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Caeculidae

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NEW MITES IN THE FAMILY CAECULIDAE

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In a collection of arachnids from the southwestern part of the United States made by the author and his wife, Dorothea, was a series of the little known mites of the family Caeculidae. These are fairly large mites measuring up to 1.6 mm. The common name of rake-legged mites is derived from the characteristic large spines on the front legs. Most of the specimens were taken in quite arid country from sweepings of shrubs and other low plants and from debris beneath. In addition to this material from the southwest, Dr. Willis J. Gertsch of the American Museum of Natural History very kindly loaned a collection from the southern part of the United States and from Puerto Rico. The types designated in this paper except as indicated otherwise are deposited in the zoological collection of the University of Utah.

This group of mites has received very little attention from acarologists; so that very few species have been reported from the western hemisphere, and none of these are known to occur in the area from which the species discussed herein came.

The early writers on the Acari placed the genus *Caeculus* with the Oribatid mites, but its eyes, palpi, and coxae show it to have closer affinities with the Trombididae. However, the dorsal plates, the nature of the ventral openings, and the rough spinose legs preclude its placement in this group.

In 1877 Canestrini and Ganzago erected a new family, Holopidae, for these mites and named the genus *Holopus*. However, since the name *Holopus* is a synonym, the family has since been called Caeculidae. This family has been represented in the United States by two species, *Caeculus americanus* Banks in California and *C. clavatus* Banks from Washington, D. C. This paper adds ten new species to the genus, and careful collecting will undoubtedly yield numerous others. None of these are believed to be parasitic at least in the adult stage.

A casual observation impresses one with the general roughened nature of the body and the very spiny legs. Their general color is a brown to black with the legs usually darker than the dorsum which in turn is darker than the venter. The dorsum is generally heavily chitinized. There is a large cephalothoracic plate which is projected forward in varying degree to form a hood above the mouth parts. On the anterior border of this hood are from one to three pairs of bristles. In *Caeculus caelchius* there is but one pair which are quite minute. At the posterior corners of this head plate is a small plate on which the two pairs of eyes are located. Behind the cephalothoracic plate is a large rectangular median abdominal plate with three to five pairs of bristles placed near the midline. Along either side of this is a lateral plate with three to five bristles each. Behind these plates are two transverse plates, an anterior and a posterior, each of which is formed by the fusion at the median line of two smaller plates except in *C. kerrulius*. This animal is less chitinized with prominent interscutal areas. The anterior pair of these plates each have several bristles.

In each of the two lateral abdominal plates are two small spiracles. These were most clearly seen in *C. kerrulius* which is least sclerotized. In the others they are to be located only with difficulty.

On the ventral side of the abdomen near the posterior is an anal opening bordered by two crescentic plates. Anterior to this is another pair of crescentic plates bordering the genital opening. On each of the plates bordering these openings are several small bristles. In the area around these genital and anal plates are other irregularly shaped plates which seem to be quite uniform for each species. The thinner membranes between these plates and the pleural area is very finely furrowed. Sparsely scattered over the venter are paired clavate spines. Externally the males and females showed no appreciable differences.

All of the specimens studied have four pairs of legs. There are typically seven segments; the coxa, trochanter, femur, patella, tibia, metatarsus, and tarsus. A careful examination of the material showed that what Banks¹ called the femur is really two segmented. His figures for *C. clavatus* and for *C. americanus* show the femur and patella as one segment. I believe that Banks failed to see the divisions between these segments because of the roughened nature of the integument. Berlese (1925) in a figure for *C. echinipes* showed the front legs as having the patellar division, but no such division for the other legs.

On the tip of each leg is a double claw with a smaller median ventral claw. The metatarsus of leg I shows characters which seem specifically valuable. In the typical segment there are five rows of bristles, spines or clavate hairs. The row along the anterior side is usually most prominent with two to five or six long spines mounted on prominent elevations. On the posterior side is another row usually less pronounced than in the anterior row. Dorsal to these two are three other rows which vary in the prominence of the elevations on which the spines are set. Most of these latter are clavate to spatulate.

The coxae are radially arranged. The first two pairs are on the cephalothorax, and their bases are completely fused. The last two pairs are slightly removed from the first; their bases are also fused. Projecting ventrally from each of these coxae are two to four clavate bristles. The openings of the first coxae are so arranged as to direct the legs directly forward. Between the coxae is a narrow finely furrowed sternal area.

From the dorsal surface of the tarsus of the fourth leg there projects dorso-posteriorly a scaly seta or bristle which is about two-thirds as long as the tarsus. This seta is set in a large rimmed cavity and is believed to be tactile in function. A similar though shorter seta occurs on the tarsus of the third leg. On the left leg IV of *C. tipus* two such bristles occur in one specimen.

The mouthparts are relatively simple. There is a pair of mandibles with a claw which moves dorsally. The pair of pedipalps consists of five segments, the last of which only slightly resembles a thumb opposed to the penultimate segment. There are numerous prominent bristles variously distributed on most of the segments.

The coxal portions of the pedipalps are fused at their median line. Anterior to this is a ligula which is so folded as to form a groove into which the chelicerae are placed. Near the median line of both the ligula and coxal plate are pairs of fine bristles. The camerostome is more or less circular.

¹Proc. Ento. Soc. Wash. 1909.

In the region beneath the hood and above the beak or capitulum there is found a pit whose function is probably sensory. Near the upper border of this pit is a tubercle, usually branched; on each branch is a spine. This forked structure varies in the degree of prominence in the species discussed in this paper; in *C. calechius* and *C. kerrulius* they are scarcely visible. On either side of the pit and usually dorsally there is another tubercle surmounted by a long, slender, and in some species, slightly clavate bristle. The figures given for the anterior views of the head will show some of the differences which exist.

The figures which appear in the plates will make clearer many of the characteristics not covered in the descriptions. Since the figures are intended to illustrate structures rather than relative size of parts, no attempt was made to indicate the degree of enlargement.

Caeculus calechius new species

Figures 4, 5, 6, 8, 9, 10, 13, 19, 28, 34, 38, and 39.

Length 1.5 mm.; width about 0.8 mm. Dorsum reddish brown, venter lighter. Legs a deep brown to black. The cephalothorax is about two-fifths of the total length and a little more than the width across the eyes; front and sides are sinuate; angles rounded; the anterior border has only one pair of very minute bristles seen only on higher magnification. The median area is depressed; on either side in the posterior corners there are conspicuous prominences on each of which are two clavate bristles.

The eyes are located near the posterior corners of the cephalothorax. Of these the anterior is slightly smaller and separated from the posterior by its diameter. The anterior border of the cephalothorax projects forward over the mouth parts. Above the mouth parts beneath this projection is a white unchitinized pit. On the upper border of this pit is a pair of minute bristles mounted on small prominences. Above these and on either side is a long, very slender bristle. These bristles are slightly clavate and roughened with minute scales.

Behind the cephalothorax is the median dorsal abdominal plate which is nearly as long as the width of the anterior border, which in turn is two-thirds as wide as the posterior border. There are three pairs of clavate bristles on this plate. Their arrangement is shown in figure 4. On either side of this plate is a longer narrow plate on which are three clavate bristles and two tracheal slits. Posterior to these plates is the first transverse plate composed of a pair of plates fused along the midline. A second transverse plate is behind these. The manner of bristle arrangement is shown in figure 4.

On the ventral side of the abdomen near the posterior part is the anal opening bordered by a pair of crescentic plates on which are three pairs of short bristles. Other chitinous plates or ridges in turn border these. Anterior to the anal opening is the genital opening bordered by crescentic ridges much like the preceding, but with six pairs of bristles. The area between these ridges and between the coxae is less heavily chitinized and is marked with fine furrows. Clavate bristles are sparsely scattered over this area.

The anterior legs are longest and directed forward. There are seven segments. On the median or anterior border of trochanter I is a tubercle on which is mounted a curved, broadly spatulate bristle. The femur and patella each have one anterior tubercle with long straight spines; the

tibia has two and the metatarsus three prominent spines and two smaller ones. The metatarsus (Fig. 34) is longer than the tarsus. On the latter is a pair of smooth curved claws between which and ventrally is a third small claw.

The chelicerae are weak and set into a groove formed by the ligula on the ventral side of which is a pair of bristles. The claw is weak. The pedipalps are five segmented and are coarsely spined.

Localities: Texas, Hidalgo County, Edinburg, holotype, immature paratypes, January 7, 1939. McCook (10 miles n.w. of Edinburg), two specimens, April 18, 1936. Starr County, 5 miles east of Rio Grande City, one specimen, January 21, 1939.

Caeculus valverdius new species

Figures 11, 14, 23, 30 and 31.

Length of body 1.4 mm. Greatest width 0.8 mm. Length of cephalothorax 0.5 mm.; width across the eyes 0.5 mm. Median abdominal plate nearly twice as long as the width at the anterior border (14-8). Posterior border is wider than the anterior (11-8).

The anterior border of the cephalothorax has three pairs of flattened crescent shaped, curved bristles. The front and sides form a sinuate line; the angles are rounded. The median area is depressed and bordered laterally by straight grooves which are slightly converging posteriorly.

The eyes are located near the posterior corners of the cephalothorax. The anterior eye is about half the diameter of the posterior and separated from the posterior by its diameter. The slight prominence on which the eye is set is black.

The anterior border of the cephalothoracic plate projects forward over the mouth parts. Above the mouth parts and below this projection is a white pit, on the upper border of which is a forked prominence with stout spines set on each fork. On the same level as this pair of bristles on either side is a pair of long slender slightly curved bristles set on slight prominences.

Behind the cephalothorax is the median dorsal abdominal plate which is about 0.5 mm. long, and this is longer than the anterior border (15-11) and only slightly longer than the posterior border (15-14). This plate has five pairs of clavate bristles. The arrangement of these is shown in figure 11. This species differs from *C. tipus* new species in the placement of the bristles. A comparison with figure 7 will make this difference clearer.

On either side of this median plate is a long narrow plate extending backward from behind the eyes. There are five clavate bristles and two spiracles on each plate. Behind these three anterior abdominal plates are two other pairs of transversely arranged plates which are fused along the median line. The arrangement of the clavate bristles on these is shown in figure 11.

On the ventral side of the abdomen toward the rear is the anal opening bordered by a pair of crescentic plates on which are three pairs of bristles. Anteriorly is the genital opening similarly bordered with crescentic plates but with six pairs of bristles. The sternal area between the

posterior pairs of coxae is about twice as wide as between the first or anterior pairs. This area is very finely furrowed and has a few sparsely scattered clavate bristles.

The first legs without the coxae are distinctly longer than the body (27-23). The fourth legs are about as long as the body (24-23). The second and third legs are slightly shorter than the body. On the median or anterior border of the first leg are prominences on which are mounted spines; on the trochanter there are three spatulate, slightly curved bristles on the anterior border; on the femur is one pointed spine which with its tubercle is longer than the width of the segment; on the patella, tibia and metatarsus there are respectively one, three and five long spines, the proximal one on the tibia, however, is noticeably shorter than the other four. On the posterior or lateral side of the tibia are four similar spines which are directed ventro-laterally. The tarsi of the third and fourth legs each have a long slender posteriorly curving bristle mounted in a depression the border of which forms a raised ring.

The chelicerae are small and set into a groove formed by the anterior plate of the ligula. The bristly pedipalps are five segmented; the basal joints are fused along the median line.

Localities: Texas, Hidalgo County, Edinburg, holotype, several paratypes, May 21, 1939. Hays County, two specimens. Val Verde County, Langtry, two specimens, June 3, 1941. Mexico, Tamaulipas, Reynosa, two paratypes, May 2, 1936. San Pedro, two specimens, March 1936.

Caeculus tipus new species

Figures 7, 16, 22, 24, 26, 36 and 40.

This species closely resembles *C. valverdius* new species. The length is 1.3 mm.; greatest width 0.7 mm. The dorsum is yellow marbled with cream. Legs are yellow brown. The ventral side is much darker than the dorsum and in color much like the legs.

The cephalothorax is less than two-fifths of the total length (7-19) and about as long as the width across the eyes. The eyes and the area above the mouth parts are much as in *C. valverdius*. Likewise there are on the median dorsal abdominal plate five pairs of clavate bristles, but the arrangement is different as shown in figures 7 and 11. Behind this plate is the first transverse abdominal plate which has two paired and one median bristle, while *valverdius* has three paired and no median bristles. The last transverse plate also has one paired and one median bristle while *valverdius* has two paired and one median. The five bristles on each lateral plate are placed nearer the median line than in *valverdius*.

The first legs without the coxae are longer than the body (11-10). The fourth legs are scarcely shorter than the body; the other two legs are shorter than these and subequal. On the anterior side of trochanter I are two prominences on which are curved spatulate bristles. A little behind the middle of the tarsi of the third and fourth legs are long slender, posteriorly curving bristles much as in the other species. However, on the tarsus of the left fourth leg is found a second such bristle placed about a third of the distance from the distal end.

Locality: Texas, Hidalgo County, Edinburg, holotype and two immature specimens taken on May 21, 1939.

Caeculus gertschi new species

Figures 3, 12, 21, 25, 32, and 37.

Length 1.1 mm. Width across the first transverse abdominal plate about 0.5 mm. Cephalothorax longer than wide (13-11); the front and sides sinuate; the anterior border with one small curved bristle. The median area is depressed, the borders of this area are curved grooves. Dorsum is a deep brown with some white marbling; the legs black. The eyes are surrounded by a black area; the anterior eye is slightly smaller than the posterior.

The anterior border of the plate of the cephalothorax projects forward forming a cover over the mouth parts. Above the mouth parts and beneath this projection is a white pit on the upper border of which is a pair of very minute bristles. On either side of this frontal area there is a fairly large prominence with a long slender bristle (Fig. 12).

The median dorsal abdominal plate is scarcely longer than wide; its posterior border but little longer than the anterior. There are three pairs of clavate bristles placed fairly near the median line. The lateral plates likewise have three bristles. In each of these plates are two spiracles difficult to detect because of the roughened nature of the surface. The lateral borders of these plates are white and this merges with the white of the posterior border of the first transverse abdominal plate. The manner of bristle arrangement on the dorsal plates is shown in figure 3. The ventral side of the abdomen is shown in figure 37.

The front legs are stout and, without the coxae, are longer than the body (35-33). On the anterior side of each trochanter are two prominences on which are slightly curved cylindrical spines. These differ from the more or less spatulate spines in the other species discussed. The metatarsus is 1.6 times as long as the tarsus, on the dorsal side of which is a long slender curved bristle or seta. On the femur on the anterior side is one long spine on a tubercle; one on the patella, on the tibia three; and on the metatarsus four.

This species differs from the others described in this paper in the nature of the spines on the first trochanter; from *C. americanus* Banks and *C. clavatus* Banks in having the first legs much longer than the body and from the latter in having pointed rather than clavate spines on the anterior side of the femur and patella.

One specimen from 8 miles north of Kerrville, Kerr County, Texas, differed from the holotype in having the dorsum and legs a reddish brown, and in having slightly longer legs.

Localities: Texas, Starr County, Rio Grande City, female holotype, January 1938. Kerr County, 8 miles north of Kerrville, male allotype, July 13, 1940.

Caeculus kerrulius new species

Figures 1, 17, 18, 29 and 33.

Length of the body 1.1 mm. The cephalothorax is one third of the total length. The first legs without the coxae are longer than the body. The width across the eyes is a third greater than the length of the cephalothorax. This species is less heavily sclerotized than the others, and the dorsum has larger interplate areas as shown in figure 1. The dorsum is a reddish brown with the plates darker. Legs are similar in color to the plates.

In this species the dorsal shield of the cephalothorax scarcely projects forward to form a cover over the mouth parts. There is an emargination on the median line. Above the mouth parts and below the rim of this shield is a white pit. On the upper border is a small forked tubercle on which are two spines. Just below the anterior corners of this dorsal shield are prominent tubercles on which are mounted long, slender, slightly curved and weakly clavate bristles. The two pairs of eyes are located at the posterior corners of the dorsal shield.

Posterior to this shield is the median dorsal abdominal plate which is sub-rectangular, and but slightly longer than wide. There are three pairs of bristles near the median line, at the anterior border, near the middle, and at the posterior border. On either side and separated from it by a wide interplate area is a lateral abdominal plate. In this species each lateral plate has four clavate spines. Behind these plates there are two pairs of small oval plates which are not as extensive as in the other species, and therefore not meeting on the midline to form what appears in the others to be a single transverse plate. The details of spine arrangement on the dorsum is shown in figure 1. The ventral side is much as in the other species. The sclerotization is much as in *C. gertschi* new species.

The front legs without the coxae are distinctly longer than the body. On the anterior side of its trochanter is a single curved, spatulate bristle mounted on a conical prominence. On the anterior side of both the femur and patella there is a blunt spine which is shorter than the diameter of these segments. On the metatarsus there are three spines which are prominent and blunt. On the tibia there are three, the first is shortest and clavate, the others cylindrical and blunt. On the posterior border of the tibia there are no such spines, and on the metatarsus there are three.

There is a long slender curved bristle on the dorsal side of the tarsae of the third and fourth legs. These are set in pits bordered by circular rims. There are two paired claws and a ventral median claw.

Locality: Texas, Kerr County, 8 miles north of Kerrville, holotype, July 13, 1940.

Caeculus dorotheae new species

Figures 2, 15, 16, 27 and 35.

Length of the body 1.1 mm.; width about 0.8 mm.; the cephalothorax is about two-fifths of the total length and four-fifths as great as the distance across the eyes. Its corners are broadly rounded; the sides are sinuate. Its anterior margin is slightly projected forward to form a roof over the mouth parts. On this anterior border are three pairs of curved spatulate bristles, the lateral pair being much smaller than the others. The entire dorsum of the cephalothorax and abdomen is prominently concave. The dorsum is reddish brown; the legs are much darker. The ventral side of the abdomen and the sternum is lighter.

Above the mouthparts and beneath the anterior projection of the cephalothorax is a white pit along the upper border of which is a prominent forked tubercle. On this are mounted two long, slender spines only slightly thickened distally. Above the level of this tubercle and laterally is a pair of longer and more slender bristles somewhat attenuate distally.

The front legs without the coxae are longest and distinctly longer than the body (41-35). The first trochanter has on its anterior border three large, curved, spatulate spines mounted on prominences. This character will distinguish it readily from the other species discussed in this paper. Along the anterior side of both the femur and patella is a single prominence

on which is a slender spine longer than the diameter of the leg. On the tibia are three such spines and on the metatarsus there are six. In the other species there are five or less such spines on the metatarsus. On the posterior border of the metatarsus there are five large spines on large tubercles. Occasionally six are found in some specimens.

A characteristic of this species represented by specimens from four widely separated localities was the presence of an incrustation over most of the body and legs. This consisted of minute particles of sand held by some cementing material of undetermined origin.

Localities: Nevada, Nye County, 10 miles southwest of Lockes on volcanic flow. Holotype and numerous paratypes, March 15, 1941. Arizona, Pinal County, Olberg. One specimen, December 27, 1940. Coconino County, in the painted Desert near Cameron, September 9, 1939. Pima County, 38 miles south of Ajo (5 miles north of Sonoyta, Mexico), paratype in January 4, 1941. Mexico, 20 miles East of San Pedro, one paratype collected July 5, 1936 by Anna Mae and L. I. Davis, deposited in the American Museum of Natural History.

The above specimens came from widely separated localities, yet there were no appreciable differences among them except for size. The Nevada specimens which include the holotype were all about 1.1 mm. in length, while the specimens from south of Ajo measured 1.6 mm. in length.

Caeculus hypopachus new species

Figures 41, 50 and 54.

This is a slender species almost twice as long as broad (32-17). Length one mm. The cephalothorax is longer than the width at the eyes and quite concave. The median abdominal plate is a fourth longer than wide with the lateral borders very little diverging posteriorly.

The first pair of legs without the coxae are noticeably longer than the body (38-32). The trochanter has on the anterior (median) side two pairs of spines. The posterior one, mounted on a prominence, is straight, slender, slightly tapering and nearly as long as the width of the trochanter; the anterior spine is smaller, curved, and slightly clavate. On the dorso-lateral side of this segment is a third spine. This is on a small prominence, and is slightly curved and clavate.

The femur and patella each have one anterior spine, the tibia two, and the pretarsus four, the proximal much smaller than the other three. The other legs are also with spines, though these are not as large or pronounced as in the first legs.

The anterior border of the cephalothorax is considerably projected forward as a hood above the mouth parts, and its anterior borders form a right angle, the apex of which is rounded. About halfway back from the tip of the coxal angle is a slightly clavate spine which projects forward and is mounted on a forward pointing prominence. Near each posterior corner are two clavate spines.

The eyes are not prominent and are situated near the posterior corners of the cephalothorax.

Beneath the hood of the cephalothorax and along the sides anterior to the first coxa is a large prominence on which is mounted a slender spine which projects antero-laterally. The frontal area immediately above the base of the chelicera is roughened and projects slightly forward. Near the middle of this frontal area is a clear pit.

The coxae are arranged in a radiate fashion. The two front pairs are placed against the last two pairs. The separation between the two coxae of the pairs is not complete to the base. Projecting ventrally from the coxae are slender slightly clavate bristles. The sternal area is narrow.

The median abdominal plate is longer than broad, its sides depressed so that its middle forms a longitudinal ridge. There are three pairs of slightly clavate spines on this plate. On either side are the lateral abdominal plates on each of which are three spines. The first transverse abdominal plate behind these has two spines on either half, placed near the posterior border, and one median spine. The posterior transverse abdominal plate is spined in a similar manner.

This species is black except for the cream colored borders of the dorsal plates and the reddish areas between the dark ventral plates. The arrangement of the plates in the region of the anal and genital openings is as figured.

This is a much more slender species than the other known American forms. The front coxa has on its anterior border a long, slender, straight spine, and anterior to this is a small curved clavate spine.

Locality: Texas, Hidalgo County, Edinburg, one specimen, the holotype, was taken from the stomach of a small toad, *Hypopachus cuneus* collected on March 22, 1935 by the author.

Caeculus brevis new species

Figures 42 and 49.

This species is closely related to *Caeculus puertoricus* new species. It differs in having a broader body, in the less concave cephalothorax, in the much longer and stouter spines on the pronged tubercle above the sensory pit above the mouth parts, and in the less clavate spines on the dorsum.

Length is a little under one mm., width about 0.7 mm. The cephalothorax is broader across the eyes than long (4-3). The anterior margin of the dorsal shield is not projected forward. At either anterior corner is a stout tubercle surmounted by a slender, slightly clavate bristle. Between these is a pronged tubercle situated above the sensory pit on the front of the head. On each fork is a stout bristle which projects forward.

On the dorsum between the cephalothorax and the median abdominal plate is an angular groove which is continued backwards between the median and lateral abdominal plates. The spine arrangement on the dorsum is shown in the figures.

The first legs are longest, but slightly shorter than the body. They are directed forward. On the posterior side of the trochanter is one small tubercle with a curved spatulate bristle. There is a similar spine on the anterior and the dorsal side. On the anterior side of the femur-patella are two slender spines as long as the diameter of the patellar region; the posterior one is on a slightly shorter prominence. The tibia on its anterior face has two spines, the anterior is larger, and the metatarsus has three not very prominent spines of which the anterior two are larger. At the tip of the tarsus of the first and second legs on the dorsal side is a long slender curved spine much as in *C. puertoricus*. A similar spine occurs on the dorsum of the third and fourth tarsae, but placed a fourth of the distance from the tip.

Locality: Texas, Harris County, Houston, holotype collected June 11, 1937 by the author.

Caeculus puertoricus new species

Figures 43, 45, 48, 52 and 55.

This species is amber in color, the legs are colored much like the dorsum and venter. The first legs without the coxae are longer than the body (28-26). Length of the body about 0.8 mm.; of the cephalothorax 0.3 mm. with the cephalothorax slightly wider than long, its dorsum is concave, the posterior corners are highest.

The spines of the body are prominently clavate. On the cephalothorax are six pairs, three grouped somewhat near the eyes in the posterior corners, the others are anterior. Behind the cephalothorax the median abdominal plate has six pairs of spines; one pair near the midline along the anterior border, two pairs near the middle, and three pairs arranged along the posterior border. The lateral dorsal plates each have six spines. Immediately behind these plates is a pair of humps or prominences on which are five or six pairs of rather thickly clavate spines, and between these is a single median spine. Further to the posterior is another pair of prominences on which are three pairs of spines. There is a single median spine between these.

The anterior border of the cephalothoracic shield does not project forward as in most other species. On the anterior lateral part of the head are two large prominences from which project fine, slightly curved, clavate spines. Between these and above the clypeal sense pit is a forked prominence on the branches of which are heavier clavate spines.

The front legs without the coxae are slightly longer than the body. The anterior (median) side of the trochanter has one small prominence with a small curved spine; the femur and patella each have one long curved, slightly clavate spine; the tibia has one, and the pretarsus three. The other four rows of spines on the leg are generally very clavate, though on the posterior (lateral) side of the tibia is a large prominence on which is a long stout pointed spine. On the extremity of the tarsus on the dorsal side is a long curved slender spine which projects distally beyond the claws. A similar spine occurs on the second leg. On the ventral side of the pretarsus of the second leg near the distal end is a pair of large backward pointing spines. Legs three and four are with rows of spines which are nearly all clavate. About a fourth of the distance from the tip of the tarsus of the fourth leg is a fine slender spine on the dorsal side. This spine is directed posteriorly. The femoral-patellar division is not clear.

The mouth parts are small. The chelicera are set in a groove formed by the forward projecting ligula. The pedipalps are more slender than in most other species and are armed with numerous long, fairly stout spines.

The coxae are arranged in a radiate manner; the first and second are fused together as are the third and fourth. From the first coxa there projects ventrally three slender spines, the first of which is on a large tubercle. The sternal area is wide.

Behind the middle on the ventral side of the abdomen is the genital opening bordered laterally by crescent shaped plates. Posterior to these is the anal opening similarly bordered.

Locality: Puerto Rico, Como Springs, June 5-7, 1915, four specimens including the holotype were collected, two of these are in the American Museum of Natural History.

Caeculus archeri new species

Figures 44, 46, 47, 51 and 53.

This is a brown species with the legs much darker than the body. The length of the body is about 1.3 mm.; the width about 0.9 mm. The length of the cephalothorax is about 0.5 mm.; its width is slightly greater. The median abdominal plate is longer than wide (14-11). The front legs without the coxae are longer than the body. There are numerous spines on the body and legs. On the dorsal plate of the cephalothorax there are two prominent clavate spines near the posterior corners. On each lateral abdominal plate are six clavate spines; two near the anterior end, two near the middle and two near the posterior end. Behind these plates is the first transverse abdominal plate, not heavily chitinized, on which are three pairs of spines. Behind these along the midline at the posterior of the body is one clavate spine, and to either side are spines on prominent humps.

The anterior portion of the cephalothoracic plate projects forward forming a hood. Beneath this hood and along either side of the front of the head is a long slender, slightly clavate spine on a large tubercle. Below these and along the midline is a pit possibly of a sensory nature. On the median line along the upper border of this pit is a small tubercle on which is a short clavate spine. In the other species studied this tubercle was forked with a spine on either branch.

The front legs are longest and clearly longer than the body (15-13). On the anterior (median) side are numerous spines. On the trochanter is a small curved clavate one, and on both the femur and patella is a long stout spine each on a large prominence. These spines are almost as long as the width of the segment. On the tibia are two large and one small spine, and on the pretarsus there are three large ones. On the dorsal side of the trochanter near its distal border is one stout clavate spine. There are two claws. On the dorsum of the tarsus of the third leg and about a fourth of the distance from the distal end is a long curved spine projecting dorso-anteriorly. The fourth leg has a similar spine placed about a third of the distance from the distal end of the tarsus.

The coxae are radiately arranged. The first and second are fused along most of their length as are the third and fourth. Projecting ventrally are several thickly clavate spines.

Immediately behind the middle of the abdomen is the longitudinal genital slit bordered by two narrow chitinized plates on which are six or seven pairs of small bristles. Behind this is the anal opening similarly bordered but with the plates broader and with but three pairs of spines.

Localities: Alabama, Madison County, Monte Sano, two specimens, one designated as the holotype, were collected by A. F. Archer, in December of 1940. Jackson County, Blowing Cave near Garth, one paratype collected on February 29, 1940 by Jones and Archer. Tennessee, Montvale Springs, one paratype collected on March 18, 1929 by Dr. Archer. Two of the paratypes are deposited in the American Museum of Natural History.

Figures and Explanations

Plate I.

- Fig. 1. *Caeculus kerrulius* n. sp. Dorsal view.
- Fig. 2. *Caeculus dorotheae* n. sp. Dorsal view.
- Fig. 3. *Caeculus gertschi* n. sp. Dorsal view.
- Fig. 4. *Caeculus calechius* n. sp. Dorsal view.
- Fig. 5. The same. Minute bristle on the anterior border of the cephalothorax.
- Fig. 6. The same. Tarsus of leg IV showing the long bristle on the dorsal side.
- Fig. 7. *Caeculus tipus* n. sp. Dorsal view.
- Fig. 8. *Caeculus calechius* n. sp. Lateral view of pedipalp.
- Fig. 9. The same. Distal part of the first tarsus.
- Fig. 10. The same. Lateral view of the anterior part of body.
- Fig. 11. *Caeculus valverdius* n. sp. Dorsal view.

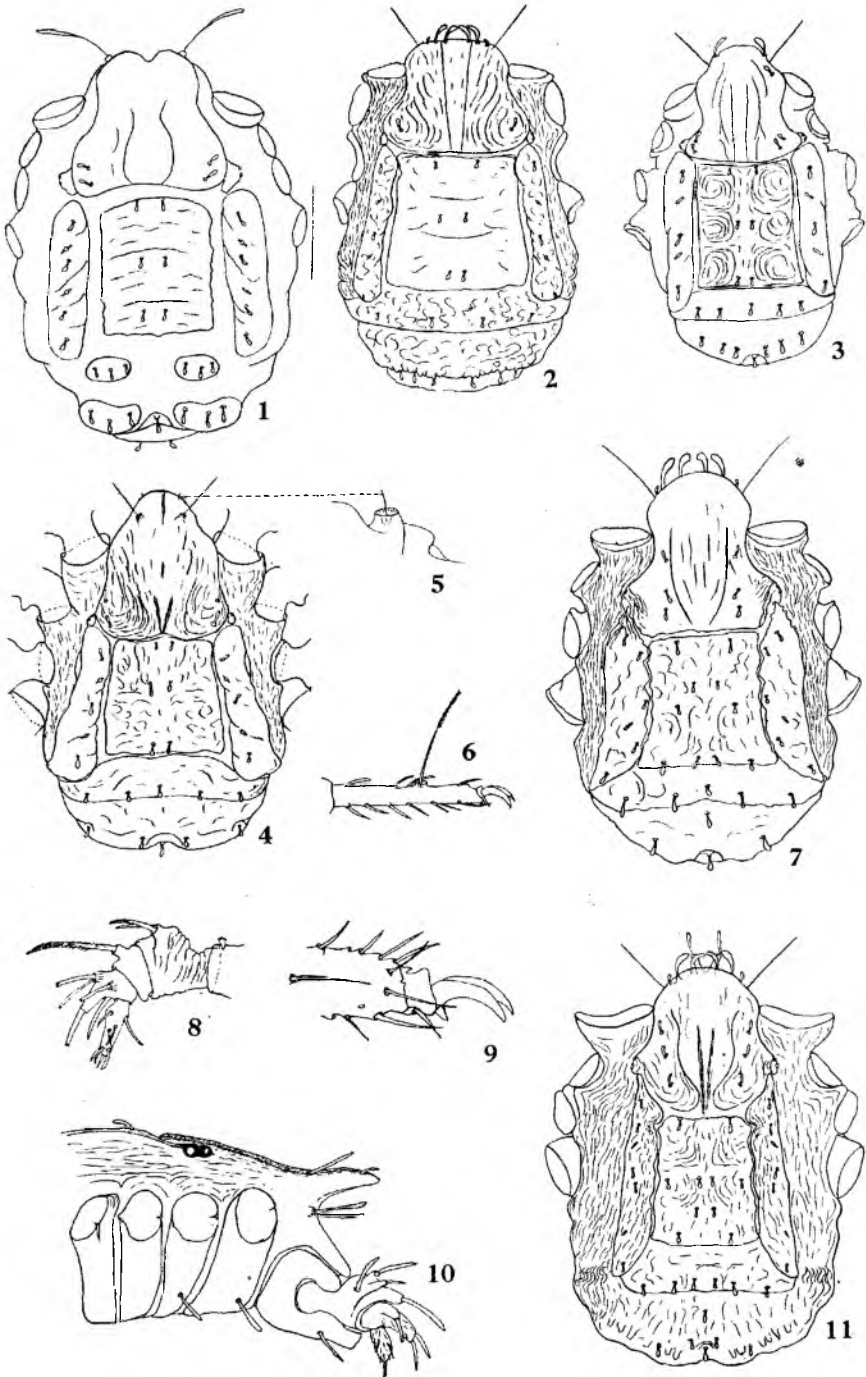


Plate II.

- Fig. 12. *Caeculus gertschi* n. sp. Anterior view of head region.
- Fig. 13. *Caeculus calechius* n. sp. Anterior view of head region
- Fig. 14. *Caeculus valverdius* n. sp. Anterior view of head region.
- Fig. 15. *Caeculus dorotheae* n. sp. Anterior view of head region.
- Fig. 16. *Caeculus tipus* n. sp. Anterior view of head region.
- Fig. 17. *Caeculus kerrulius* n. sp. Anterior view of head region.
- Fig. 18. The same. Dorsal view of trochanter I.
- Fig. 19. *Caeculus calechius* n. sp. Dorsal view of trochanter I.
- Fig. 20. *Caeculus dorotheae* n. sp. Dorsal view of trochanter I.
- Fig. 21. *Caeculus gertschi* n. sp. Dorsal view of trochanter I.
- Fig. 22. *Caeculus tipus* n. sp. Dorsal view of trochanter I.
- Fig. 23. *Caeculus valverdius* n. sp. Dorsal view of trochanter I.
- Fig. 24. *Caeculus tipus* n. sp. Dorsal view of leg I without coxa.

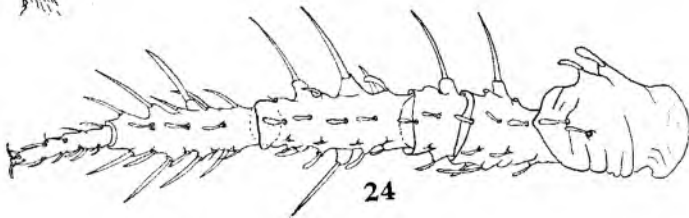
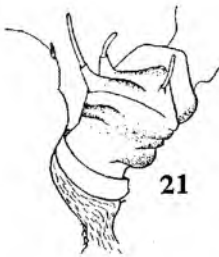
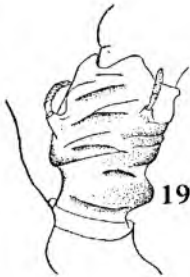
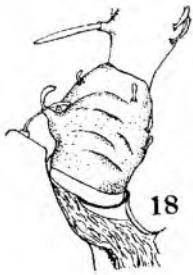
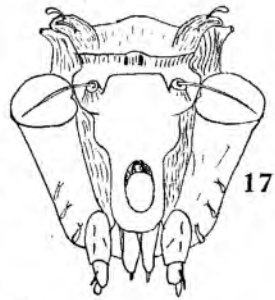
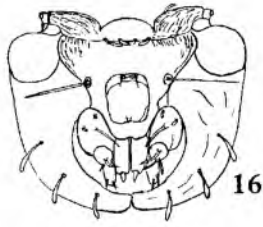
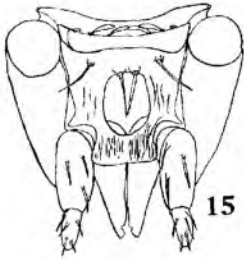
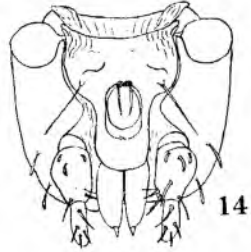
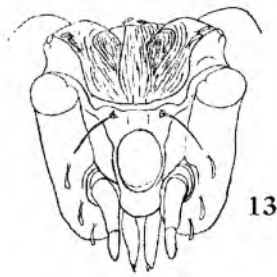
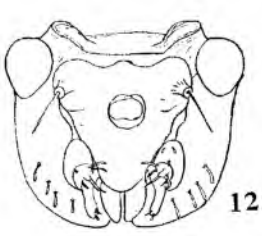
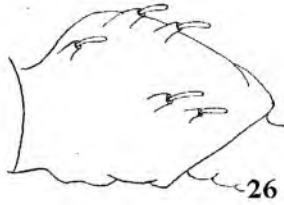


Plate III.

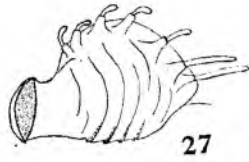
- Fig. 25. *Caeculus gertschi* n. sp. Dorsal view of trochanter III.
- Fig. 26. *Caeculus tipus* n. sp. Dorsal view of trochanter III.
- Fig. 27. *Caeculus dorotheae* n. sp. Dorsal view of trochanter III.
- Fig. 28. *Caeculus calechius* n. sp. Dorsal view of trochanter III.
- Fig. 29. *Caeculus kerrulius* n. sp. Dorsal view of trochanter III.
- Fig. 30. *Caeculus valverdius* n. sp. Dorsal view of trochanter III.
- Fig. 31. The same. Dorsal view of pretarsus I.
- Fig. 32. *Caeculus gertschi* n. sp. Dorsal view of pretarsus I.
- Fig. 33. *Caeculus kerrulius* n. sp. Dorsal view of pretarsus I.
- Fig. 34. *Caeculus calechius* n. sp. Dorsal view of pretarsus I.
- Fig. 35. *Caeculus dorotheae* n. sp. Dorsal View of pretarsus I.
- Fig. 36. *Caeculus tipus* n. sp. Dorsal view of pretarsus I.
- Fig. 37. *Caeculus gertschi* n. sp. Region of anal and genital openings, the former below.
- Fig. 38. *Caeculus calechius* n. sp. View of fused coxae of the pedipalps and of the ligula.
- Fig. 39. The same. Region of anal and genital openings, the former below.
- Fig. 40. *Caeculus tipus* n. sp. Region of anal and genital openings, the former below.



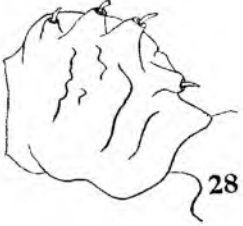
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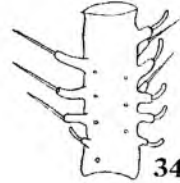
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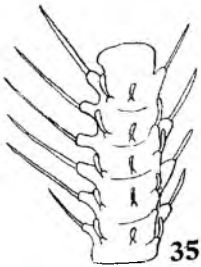
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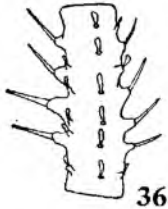
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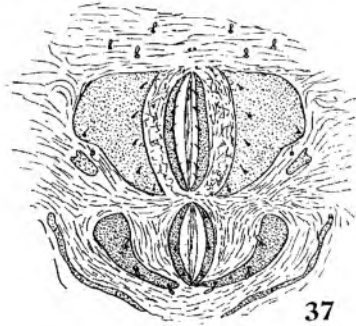
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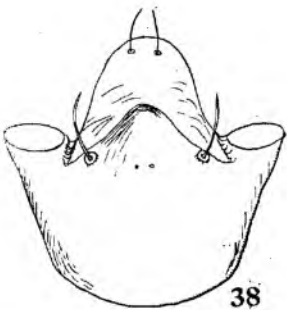
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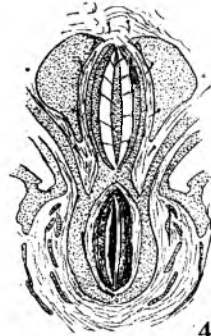
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Plate IV.

- Fig. 41. *Caeculus hypopachus* n. sp. Dorsal view of body.
- Fig. 42. *Caeculus brevis* n. sp. Dorsal view of body.
- Fig. 43. *Caeculus puertoricus* n. sp. Dorsal view of body.
- Fig. 44. *Caeculus archeri* n. sp. Dorsal view of body.
- Fig. 45. *Caeculus puertoricus* n. sp. Anterior view of head.
- Fig. 46. *Caeculus archeri* n. sp. Anterior view of head.
- Fig. 47. The same. Lateral view of head.
- Fig. 48. *Caeculus puertoricus* n. sp. Dorsal view of right trochanter I.
- Fig. 49. *Caeculus brevis* n. sp. Dorsal view of right trochanter I.
- Fig. 50. *Caeculus hypopachus* n. sp. Ventral view of region around genital and anal openings showing chitinized areas.
- Fig. 51. *Caeculus archeri* n. sp. Ventral view of region around the genital and anal openings showing chitinized areas.
- Fig. 52. *Caeculus puertoricus* n. sp. Dorsal view of right trochanter I.
- Fig. 53. *Caeculus archeri* n. sp. Dorsal view of left leg I.
- Fig. 54. *Caeculus hypopachus* n. sp. Dorsal view of left trochanter I with a detailed view of a spine.
- Fig. 55. *Caeculus puertoricus* n. sp. Tarsus and pretarsus of left leg showing detailed view of the tip.

