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A Second Species of the Spider Genus *Hypochilus* from Eastern North America¹

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Spiders of the archaic genus *Hypochilus* often occur in the habitats that I search for millipeds, and for more than a decade I have usually taken a few specimens from each such locality that appeared to be peripheral on the known range of *Hypochilus thorelli*.

As an outcome of this entirely incidental interest, it eventually became apparent to me that the population of *thorelli* occurring in western Virginia was separated by a considerable geographic hiatus from the nearest localities in North Carolina and Tennessee. There also seemed to be some minor differences in habits, but no close comparison of specimens from the two areas was made until the summer of 1962, when a large population of *Hypochilus* was located in southern West Virginia, and numerous adult males and females were taken.

Comparison of these specimens with the recent excellent figures and descriptions published by Gertsch (1958) and with specimens of *thorelli* from North Carolina and Tennessee (including topotypes), indicates that the northern population of spiders is a clearly distinct and easily recognized species. Moreover, this form is structurally less similar to *thorelli*, its geographically nearest relative, than it is to *H. petrunkevitchi* Gertsch, known only from central California.

In the following pages are presented not only diagnostic structural

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notes on the three known members of the genus, but also a summary of what I have been able to discover about the distribution and habits of the two eastern species of *Hypochilus*. Dr. H. W. Levi kindly supplied me with a list of specimens in the Museum of Comparative Zoölogy, and Dr. Willis J. Gertsch provided a similar list of the material that has accumulated in the American Museum of Natural History subsequent to the publication of his monograph.

In recognition of his numerous contributions to arachnology, and in appreciation of his interest and help over a period of years, I take pleasure in associating the name of a third outstanding student of the spiders in the same genus which commemorates Thorell and Petrunkevitch.

Hypochilus gertschi, new species

Figures 1-5

TYPE SPECIMENS: Male holotype and female paratype, from Grandview State Park, 7 miles northeast of Beckley, Raleigh County, West Virginia, collected on September 14, 1962, by R. L. Hoffman; both in the American Museum of Natural History. Topoparatypes collected by me on September 14, and also on September 22, with James E. Carico, are deposited in the United States National Museum, the Museum of Comparative Zoölogy, the British Museum (Natural History), and the Senckenbergische Naturforschende Gesellschaft. Additional paratypes are in my personal collection and that of Carico.

DIAGNOSIS: *Hypochilus gertschi* is in most aspects of its structure similar to *H. thorelli*, as described in detail by Gertsch (1958). The following key to the three known species, and the appended notes on particular morphological details, will serve as a diagnosis of this new form:

1. Tibia of male palpus slender, essentially uniform in thickness; basal section of bulb considerably greater than distal section; conductor slender, apically produced into two subtriangular lobes; female genitalia consisting of four globose, subequal receptacles at end of broad, short ducts; anterior median eyes as large as others. *thorelli* Marx
- Tibia of male palpus conspicuously incrassate proximally, where at least twice the diameter of patella; basal section of bulb about equal in size to distal; conductor broader, apically acuminate; female genitalia not as described above; anterior median eyes smaller than anterior laterals. 2
2. Palpus and legs of males with large, distinct spots or bands, palpal tarsus, however, immaculate; embolus forming a broad, loose, basal coil as seen in prolateral aspect; female genitalia consisting of four slender ducts ending in enlarged receptacles; calamistrum short, consisting of about 20 setae in each series; space between anterior median eyes less than diameter of one eye *petrunkevitchi* Gertsch

Palpus and legs of males with only vaguely indicated dark areas, or entirely immaculate, palpal tarsus, however, with dark spot at base of lateral apophysis; embolus forming tighter coil as seen in prolateral aspect; female genitalia consisting of two scarcely enlarged receptacles at ends of short, broad, convoluted ducts, each duct with a shorter, apparently abortive branch near its base on dorsal side; calamistrum long, consisting of about 30 setae which merge imperceptibly into normal metatarsal pilosity; anterior median eyes separated by distance equal to or greater than diameter of one of them
 *gertschi*, new species

MALE HOLOTYPE: Total length, 8.5 mm.; carapace length, 4.0 mm.; carapace width, 2.8 mm.; abdomen length, 4.5 mm.; abdomen width, 2.7 mm. In general details of body structure, similar to *thorelli*.

Legs intermediate in length between those of the two other species, the first leg about 18 times as long as the carapace (16 times as long in *petrunkevitchi*, 20 times as long in *thorelli*). Legs uniformly light testaceous brown except for occasional vague mottling and for darkened apical rings on most of the segments. Length values for the legs:

SEGMENT	I	II	III	IV
Femur	21.8 mm.	15.0 mm.	11.3 mm.	13.9 mm.
Patella	1.7	1.6	1.5	1.7
Tibia	22.0	14.7	10.5	13.0
Metatarsus	18.6	12.7	9.5	12.2
Tarsus	7.3	6.0	4.4	6.0
	<hr/> 71.4 mm.	<hr/> 50.0 mm.	<hr/> 37.2 mm.	<hr/> 46.8 mm.

Palpus (fig. 4) in general form typical for the genus, but in general portions similar to that of *petrunkevitchi*, particularly as regards the proximally crassate tibia, which is at least twice the thickness of the patella. The embolus of the palpal organ forms a more closely coiled loop than that of *petrunkevitchi*, and the entire appendage is unicolorous except for a distinct small dark spot at the base of the lateral tarsal apophysis. Differences between the palpus of *thorelli* and that of *gertschi* are numerous and distinct, as shown in figures 5 and 7.

FEMALE PARATYPE: Total length, 14.0 mm.; carapace length, 6.0 mm.; carapace width, 4.0 mm.; abdomen length, 8.0 mm.; abdomen width, 5.5 mm. Structure generally similar to that of *H. thorelli*, but with the following differences: calamistrum of nearly equal length, but the distal setae are gradually enlarged and merge into the metatarsal hairs; it is almost impossible to ascertain the end of the calamistrum series. Eye relationships (figs. 1 and 2) apparently characteristic: the anterior median eyes tend to be distinctly smaller than the laterals, as in *petrunkevitchi*, but are separated by a considerably wider clypeal area.

Legs similar in proportions and coloration to those of *thorelli*, the length values as follows:

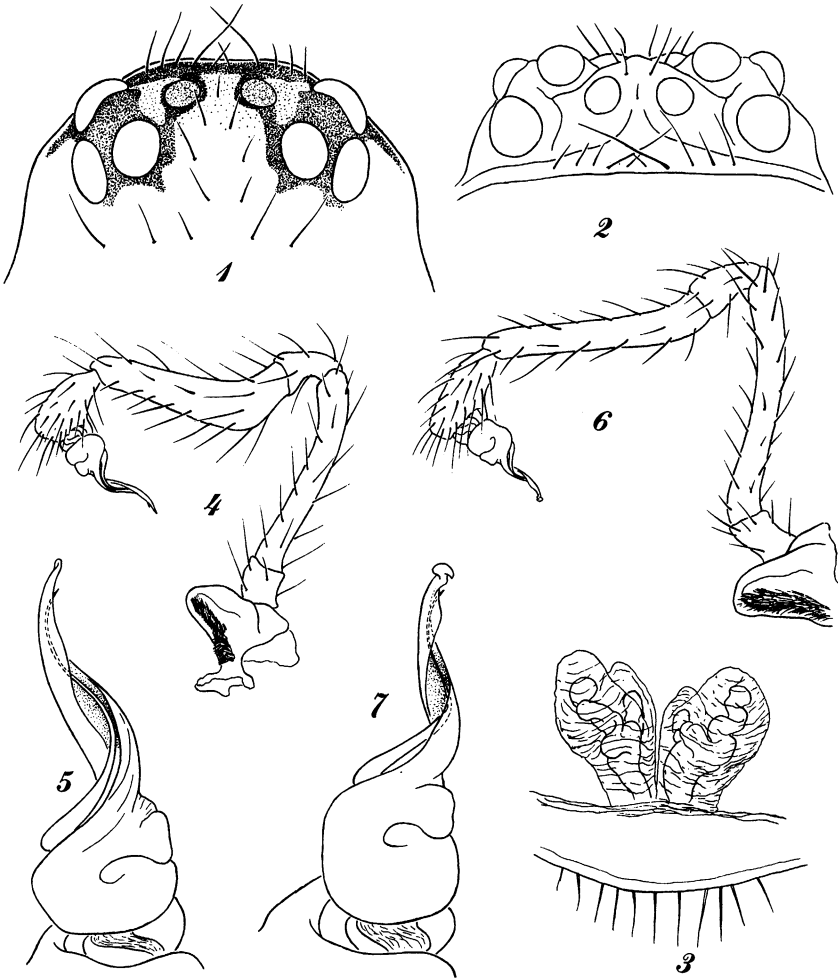
SEGMENT	I	II	III	IV
Femur	19.3 mm.	14.1 mm.	11.8 mm.	13.5 mm.
Patella	2.4	2.4	2.1	2.0
Tibia	19.4	13.7	10.5	12.6
Metatarsus	12.5	9.6	7.3	9.5
Tarsus	5.8	5.0	3.9	5.1
	<u>59.4 mm.</u>	<u>44.8 mm.</u>	<u>35.6 mm.</u>	<u>42.7 mm.</u>

Female genitalia internal, no sclerotized epigynum. A broad, transverse sheath leads on each side into a strongly convoluted duct, which terminates in a scarcely enlarged, globose, seminal receptacle. Apparently only two ducts are present (four in the other species), but each has a small, short, apparently rudimentary duct on the dorsal side, as shown in the illustration (fig. 3).

DISTRIBUTION: Petrunkevitch (1932) summarized the then-known range of *H. thorelli* as being roughly triangular, with the angles located at Cumberland Gap, Kentucky, Lookout Mountain, Tennessee, and Tallulah Falls, Georgia. Since that time, the southwestern angle has been extended into northeastern Alabama, but the remainder of the distribution has been only slightly altered. Most of the fairly numerous records (see fig. 8) lie in western North Carolina and adjacent eastern Tennessee, northeastward as far as the vicinity of Grandfather Mountain. I have searched in vain for the species in eminently suitable habitats at Mt. Rogers and along the Blue Ridge in Virginia, and do not think that *thorelli* occurs in those areas. There is thus, at the present time, a hiatus of nearly 100 miles between the nearest localities for *gertschi* and *thorelli*, lying in the narrow "isthmus" of southwestern Virginia.

There are locality records for *H. gertschi* in four counties in central western Virginia, and I think that these records show fairly accurately the eastern limits of the species' range. No colonies have been discovered either southwest of the Bland County locality or northeast of that in Alleghany County, despite much search in suitable habitats. All the known stations lie west of the Great Valley. The species occurs in the vicinity of Blacksburg, in Montgomery County, but only west of the first range of the Alleghanies. The situation in West Virginia is, however, quite another matter. Judged from the abundance of *gertschi* at its type locality, it is reasonable to expect that the species may actually extend far to the north along the Appalachian Plateau country which provides a continuous environmental type.

The map (fig. 8) indicates two *Hypochilus* records of problematical status, both along the Virginia-Kentucky border. Only females are known in the collection from Cumberland Gap, in the American Museum of Natural History; only immatures are in the material that I col-



FIGS. 1-5. *Hypochilus gertschi*, new species. 1. Eyes of female paratype, dorsal view. 2. Eyes of female paratype, frontal view. 3. Genitalia, female paratype, internal (dorsal) view. 4. Palpus of male paratype, retrolateral view. 5. Palpal organ of same specimen, retrolateral view, enlarged.

FIGS. 6, 7. *Hypochilus thorelli* Marx. 6. Palpus of male from Signal Mountain, Tennessee, retrolateral view. 7. Palpal organ of same specimen, retrolateral view, enlarged.

lected at the Breaks Interstate Park, Dickenson County, Virginia, in my collection. Adult males from these localities, as well as from other places in eastern Kentucky and southern West Virginia, will be of great interest in settling the identity of the species in this intermediate area.

Localities from which *Hypochilus gertschi* is known are as follows:

VIRGINIA: *Alleghany County*: Mouth of Blue Spring Cave at Clifdale (7

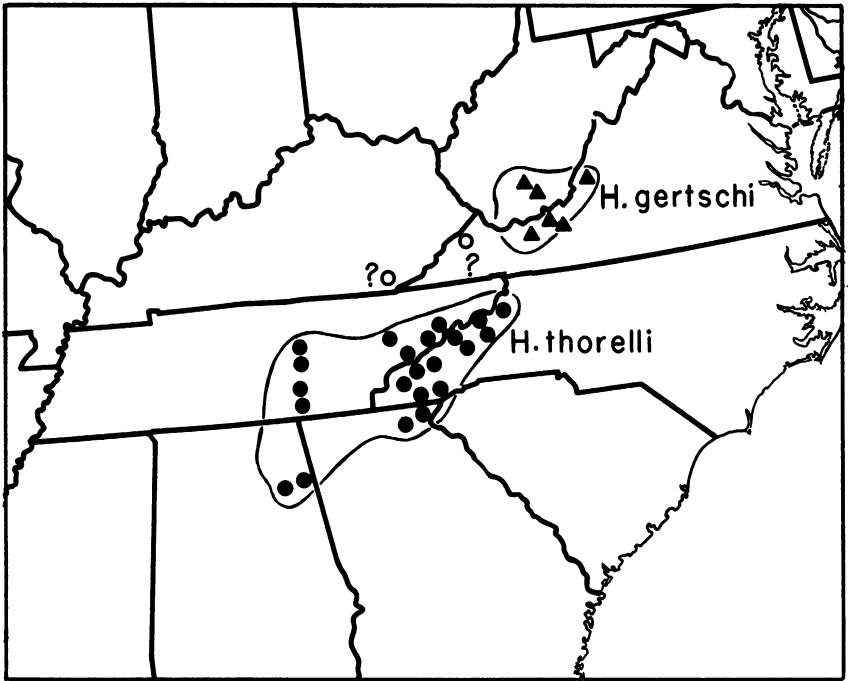


FIG. 8. Distribution of the two eastern species of *Hypochilus*, based on specimens personally examined, literature records, and unpublished data supplied by Levi and Gertsch. The question marks indicate localities based on specimens of undetermined status, as discussed in the text.

miles south of Covington), September 8, 1958, females (Hoffman, in the American Museum of Natural History). *Bland County*: Mouth of Hamilton's Cave, 4 miles east of Mechanicsburg, September 10, 1956, females (Hoffman, in the American Museum of Natural History). *Giles County*: Mountain Lake, June 24, 1946, immatures (H. K. Wallace, in the American Museum of Natural History); sink hole, 2 miles west of Newport, July 20, 1962, immatures (Hoffman, in the author's collection). *Montgomery County*: Shale bluff along Craig Creek, 6 miles north-north-

east of Blacksburg, September 22, 1962, females (J. E. Carico, in his personal collection); along Poverty Creek, 3 miles northwest of Prices Fork, September 30 and October 7, 1962, females (J. E. Carico, in his personal collection).

WEST VIRGINIA: *Raleigh County*: Grandview State Park, 7 miles northeast of Beckley, September 14 and 22, 1962, males and females (Hoffman and Carico, in the collections of the American Museum of Natural History, the United States National Museum, the Museum of Comparative Zoölogy, the Senckenbergische Naturforschende Gesellschaft, and in the private collections of James E. Carico and of the author). *Summers County*: New River bluffs at Bellepoint, September 22, 1962, males (Hoffman, in his personal collection); ravine beside Highway 12, 10 miles southeast of Hinton, September 22, 1962, females (Carico, in his personal collection).

ECOLOGY: The favored habitat of *H. thorelli* has been mentioned frequently in the literature. There seems to be a distinct preference for dark, shaded, and moist areas, such as rock outcrops in deep wooded ravines, but in many areas, such as at the type locality, *thorelli* is found in abundance beneath the dry sandstone ledges which form the edges of the plateaus. In the dozen or so localities in Tennessee and North Carolina where I have seen the species, however, the webs are characteristically located in uniformly dark situations.

Hypochilus gertschi is likewise the inhabitant of a variety of ecological niches, ranging from very dry to very humid. It does, however, prefer considerably greater exposure to the sunlight. At most of the places where I have seen it, the webs of adults are built on bare, vertical rock faces and may be thus exposed to the sun for a large part of the day. There seems to be no appreciable difference in the basic design of the web, however, except for having a shallower bowl on the average.

In both species, sexual maturity in males appears to be achieved in mid or late summer. Males of *thorelli* taken on July 31, 1962, in Greene County, Tennessee, had just completed molting and were still teneral, although with the palpal organ fully developed. So far I have not perceived mating, or even heterosexual associations, in either species. At the type locality of *gertschi*, I found two males sharing one web in equanimity, although they at once became antagonistic upon being placed in a collecting jar.

Specimens of *gertschi*, when disturbed, rush out of their web and drop to the ground, where they lie motionless with the legs closely flexed over the body. Upon venturing to move voluntarily, males of this species tend to use the left front leg (rarely the right) as a tactile organ.

Other species of spiders associated with *H. gertschi* at the type locality include theridiids (particularly *Achaearanea tepidariorum*), various small agelenids, and a variety of orb-weavers, dominantly a large gray species of *Aranea*. Phalangids (*Leiobunum* sp.) are abundant and frequently are found as food items in the *Hypochilus* webs.

Grandview State Park is on the edge of the deep gorge which is cut across southern West Virginia by the New River, which at this locality is nearly 1300 feet below the average level of the landscape. The plateau of this region is formed by a thick, resistant, horizontal formation of sandstones and intercalated coal beds of Pennsylvanian age. On the edges of gorges and ravines, this sandstone breaks off into a system of deep fissures, isolated blocks, tunnels, and sheer cliffs, subtended by extensive talus slopes. This type of habitat extends more or less continuously from Alabama to western New York, and it seems reasonable to suspect that *gertschi* may be found to occur as far northward as western Pennsylvania.

RELATIONSHIPS: In many characters, including the form of the entire male palpus and eye relationships, *Hypochilus gertschi* is remarkably similar to the Californian species *H. petrunkevitchi*. It seems to me possible that these two forms, if their similarities are not due entirely to convergence, represent the surviving remnants of a now largely extinct parental stock which (during the early or middle Tertiary) occurred in a crescent-shaped arc across the northern part of North America. If so, *H. thorelli* must be viewed as a more recent and specialized, southern derivative of *gertschi*.

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