

CATINELLA PARALLELA, A NEW SUCCINEIDAE (PULMONATA) FROM MIDWESTERN UNITED STATES

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ABSTRACT

Catinella parallela, a new species of Succineidae, and its reproductive organs, chromosomes, shell and detailed habitats are described. The known geographic range extends from western Illinois to western Indiana, between 38°10' - 40°50' N latitude. This species was taken from three types of habitats.

In the course of my field studies on succineid gastropods in the midwestern states I have found a large, hitherto undescribed species.

Catinella parallela n. sp.

Description of Holotype: Shell: amber-colored,

translucent, imperforate, elongate-ovate, composed of three and one-third inflated whorls separated by a deeply incised suture; height 10 mm, width 6.1 mm. A knoblike nuclear whorl tops the acute spire; whorls increase rapidly in size resulting in a tumid ultimate whorl; nuclear

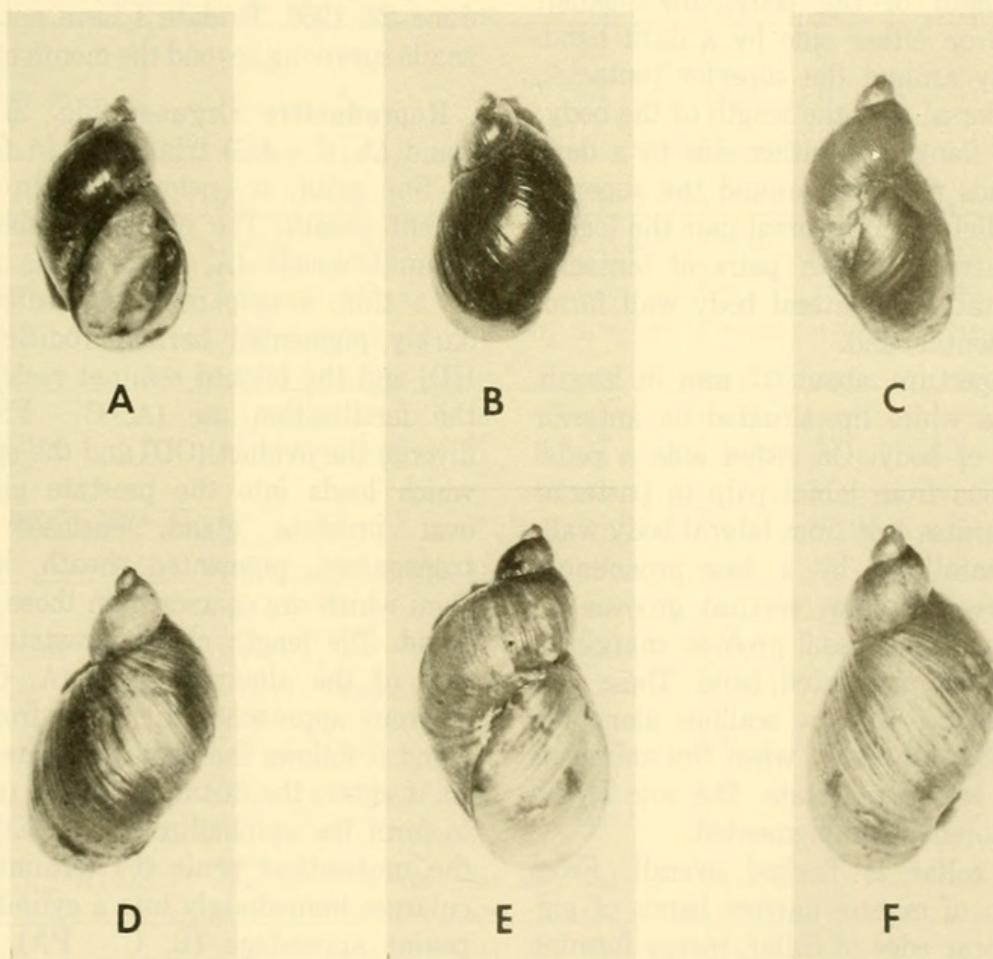


FIG. 1. A, B, *Holotype* of *Catinella parallela*, n. sp. (Height, 10 mm). C. *Paratype* of *Catinella parallela* n. sp., one-half mile N. White River, Knox County, Indiana (Height 11.7 mm). D. *Paratype* of *Catinella parallela* n. sp., Pere Mar-

quette State Park, Jersey County, Illinois (Height 12.0 mm). E, F. *Paratype* of *Catinella parallela* n. sp., New Hardin, Greene County, Illinois (Height 13.2 mm.)

whorl finely granular; irregularly-spaced longitudinal striations, fine on the lower half of the nuclear whorl, increasing gradually, becoming coarser towards the aperture; ovate aperture occupies nearly seven-tenths of height of shell (Table 1). Sharply-edged peristome very fragile; very thin callus discernible on ultimate whorl above the aperture; amber-colored columella follows inner border of peristome and curves as it disappears into the ultimate whorl (Fig. 1, A).

Body and Mantle Surfaces: Surface of head and body wall cream-colored, coarsely and irregularly tuberculate; pigmentation of dorsal body surface consists of bands of dark flecks extending from anterior end of head to junction of mantle and the body wall; mid-dorsally on head pigmentation forms a triangle, narrowing to a band between the superior (posterior) tentacles, dividing and continuing as a double band mid-dorsally the length of the body; the median triangle flanked on either side by a dark band, bending medially around the superior tentacles, paralleling the dorsal pair the length of the body; median triangle flanked on either side by a dark band which bends medially around the superior tentacle to parallel the mid-dorsal pair the length of the body; surface of both pairs of tentacles flecked; pigmentation of lateral body wall forming a broad horizontal band.

The genital aperture, about 0.5 mm in length, surrounded by a white lip, situated on anterior right-hand side of body. On either side a pedal groove, continuous from labial palp to posterior tip of body, separates foot from lateral body wall; pedal groove paralleled by a less pronounced suprapedal groove. Shallow, vertical grooves incise the suprapedal and pedal grooves, margin of foot and the broad pigmented band. These vertical grooves produce shallow scallops along the margin of the foot especially when the animal is in a somewhat contracted state. The sole of the foot is cream-colored and unpigmented.

The mantle collar is flecked overall. From anterior margin of mantle narrow bands of pigment, distinct near edge of collar, merge forming streaks over mantle surface. The kidney is outlined by a dark band.

Holotype: Catalogue no. FMNH 201444; **Paratypes nos.:** FMNH 201445, FMNH 201446,

Molluscan Collection, Field Museum of Natural History, Chicago, Illinois. Additional paratypes are in the private collection of the author.

Description of Paratypes: Shell: (Fig. 1, C-F) Shells of mature snails, attaining a height of 15.2 mm, are comprised of 3 1/4 to 3 3/4 inflated whorls. Dimensions of the three largest shells, number of shells measured, and the median of each of the nine series measured, are recorded in Table 1. The range of the greatest height of the series of shells included in this study is from 10.2 to 15.2 mm, and the range of the greatest width is from 6.0 to 8.28 mm. The largest apertures of the shells of the nine series occupy from 65.8 to 72.0 percent of the entire height of the shell. Other dimensions and relative dimensions are to be noted in Table 1. The largest shells were taken from the flood plain of the Illinois River, New Hardin, Green County, Illinois (Field #269) on June 22, 1966. To date I have not found mature snails surviving beyond the month of July.

Reproductive Organs: (Fig. 2) The albumin gland (A, C - AG) triangular in form, composed of fine acini, is enclosed within a thin, transparent sheath. The elongate, subequally bilobed seminal vesicle (A, C - SV) is enclosed within a thin, transparent, pigmented sheath. The darkly pigmented hermaphroditic duct (A, C - HD) and the bilobed seminal vesicle join to form the fertilization sac (A, C - FS) from which diverge the oviduct (OD) and the sperm duct (SD) which leads into the prostate gland (PG). The oval prostate gland, enclosed by a thin, transparent, pigmented sheath, is composed of acini which are coarser than those of the albumin gland. The length of the prostate gland exceeds that of the albumin gland (A, C). As the vas deferens approaches the penis from the prostate gland it follows the penis along its dorsal surface. As it enters the distal end of the penis it enlarges to form the epiphallus (B, C - EP) which enters the unsheathed penis (P) terminally. The penis enlarges immediately into a cylindrical form. The penial appendage (B, C - PA) whose base is almost one-half the length of the penis, originates subterminally where the penis joins the genital atrium (B, C - GA). The appendage expands horizontally to equal about two-thirds of the

TABLE 1. *Dimensions of shells of Catinella parallela, n. sp. The measurements are of the three largest shells of each of the 9 series (6 localities) as indicated. In the 4th column of measurements are listed the ratios of the width of the shell over its height. In the last 3 columns are listed the ratios of the height of the aperture over the height of the shell, width of aperture over width of shell, width of aperture over height of aperture.*

	No. of Whorls	Height	Width	Width/Height	Height of Aperture	Width of Aperture	H. Ap./H. Shell	W. Ap./W. Shell	W. Ap./H. Ap.
Holotype	3 1/3	10.0 mm	6.1 mm	.61	6.7 mm	4.1 mm	.67	.67	.61
Type Locality	3 1/3	10.2	6.4	.62	7.4	4.5	.72	.70	.61
Field #458	3 1/3	9.5	5.6	.59	6.4	3.8	.67	.68	.59
Floodplain, Wabash R., White Co., Illinois									
June 20, 1977									
Range (6 shells)	3 - 3 1/3	7.5 - 10.2	4.7-6.4	.56-.62	5.1-7.4	3.2-4.5	.66-.72	.67-.73	.59-.62
Median		9.5	5.6	.59	6.4	3.8	.67	.68	.59
Field #458	3 1/2	11.91	6.7	.563	7.89	5.51	.662	.822	.698
Floodplain, Wabash R., White Co., Illinois	3 1/2	11.25	6.33	.563	7.27	5.00	.646	.790	.688
June 5, 1976	3 1/3	11.15	7.00	.628	7.50	5.38	.623	.769	.717
Range (12 shells)	3 - 3 1/2	6.3 - 11.91	3.61-7.0	.53-.628	3.94-7.89	2.78-5.51	.623-.711	.672-.869	.606-.717
Median		10.26	6.24	.573	6.86	4.42	.670	.798	.684
Field #461	3 1/2	14.29	7.44	.521	8.95	5.76	.626	.774	.644
One-half mi. N of White River, Knox Co., Indiana	3 1/2	13.27	8.80	.663	8.50	5.74	.640	.652	.675
June 6, 1976	3 1/2	13.04	7.85	.602	7.85	5.20	.602	.662	.662
Range (8 shells)	3 1/3- 3 1/2	9.82- 14.29	6.28-8.80	.521-.663	6.53-8.95	4.48-5.76	.585-.678	.652-.80	.662-.735
Median		12.70	7.20	.640	7.56	5.44	.637	.713	.684
Field #461	3 1/2	10.6	6.0	.56	6.7	4.4	.63	.73	.65
One-half mi. N of White River, Knox Co., Indiana	3 1/3	10.5	6.10	.58	6.8	4.5	.64	.73	.66
June 21, 1977	3 1/3	9.8	5.7	.58	6.0	3.5	.61	.61	.58
Range (28 shells)	3 1/4- 3 1/2	8.2-10.6	4.8-6.1	.49-.64	5.1-6.8	3.4-4.5	.56-.70	.60-.77	.56-.66
Median		9.5	5.6	.59	6.1	3.7	.64	.67	.61
Field #462	3 1/2	12.84 mm	7.25 mm	.565	7.83 mm	5.26 mm	.610	.726	.672
10 mi. N Vincennes, Knox Co., Indiana	3 1/2	10.00	6.09	.609	6.28	4.17	.628	.685	.664
June 6, 1976	3 1/3	9.47	5.65	.597	5.78	3.95	.610	.699	.683
Range (20 shells)	3 1/3- 3 1/2	3.89- 12.84	2.50-7.25	.474-.643	2.56-7.83	2.0-5.26	.528-.658	.641-.767	.576-.843
Median		8.03	4.75	.597	4.81	3.27	.577	.688	.684
Field #187	3 1/2	12.4	7.5	.60	8.6	5.4	.69	.72	.62
Pere Marquette State Park, Jersey Co., Illinois	3 1/3	12.2	7.0	.57	7.8	4.6	.64	.65	.59
June 15, 1954	3 1/2	11.7	6.7	.57	7.5	4.3	.64	.64	.57
Range (7 shells)	2 3/4- 3 1/2	8.9- 12.4	5.1-7.5	.56-.61	6.2-8.6	3.7-5.4	.60-.69	.64-.72	.57-.66
Median		11.6	6.7	.57	7.5	4.6	.65	.70	.60
Field #269	3 3/4	13.23	8.20	.620	8.65	5.61	.654	.684	.649
New Hardin, Greene Co., Illinois	3 1/2	13.05	7.80	.598	8.60	5.68	.659	.728	.660
July 11, 1964	4	13.00	7.74	.595	8.30	5.00	.638	.646	.602
Range (23 shells)	3 1/3- 4	10.10- 13.23	5.60-8.20	.518-.645	6.22-8.65	4.36-5.68	.606-.711	.631-.841	.602-.723
Median		11.60	6.95	.60	7.59	4.91	.653	.701	.652
Field #269	3 1/2	15.20	8.28	.545	9.60	6.40	.632	.773	.667
New Hardin, Greene Co., Illinois	3 1/2	13.15	7.35	.559	8.55	5.95	.650	.810	.696
June 22, 1966	3 1/2	12.82	7.40	.577	8.20	5.17	.640	.699	.630
Range (9 shells)	3 1/3- 3 1/2	10.50- 15.30	6.05-8.28	.527-.630	6.95-9.60	5.05-6.80	.618-.689	.699-.863	.630-.777
Median		12.70	7.22	.576	8.20	5.36	.640	.810	.696
Field #445	3 1/3	12.15	6.85	.564	7.50	4.47	.617	.653	.596
0.8 mi. S Nutwood, Jersey Co., Illinois	3 1/3	11.51	6.6	.573	8.0	4.92	.695	.745	.615
June 1, 1975	3 1/3	11.45	7.0	.611	7.50	4.52	.657	.646	.603
Range (14 shells)	3 1/3- 3 1/2	8.42- 12.15	5.08-7.00	.566-.641	5.20-8.0	3.55-4.92	.610-.708	.646-.80	.596-.72
Median		10.5	6.12	.603	6.95	4.45	.657	.742	.648

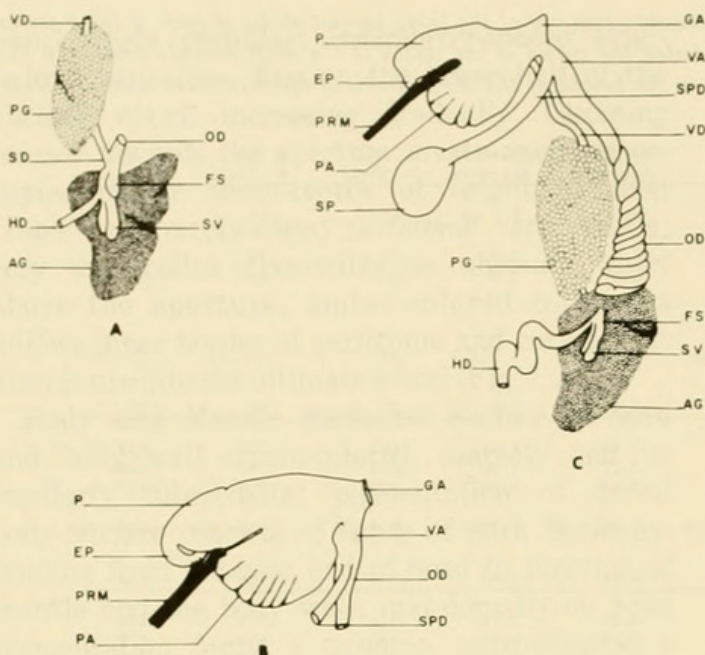


FIG. 2. Reproductive organs of *Catinella parallela* n. sp. AG, albumin gland; EP, epiphallus; FS, fertilization sac; GA, genital atrium; HD, hermaphroditic duct; OD, oviduct; P, penis; PA, penial appendage; PG, prostate gland; PRM, penial retractor muscle; SD, sperm duct; SP, spermatheca; SPD, spermathecal duct; SV, seminal vesicle; VA, vagina; VD, vas deferens.

length of the penis — the expanded portion parallels the penis (A, C). The vertical dimension of the appendage is almost twice that of the body of the penis. The internal walls of the penis and of the appendage are folded forming very prominent ridges projecting into the lumen. The internal foldings of the appendage can be noticed externally by markings as indicated (B, C). Fibers of the broad, stout penial retractor muscle insert mainly onto the base of the penial appendage; lesser fibers insert onto the penis and onto the epiphallus (B, C - PRM).

The globular spermatheca (Fig. 2, C - SP) is connected to the vagina by a stout spermathecal duct (SPD) which enlarges as it approaches and enters the vagina. The short vagina expands as it opens into the genital atrium (B - GA).

The Radula: Radulae of seven paratypes of three localities were stained and mounted. The number of rows of teeth occurring on the radulae examined range from 84 - 90 (Table 2). There are few teeth to a row on the anterior-most rows; the number increases rapidly posteriorly.

The number of marginals and laterals of representative rows of the seven radulae are recorded in Table 2. Although there is an individual variation of the radulae and also of the rows of teeth of a radula, the ratio of marginals to laterals is approximately 1:1. Such a ratio is characteristic of the genus as noted by Quick to be true of *Catinella* (*Succinea*) *arenaria* ("B.-Ch.") (Quick, 1933, Fig. 4, p. 296).

The structural details of the individual teeth resemble those of the genus as described for European species by Quick (ibid). The characteristics of the teeth are described below and illustrated in Fig. 3, A. The central tooth (C) bears a broad basal plate having a posterior, serrated margin flanked on either side by a rounded boss. The pointed mesocone extends downward to about the lower third of the basal plate. A short, pointed ectocone flanks the mesocone on either side.

The laterals (L-L) have a large, pointed mesocone which, like that of the central tooth, extends downward to about the lower third of the basal plate. A small, pointed endocone is present. The singly pointed ectocone is sometimes divided into two cusps; this is especially true of the more lateral teeth.

The marginals (L-M) smaller than the laterals, have a basal plate which is broader than long; this is especially true of the outermost marginals (Fig. 3). The small endocone is pointed; the pointed mesocone extends to the base of the basal

TABLE 2. Formulae of representative rows of teeth of *Catinella parallela* new species.

Station	Slide	No. of Rows of Teeth	Row	M	L	C	L	M
Field No. 445 Jersey County, Illinois	A	86	47	15	- 10	- 1	- 12	- 13
			50	13	- 12	- 1	- 12	- 13
			52	14	- 11	- 1	- 12	- 13
			63	15	- 10	- 1	- 11	- 13
Field No. 269 East Hardin, Illinois	A	90	21	10	- 13	- 1	- 16	- 7
			36	11	- 13	- 1	- 14	- 9
			46	15	- 9	- 1	- 10	- 12
	C	88	47	13	- 10	- 1	- 11	- 12
			29	10	- 12	- 1	- 12	- 12
			33	13	- 12	- 1	- 14	- 11
Field No. 461 Knox County, Indiana	A	84	45	11	- 13	- 1	- 13	- 11
			53	11	- 13	- 1	- 10	- 12
			64	13	- 13	- 1	- 13	- 13
	B	88	34	14	- 13	- 1	- 14	- 14
			66	14	- 13	- 1	- 12	- 16

plate. The ectocone of the inner-most marginals is divided into two, while the outermost is divided into three cusps.

The basal plates of the marginals are short and broad which is a distinctive feature of the genus *Catinella* as observed by Quick (1933, Fig. 4). The basal plates of the marginals of the radula in the genus *Oxyloma* are long and tapering as reported of *Oxyloma (Succinea) pfeifferi* ("Rossm.") by Quick (ibid, Fig. 1). This feature of the radula was observed in other species of *Oxyloma* by Franzen (1963, Fig. 1; 1966, pp. 64-65; 1969, Fig. 1; 1973, Fig. 4). The basal plates of the marginals of the genus *Succinea* are intermediate in length (Quick, 1933, Figs. 2, 3; and Franzen, 1959, Fig. 3; 1971, Fig. 3).

The Jaw. The amber-colored jaw is illustrated in Fig. 3, B. Anteriorly the collar has a median fold flanked on either side by smaller lateral folds. Posteriorly the collar bears a broad, median indentation.

Chromosome Number. Ovotestes of *Catinella parallela* were squashed and stained with orcein. Examination of the stained chromosomes in meiotic metaphase revealed the haploid number of six. This small number is characteristic of the genus *Catinella* (Patterson, 1971, Table 1.). This contrasts with the haploid number of nineteen of several species of *Oxyloma*: *Oxyloma deprimida* Franzen (Franzen, 1973, Fig. 1, and p. 68); *O. retusa* (Lea), *O. haydeni* (W. G. Binney) and *O. salleana* (Pfeiffer) (Franzen, 1966, p. 67). The haploid chromosome number of eighteen is characteristic of *Succinea vaginacontorta* Lee (Franzen, 1971, p. 141) and other species of *Succinea* of continental USA. (Patterson, 1971, Table 1).

Geographic Distribution and Habitats. The known geographic range of *Catinella parallela* extends from the flood plain of the Illinois River in Greene and Jersey counties in western Illinois, across the state to the banks of the Wabash River in White County in eastern Illinois, and to Knox County in western Indiana. The eight localities where I have found *C. parallela* represent three types of ecological habitats, namely: (1) a wooded flood plain of a river; (2) a slough with stands of plants including *Typha* sp. (cattails), *Sagittaria latifolia* Willd. (arrowhead), *Eleocharis* sp. (spike

rush), *Polygonum inermis* Muhl (water smartweed), *Rhus radicans* L. (poison ivy), and *Spartina* sp. (sawgrass); (3) roadside ditch supporting a stand of *Typha* sp.

Locality 1, Type Locality: Field No. D.S.F. 458; western edge of the flood plain of the west side of the Wabash River, below the bridge of Illinois Hwy. 14 (formerly U.S. Hwy 460), 7 miles E Crossville, White County, Illinois. The flood plain is a woodland of predominantly *Acer saccharinum* L. (silver maple), *Gleditsia triacanthos* L. (honey locust), and *Populus deltoides* Marsh (cottonwood). *Catinella parallela* lives on the shaded damp ground, on rotting wood, and on dead leaves on the ground.

Locality 2, Field No. D.S.F. 459; twelve miles E Princeton, Gibson County, Indiana, Indiana Hwy. 64, one-half mile E Wabash River, in a lowland wooded area of predominantly *Acer saccharinum* L. One individual of *Catinella parallela* was under a piece of cardboard in a small pile of rubbish.

Locality 3, Field No. D.S.F. 460; flood plain of the Patoka River, Patoka, Gibson County, Indiana, in a wooded area of predominantly *Acer saccharinum* L. and *Populus deltoides* Marsh. Two individuals of *Catinella parallela* were found on damp ground of an exposed area.

Locality 4, Field No. D.S.F. 461; one-half mile N White River, a roadside ditch and slough alongside Orville Road, west off of U.S. Hwy. 41, Knox County, Indiana. *Typha* sp. grows in the

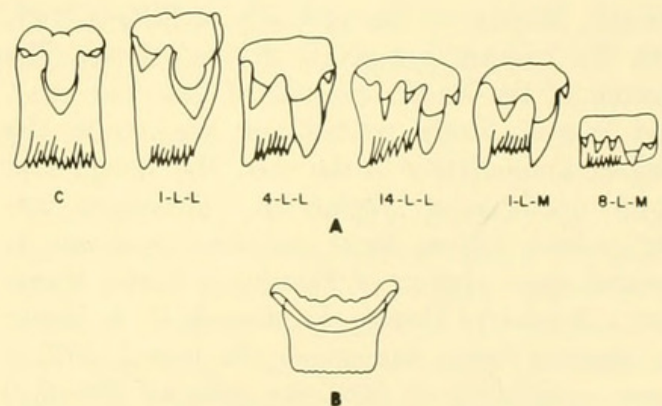


FIG. 3. A: Representative radula teeth of *Catinella parallela* n. sp. C, central tooth; 1-L-L, 1st left lateral; 4-L-L, 4th left lateral; 14-L-L, 14th left lateral; 1-L-M, 1st left marginal; 8-L-M, 8th left marginal. B: A jaw of *Catinella parallela* n. sp.

water while *Sagittaria latifolia* Willd. and *Spartina* sp. grow in very wet ground. *Oxyloma salleana* (Pfeiffer) lives on the cattails and on dead vegetation floating on the water. *Catinella parallela* lives near the water's edge on the base of cattails, on the matting of dead vegetation and on bare spots on the wet ground shaded by sawgrass and leaf litter.

Locality 5, Field No. D.S.F. 467; ten miles N Vincennes, Knox County, Indiana, roadside ditch along U.S. Hwy. 41. Although at the time this site was visited the water was becoming polluted, *Typha* sp. was growing in the ditch and *Catinella parallela* was still living there.

Locality 6, Field No. D.S.F. 269; eastern bank of the Illinois River at New Hardin, Greene County, Illinois. On June 11, 1964, the ground was muddy from recent rains. The bank supported a thicket of *Salix* sp. (willows). *Oxyloma salleana* (Pfeiffer) lived on the muddy bank. *Catinella parallela* was found creeping on the wet ground, on surfaces of wet boards and other debris on the ground along the eastern edge of the flood plain away from the shore of the river. Since then, as a result of severe storms and flooding, the entire flood plain is littered with logs, branches and other debris. The habitats of the two succineid species are destroyed, at least temporarily.

Locality 7, Field No. D.S.F. 445; eight-tenths mile S Nutwood, or 2.4 miles S from the junction of Illinois Hwy. 100 and Illinois Hwy. 16, Jersey County, Illinois, on the west side of Illinois Hwy. 100. The habitat is a poorly drained slough. The bottom of the slough consists of fine, tan sand, and coarse, sandy reddish-tan loess from the deposit immediately to the east. The slough supports growths of *Typha* sp., *Eleocharis* sp., *Polygoneum inermis* Muhl and *Rhus radicans* L. Several small clumps of *Populus deltoides* Marsh and a thicket of *Cornus drummondii* C. A. Meyer are located within the slough. On June 1, 1975, a large population of *Oxyloma salleana* (Pfeiffer) lived on *Typha* sp. and on the wet ground at the base of the cattails. A well-established population of *Catinella parallela* lived on the eastern edge of the slough on wet, but not swampy, ground where the vegetation was less dense. On June 11, 1977,

due to an abnormally low amount of rainfall during the spring months, there was no water in the slough but the ground was still damp. *O. salleana* was feeding on cattails and spike rish. However, a four-hour search netted only one individual of *C. parallela*. This might indicate that *C. parallela* is more readily affected by adverse conditions than is *O. salleana*.

Locality 8, Field No. D.S.F. 187; Pere Marquette State Park, Jersey County, Illinois, west side of Illinois Hwy. 100. The site is the east shore of a lake formed by a bow of the Illinois River. On June 15, 1954, *Oxyloma salleana* (Pfeiffer) and *Catinella parallela* were abundant on the wet ground and on wet boards lying on the bank. I have visited this site several times but have not found *C. parallela* since 1954, although *O. salleana* is still well-established.

Diagnostic Features. Shell: the elongate-ovate shell is comprised of $3\frac{1}{4}$ to $3\frac{1}{2}$ tumid whorls. The height of the ovate aperture exceeds six-tenths of the height of the shell. Two examples of the latter are: (a) The height of the shell of the holotype is 10.0 mm and its aperture 6.7 mm in height; height of aperture / height of shell is .67. (b) The height of the largest shell of the series studied is 15.2 mm and its aperture 9.6 mm in height; height of aperture / height of shell is .632. The amber-colored columella forms the inner border of the peristome. A thin callus is discernible on the ultimate whorl above the aperture.

Penis and Penial Appendage: the base of the penial appendage equals almost half the length of the penis. The expanded appendage is positioned parallel to the penis. The vertical dimension of the appendage is almost twice the width of the body of the penis. The penial retractor muscle inserts mainly onto the base of the penial appendage and by means of lesser fibers onto the penis and the epiphallus.

The specific name *parallela* refers to the expanded penial appendage being parallel to the penis instead of right angle to the penis as is characteristic of other species in the genus *Catinella*.

Spermatheca: the globular spermatheca is connected to the vagina by a stout duct which enlarges as it approaches and enters the vagina.

Comparative Remarks: *Catinella parallela* probably more nearly resembles *C. texana* Hubricht than any other described species. The differences include: (a) Shell dimensions and ratios of dimensions. (1) The aperture of *C. parallela* is larger in proportion to the height of the shell than it is in *C. texana*. (2) The largest known shell of *C. parallela* is 15.2 mm in height. (b) The penial appendage of *C. parallela* is parallel to the penis whereas in *C. texana* the penial appendage is vertical in position, i.e. at right angle to the penis. (c) The penial retractor muscle of *C. parallela* inserts mainly onto the base of the penial appendage; lesser fibers insert onto the penis and onto the epiphallus. The penial retractor muscle of *C. texana* is "connected to the side of the penis near the middle" (Hubricht, 1961, p. 61). (e) The spermathecal duct of *C. parallela* is stout, of *C. texana* slender. (f) The seminal vesicle of *C. parallela* is pigmented but not as darkly as described of *C. texana* as being "strongly pigmented, almost black" (ibid).

ACKNOWLEDGMENTS

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REDISCOVERY OF SOME PLEUROCERIDS (GASTROPODA) NEAR MUSCLE SHOALS, TENNESSEE RIVER, ALABAMA

Billy G. Isom¹, Sally D. Dennis² and Charles Gooch¹

Lithasia verrucosa (Rafinesque, 1820), *Lithasia geniculata salebrosa* (Conrad, 1834), and *Pleurocera alveare* (Conrad, 1854) were rediscovered in May 1977 at Muscle Shoals, Alabama, below Wilson and Wheeler Dams on the Tennessee River.

The last records of *L. g. salebrosa* from the

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²Tennessee Valley Authority, Forestry Building, Norris, Tennessee 37828

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