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ABSTRACT

Speocirolana thermydronis, previously known from a single specimen, was rediscovered in interstices of travertines that rim large spring-fed pools near Cuatro Ciénegas Coahuila, México. The 29 new specimens differ little from the original description, but some variations are described.

Speocirolana thermydronis Cole and Minckley (1966) was described from a single, large female collected 12 April 1964 near Posos de la Becerra, 13.7 km southwest of Cuatro Ciénegas, central Coahuila, México. In August 1967, 29 additional specimens were caught, 22 from an unnamed poso (sinkhole) *ca.* 12 km southwest of Cuatro Ciénegas, and 7 specimens from the west laguna of El Mojarral, 11 km southwest of that town. Considerable time spent at a number of other places, including the area of original discovery, failed to obtain the isopod.

Habitats.—The unnamed poso is a spring tributary to the west laguna of El Mojarral. Its dimensions are about 10 by 12 m, by about 2 m deep. There was about 0.85 m of water in the pit, over a dark, flocculent bottom of silt, shells of the snails *Paludiscala caramba* Taylor and *Durangonella* sp., and travertine blocks and fragments. The banks are of gypsum, matted roots of desert plants, and travertine. The inflowing water was 34° C. This is the type-locality of *P. caramba,* the most distinctive of the freshwater snails of the Cuatro Ciénegas basin (Taylor, 1966: 207-8).

The second locality for *S. thermydronis,* the western limnocrene in the marshy area called El Mojarral, has been described by Taylor (1966:163, pls. 9-10). It is a large, clear pool, about 25 by 100 m and up to 5 m deep. Large springs enter at the northwest end and water leaves by a subsurface channel and by small surface outflows at the southeast. Water temperatures at the inflow are about 33° C, but some variations occur in places remote from the source. Much of the bottom is soft, gray, flocculent silt, stabilized locally by beds of waterlily, *Nymphaea* sp. Banks are undercut and mostly of gypsum and travertines.

All our new specimens of *S. thermydronis* were collected by manually breaking large, loosely-cemented, porous travertine blocks that were abundant around the margins of the pools. In some instances, individual isopods moved from interstices of a block as water drained from it, and could be picked from the surface. Minckley (1961:454) described similar habitats for a troglobitic asellid, *Asellus stygius* (Packard), in porous marls of Doe Run, Meade County, Kentucky. *S. thermydronis* was accompanied in its habitat by an undescribed species of aquatic isopod, by an aquatic mite, and by an oligochaete. The last three animals also lived in the softer sediments; however, *S. thermydronis* was consistently absent from such places. It seems unlikely that *S. thermydronis* moves extensively within the sediments that characterize most lagunas of the Cuatro Ciénegas area. Living specimens retained in the field soon became entangled with loose sediment particles on the bottoms of their containers, and were distinctly incapacitated. *A. stygius* is similarly affected under certain conditions (Minckley, 1961: 454). Life on the surface of the undisturbed sediments also is most likely limited to places where fishes are absent; as many as 12 species of fish, many of which are highly predaceous, occur in larger springs of the area.

Neil F. Hadley (personal communication), now of Arizona State University, was with Mary L. Allesio when she collected the holotype in 1964, and has provided additional data on the type-locality. The holotype was one of three, similarly-sized individuals observed in a small pit, about 0.5 m in diameter and one m deep, *ca.* 0.6 km south of the head-spring of Posos de la Becerra. The animals were in the shade and were moving about on the surface of gray, flocculent sediment beneath about 0.25 m of water. The pit was near extensive marshes that existed downflow from La Becerra prior to diversion of water by canalization in late 1964 (Cole and Minckley, 1966). The entire marsh-river-poso complex south and west of La Becerra now is dry, and during core-drilling operations in 1967 the water table was encountered about 3 m below the land surface—there is little doubt that the point of original capture also is destroyed.

Our failure to find *S. thermydronis* in the remaining habitats of Posos de la Becerra may be attributed, in part, to destruction by desiccation of most marginal deposits of suitable travertine. The sudden drying of the laguna decimated fish and endemic snail populations (Minckley, in Taylor, 1966: 162-3). In 1967, some of the snails were becoming re-established, as may *S. thermydronis,* as the habitat stabilizes. On the other hand, absence of the species from apparently suitable habitat in a number of other springs diminishes somewhat the importance of its apparent absence in La Becerra. This may result from the well-known vagaries of collecting such secretive organisms. Much of the basin floor has water within a meter of its surface; numerous large, subterranean channels are known, and interstitial habitat for *S. thermydronis,* as well as for other animals, must be exceedingly abundant. We have little doubt that additional specimens and habitats will be found.

Supplemental description.—Those features of *S. thermydronis* adequately described in our original paper are not elaborated here. We find that part of the description was in error, however, and reproduce that section (Cole and Minckley, 1966:18), with corrections in boldface type, as a footnote.[1]

In addition, the second and third pereonites of *S. thermydronis* bear epimera, as do other species of the genus—their absence in the holotype was due to an artifact of preparation, as was suspected.

Body shape and proportions in *S. thermydronis* are quite constant. The telson, broad and acutely tipped in both sexes, seems a good character separating the Coahuilan form from *S. pelaezi* (telson broadly rounded) and *S. bolivari* (telson truncate).

It appears that length and number of segments in the antennal flagella in the genus *Speocirolana* may vary considerably with size, with larger individuals tending to add length and segments. All specimens of *S. thermydronis* are small (the holotype at 15 mm is largest), whereas *S. pelaezi* ranges from 19 to 26 mm and *S. bolivari* from 15 to 35 mm (Bolivar y Peltain, 1950; Rioja, 1953). The second antenna of the 15-mm holotype of *S. thermydronis* reaches posteriad to the seventh pereonite (as in *S. pelaezi*). In the smaller, new specimens of *S. thermydronis,* the maximal extension is to the fifth pereonite. And, in the large *S. bolivari,* its extension is far past the seventh. Articles in the first antennal flagellum of *S. thermydronis* range from 6 to 14 (including the holotype, at the maximum). The second antenna is similarly variable, ranging from 25 to 35 (with the large holotype again bearing the maximum). *S. bolivari* has 22 to 28 segments in the first antennae, and 48 to 82 in the second, and *S. pelaezi* has 20 and 30 segments, respectively. The relative elongation of terminal segments in the second antennal flagellum is variable—the holotype has long terminal segments (as in *S. pelaezi*), yet some smaller specimens have shortened segments indistinguishable from those of *S. bolivari.*

The inner plate of the first maxilla of *S. thermydronis* is invariable in bearing three sparsely-plumose spines and two delicate setae. The outer plate, however, often has as many as 12 strong, distal spines (10 in the holotype).

The maxilliped of *S. thermydronis* seems highly diagnostic. Penultimate and ante-

[1] In *S. thermydronis* the mandibles (Fig. 6) are asymmetrical, with the **left** incisive process overlapping the **right** ventrally. The **pars molaris** of the mandible is sub-triangular, bearing on its margin about 34 short, cone-shaped teeth.

penultimate segments of the palp have only fine, hairlike setae on their outer surfaces, except for a strong spine at each of their distal corners. The ultimate segment is sometimes naked on its outer surface, as in the holotype, but in some specimens there are fine hairlike setae on the proximal half. The outer surfaces of the last three palp segments in *S. bolivari* are strongly setaceous, and such a condition also is found on the penultimate and antepenultimate segments in *S. pelaezi.* These species, however, lack the strong, isolated spines at the distal, outer corners of the last two segments. Such a spine is present only on the first segment of their palps (Bolivar y Peltain, 1950:Fig. 5; Rioja, 1953:Fig. 18).

All pereopods of *S. thermydronis* are essentially as described, except for variable armament on the subcheliform, first three pairs. The holotype has the palmar margins of the propodus armed with 2, 3, and 4 stout spines, respectively; many of the new specimens have 2, 4, and 4 such spines.

The exopod of the fifth pleopod of the new material (rather than the fourth, as erroneously given for the holotype) is only sparsely invested with plumose setae. We also find that both sexes of *S. thermydronis* lack distal setae on the endopodites of all pleopods. Presence of such setae on the first two pleopods, and their absence on the succeeding three, as in *S. bolivari* and *S. pelaezi,* is therefore not a character of generic rank as was tentatively suggested by Bowman (1964:233-4). Distribution of setae on the pleopods does, however, provide good specific characterization—*S. bolivari* has setae on endopods of at least the first and second pleopods in males (Rioja, 1953: Figs. 28, 30); *S. pelaezi* has setae on the endopod of the first pleopod in females and at least the second in males (Bolivar y Peltain, 1950:Figs. 9, 11); and, as given before, all pleopodal endopods of both sexes of *S. thermydronis* lack setae.

Except for the modified second pleopods of the male, no sexual dimorphism is obvious in the genus *Speocirolana.* The copulatory organ of *S. thermydronis* rises from the base of the pleopodal endopod. The organ is variable in length, ranging from slightly shorter to slightly longer than the endopod.

Living specimens of *S. thermydronis* have ivory-white exoskeletons, with dark-brown or black masticatory surfaces on the mandibles and terminal claws of the pereopods. In addition, the spines on the pereopods are straw-yellow. There is a variable amount of red-to-brownish pigment associated with internal organs, and this is visible through the dorsum of living animals, but fades rapidly to light-brown or yellow in alcoholic material.

Specimens of *S. thermydronis* from the 1967 collections are housed at the U. S. National Museum, Washington, D. C., the Instituto Nacional de Investigaciones Biológico Pesqueros, México, D. F., and the National Museum of Canada, Ottawa, Ontario. A permit for collection of aquatic animals in México was supplied by the Dirección General de Pesca e Industrias Conexas, México, D. F. Numerous personnel of Arizona State University deserve thanks for help in the field and in the laboratory. Studies were supported, in part, by Grants GB-2461 and GB-6477X from the National Science Foundation.

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