figures 39–43)

Diagnosis: Shell medium, elliptical-subquadrate. Chevrons bisected by line meeting ventral-margin anterior. Total number of ribs on disk of each valve approximately 80; ribs (posterior of chevron-bisecting line), very narrow to narrow, with interspaces approximately $\frac{1}{4}$ as wide to same width as ribs. Escutcheon bounded by flattish to grooved area usually crossed by ribs not continuous with ribs on disk.

Description: Shell medium for subgenus (up to 19.6 mm in height and 25.5 mm in length), longer than high, height/length ratio = 0.68 to 0.78. Elliptical-subquadrate,

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left-valve hinge, $\times 3.8$. Figures 39–43. *Acila* (*Truncacila*) *rosaria* Squires & Saul, sp. nov. Figure 39. Holotype LACMIP 13234, LACMIP loc. 25431, left valve, $\times 1.8$. Figure 40. Paratype LACMIP 13235, LACMIP loc. 8068, left valve, $\times 2$. Figure 41. Paratype UCMP 155631, UCMP loc. B-5320, left valve, $\times 2$. Figure 42. Paratype LACMIP 13236, LACMIP loc. 25431, right valve, $\times 1.8$. Figure 43. Hypotype LACMIP 13234, LACMIP loc. 25431, oblique posterior view, $\times 2.3$. Figures 44–48. *Acila* (*Truncacila*) *princeps* Schenck, 1943. Figure 44. Holotype CAS 69075, CAS loc. 69075, left valve, $\times 1.3$. Figure 45. Hypotype LACMIP 13130, LACMIP loc. 23314, left valve, $\times 1.5$. Figure 46. Hypotype CAS 69086.02, CAS loc. 69086, rubber peel of left valve, $\times 2.1$. Figure 47. Paratype CAS 69078, CAS loc. 69075, left valve, $\times 1.5$. Figure 48. Paratype CAS 69076, CAS loc. 69075, right valve, $\times 1.5$.

inequilateral, equivalved, valves moderately inflated. Anterior end broadly rounded. Antero-dorsal margin long and straight. Posterior end straight, truncate and set off from escutcheon by weak rostration. Ventral margin convex. Lunule small, not very distinct, very slightly depressed, and crossed by ribs. Umbones low, located posteriorly; umbonal angle varying from 113 to 125°. Beaks pointed, incurved, opisthogyrate. Disk very broad, ornamented with abundant ribs diverging from umbo area and forming chevron-shaped (divaricate) pattern. Chevron angle 34 to 44°. Chevrons bisected by line extending from slightly anterior of umbo to anterior of ventral margin (rarely near center); ribs anterior to bisecting line 30 to 44 (excluding occasional bifurcations), ribs posterior to bisecting line 42 to 49. Secondary divarication common; tertiary divarication rare and only on those specimens where divarication is near center. Total number of ribs on disk of each valve usually approximately 80; ribs very narrow to narrow, with interspaces approximately $\frac{1}{4}$ as wide to same width as ribs, except anterior of chevron-bisecting line, where ribs become slightly wider, more widely spaced, and occasionally of irregular width. Ribs on juvenile specimens minutely tuberculate. Growth check(s) prominent on some adult specimens near ventral margin; growth check(s) commonly associated with riblet insertion near ventral-margin center and anterior of ventral-margin center. Ventral-margin edge and, for short distance, interior finely crenulate. Escutcheon prominent, sunken, bounded by flattish to shallowly grooved area usually crossed by ribs not continuous with ribs on disk, except on ventral part of escutcheon; flattish to shallowly grooved area occasionally smooth. Escutcheonal area elevated centrally and with riblets more widely spaced than elsewhere on this area. Interior nacreous. Adductor scars well delineated. Right-valve hinge with at least 18 anterior teeth, similar in form, becoming stronger posteriorly. Resilifer narrow, oblique.

Dimensions of holotype: Conjoined valves, height 18.0 mm, length 25.4 mm, thickness 14.9 mm.

Holotype: LACMIP 13234.

Type locality: LACMIP loc. 25431, Punta San Jose, Baja California, Mexico, 31°26'30"N, 116°38'45"W.

Paratypes: LACMIP 13235 and 13236, and UCMP 155631.

Geologic age: Early late Campanian to early late Maastriichtian.

Distribution: LOWER UPPER CAMPANIAN: Moonlight Formation?, north end of Shale Hills, southwest side of Antelope Valley, eastern Temblor Range, Kern County, south-central California. UPPER UPPER CAMPANIAN TO POSSIBLY LOWER MAASTRICHTIAN: Point Loma Formation, near Carlsbad, San Diego County, southern California; Rosario Formation at Punta San Jose,

San Antonio del Mar, and Arroyo Santa Catarina, Baja California, Mexico. UPPER LOWER TO LOWER UPPER MAASTRICHTIAN: Moreno Formation, Tierra Loma Member, Merced County, north-central California.

Discussion: This species is based on 40 specimens: 10 left valves, 11 right valves, and 19 with conjoined valves. Most show excellent preservation, although a few shells are partially decorticated. Most specimens are from the Rosario Formation, and most of these are from or near the vicinity of Punta San Jose.

The new species is most similar to *A. (T.) demessa*, but the new species differs by having a more oval shape, more projected anterior and posterior ends, generally more uniform sculpture over the entire valve surface, and usually a larger shell size. On the posterior part of the disk of the new species, the ribs have more prominent interspaces than those of *A. (T.) demessa*. In addition, large specimens of the new species have narrower ribs than large specimens of *A. (T.) demessa*. In addition, the ribs on the anterior part of the valves of the new species can be elevated and minutely tuberculate, whereas correspondingly, on *A. (T.) demessa* these ribs are flat-topped and smooth. The escutcheonal area of the new species can be very similar to that of *A. (T.) demessa*, if the bounding shallow groove is smooth or smoothish, but most specimens of the new species have ribs across the entire escutcheon.

Acila (T.) rosaria is similar to *A. (T.)* sp. nov.? but differs by having a more elliptical shape, usually narrower ribs, and slightly narrower spaced ribs.

Etymology: The new species is named for the Rosario Formation, Baja California, Mexico.

Acila (Truncacila) princeps Schenck, 1943

(Figures 45–51)

Acila (Truncacila) princeps Schenck, 1943:63–66, pl. 8, figs. 1–4, 6–8.

Acila (Truncacila) sp. D. Schenck, 1943:65, pl. 9, fig. 5.

Acila (Truncacila) sp. F. Schenck, 1943:66, pl. 9, figs. 6, 8.

Acila sp. Saul, 1986b:26.

Diagnosis: Shell large, subquadrate, rarely trigonal. Chevrons bisected by line meeting ventral-margin anterior. Total number of ribs on disk of each valve approximately 85; ribs (posterior of chevron-bisecting line), flat and narrow to wide, with interspaces approximately $\frac{1}{2}$ to $\frac{1}{4}$ as wide.

Description: Shell large for subgenus (up to 25.8 mm in height and 34.4 mm in length), longer than high, height/length ratio = 0.71 to 0.85. Subquadrate, rarely trigonal; inequilateral, equivalved, and valves inflated. Anterior end broadly rounded. Antero-dorsal margin long and lowly convex. Posterior end straight, abruptly truncate and set off from escutcheon by weak rostration. Ventral mar-