

and below; thorax rufofulvous, with pale hair; mesothorax shining, black with narrow red lateral and hind margins; mesopleura with a large black spot below; middle of mesothorax shining, distinctly darkened, sides densely ochreous-pruinose; tegulae pale rufotestaceous; wings greyish; stigma slender, dull pale yellowish; legs entirely clear ferruginous, hind tibiae relatively narrow, the fringe on hind margin long and red; hind basitarsi nearly parallel-sided; abdomen rather narrow, entirely shining ferruginous.

Porto Bello, Panama, April 18, 1912 (*A. Busck*). Related to *T. braueri* Friese, from Brazil, but readily separated by the black mesothorax. There is a strong superficial resemblance to *T. dorsalis* Smith, which occurs at Alhajuelo, Panama (*Busck*), Guapiles, Costa Rica (*Crawford*) and Secanquin, Guatemala (*G. P. Goll*).

SYNOPTIC KEYS TO THE LYGÆIDÆ (HEMIPTERA) OF THE UNITED STATES.

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PART I.

Several months ago I was requested by Dr. W. E. Britton of the Connecticut Agricultural Experiment Station to prepare a list of the Lygæidæ occurring in Connecticut, with suitable keys, for the proposed list of Hemiptera of the state. As a basis for this work I found it necessary to construct synoptic keys of all of the subfamilies, tribes and genera for the entire United States. As so much time and study has been spent in their preparation, and as no such keys covering this family, restricted to our fauna, has ever been published, it seems advisable to publish these in the hope that they may be of service in solving some of the difficulties experienced by systematists in this troublesome group. Professor Gregory, superintendent of the Connecticut Geological and Natural History Survey, and Dr. Britton have kindly given their consent to this publication in advance of the appearance of such parts as apply only to New England Lygæidæ.

I have used as a basis for these keys Stal's "Genera Lygæidarum

Europæ," Ofv. Vet.-Akad. Förh., 1872, and Enumeratio Hemipterorum, Part 4, 1874. As Van Duzee's excellent "Check List of the Hemiptera of the United States," recently published, will be used for reference I have adopted his system of nomenclature and order of arrangement. However, I have found it necessary to transfer the genus *Orsillacis* Barb. to the Tribe *Lygæini*. Part II will include the Subfamily *Rhyparochrominæ* or *Aphaninæ*.

I desire to express my appreciation to Dr. W. E. Britton, who makes the publication of these keys possible and to Mr. H. M. Parshley of Bussey Institution, who has suggested some important changes in my keys.

Key to the Subfamilies of Lygæidæ.

A. All sutures between the ventral segments of the abdomen straight and reaching the lateral margins on each side. Head commonly without setæ near the eyes.

B. All of the abdominal spiracles situated dorsally. Entire posterior margin of the pronotum, or at least the margin before the scutellum, turned down convexly. Fore femora, compared to the succeeding pairs, not much swollen and rarely armed beneath with teeth or spines.

C. Posterior margin of the pronotum between scutellum and lateral angles more or less distinctly depressed or impressed. Hemielytra, also usually the head, pronotum and scutellum impunctate. The two interior veins of the membrane commonly joined together near base by a transverse vein. *Lygæinæ* Stal.

CC. Posterior margin of the pronotum between the scutellum and lateral angles not distinctly depressed or impressed. Hemielytra, head, pronotum and scutellum distinctly punctate. The two interior veins of the membrane not joined together near base by a cross vein. *Cyminæ* Stal.

BB. All of the abdominal spiracles not situated dorsally, at least those of the sixth placed on the venter. Posterior margin of the pronotum, at least before the scutellum, commonly not turned down convexly. Fore femora, as compared with the succeeding pairs, more or less shortened and swollen, armed or unarmed.

D. All of the abdominal spiracles not situated ventrally, at most only the three apical ones so placed. The anterior femora moderately incrassate and commonly unarmed (except some species of *Ischnodemus*).

E. Head always narrower than the posterior margin of the pronotum; tylus not sulcate. Hemielytra not convex and almost if not quite impunctate; clavus not narrowing posteriorly; commissure distinct, at least half as long as scutellum. Fore femora sometimes much swollen (*Ischnodemus*)

Blissinæ Stal.

EE. Head, across eyes, very broad, as wide as or wider than the posterior margin of the pronotum. Tylus usually sulcate. Hemielytra convex and plainly punctate; clavus commonly narrowing posteriorly; commissure usually absent or very short. Fore femora moderately incrassate and unarmed

Geocorinæ Stal.

DD. All of the abdominal spiracles situated ventrally. Anterior femora more or less swollen and armed with one or more spines.

F. The anterior femora much swollen and armed beneath with one or more teeth. Exterior vein of corium not parallel with margin. Corium not wider than abdomen. Bucculæ short, confined to front of head. Posterior coxæ not widely separated.

G. Membrane with the two interior veins connected anteriorly by transverse veins. Posterior margin of pronotum very concave before scutellum. Fore femora not armed with numerous teeth

Heterogastrinæ Stal.

GG. Membrane with the two interior veins not connected anteriorly by a transverse vein; all veins running from the base, sometimes posteriorly reticulate. Posterior margin of the pronotum straight before the scutellum. Fore femora much swollen and armed with numerous teeth

Pachygronthinae Stal.

FF. The anterior femora not so incrassate as in the preceding and armed with a single tooth. Corium expanded, wider than abdomen; exterior vein sub-parallel with margin of corium. Bucculae extended through the head. Antennae inserted close to bucculae. Posterior coxae widely separated. *Oxycareninae* Stal.

AA. The suture between the third and fourth ventral segments of the abdomen most commonly curved anteriorly and not reaching the lateral margins. Head commonly provided with two setae near eyes. Fore femora swollen and armed with teeth

Rhyparochrominae Stal.

Key to the Tribes and Genera of the Subfamily Lygaeinae.

A. Apical margin of the corium straight, not sinuate inwardly. Exterior apical angles of antenniferous tubercles obtuse or sub-obtuse. Last dorsal segment of the male truncate. Genital segment of the males not foveate. Tribe *Lygaeini* Stal.

B. Basal segment of antennae just surpassing the apex of the tylus. Rostrum not extending beyond the first segment of the abdomen. Head short and broad.

C. Posterior margin of pronotum before scutellum sinuate; carinate anteriorly in the middle. Scutellum more or less tumid and carinate apically

Oncopeltus Stal.

CC. Posterior margin of pronotum truncate; without a median keel or with keel not reaching the anterior margin. Scutellum not tumid, with a longitudinal keel, commonly joined to a transverse keel at base.

Lygaeus Fab.

- BB. Basal segment of the antennæ not reaching apex of tylus. Rostrum extending to the middle of the venter. Head longer than broad. *Orsillacis* Barb.
- AA. Apical margin of corium inwardly sinuate. Scutellum near base with a more or less distinct transverse ridge; base before this depressed; longitudinally carinate behind ridge. Apical angle of the antenniferous tubercles prominent, acute or subacute. Sixth dorsal segment of the male rounded. Genital segment of male foveate. Tribe *Orsillini* Stal.
- D. Basal segment of antennæ surpassing apex of tylus. Head moderately elongate. Rostrum short, its apex scarcely reaching upon the abdomen.
- E. Costal margins of hemielytra straight throughout, parallel or converging posteriorly. Eyes prominent, the exposed area back of eyes greater than half of the width of the eyes. Bucculæ less than half the length of gular area. Apex of orifices exteriorly, prominently auriculate
Ortholomus Stal.
- EE. Costal margin of the corium straight only at the base, if at all. Eyes not so prominent. Bucculæ variable. Apex of orifices suddenly abbreviated, rarely subauriculate
Nysius Dall.
- DD. Basal segment of antennæ not reaching apex of tylus. Head much elongated. Rostrum long, reaching to or beyond the middle of the venter
Belonochilus Uhl.

Key to the Tribes and Genera of the Subfamily Cyminæ.

- A. Head without a curved longitudinal sulcus before each ocellus; apical angle of antenniferous tubercles not prominent. Basal segment of antennæ surpassing apex of tylus; fourth segment of antennæ longer than third. Scutellum equilateral with the claval commissure shorter than scutellum. Hemielytra hyaline, provided with few punctures. Orifices exteriorly extended and produced into a tooth at apex. . . . Tribe *Ischnorrhynchini* Stal.
- B. Head porrect, not abruptly deflexed in front. Eyes nearly

in contact with front margin of pronotum. Width of head across eyes not much more than half the width of posterior margin of pronotum. Sides of clavus parallel. Costal margin of corium convexly arcuated. . . . *Ischnorrhynchus* Fieb.

BB. Head deflexed in front, almost vertical. Eyes distant from the anterior margin of pronotum; tumid back of eyes. Width of head across eyes subequal to width of posterior margin of pronotum. Clavus posteriorly widened. Costal margin of corium concave towards base. *Ninus* Stal.

AA. Head with a curved longitudinal sulcus before each ocellus. Apical angles of the antenniferous tubercles prominent, acute. Basal segment of the antennæ not surpassing the apex of the tylus; fourth segment shorter than third. Scutellum broader than long. Clavus widened posteriorly. Commissure much longer than scutellum. Hemielytra not hyaline, strongly and densely punctate. Tribe *Cymini* Stal.

C. Tylus considerably produced before the bucculæ. Rostrum shorter, scarcely reaching middle of mesosternum; second segment extending a little behind anterior margin of prosternum. Mesosternum distinctly grooved. *Arphnus* Stal.

CC. Tylus not at all or very slightly extended beyond the bucculæ. Rostrum longer, extending to or behind the intermediate coxæ; second segment usually reaching anterior coxæ. Mesosternum not distinctly grooved. *Cymus* Hahn.

Key to the Genera of the Subfamily Blissinae.

A. Body elongate; abdomen over twice as long as head and thorax together. Apical margin of corium straight. Anterior coxal cavities closed behind, along the posterior margin of the prosternum. Antennæ longer than head, thorax and scutellum together. Rostrum relatively shorter, its apex not reaching past the middle coxæ. Scutellum subequilateral

Ischnodemus Fieb.

AA. Body shorter; abdomen less than twice as long as head and thorax together. Apical margin of corium not straight but sinuate before apex of clavus. Coxal cavities open along the posterior margin of the prosternum. Width of head across

eyes about one half the diameter of the posterior margin of the prothorax. Antennæ about as long as head, thorax and scutellum together. Rostrum longer, reaching past the middle coxæ. Scutellum broader than long. *Blissus* Burm.

Key to the Genera of the Subfamily Geocorinæ.

- A. Head extended laterally, eyes obviously stalked; inner margins of the eyes strongly converging throughout; the eyes not in contact with the anterior lateral margins of the pronotum. The first segment of the rostrum shorter than the second or subequal to it. Ocelli commonly placed midway between the inner margin of the eye and the middle of the vertex. Head smooth, impunctate. *Isthmocoris* McAtee.
- AA. Eyes not obviously pedunculate or stalked and commonly contiguous to the anterior lateral margins of the pronotum; inner margins, at least anteriorly, more commonly subparallel. Head, commonly, more or less punctate. Ocelli in most cases placed closer to the inner margin of the eyes than to middle point of the vertex (except in *punctipes* Stal and *flavilineus* Stal). The first segment of the rostrum longer than the second
Geocoris Fallen.

Subfamily Heterogastrinæ.

Body oblong. Lateral margins of pronotum lightly marginate; posterior margin strongly concave. Anterior femora armed toward apex with a tooth or spine. *Heterogaster* Schill.

Key to the Genera of the Subfamily Pachygronthinæ.

- A. Antennæ short; first segment shortest of all, not attaining apex of head and not clavate at apex; second segment more than twice as long as basal segment. Head strongly deflexed from base; exterior margins of the jugæ not elevated to form a ridge. Scutellum subequilateral, not at all calloused near basal angles. Apical margin of corium toward apex of clavus more or less sinuate, and at outer apical angle obviously rounded. First tarsal segment of the hind legs short, about as long as the second and third taken together. *Phlegyas* Stal.
- AA. Antennæ longer; first joint longest of all, far surpassing apex of head and clavate or swollen at apex. Head not strongly deflexed; exterior margins of lateral lobes (jugæ) of the head

ridged. Scutellum usually longer than wide and with a smooth calloused area near basal angles. Apical margin of corium straight and outer apical angle subacute. First tarsal segment of hind legs longer than second and third together.

- B. Scutellum without a median longitudinal, pale, smooth line.....*Edancula* A. and S.
- BB. Scutellum with a median, longitudinal, pale, smooth line.....*Pachygrontha* Germ.

Key to the Genera of the Subfamily Oxycareninae.

- A. Veins of corium and membrane evident. The corium coarsely but sparingly punctate. Head, pronotum and hemielytra without fine erect hairs. Head, pronotum, scutellum and body beneath not polished.....*Crophius* Stal.
- AA. Veins of corium and membrane not evident. The general surface of the corium impunctate. Head, pronotum and hemielytra with fine erect hairs. Head, pronotum, scutellum and body beneath polished.....*Dycoderus* Uhl.



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