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New Species of the Genus *Cryptognathus* Kramer (Acarina: Cryptognathidae)

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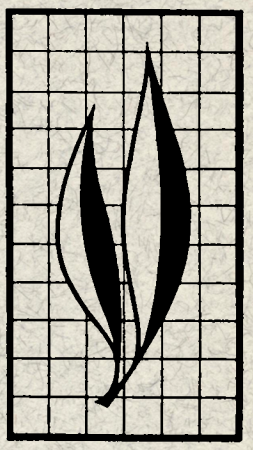

The genus *Cryptognathus* is defined and the relatedness of its family to others now included in the superfamily Raphignathoidea is discussed. Eight new species from California and two from the Galapagos Islands are described. One previously named subspecies, *C. cucurbita cucurbitella,* is elevated to specific rank and redescribed. The species included in this study comprise two distinct groups. Characteristic patterns of ornamentation on the dorsal and ventral body plates are found to be especially useful for distinguishing one species from another. A key for identifying females of the new species is provided.

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INTRODUCTION

MITES OF THE FAMILY Cryptognathidae are so distinctive among raphignathoids that slide-mounted specimens are easily recognized as belonging to the sole genus of the family. Present knowledge of their habits and distribution is scant; they are known to occur in low-density populations, in leaf mold and on moss-covered substrates. It has been supposed that they are predaceous, but the mouthparts are so loose-jointed and vulnerable to injury that if there is predation, it must be concerned with passive prey.

The writers are preoccupied with these mites for two reasons. One concern is to assess their relatedness to other families currently included in the superfamily Raphignathoidea. A second purpose is to develop new information about species recognition.

The affinities of cryptognathids with their more conventionally organized relatives are somewhat difficult to appreciate because the adaptive features of the group are dominant. That they are indeed raphignathoids is evident when certain features are examined: peritremes on the chelicerae, the chaetotaxy of both body and appendages, the simple claws and symmetrically rayed empodia, and the anterior aggregation of coxae. When concentrated samples of mites in alcohol are sorted under low magnification, species of *Cryptognathus* are difficult to distinguish from species of *Raphignathus*—unless their mouthparts are far protruded, or the hood is noticed. However, reference to structural details appears to emphasize that their ancestral characters show a somewhat closer relationship to the Caligonellidae than to the Raphignathidae. The few deutonymphs examined are caligonellid-like in many respects. The nymphs show little portent of the complex skeleton that is to be acquired. The rudiment of the hood is scarcely more than a slight epivertical prominence; the dorsal plate is thinly sclerotized, faintly reticulate but not porous; the pleural areas and much of the ventral plate are conventionally striated; and the coxae are not completely incorporated into the ventral plating. Both nymphs and adults of *Cryptognathus* resemble caligonellids, especially the genera *Neognathus* and *Coptocheles,* in these respects: peritremes on the chelicerae; the 11 pairs of simple dorsal setae are similarly disposed; the genital and anal covers are separated; the coxae are grouped forward on the body; there are four terminal sensilla on the palp tarsus; and additional solenidia do not occur on the tarsi of males. The differences between mites of these two families are emphasized in the structure and carriage of the gnathosoma and the elaboration of the skeleton of cryptognathids.

[1] Submitted for publication August 24, 1964.

MORPHOLOGY OF MOUTHPARTS

The gnathosoma comprises a very short, almost conical rostrum and an unusually elongate basis capituli with which the paired oral appendages articulate, the 5-segmented palpi on its distal end, and the chelicerae far behind on its basal end (pl. I, fig. 10). The midsection of the basis is a sclerotized and possibly rigid tube which appears to be flattened above to accommodate the bodies of the chelicerae. The terminal digits of the chelicerae are equally long, edentate; the stylets are needlelike. The tips of the chelicerae converge and, probably when normally operative, are positioned together on the upper face of the rostrum. A long, straight peritreme occurs in the lateral wall of each chelicera. Near its distal end there is a very short endpiece or chamber. The proximal end of each peritreme loops around the basal rim of the chelicera and comes to lie beside its mate of the opposite side. The juxtaposed trunks pass downward to penetrate the neckpiece, then turn rearward and immediately branch into 3 or more pairs of body tracheae.

The entire gnathosoma is flexibly joined to the idiosoma by a membranous neckpiece. When the gnathosoma is retracted, the cuticle of the neckpiece telescopes and becomes the lining of a camerostome. In the retracted position, the rostrum and cheliceral digits come to lie under the canopy of the hood. In the exserted position, the wall of the camerostome everts to become an elongate tubular stalk on which the gnathosoma is projected forward. The protrusibility of the gnathosoma provides a probelike action for feeding. But because the cuticle of the neckpiece is a thin membrane, the animal exposes a vital area in order to explore in advance of its heavily armored body. The hood and prosternal apron are partly protective in this respect.

The long "reach" of the mouthparts requires some unusual arangement of protractor muscles; or, more likely, a secondary protrusile mechanism is involved. The effort to exsert the neckpiece appears to be shared or dominated by tergosternal muscles within the idiosoma. The rigid dorsal plate of the idiosoma is totally separated from the unified ventral armature by a wide girdle of striated integument. It is believed that fluid pressure developed by tergal depression expels the mouthparts; and, conversely, elevation of the tergum is assisted by retractors of the gnathosoma. The girdle of striae is invaginated within a deep marginal sulcus at the sides and rear of the idiosoma and underlies the base of the hood in front. The edges of the marginal folds appear as a pair of lines converging toward the gnathosoma (pl. I, fig. 5; pl. II, fig. 11). The striae are simple in the nymphs, but they develop a fine-meshed reticular sclerotization in mature forms.

It is not known whether the mouthparts are equally protrusile in different species. Although the extent of protrusibility is not a manageable taxonomic character for preserved material, we believe that species differ considerably in this respect. Specimens preserved in alcohol and mounted in Berlese-type media have been routinely heated and pressed to extend the neckpiece and stretch the legs. Release of the pressure applied to the coverglass reduces the extreme stretch, and the appendages relax, lose extreme turgidity but remain extended. The tubular neckpiece is circumferentially striated for its full length and can be everted and then further stretched. The amount of stretch due to unpleating of the striae may be proportional to applied pressure, but when the pressure is released there is an apparent recovery to a position of full eversion without undue membrane stretch. This "equilibrium" position seems to be fairly constant and characteristic for species.

TAXONOMIC CHARACTERS

The few species described here represent a casual sampling of *Cryptognathus* for a very limited geographical area, mainly California. No truly bizarre specific characters have been discovered within this collection of species. Their qualitative or discrete features tend to be inherent in groups of species and taxonomically useful in combinations. The several species are distinguishable principally according to patterns of plate ornamentation. A wealth of detail is involved, but much of it is most difficult to describe adequately or to portray with line drawings. The terminology employed in this connection should be defined as far as possible.

The hood and sometimes much of the body plating are beset with numerous dimple-like depressions which are evident when a surface is viewed obliquely, as on the sidewalls of the idiosoma. On the dorsum and sometimes on the venter, the dimples are shallow, large, and encroach upon one another so that their perimeters become angular or polygonal. The surface cuticle of the interspaces then appears as a raised meshwork or "surface" reticulum.

Numerous vertical canaliculae, or *pores,* within the cuticle are generally prevalent in the principal body plates. There are specific patterns in the numbers and arrangements of the pores on the smooth plate surface and within the depressions. The term *cell* is used in reference to a mesh of the reticulum, i.e., a dimple outlined by its elevated rim.

The form and disposition of body setae furnish very useful taxonomic characters in other families of raphignathoids. These setae are very similar in form and location among species of *Cryptognathus;* they are simple, short, collectively alike, and certain ones are very difficult to measure. The lengths of only 4 dorsocentrals and the distances separating individuals of 3 pairs are included in the measurement data (setae designated on pl. I, fig. 5).

Phase microscopy and Keifer's or Hoyer's media have been relied upon almost exclusively for this study of cryyptognathids, and no attempt is made to account for differences in appearance of specimens otherwise prepared or examined.

Several males of two of the new species have been recognized. From these few specimens it is known that the sexes are much alike in general form and are distinguishable primarily by their genitalic organization. The anal aperture of the male is posterodorsal, higher on the dorsal plate than that of the female, and the 3 pairs of posterior setae (*c, d, le*) lie close together in a compact cluster. The front rim of the anal opening is located very close behind this group of setae. There is no genital aperture in the ventral plate. This aperture appears to be terminal, in the striated membrane between the two body plates. Males of most, if not all, other families of raphignathoids possess a large, additional male solenidion *w*♂ on one, two, or all of the tarsi. Males of the two species of *Cryptognathus* do not have additional tarsal sensilla. There is, however, a sex difference in solenidion *w*. This sensillum occurs on tarsi I-IV of both sexes; on each tarsus of the male it is approximately twice as large as on the corresponding podomere of the female.

SPECIES GROUPS

The eleven species included in this study comprise two distinct groups, an Imbricatus Group and a Favus Group. So far it has been found that the several species of each group have at least four features in common. The group features provide some insight into the descriptions given for the previously known species.

The original descriptions of the two

classical species, *Cryptognathus lagena* Kramer and *C. cucurbita* Berlese, emphasize generic rather than specific details. Without having recourse to type specimens of either, we are obliged to proceed with but limited understanding of their identities and relationships to the species described here.

According to Kramer's (1879) description, the type species, *Cryptognathus lagena,* is one of the more elongate forms on which the dorsal plate is entirely reticulate and it has numerous pores in each of the cells. These and other less obvious features characterize the Imbricatus Group. Berlese (1885) probably misidentified *C. lagena* because his redescription of it gives two features not characteristically associated with the Imbricatus Group. He illustrated *C. lagena* as having only 2 pairs of paragenital setae and a triangular, dimpled "prosternal apron." These two characters typify the Favus Group of species. Berlese's own species, *C. cucurbita,* described in 1917, almost certainly belongs in the latter group. Sig Thor (1931) gave more detailed information about a species which he redescribed as *C. lagena,* but he reproduced Berlese's figures to illustrate it. However, his key to the two named species, *lagena* and *cucurbita,* suffices to distinguish between the presently constituted groups. We therefore expect the type of *lagena* to resemble or to identify with one of the Imbricatus forms and the type of *cucurbita* to fit into the Favus Group. The second expectation is based in part on the recent contribution of Meyer and Ryke (1959) on *C. cucurbita cucurbitella.*

CRYPTOGNATHUS KRAMER

Cryptognathus P. Kramer, 1879, p. 156; Berlese, 1885, fasc. 22, no. 10; Thor, 1931, Lief. 79–81; Baker and Wharton, 1952, pp. 183–84; Meyer and Ryke, 1959, pp. 233–34.

Idiosoma entirely covered with a cuirass-like ornamented exoskeleton of two parts. A vaulted dorsal plate laps onto venter, infolded and heavily sutured around dorsopleural line to a unified ventral plate. Vertex of dorsal plate drawn out in front to form a rigid, sclerotized hood, which overhangs retracted gnathosoma. Gnathosoma retracts into a deep camerostome, extremely protrusible. Chelicerae chelate, movable digits styliform. Peritremata on chelicerae, one long, straight ramus on each chelicera; each peritreme with one short chamber near distal end. Palptarsus bears a crown of 4 apical sensilla. Claw of palptibia vestigial or absent. One pair of subcapitular setae. Two pairs of eyes. Humeral sulcus absent. Eleven pairs relatively short, smooth dorsal setae, none appreciably longer than others; ventral setae: 6 pairs. Anal and genital covers separated; anus terminal on dorsal plate; female genital covers on ventral plate. Coxae of legs juxtaposed, their proximal ends incorporated into ventral plate; trochanters severely constricted near coxal articulation. Pretarsi comprise 2 simple claws and a rodlike empodium bearing 3–4 pairs of capitate raylets.

KEY TO FEMALES OF *CRYPTOGNATHUS*

1. Prosternal apron wedge-shaped, dimpled (pl. I, fig. 2); 2 pairs of paragenital setae (Favus Group) 2
   Prosternal apron comprises a crescentic, transparent flange on front margin of ventral plate (pl. I, fig. 1); 3 pairs of paragenital setae (Imbricatus Group) 5
2. Sternocoxal portion of ventral plate with extensive nonporous, striated areas (e.g., pl. IV, figs. 25, 30) 3

Sternocoxal portion of ventral plate with pattern of pores uninterrupted, no striae (e.g., pl. IV, fig. 23) 4

3. Dorsal and ventral plates not similarly ornamented, dorsal plate with enlarged pores in clusters; chelicerae not joined together ..... *C. pictus* Summers and Chaudhri
Dorsal and ventral plates similarly ornamented, coarse pores uniformly dispersed; chelicerae joined together basally ..... *C. ochraceus* Summers and Chaudhri

4. Addorsal setae *tc* on tarsus II similar; genu II with peglike sensillum *k* (spine *k* on pl. I, fig. 3) ..... *C. favus* Summers and Chaudhri
Addorsal setae *tc* on tarsus II dissimilar (pl. II, fig. 8); genu II lacks peglike sensillum *k* ..... *C. cucurbitellus* Meyer and Ryke

5. Peglike sensillum *k* present on genu II 6
Peglike sensillum *k* absent on genu II 9

6. One proximoventral seta on tarsi III and IV (10 setae on each of these podomeres) 7
Two proximoventral setae on tarsi III and IV (11 setae each) ..... *C. imbricatus* Summers and Chaudhri

7. Palptibia with 3 setae plus minute claw 8
Palptibia with 4 setae, no claw ..... *C. corrugis* Summers and Chaudhri

8. Each cell of dorsal reticulum with about 17–25 small pores, all but 2–3 restricted to periphery ..... *C. scutellatus* Summers and Chaudhri
Each cell of dorsal reticulum with more numerous pores, 35–50 per cell, about 8–22 dispersed throughout the central area ..... *C. luteolus* Summers and Chaudhri

9. Addorsal setae *tc* on tarsus II similar 10
Addorsal setae *tc* on tarsus II dissimilar ... *C. aureatus* Summers and Chaudhri

10. Cells in dorsal reticulum preponderantly longer than wide, some almost twice as long as wide; chelicerae short (av. 79μ) ..... *C. cucullus* Summers and Chaudhri
Cells in dorsal reticulum preponderantly isodiametric; chelicerae long (av. 133μ) ..... *C. ultrarostratus* Summers and Chaudhri

I. FAVUS GROUP. Dorsal plate smooth or with reticulum clearly defined only near margins; pores coarse, equidistant or symmetrically grouped. Prosternal apron a triangular, dimpled plate separated from ventral plate proper by a V-shaped suture (pl. IV, figs. 24, 25). Palptibia bears three setae only, no claw. Two pairs of paragenital setae. Four setae on femur I.

Cryptognathus favus Summers and Chaudhri, n. sp.

(Pl. I, figs. 2, 6; pl. III, fig. 12; pl. IV, fig. 23; pl. V, fig. 34)

Female. Gnathosoma with limited protusibility, extends far enough to carry basal articulations of chelicerae beyond margin of hood, or to bring palptarsi to level of foreleg claws. Hood somewhat downcurved; front margin with few, small denticles; length not greater than 6 dimples in any longitudinal row. Dorsal plate porous and faintly reticulate; reticulum with coarse meshes, extremely faint on mid-dorsum, fairly clear and sharply detailed peripherally; small circular pores dispersed over entire plate as more or less uniformly spaced stipples. Very delicate striae in broken longitudinal rows interwoven among pores. Dorsal setae relatively long, flagelliform. Setae of pair *a* very widely spaced, almost marginal in position. Ventral plate with pores dispersed as on dorsum; striations evident without special optics; surface

reticulation vague and ill-defined, limited to marginal areas of plate; pore pattern not noticeably disrupted in coxosternal region. Ventral body plate emarginate in front to accommodate a V-shaped prosternal apron of hyaline skeleton (pl. I, fig. 2); this sclerite dimpled like overlying hood, bears 10–16 dimples. Apodemes of podosomal region subdivided into small irregular bits, as illustrated (pl. I, fig. 2). Coxae I and II provided with a crown of 3–4 reinforcing splines. Trochanters I and II without pores in skeleton. Sensillum *k* present on genu II. Tarsus II with 13 setae. Addorsal setae *tc* on tarsus II alike: lateral seta *tc″* and mesal seta *tc′* acicular, finely pointed, equal in length. Measurements in microns (n = 2): length of idiosoma, including hood and anal covers, 320; chelicera 94; length of setae: *po* 36, *a* 34, *b* 38, *c* 30; spacing of setae: *a-a* 149, *b-b* 84, *c-c* 66.

Types. Holotype ♀, 1 paratype ♀, Mix Canyon, Solano Co., Calif., Oct. 9, 1948, S. F. Bailey and E. Cott, from moss. Holotype filed in United States National Museum, Washington, D.C.; paratype in collection of Department of Entomology, University of California, Davis.

Other specimens. One ♀, Putah Canyon, near Monticello, Solano Co., Calif., Oct. 28, 1948, E. Cott, from moss.

Cryptognathus ochraceus Summers and Chaudhri, n. sp.

(Pl. III, fig. 14; pl. IV, fig. 25; pl. V, fig. 36)

Female. Gnathosoma greatly protrusile; apparent full extension projects palptrochanter to level of foreleg claws. Hood slightly deflexed, longer than in most species, as many as 7–8 dimples per longitudinal row; front margin with numerous well-defined denticles. Chelicerae fused together for a short distance beyond basal articulation with basis captiuli. Dorsal setae smooth, uncommonly long; i.e., vertical *ae* and postvertical *pv* overlap ends of their respective mates of opposite side; seta *a* slightly longer than distance *a-b*. Dorsal and ventral plates essentially nonreticulate; downturned edges of dorsal plate show a few cells of a faintly developed reticulum. Pores on both plates much alike: small, circular, equispaced. Podosomal region of ventral plate with pores absent in several areas; a median band of pores, 2–3 pores wide, extends from apex of prosternal apron to second pair of ventral setae; patches of nonporous skeleton restricted to coxosternal regions of coxae I, II and III; nonporous region adjoining coxa III isolated by a narrow, diagonal strand of pores extending from margin of plate under coxa III to midline; nonporous areas adjoining coxae I and II incompletely separated from each other by a triangular group of pores overlying anteriormost sternocoxal apodeme (pl. IV, fig. 25). Apodemes dispersed as small elements, 8 per side, of which 3 form a linear series within nonporous area opposite coxae II. Nonporous areas clearly striated and with subsurface reticulation. Prosternal apron triangular, anterior margin concave, with 16–18 dimples. Reinforcing splines on coxae I and II; distended parts of corresponding trochanters with numerous pores. Addorsals *tc* on tarsus II dissimilar: i.e., lateral seta *tc″* acicular, finely pointed; mesal seta *tc′* a blunt-tipped eupathid, about two-thirds as long as its opposite counterpart. Sensillum *k* present on genu II. Tarsus II with 13 setae. Measurements in microns (n = 4): length of idiosoma 294, chelicera 103; length of setae: *po* 39, *a* 40, *b* 40, *c* 34; spacing of setae: *a-a* 123, *b-b* 90, *c-c* 60.

Types. Holotype, 3 paratypes, all females, Old Bella Vista Trail (20 meters elev.), Santa Cruz Island, Galapagos Islands, Feb. 26, 1964, R. O. Schuster, from rotted lvs. of *Tourneyia*. Holotype in U. S. National Museum; one paratype in British Museum (Natural History); others retained at University of California, Davis.

Cryptognathus ochraceus is most

likely to be confused with *C. favus*. Both species are relatively small, ovoid forms having noticeably long dorsal setae and similar patterns of pores in the body plates. A peculiar feature of *C. ochraecus* is the partial fusion of chelicerae, a feature difficult to determine unless specimens are favorably mounted. Otherwise there are three distinguishing characters: in *C. ochraceus*, the addorsal setae *tc* on tarsus II are dissimilar, no striae occur on the dorsal plate, and portions of the ventral podosomal plating lack pores; in *C. favus*, the addorsals *tc* on tarsus II are identical, the dorsal plate has striae, and there are no areas on the ventral podosomal plating which lack pores. Possibly also the mouthparts exsert farther in *ochraceus*.

Cryptognathus pictus Summers and Chaudhri, n. sp.

(Pl. III, fig. 13; pl. IV, fig. 24; pl. V, fig. 35)

Female. Limit of gnathosomal exsertion indeterminate on specimens available. Hood with elongate dimples crowded close together, 6–7 dimples per longitudinal row; reinforcing rim of skeleton on its front border very narrow, without denticles; downhanging side margins smoothly rounded, possibly flared outward. Dorsal setae much shorter than those of *favus;* setae of pairs *d* and *le* aligned in an almost straight crossrow—*le* situated behind *d* in other known species. Dorsal and ventral plates quite dissimilar in appearance. Dorsal plate with enlarged, ellipsoidal pores covering its midsection; pores appear to be oblique cuticular canaliculae clustered in groups of 3–5, each group in a shallow basin of a dimple-like depression (pl. III, fig. 13); pores in thinner, marginal areas of plate smaller, circular, 4–6 enclosed within each cell of more clearly embossed reticulum. Reticulum on middle part of plate with thick, ill-defined bars fashioned into irregularly shaped cells having rounded corners; thick-barred meshes grade laterally into a latticework having sharply defined lines and regular 5- or 6-sided polygonal meshes. Dorsal plate also delicately striated; longitudinal striae clearly defined around anal area and plate margins, somewhat erratic in direction over heavily sculptured central area. Ventral plating with small, equally spaced, circular pores dispersed over most of surface; a faint reticulum appears only around margin of opisthosoma; plate entirely striate; striae longitudinal but curving to become transverse only in front of genital apparatus. Small pores of common type absent in middle of podosoma; a row of about 10 slightly enlarged pores originates near anterior rim of coxa IV and ends close to nearest ventral seta (second pair), one such row on each side of body; another row of 7–8 enlarged pores bisects sternal area of podosoma (pl. IV, fig. 24), these pores being irregularly spaced along a line extending from apex of V-shaped insert of prosternal apron to level of second ventral setae. Coxosternal apodemes subdivided into series of small irregularly shaped elements. Hyaline skeleton of prosternal apron has about 20 dimples. Each coxa, especially I and II, bears a fanlike group of skeletal folds reinforcing articulation with trochanter. Trochanters I and II with numerous pores in skeleton. Addorsal setae *tc* on tarsus II dissimilar. Sensillum *k* present on genu II. Tarsus II with 14 setae. Measurements in microns (n = 2): length of idiosoma 289, chelicera 85; length of setae: *po* 31, *a* 31, *b* 27, *c* 27; spacing of setae: *a-a* 108, *b-b* 71, *c-c* 27.

Types. Holotype ♀, 1 paratype female, Horneman Farm, Santa Cruz Island, Galapagos Islands, Feb. 15, 1964, R. O. Schuster, from moss and lichen on coffee. Holotype in U. S. National Museum; paratype at University of California, Davis.

Cryptognathus pictus is distinctive among species so far assigned to the

Favus Group; the ornamentation of its dorsal plate is diagnostic.

Cryptognathus cucurbitellus Meyer and Ryke, n. comb.

(Pl. III, fig. 15; pl. IV, fig. 26)

Cryptognathus cucurbita cucurbitella Meyer and Ryke, 1960, pp. 233–34, fig. 40.

Female. Protrusibility of gnathosoma not determined. Hood with close-set, angular dimples, those in anteriormost crossrow nearly rectangular; 6–7 dimples per longitudinal row; reinforcing rim of skeleton on front margin very narrow, without projecting denticles. Body setae very short, fine. Dorsal plate partly reticulate, with small pores evenly distributed over nonreticulate central area; definitive reticulation restricted to periphery of plate, 3 or 4 rows of elongate polygonal cells on each side (pl. III, fig. 15), from hood base to vicinity of seta *le;* 6–8 pores disposed around periphery of each cell. Pores in both principal plates compressed, slotlike, especially so on venter of podosoma (pl. IV, fig. 26). Ventral plate entirely covered with pores, pattern not disrupted in middle of podosoma; no reticulation or striation. Sternocoxal apodemes associated with legs I and II very vaguely defined. Prosternal apron an inverted pentagon coextensive with flanking trochanters I, separated from sternal plating by a V-shaped suture; number and arrangement of dimples in hood obscure on type specimen. Distal ends of coxae I and II strongly reinforced with skeletal folds or splines. Trochanter I has a serrated ridge transversely placed on its dorsolateral surface; trochanter II with a lesser ridge; both trochanters perforate like ventral plate. Genu II lacks peglike sensillum *k*. Addorsal setae *tc* on tarsus II dissimilar. Fourteen setae on tarsus II (extra seta is a ventromedian in subterminal group). Setae on ventral plate proper very short, fine; sixth pair, usually situated in marginal sulcus behind genital aperture of other species, not observed in type specimen. Measurements in microns (holotype): length of idiosoma, including hood and anal covers, 327, chelicera (retracted); length of setae: *po* 22, *a* 22, *b* 22, *c* 20; spacing of setae: *a-a* 113, *b-b* 88, *c-c* 47.

The specimen examined is the type of the subspecies obligingly loaned to the authors by Miss M. K. P. Meyer, Plant Protection Research Institute, Pretoria, Republic of South Africa.

Three of the four species here referred to the Favus Group are believed to be very close relatives of *Cryptognathus cucurbita* Berl. But since those known to us—*C. favus, C. ochraceus, C. cucurbitellus*—are readily distinguishable one from the other, we feel that the elevation of *C. cucurbitellus* to species rank is justified. Without access to type specimens of *C. curcurbita* Berl. and *C. cucurbita* var. *subnidita* Berl., we can only assume that the var. *subnidita* is a distinct species and that both of Berlese's species will ultimately be distinguished from those described here.

In *Cryptognathus cucurbitellus* the pattern of pores is continuous over the entire venter of the podosoma, and there are no striae on either of the principal body plates. Reticulation on the dorsal plate is confined to the vertex and side margins. The dorsal setae are quite short; genu II lacks the peglike sensillum *k*, and there are 14 setae on tarsus II. The ventral pore pattern of *C. ochraceus* is disrupted on the podosoma; this area is striated. Its dorsal plate has no striae or definite reticulation. Genu II has a peglike sensillum; there are 13 setae on tarsus II, and the chelicerae are partly fused together.

Cryptognathus cucurbitellus and *favus* may be confused as regards plate ornamentation, although the latter shows a faint, honeycomblike reticulation over the entire dorsum (pl. III, fig. 12). *C. favus,* like *C. ochraceus,* has much longer dorsal setae than *C. cucurbitellus. C. favus* has sensillum *k* pres-

ent on genu II, 13 setae on tarsus II; and the addorsals *tc* on this podomere are alike.

II. IMBRICATUS GROUP. Dorsal plate with sharply etched reticulum over entire surface and very small pores irregularly spaced within each mesh. Prosternal apron comprises a narrow, hyaline flange or lip, not separated from ventral plate by a V-shaped suture and having no dimples (pl. I, fig. 1). Palp-tibia bears 3 setae plus a very minute claw (pl. I, fig. 4); or 4 setae, one of which appears to replace claw. Three pairs of paragenital setae. Three setae on femur I.

Cryptognathus imbricatus Summers and Chaudhri, n. sp.

(Pl. I, figs. 1, 5; pl. III, fig. 20; pl. IV, fig. 31; pl. V, fig. 41)

Female. Fully everted gnathosoma aligns distal end of palpgenu and foreleg claws. Hood truncate in front, often with minute denticles on anterior rim; about 7 dimples per longitudinal row. Dorsal and ventral plates not identically ornamented. Dorsal plate with thin raised lines of surface reticulum, lines noticeably roughened or varicose over propodosoma, polygonal cells mostly isodiametric, very few elongate; pores small, circular, many positioned around perimeter of each polygon but with about 5–15 pores irregularly scattered over its central surface; some of the center pores slightly larger and brighter (or clearer) than others (pl. V, fig. 41). Ventral plate incompletely reticulate (pl. I, fig. 1), nonstriate; pores larger than on dorsum, circular to oval in outline; reticulum very faint or evanescent in midline of opisthosoma, better defined near margins and between coxae of podosoma; sternal region with pore pattern disrupted; nonporous area roughly trapezoidal, with an indistinct intracuticular reticulation. Prosternal apron a narrow, hyaline extension of ventral plate, its front border concave. Peglike sensillum *k* on genu II. Tarsi III and IV with 11 setae each (i.e., two long proximoventral setae—other known species have only one long proximoventral). Addorsal setae *tc* on tarsus II dissimilar (pl. II, fig. 8). Measurements in microns (n = 20): length of idiosoma 372 ± 8.8, chelicera 117 ±3.2; length of setae: *po* 24 ± 1.5, *a* 25 ± 1.6, *b* 25 ±1.4, *c* 26 ± 1.9; spacing of setae: *a-a* 113 ± 4.8, *b-b* 86 ± 3.5, *c-c* 56 ± 4.7.

Types. Holotype, 9 paratypes, all females, Altadena, Calif., Dec. 24, 1951, E. I. Schlinger, from leaf mold, *Quercus agrifolia;* 4 paratype ♀, Glendale, Los Angeles Co., Calif., Dec. 26, 1951, E. I. Schlinger, from leaf mold *Quercus agrifolia;* 9 paratype ♀, Cobb Mountain, Lake Co., Calif., May 10, 1951, S. F. Bailey, from oak and pine leaf mold. Holotype deposited in U. S. National Museum; one paratype in British Museum (Natural History); others retained in collection, University of California, Davis.

Other specimens. Mount St. Helena, Napa Co., Calif., May 10, 1951, S. F. Bailey, from manzanita leaf mold; 5 mi. S., Santa Maria, Calif., April 10, 1961, J. W. Russell, from soil sample; Lodi, Calif., June 15, 1961, R. O. Schuster, from bark of cultivated grape vines.

Cryptognathus scutellatus Summers and Chaudhri, n. sp.

(Pl. III, fig. 17; pl. IV, fig. 28; pl. V, fig. 38)

Female. Gnathosoma protrudes far enough to align distal end of palpgenu with claws on foreleg. Hood with small denticles on its anterior rim, 6-7 dimples per longitudinal row. Dorsal and ventral plates differently ornamented. Dorsal plate completely reticulate, cells mostly isodiametric (pl. III, fig. 17); each cell contains 17–25 optically similar pores, all but 2 or 3 positioned around its perimeter (pl. V, fig. 38). Ventral plate indistinguishable from that of *imbricatus.* Peglike sensillum *k* on genu II. Addorsal setae *tc* on tarsus

II dissimilar. Measurements in microns (holotype): length of idiosoma 350, chelicera 109; length of setae: *po* 24, *a* 24, *b* 22, *c* 24; spacing of setae: *a-a* 105, *b-b* 74, *c-c* 51.

Type. Holotype ♀, Green Valley, Solano Co., Calif., Dec. 1, 1948, H. E. Cott, from fleshy bracket fungus; in Department of Entomology, University of California, Davis.

This species has most of the characteristics of *Cryptognathus imbricatus.* The lengths of parts measured are smaller in *scutellatus* and there are two other describable differences: it has only one proximoventral seta on each tarsus III and IV, and there are fewer dorsal pores. In *C. imbricatus* the number of pores dispersed within the center of each polygonal cell, exclusive of the peripheral border of pores, ranges from 5–15 or possibly a few more, and some of these are slightly larger and clearer (optically brighter) than others. In *C. scutellatus,* there are only 17–25 pores in each cell, including border pores, of which only 2–3 are dispersed within the central area; all of these are similar in size and brilliance.

Cryptognathus ultrarostratus Summers and Chaudhri, n. sp.

(Pl. II, fig. 10; pl. III, fig. 19; pl. IV, fig. 30; pl. V, fig. 40)

Female. Gnathosoma extremely protrusile, capable of projecting rostrum beyond ends of forelegs (pl. II, fig. 10); length of fully everted neckpiece exceeds length of basis capituli. Hood truncate, front margin smooth or with 2–3 minute denticles; not more than 6 dimples in any longitudinal row. Dorsal plate with reticular cells (meshes) mostly isodiametric, a few longer than wide (pl. III, fig. 19); plating porous; perimeter of each cell with a row of small, irregularly spaced pores adjacent to bars of meshwork and a very few (1–3) slightly larger, clearer pores near centers of cells (pl. V, fig. 40). Ventral plating with emphatic porosities evenly spaced, each pore noticeably elongate lengthwise (pl. IV, fig. 30), tending to align in ill-defined rows which change from longitudinal to transverse direction on posterior third of opisthosoma; perforate pattern absent in coxosternal area; this area invaded by faint longitudinal striae and showing a faint subsurface reticulum; surface reticulation very feebly developed over entire venter of opisthosoma (pl. IV, fig. 30). Prosternal apron hyaline, narrow, front margin concave but not deeply excavate. Peglike sensillum *k* absent on genu II. Addorsal setae *tc* on tarsus II alike. Measurements in microns (n = 20): length of idiosoma 365 ± 13.4, chelicera 133 ± 3.0; length of setae: *po* 24 ± 1.4, *a* 20 ± 1.3, *b* 20 ± 1.0, *c* 19 ± 1.0; spacing of setae: *a-a* 96 ± 3.5, *b-b* 90 ± 3.6, *c-c* 46 ± 3.5.

Types. Holotype, 13 paratypes, all females, Mix Canyon, Solano Co., Calif., S. F. Bailey and H. E. Cott, Oct. 9, 1948, from soil and moss. Holotype in U. S. National Museum; one paratype in British Museum (Natural History); other paratypes retained.

Other specimens. Green Valley, Solano Co., Calif., July 23, 1950, H. E. Cott, from beetle frass in fallen oak tree; Maacama Creek at Hwy. 28, Solano Co., Calif., L. M. Smith and R. O. Schuster, from *Vitis californicus;* Eagle Creek, Trinity Co., Calif., June 2, 1951, A. T. McClay, from wild grape; Sagehen, Calif., July 12, 1953, J. D. Latlin, from pine duff; Dardanelle, Calif., July 19, 1953, G. A. Marsh, from white fir and cedar leaf mold; 11 mi. N. E. Caliente, Kern Co., Calif., March 31, 1959, F. C. Raney, from leaf mold; June Lake, Mono Co., Calif., July 2, 1961, S. F. Bailey, from lodgepole pine and aspen leaf mold.

Except for much greater protrusibility of mouthparts and length of chelicerae, *Cryptognathus ultrarostratus* closely resembles both *C. imbricatus* and *C. scutellatus.* The distinctions between *C. ultrarostratus* and *C. imbricatus* are mostly clear-cut. *C. ultraro-*

stratus lacks a peglike sensillum *k* on genu II; its addorsals *tc* on tarsus II are alike, and there is only one proximoventral seta on tarsi III and IV. There are also subtle differences in the dorsal plating. The cells of the lattice in *C. ultrarostratus* have very few pores other than those situated around their peripheries; in *C. imbricatus* the peripheries of the cells are also bordered with pores, but the centers of the cells have more scattered pores, generally 10 or a few more.

Whereas the dorsal plates of *Cryptognathus ultrarostratus* and *C. scutellatus* are very similar, their ventral plates show at least two differences. The pores in this plate of *C. ultrarostratus* are unmistakably elongate or slitlike, and the nonporous sternocoxal area bears fine longitudinal striae. In *C. scutellatus* the ventral pores are essentially circular to slightly oval in outline, and the coxosternal plating has no striae. *C. ultrarostratus* is also distinguishable from *C. scutellatus* in having no sensillum *k* on genu II and equal addorsals *tc* on tarsus II.

Cryptognathus corrugis Summers and Chaudhri, n. sp.

(Pl. II, fig. 9; pl. III, fig. 21; pl. IV, fig. 32; pl. V, fig. 42)

Female. Four setae on palptibia, smallest one replaces claw of other species. Hood not downcurved, front margin truncate, without noticeable denticulation; not more than 6 dimples in any longitudinal row. Dorsal plate with numerous cells longer than wide, their boundary lines well raised, roughened or varicose over front part of propodosoma, becoming thinner and smooth over opisthosoma; pores small, circular, somewhat variable in size, many irregularly scattered within boundaries of each cell but more numerous around cell perimeter (pl. V, fig. 42). Ventral plate (pl. IV, fig. 32) ornamented much like dorsal plate; cells situated across anterior margin of sternum and between coxae with boundary lines strongly raised and varicose; in these roughened areas, basins of cells depressed, dimplelike, their pores concentrated peripherally, only 1–2 pores in centers of depressions. Prosternal apron narrow, hyaline, slightly concave in front. Genital covers protrude through an almost rectangular window; aperture in ventral plate, usually ovoid to accommodate genital covers, partly occluded in this species by transparent flaps of ventral plate which overlap margins of covers. Genu II lacks peglike sensillum *k*. Addorsal setae *tc* on tarsus II dissimilar; outer seta *tc″* a slender, finely pointed element of acicular type; inner (mesal) seta *tc′* thicker, eupathidlike, shorter than its opposite counterpart. Measurements in microns (n = 5): length of idiosoma 396 ± 21.8, chelicera 122 ± 5.1; length of setae: *po* 23 ± 0.9, *a* 24 ± 0.7, *b* 24 ± 1.1, *c* 25 ± 2.1; spacing of setae: *a-a* 151 ± 14.8, *b-b* 99 ± 10.1, *c-c* 51 ± 4.3.

Types. Holotype ♀, Franklin, Idaho, April 18, 1951, G. F. Knowlton and Shi-Chun Ma, from lilac and poplar leaves. Paratypes: 1 ♀, same sample; 1 ♀, Point Reyes Station, Marin County, Calif., Jan. 26, 1951, S. F. Bailey, from moss on tree; 2 ♀, Meyers, Calif., May 29, 1949, from pine duff (6,000 ft. elev.). Holotype in U. S. National Museum, paratypes retained.

Other specimens. June Lake, Mono Co., Calif., July 2, 1961, S. F. Bailey, from lodgepole pine and aspen leaf mold.

This species links *Cryptognathus imbricatus* and *C. ultrarostratus* and is perhaps an intermediate form. It differs from *C. imbricatus* by having a strongly embossed polygonal lattice on both dorsal and ventral plates, especially around margins of propodosoma above and between coxae below; an additional seta instead of a palptibial claw; it also shows a difference in having one proximoventral seta on each tarsus III and IV and parallel-sided flaps partly overlying genital covers. *C. ultrarostratus*

has a palptibial claw, no peglike sensillum on genu II; and setae of pair *a* are set much closer together. The pores in the ventral plates of *C. imbricatus* and *C. ultrarostratus* are strongly outlined (and somewhat slitlike in *C. ultrarostratus*); in *C. corrugis* the pores in the ventral plate are like those in the dorsal plate: i.e., small, circular, weakly outlined and irregularly scattered within the cells of the lattice—except in restricted areas. The addorsal setae *tc* on tarsus II are dissimilar in *C. imbricatus* and *C. corrugis;* they are identical with each other in *C. ultrarostratus.*

Cryptognathus luteolus Summers and Chaudhri, n. sp.

(Pl. III, fig. 22; pl. IV, fig. 33; pl. V, fig. 43)

Female. Full protrusibility of mouthparts not known. Anterior margin of hood truncate, with several small denticles; 6–7 dimples per longitudinal row. Dorsal plate entirely reticulate, with lines somewhat roughened or pebbly around cells near periphery of body; cells preponderantly isodiametric except that a few in midline between setae *b* tend to be longer than wide (pl. III, fig. 22); pores in plating small, very numerous, 35–50 in each cell, many concentrated around its periphery (pl. V, fig. 43); 1–4 pores per cell, slightly larger and noticeably brighter or clearer than common type. Ventral plate (pl. IV, fig. 33) and prosternal apron as in *imbricatus.* Genu II with peglike sensillum *k;* 1 proximoventral seta on each tarsus III and IV. Addorsal setae *tc* on tarsus II dissimilar. Measurements in microns (n = 2): length of idiosoma 368, chelicera 105; length of setae: *po* 28, *a* 30, *b* 28, *c* 29; spacing of setae: *a-a* 131, *b-b* 93, *c-c* 56.

Types. Holotype ♀, 1 paratype ♀, Walker Pass, Kern County, Calif., March 30, 1952, E. I. Schlinger, from leaf mold of *Pinus montifolia;* 1 paratype ♀, Morongo Valley, San Bernardino County, Calif., March 29, 1952, E. I. Schlinger, from juniper duff. One paratype in U. S. National Museum, others retained in Department of Entomology, University of California, Davis.

Although *Cryptognathus luteolus* appears to most resemble *C. imbricatus,* combinations of characters are required to distinguish it from both *C. imbricatus* and *C. corrugis. C. imbricatus* has 2 proximoventral setae on tarsi III and IV; *C. luteolus* has only one. In *C. corrugis,* the palptibial claw is displaced by a seta (4 setae on the palptibia), and the ventral plate is entirely reticulate; *C. luteolus* and *C. imbricatus* have a minute claw and 3 setae on the palptibia, and their ventral plates have sharply differentiated reticulation only on the margins of the opisthosoma. *C. luteolus* has shorter chelicerae than its two closest relatives. *C. scutellatus* and *C. luteolus* differ in their dorsal pore patterns.

Cryptognathus cucullus Summers and Chaudhri, n. sp.

(Pl. II, fig. 11; pl. III, fig. 16; pl. IV, fig. 27; pl. V, fig. 37)

Female. Gnathosoma apparently everts only far enough to carry basal ends of chelicerae slightly beyond margin of hood (pl. II, fig. 11), or to extend palptarsus to level of addorsal setae *tc* on tarsus I. Hood slightly humped or with curved surfaces; front margin truncate, with irregularly spaced denticles; 4–5 dimples per longitudinal row. Dorsal and ventral plates not alike in respect to ornamentation. Dorsal reticulum comprises a thin-lined lattice, most cells very much longer than broad (pl. III, fig. 16); pores numerous in each cell, approximately twice as many around periphery as in center; 1 or 2 pores in almost every cell considerably larger and brighter than all others (pl. V, fig. 37). Ventral plate porous and striate, with but faint suggestion of surface reticulation except on podosoma; ventral pores uniformly as large as

largest (brightest) ones on dorsum, evenly spaced; striae very delicate, difficult to see except over nonporous area between coxae; in this area striae overlie a vague, subsurface reticulum (pl. IV, fig. 27). Anteriormost margin of ventral plate bears a narrow, curved prosternal apron. Six pairs ventral body setae present, but hindmost pair, behind genital apparatus, quite difficult to locate in fold of marginal suture. Sensillum *k* absent on genu II. Addorsal setae *tc* on tarsus II alike. One proximoventral seta on each tarsus III and IV. Measurements in microns (n=3): length of idiosoma 296, chelicera 79; length of setae: *po* 18, *a* 17, *b* 18, *c* 18; spacing of setae: *a-a* 78, *b-b* 64, *c-c* 42.

Types. Holotype, ♀, Morongo Valley, San Bernardino Co., Calif., March 29, 1952, E. I. Schlinger, from juniper leaf mold. Paratypes: 1 ♀, same collection as holotype; 1 ♀, Warner Springs, San Diego Co., Calif., March 30, 1959, F. C. Raney, from soil sample. One paratype deposited in U.S. National Museum, other types in Department of Entomology, University of California, Davis.

Cryptognathus cucullus is the smallest of the species included in this study. Apart from small size and limited protrusibility of mouthparts, it most nearly resembles *C. ultrarostratus*. There are subtle differences in the plate markings of these two species. In *C. cucullus*, the lines of the dorsal reticulum are thin and delicate, most of the cells are very much longer than wide, and the pores of smallest size are liberally scattered within each cell, although more than half of them are concentrated around the perimeter. Each cell also has 1–2 larger, brighter (or more refringent) pores. In *C. ultrarostratus*, the lines of the reticular meshes are heavy and the small pores confined almost exclusively to the peripheral or border row. One or two larger, brighter pores are also included in each cell, but these are rarely comingled with those of smaller size. The ventral plates of both species have equally spaced pores and similar patterns of striation and subsurface reticulation between the sternocoxal apodemes. But the pores of *C. cucullus* are round, or nearly so, whereas in *C. ultrarostratus* they are slitlike. Measurements for several body parts, particularly idiosoma and chelicera, assist in separating these two species.

Cryptognathus aureatus Summers and Chaudhri, n. sp.

(Pl. III, fig. 18; pl. IV, fig. 29; pl. V, fig. 39)

Female. Gnathosoma markedly protrusile, neckpiece everts far enough to align middle of palpgenu with claws of forelegs. Hood slightly downcurved, front margin smooth or slightly scalloped, with 6 dimples per longitudinal row. Dorsal plate completely reticulate; polygonal cells approximately isodiametric over podosoma and sides of opisthosoma; a few mid-dorsal cells on opisthosoma, between setae *b*, somewhat longer than wide (pl. III, fig. 18); 12–20 small pores dispersed within each cell, majority peripherally disposed, very few scattered centrally (pl. V, fig. 39); pores somewhat variable in size but not in brightness or refringence. Ventral plate with reticulation variable; pores circular, uniform in size, very nearly equidistant one from another (pl. IV, fig. 29). Reticulum may be complete over ventral opisthosoma, or evident only at margins, or not at all apparent; in any case, lines of meshwork vague, not sharply embossed. Surface ornamentation lacking between sternocoxal apodemes, this area with a subsurface reticulum but lacking pores and striae. Prosternal apron narrow, concave, hyaline. Genu II lacks peglike sensillum *k*. One proximoventral seta on tarsi III and IV. Addorsal setae *tc* on tarsus II dissimilar. Measurements in microns (n = 8): length of idiosoma 281 ± 6.3, chelicera 91 ± 1.8; length of setae: *po* 22 ± 1.1, *a* 20 ± 1.1, *b* 20 ± 0.6,

c 20 ± 1.7; spacing of setae: *a-a* 84 ± 2.2, *b-b* 72 ± 2.4, *c-c* 37 ± 3.2.

Types. Holotype ♀, 7 paratype ♀, Forest Range and Experiment Station, Quincy, Calif., April 1, 1951, F. M. Summers, from manzanita leaf mold. Holotype in U. S. National Museum; one paratype in British Museum (Natural History); others retained.

Cryptognathus aureatus is a small species apt to be confused with *C. cucullus*. Comparisons of mounted (and partly flattened) specimens suggest that *C. cucullus* has a slender or fusiform body, whereas the body of *C. aureatus* seems to be more rotund than usual in this genus. Possibly also the gnathosoma of *C. cucullus* is more limited in protrusibility. These two species separate readily according to the structure of addorsal setae *tc* on tarsus II: *tc′* and *tc″* in *C. cucullus* are identical acicular setae, whereas in *C. aureatus* the mesal seta *tc′* is a eupathid and about half as long as *tc″*. There is probably a significant difference between *C. cucullus* and *C. aureatus* in respect to length of chelicerae. The dorsal plating of *C. cucullus* shows predominantly elongate cells, each containing pores of two kinds: abundant "common" pores and one or two larger bright or refringent pores. The bright pores are evident with conventional or phase optics. In *C. aureatus* the cells on the dorsal plate are preponderantly isodiametric and the pores are optically similar. The ventral plate of *C. cucullus* is finely striated; in *C. aureatus*, no striae are identifiable on this plate.

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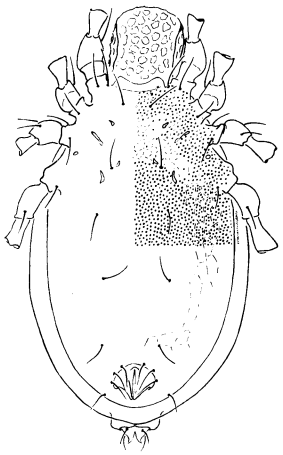

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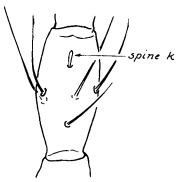
2. *C. favus*



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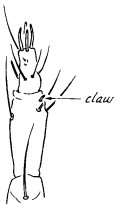

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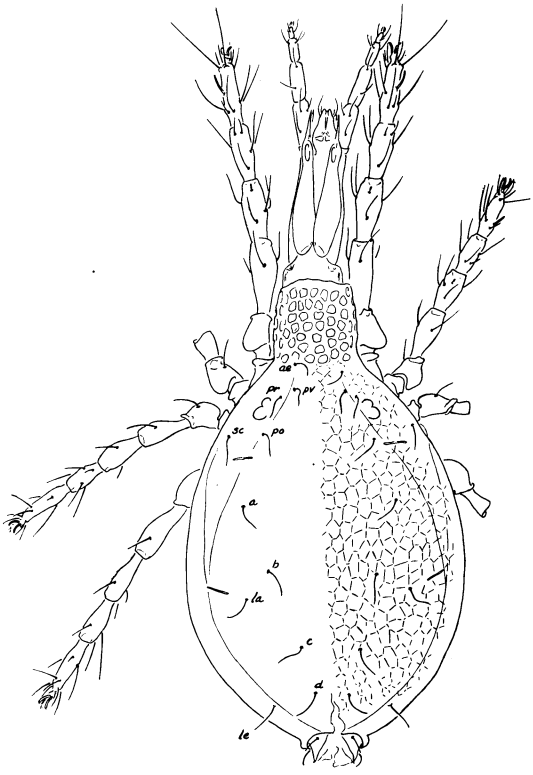

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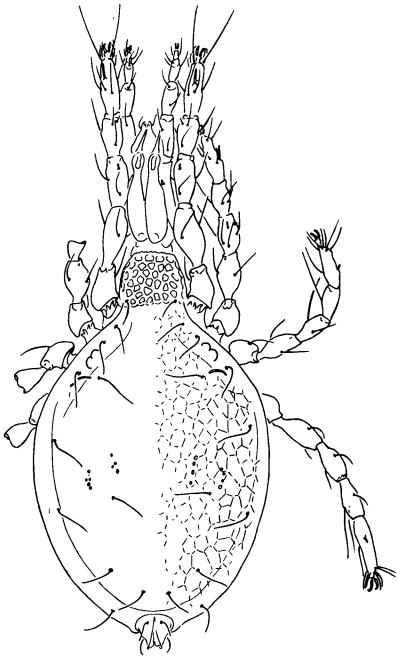
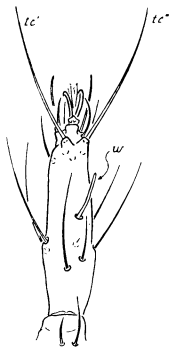


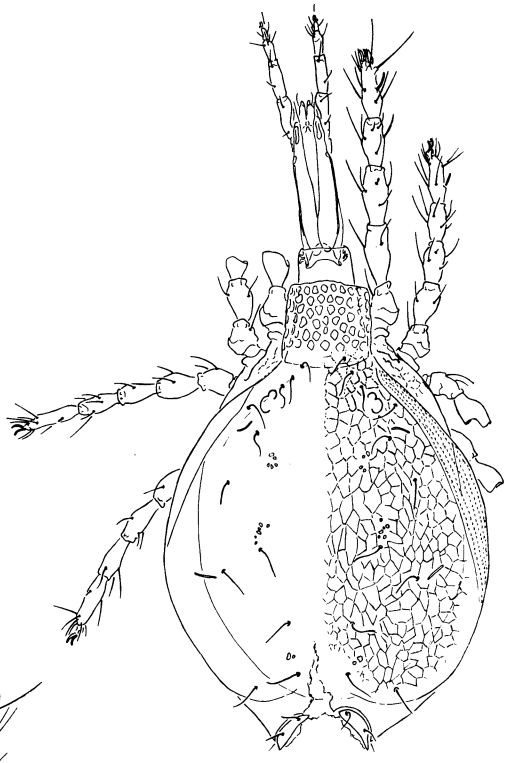
6. *C. favus*

Plate I. **Fig 1.** Ventral plate of *Cryptognathus imbricatus,* female, with only a portion of the ornamentation indicated. **Fig. 2.** Podosomal portion of venter of *C. favus.* **Fig. 3.** Right genu I of *C. imbricatus,* dorsal. **Fig. 4.** Tibia and tarsus of left palp of *C. imbricatus,* dorsal. **Fig. 5.** Dorsal aspect of *C. imbricatus,* female, porosities not indicated. **Fig. 6.** Dorsal aspect of *C. favus,* female, porosities omitted.



7. *C. imbricatus*

8. *C. imbricatus*



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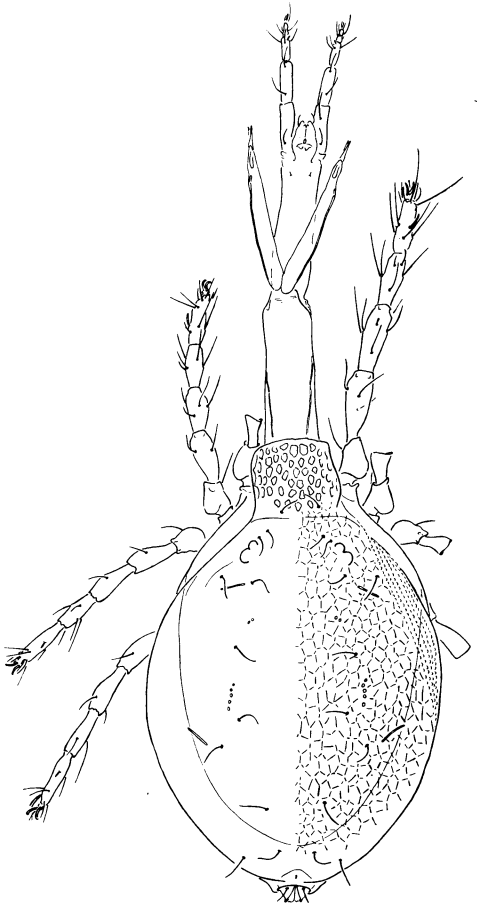
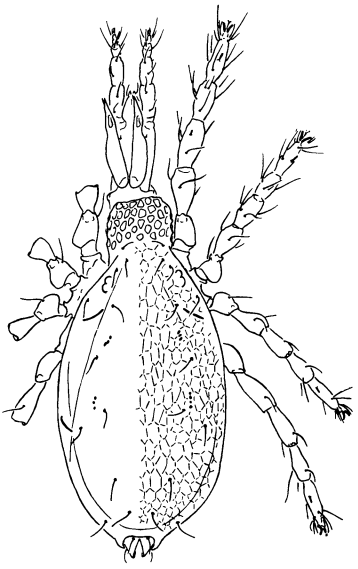
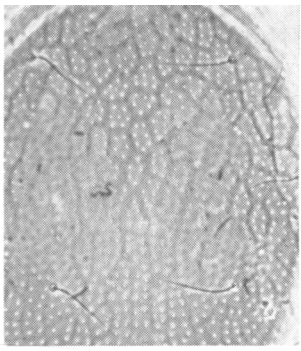


10. *C. ultrarostratus*

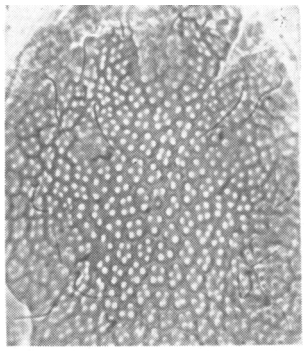


11. *C. cucullus*

Plate II. **Fig. 7.** Right tarsus of *Cryptognathus imbricatus* female, dorsal. **Fig. 8.** Right tarsus II of *C. imbricatus* female, dorsal. **Fig. 9.** Dorsal aspect of *C. corrugis,* female. **Fig. 10.** Dorsal aspect of *C. ultrarostratus,* female. **Fig. 11.** Dorsal aspect of *C. cucullus,* female.



12. *C. favus*



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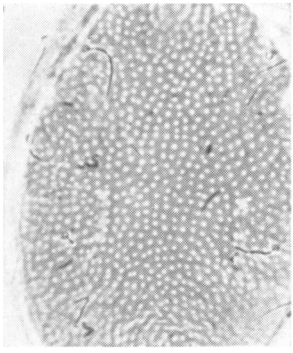
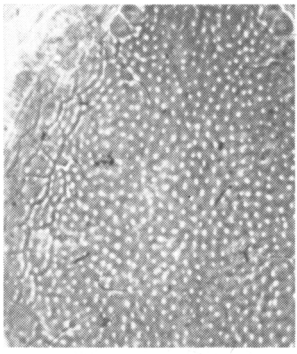
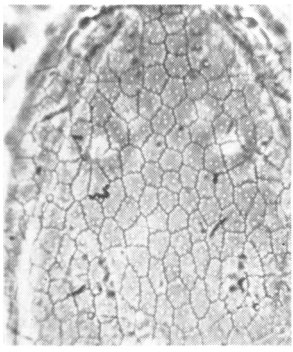


14. *C. ochraceus*

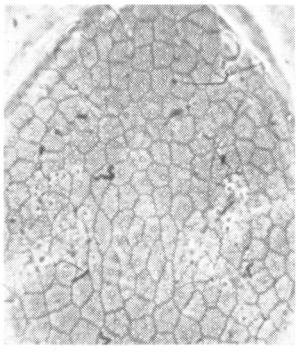


15. *C. cucurbitellus*

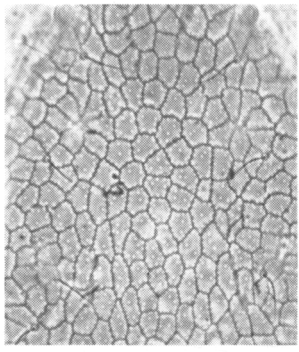
16. *C. cucullus*



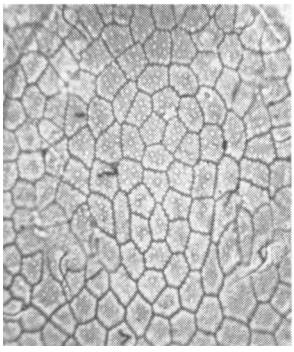
17. *C. scutellatus*



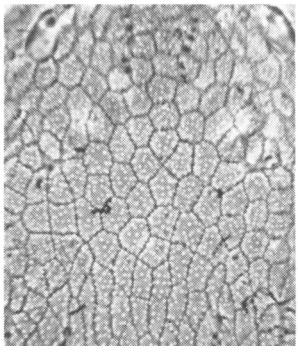
18. *C. aureatus*



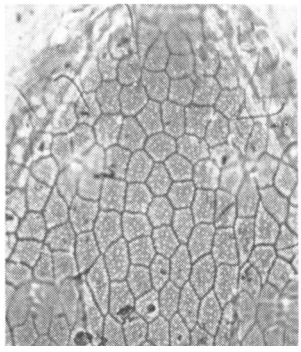
19. *C. ultrarostratus*



20. *C. imbricatus*

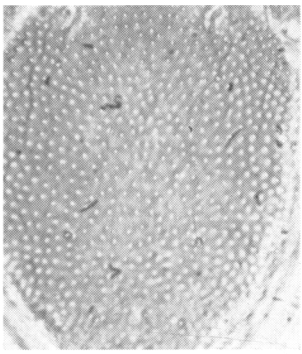


21. *C. corrugis*

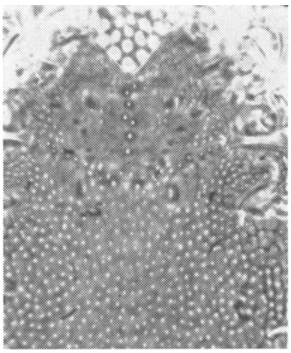


22. *C. luteolus*

Plate III. **Figs. 12–22.** Medium phase contrast photographs to show ornamentation of dorsal plates of 11 species of *Cryptognathus*. A portion of opisthosoma not shown. The same magnification was used for each photo. **Fig. 12.** *C. favus*. **Fig. 13.** *C. pictus*. **Fig. 14.** *C. ochraceus*. **Fig. 15.** *C. cucurbitellus*. **Fig. 16.** *C. cucullus*. **Fig. 17.** *C. scutellatus*. **Fig. 18.** *C. aureatus*. **Fig. 19.** *C. ultrarostratus*. **Fig. 20.** *C. imbricatus*. **Fig. 21.** *C. corrugis*. **Fig. 22.** *C. luteolus*.

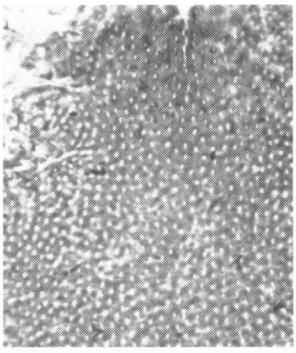


23. *C. favus*

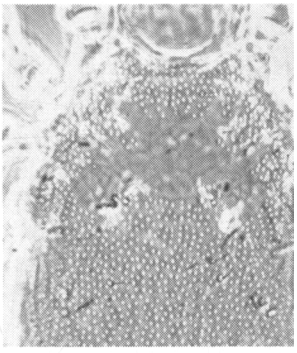


24. *C. pictus*

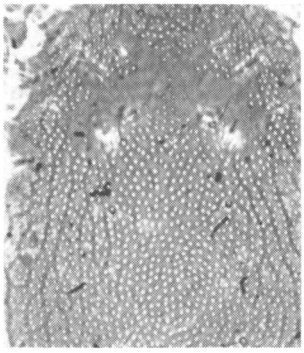
25. *C. ochraceus*



26. *C. cucurbitellus*

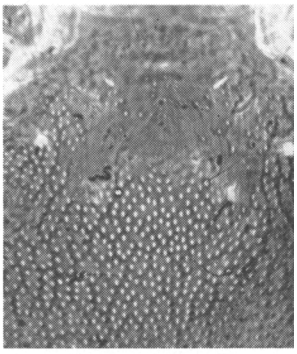


27. *C. cucullus*

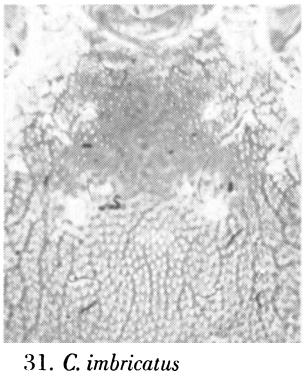


28. *C. scutellatus*

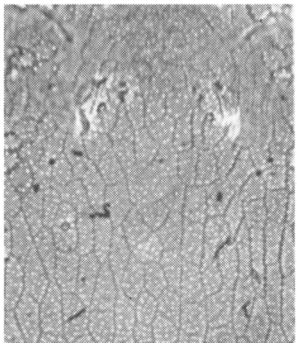
29. *C. aureatus*



30. *C. ultrarostratus*



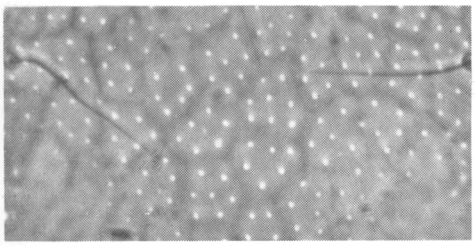
31. *C. imbricatus*



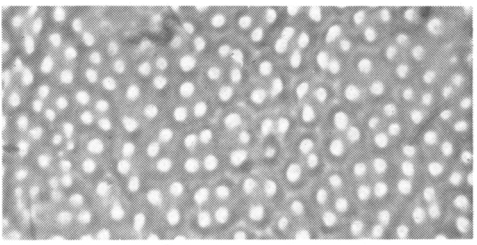
32. *C. corrugis*

33. *C. luteolus*

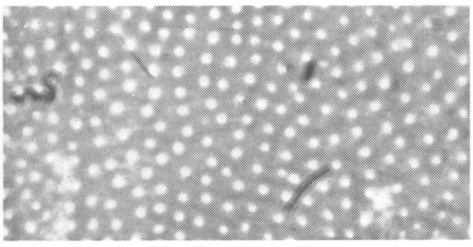
Plate IV. **Figs. 23–33.** Photomicraphs of corresponding parts of ventral plates. Same magnification as used for photos of dorsal plates. **Fig. 23.** *C. favus.* **Fig. 24.** *C. pictus.* **Fig. 25.** *C. ochraceus.* **Fig. 26.** *C. cucurbitellus.* **Fig. 27.** *C. cucullus.* **Fig. 28.** *C. scutellatus.* **Fig. 29.** *C. aureatus.* **Fig. 30.** *C. ultrarostratus.* **Fig. 31.** *C. imbricatus.* **Fig. 32.** *C. corrugis.* **Fig. 33.** *C. luteolus.*



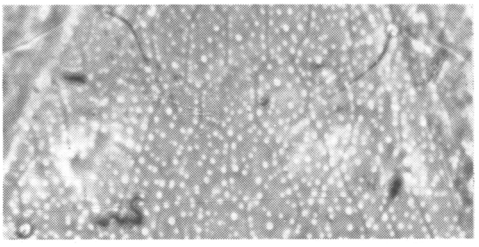
34. *C. favus*



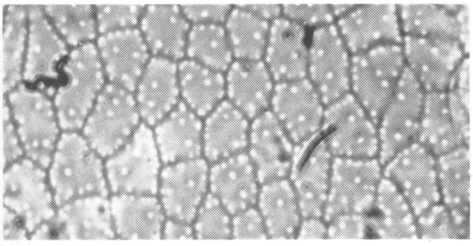
35. *C. pictus*



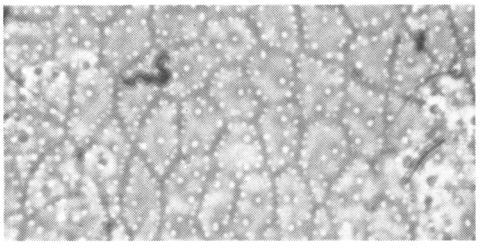
36. *C. ochraceus*



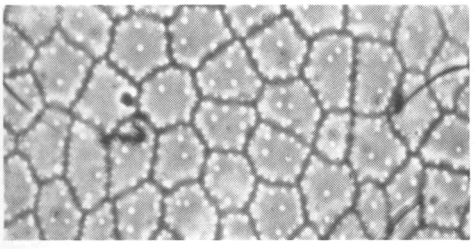
37. *C. cucullus*



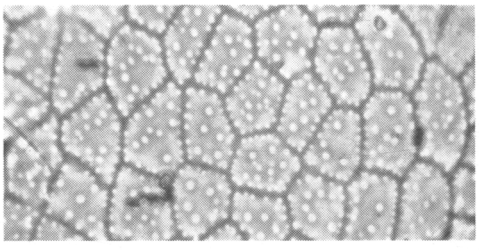
38. *C. scutellatus*



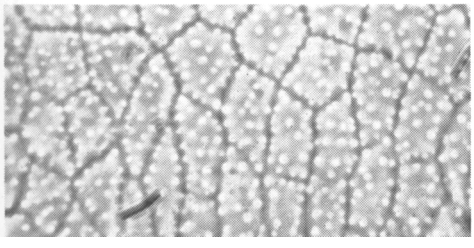
39. *C. aureatus*



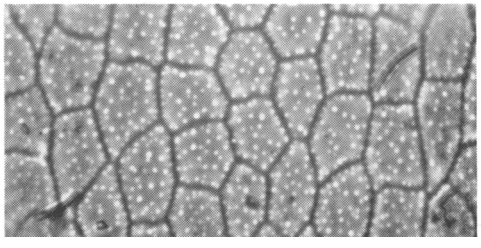
40. *C. ultrarostratus*



41. *C. imbricatus*



42. *C. corrugis*



43. *C. luteolus*

Plate V. **Figs. 34–43.** Further enlargement of photographs of dorsal plates to emphasize patterns of pores in plating of metapodosomal areas. All photos made to same scale of magnification and, as far as possible, of corresponding areas of the back. **Fig. 34.** *C. favus.* **Fig. 35.** *C. pictus.* **Fig. 36.** *C. ochraceus.* **Fig. 37.** *C. cucullus.* **Fig. 38.** *C. scutellatus.* **Fig. 39.** *C. aureatus.* **Fig. 40.** *C. ultrarostratus.* **Fig. 41.** *C. imbricatus.* **Fig. 42.** *C. corrugis.* **Fig. 43.** *C. luteolus.*

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