New Mexican Gall Wasps (Hymenoptera, Cynipidae). IV

Alfred C. Kinsey, Indiana University[1]

An adequate analysis of the Mexican cynipid fauna cannot be made until the species of that fauna have been named and described, and their relationships carefully considered. The present series of papers describing that fauna should provide the materials from which we may ultimately build faunistic analyses and some story of the processes of evolution.

The 16 new species described in the present paper include representatives of the genera *Cynips, Disholcaspis,* and *Neuroterus.* A new genus, *Conobius,* is described with one new species from Mexico.

In *Cynips,* there are 6 species to be added to the 170 included in our previous publications on that group (Kinsey 1930 and 1936). Five of these *Cynips* species are from the northeastern portion of Mexico; one is from the area southeast of Mexico City. Five of the species are from complexes *(arida, nubila,* and *plumbea)* well represented in our previous treatment of the Mexican groups; but one species, *C. (mellea) sagata,* is from a complex previously known only from the southeastern quarter of the United States.

The three new species of *Disholcaspis* belong to the *cinerosa, fungiformis,* and *mexicana* complexes. The first and last have previously had lone Mexican representatives described; the *fungiformis* complex has been known heretofore only from Central Texas.

The six species of *Neuroterus* represent the first members of that genus to be recorded from Mexico. The new species belong to four different complexes.

Faunistically, these Mexican species line up as follows: One species *(Conobius strues)* from the Western Sierra has its described relatives in our Southwest; two of the Western Sierran species *Neuroterus reconditus* and *N. tumba,* belong to groups which are known from all parts of the United States. Among the Eastern Sierran species there are five *(Cynips conspecta, C. rubella, C. lanaris, C. molucrum,* and *C. torosa)* which have their chief affinities in the Western Sierra and in our Southwest. More notable among these Eastern Sierran species, there are three *(Cynips sagata, Disholcaspis insulana,* and *D. pallens)* whose relatives occur chiefly in the southeastern quarter of the United States. See *D. (cinerosa) pallens* for a discussion of the present-day contacts between the northeastern Mexican and Eastern Texan oak floras and cynipid faunas. Finally, there are four species of *Neuroterus (N. junctor, N. visibilis, N. volutans,* and *N. vulpinus)* which have both Eastern American and Californian affinities, although there are no known relatives in the Rocky Mountain area in the United States.

This is our fifth publication on Mexican Cynipidae, and the fourth under the present title. Previous papers have appeared in the Indiana University Science Series (No. 4, 1936), and in volumes 7 and 8 of the Revista de Entomologia (1937 and 1938). The material herein

[1] Contribution from the Department of Zoölogy, Indiana University, No. 272 (Entomological Series No. 22).

described comes from collections which we made in 1931-32, and in 1935-36, on Mexican expeditions supported in part by Indiana University and the National Research Council (U.S.A.). Further acknowledgment should be made for courtesies extended by numerous Mexican government officials. The National Youth Administration in Indiana has, for several years, provided part of the technical assistance employed in preparing this insect and gall material for study.

Conobius, new genus

agamic forms

FEMALE.—Head fully as wide as thorax, punctate and hairy, face broad and flat, cheeks well protruded beyond eyes, without a malar furrow; antennae with 13 (or obscurely 14) segments. Mesonotum punctate and coriaceous to finely rugose, sparsely hairy, scutellum more coarsely rugose; parapsidal grooves continuous, fine for whole length, or slightly wider posteriorly, well separated at scutellum; anterior parallel lines fine, slightly raised, not prominent; lateral lines poorly indicated; median groove absent or indicated right at scutellum; scutellum depressed anteriorly, with two rather broad, rounded, usually smooth, but shallow and poorly separated foveae; mesopleuron rugose to striate on ventral half, smoother on dorsal half. Abdomen longer than high, slender, not produced dorsally or ventrally, second segment covering about one-half of whole, entirely smooth and naked except for a sparse patch of hairs latero-basally, or finely punctate and hairy on lateral edges of segments 3 to 5; hypopygial spine fine, slender, about 0.08 of body in length, hairy for whole length of ventral edge. Legs punctate and hairy, tarsal claw of moderate weight only, distinctly toothed. Wing tinged smoky yellow, of fair length, slender, with wing-body ratio averaging about 1.30; front and hind margins non-ciliate, outer margin only very short-ciliate; whole hind margin of hind wing long-ciliate; subcosta, basalis, and radius heavier than other veins which are usually fine and light in color; usual break in subcosta bridged by one edge of vein; radial cell slightly shortened, open; first abscissa of radius sharply angulate, without a projection or with a short projection at tip of angle, hardly infuscated; second abscissa of radius slightly curved; areolet small to moderate in size; cubitus continuous or discontinuous; length 2.2 to 3.2 mm.

Fig. 1. Conobius strues, new species
From Western Mexican Sierra, state of Chihuahua. Paratype galls, natural size.

GALL.—Woody, seed-like cells densely clustered on stems, the clusters resembling small nubbins of dent corn. Each cell monothalamous, roughly conical, sharply pointed at place of attachment, expanding into a broadened, distinctly flattened top, the top centrally tipped with a small scar, the individual galls mis-shapened, often flattened on the sides because of the pressure within the cluster of galls; each cell covered with a thin, hard-papery epidermis which usually shrivels or becomes fluted, and sometimes flakes off in dried galls. Internally each gall compact, woody, with a spherical larval cell centrally placed in the expanded, upper end of the galls, the cell relatively small, without a separate lining. Adventitious bud galls, occurring in dense clusters of up to 30 galls, on the sides of the twigs of the hosts.

HOSTS.—White oaks, probably including several of the species found in the area involved.

RANGE.—Known from New Mexico and Arizona to Jalisco. At least throughout the southern Rocky Mountain area of the United States and the Western Sierra of Mexico.

GENOTYPE.—*Conobius strues* Kinsey (described below).

The most distinctive characters of this genus are the broad and flattened face with the cheeks protruding well beyond the eyes, the lack of a malar groove, the 13- (or obscurely 14-) segmented antennae, the continuous parapsidal grooves, two distinct foveae, slender but not long hypopygial spine with its row of hairs on the ventral margin, the toothed tarsal claw, wings which are non-ciliate on all but the outer margin, and monothalamous, seed-like galls which are clustered like nubbins of corn on the sides of the twigs of the oaks involved. Bassett's *spicatus*, from the Southwestern United States, and the Mexican species *strues*, described below, are typical of the genus. There are several other described species from the United States which are related, but the extent of the group will have to be worked out when a monographic revision of the whole genus can be made. Bassett's species *spicatus* is re-described here from type material, in order to give a better basis for comparison of the new Mexican species.

Conobius (spicatus) spicatus (Bassett)

agamic form

Loxaulus spicatus Bassett, 1900, Trans. Amer. Ent. Soc. 26:329. Dalla Torre and Kieffer, 1902, Gen. Ins. Hymen. Cynip.: 54. Dalla Torre and Kieffer, 1910, Das Tierreich, 24:388, 802. Felt, 1918, N. Y. Mus. Bull. 200:71. Cresson, 1923, Trans. Amer. Ent. Soc. 48:202. Weld, 1926, Proc. U. S. Nat. Mus. 68(10):45.

Loxaulus spicata Thompson, 1915, Amer. Ins. Galls: 10,40.

FEMALE.—Head light yellow rufous; antennae yellow rufous basally, hardly darker terminally, the third segment a third longer than the fourth; thorax light brownish rufous, more or less uniformly so; mesonotum sparsely punctate and sparsely hairy, only very minutely coriaceous between punctations; scutellum rugose but still sparsely hairy; lateral lines barely evident; without trace of a median groove; abdomen rufous brown or darker; all legs light yellow rufous, darker on tibiae; wing veins rather fine; first abscissa of radius without projecting tip at apex of angle; second abscissa of radius weakly bent at tip; areolet of moderate size; cubitus not reaching basalis; whole insect rather small, 2.2 to 2.8 mm. in length.

GALL.—As described for the genus, distinguished as follows: Color dark reddish brown, weathering dark to black, the old epidermis becoming quite ashy gray; individual galls up to 9.0 mm. in length and 6.5 mm. in diameter; the whole cluster up to 28. mm. in diameter.

HOST.—*Quercus grisea* (Kinsey coll.). *Q. arizonica*. *Q. oblongifolia*. *Q. Toumeyi* (acc. Weld, 1926; possibly more than one species of cynipid involved).

RANGE.—New Mexico: Hillsboro. (Kinsey coll.).

Arizona: Whetstone (galls, *Q arizonica*). Sabino Trail in Santa Catalina Mountains (galls, *Q. oblongifolia*, Kinsey coll. Also acc. Weld, 1926). Oracle *Q. arizonica*, Kinsey coll. Also acc. Weld, 1926). Huachuca Mountains, Mule Mountains, Santa Rita Mountains, Patagonia Mountains (acc. Weld, 1926).

Probably restricted to southernmost Arizona and immediately adjacent portions of New Mexico.

TYPES.—6 females, one cluster of galls, in Philadelphia Academy.

From Arizona, without locality (possibly from near Tucson where the collector lived); host indefinitely determined as "some variety of *Quercus virens*"; E. T. Cox, collector.

The present re-descriptions are based on paratypes from the Philadelphia Academy and on my own collection from Hillsboro, New Mexico. The original description is misleading in describing the parapsidal grooves as obscure, the foveae as very small, and the areolet as rather small.

LIFE HISTORY.—Adults: December 31, January 1, 24 (acc. Weld, 1926). Galls I collected at Hillsboro, New Mexico, on December 26, had all the live insects emerged and only dead insects remained in the galls.

This species appears to be the only American representative of

the complex, though we have galls of other species of the group from a wide area in western Mexico, as far south as Jalisco. *Spicatus* differs from its nearest Mexican relative, *strues*, in being smaller, in being less distinctly coriaceous between the punctations on the mesonotum, in lacking any trace of a median groove, in having the abdomen darker rufo-brown to black, the wing veins lighter in weight, the second abscissa of the radius only weakly bent at the tip, and the areolet larger. The galls of *spicatus* and *strues* are hardly distinguishable.

Spicatus was originally described as a species of *Loxaulus*. True *Loxaulus*, according to my studies, includes the genotypes of *Compsodryoxenus*. The genus (Mayr, 1881, Gen. gallenbew. Cynip. :9, 12, 33) was monobasic, with Bassett's species *mammula* as type; but *spicatus* is not at all closely related to true *Loxaulus*. Weld (1926, Proc. U. S. Nat. Mus. 68 (10) :45) recognized this error in assigning *spicatus to Loxaulus*, but made no re-assignment of the species.

Conobius (spicatus) strues, new species

agamic form

Fig. 1.

FEMALE.—Head light yellow rufous; antennae light brown, more yellow rufous basally, darker brown terminally, the third segment more distinctly longer than the fourth; thorax light brownish rufous, more or less uniformly so; mesonotum moderately punctate and scatteringly hairy, finely coriaceous between punctations, scutellum rather coarsely rugose and more hairy; lateral lines indicated by rather broad and smoother areas, but not conspicuous; sometimes with a trace of a very short median groove; abdomen rich rufous to brownish rufous, sometimes black at base dorsally; all legs light rufo-yellow, browner on tarsi, darkest brown on tibiae and on posterior tarsi; first abscissa of radius without projecting tip at apex of angle; second abscissa of radius with an expanded and distinctly bent tip; areolet small; cubitus hardly reaching basalis; whole insect quite robust, rather large, 2.5 to 3.2 mm. in length.

GALL.—As described for the genus; distinguished as follows: Color dark reddish brown, probably weathering darker; individual galls up to 9.0 mm. in length and 6.5 mm. in diameter; the whole cluster up to 23. mm. in diameter (Figure 1).

HOST.—*Quercus undata*, an evergreen white oak with ovate leaves which are soft pubescent beneath.

RANGE.—Chihuahua. Santa Isabel, 6 E, 6000′ (types).

Probably ranging through the Western Sierra of Chihuahua to the northern end of that state; possibly ranging southward to the state of Durango.

TYPES.—11 females, three clusters of galls (containing about 60 galls). Holotype, paratype females, galls; Kinsey collection.

Labeled: Santa Isabel, 6 E, 6000′, Chihuahua; galls October 24, 1931; females, March 1, 1932; *Q. undata;* Kinsey collector.

LIFE HISTORY.—Adults: March 1.

This insect is close to *spicatus*, from which it is, however, distinguishable by a number of characters. The whole insect of *strues* is larger, the mesonotum is more distinctly coriaceous between its punctations, sometimes there is a short indication of a median groove at the scutellum; the abdomen is more rufous, all of the tarsi and the hind tibiae are browner, the wing veins are heavy, the second abscissa of the radius has a distinctly bent tip, and the areolet is smaller. The galls are practically identical with those of *spicatus*.

Cynips (arida) conspecta, new species

agamic form

FEMALE.—Body color in general light brownish rufous, thorax nearly uniform in color, the insect darker in hardly any place except on abdomen which is rufous and piceo-rufous; antennae yellow rufous, dark brown on terminal third; parapsidal grooves more or less discontinuous, always more obscure near pronotum; mesopleuron rather shining but everywhere sparsely punctate and hairy; foveal groove more or less rugose; wings of normal length; all main veins medium brown; radial cell moderate in width, second abscissa of radius curved most near tip, tip of vein distinctly triangulate though mostly bent to one side; infuscation at base of radial cell very small; cubital cell almost entirely colorless, sometimes with the most obscure trace of a single mark; rather small insects 2.8 to 3.0 mm. in length.

GALL.—Similar to but readily distinguished from other galls of the complex. Mature gall almost strictly spherical, with a flat or slightly concave base; perfectly smooth, light red brown in color, with a white scurf which persists on at least part of the gall; up to 6.5 mm., averaging near 5.0 mm. in diameter.

HOST.—*Quercus Pringlei*, one of the several scrub oaks of the region; replaced on other scrub oaks in the same area by *C. rubella*.

RANGE.—Tamaulipas: Miquihuana, 7 SE, 6000′ (types).

Known only from this one locality in the southwestern corner of Tamaulipas.

TYPES.—3 mature females, 4 not fully transformed females, numerous galls. Holotype, paratype females, galls; Kinsey collection. Paratype galls: American Museum of Natural History, Museum of Comparative Zoölogy, Philadelphia Academy, U. S. National Museum.

Labeled: Miquihuana, 7 SE, 6000′, Tamaulipas: galls November 15, 1935; females without date; *Q. Pringlei;* Kinsey collector.

In our previous revision of the *Cynips arida* complex (Kinsey 1936, Ind. Univ. Sci. Ser. 4:217-237), the only species reported from the Eastern Mexican Sierra was *Cynips saxifera*, from a locality west of Ciudad Victoria, in the southwestern corner of Tamaulipas. From a few miles west of that same locality, from Miquihuana, which is still in Tamaulipas but immediately east of the main divides of the Sierra, we now have two more species to describe.

In this locality southeast of Miquihuana, there are several species of scrub or dwarf oaks, from three of which we have now bred insects of the present complex. Although these dwarf oaks are so closely related that it is often difficult to distinguish them in the field, we find that two perfectly distinct and not closely related insects are isolated on different oaks. The present species, *C. conspecta*, occurs on *Q. Pringlei*. As yet we do not have it from any other oak. It is *C. rubella* (described in the present paper) which occurs on the scrub oak, *Q. intricata*, and on the low dwarf, *Q. cordifolia*. The two cynipids are as different as the two most extreme forms in the *arida* complex. To note only a few of the differences: The galls of *conspecta* are nearly spherical, almost entirely smooth, and a bit smaller in average diameter; those of *rubella* are more hemispherical, distinctly shrivelled, and slightly larger in diameter. The insects of *conspecta* are almost uniformly brownish rufous, without any marks or blotches in the cubital cell, and with almost no infuscations at the base of the radial cell; the insects of *rubella* are red rufous with the lateral lines (and sometimes the anterior parallel lines) distinctly brown, and the splotches in the cubital cell and the infuscation at the base of the radial cell are distinct and of some size. *Conspecta* is most closely related to the *contacta-eluta-eminula* group of species from more southern Mexico;

rubella has its closest relatives in *saxifera*, from a more eastern part of the same Eastern Sierra, and in *saxulum*, from the Western Mexican Sierra. It is an interesting case of two branches of the one complex invading the one locality where they are, however, still separated by their restriction to different oak hosts.

From *contacta*, its geographically and evolutionarily nearest relative, *conspecta* is to be distinguished by the greater obscurity of the parapsidal grooves near the pronotum, by the fact that the cubital cell is entirely clear, and by its larger and more spherical gall. In *contacta* the parapsidal grooves are distinct to the pronotum, the cubital cell is heavily splotched, and the gall is distinctly dome-shaped. *Conspecta* and *contacta* agree in having the body uniformly light brownish rufous, in having the infuscation on the first abscissa of the radius very small, and in numerous other less prominent points.

Three of the 13 species now known in this complex have the cubital cell clear of all marks and splotches. Among the three, there is the most northern species in the complex, *C. conica* from northern Arizona; there is the most southern species in the complex, *C. fugiens* from Guatemala; and now we have this species *conspecta* from the central portion of the Eastern Sierra of Mexico. A consideration of all the characters of these three species makes it clear that they are not a phylogenetic unit. It would appear that this curiously distinct character—a clear cubital cell in a complex in which a heavily blotched cell is the rule—has arisen independently three times, in geographically remote portions of the continent. It should, however, be noted that the cubital cell splotches are smaller and lighter in all of the more southern Mexican members of the complex; so the complete loss of the markings is not such an unexpected development in the group.

Cynips (arida) rubella, new species

agamic form

FEMALE.—Body color in general red rufous, with the anterior parallel lines of the same color or with a touch of brown (never brown between the lines), the lateral lines more distinctly brown; antennae with terminal third or less dark brown; parapsidal grooves more or less distinct to pronotum (not always continuous); mesopleuron rather shining, but everywhere sparsely punctate and hairy; foveal groove more rugose than usual in the complex; wings of normal length; all main veins dark brown, radial cell not particularly broad; second abscissa curved only toward tip, tip of vein bent or slightly expanded; infuscation at base of radial cell not large but heavy; two splotches in cubital cell rather light, narrow, well separated; rather small insects 2.3 to 3.5 mm. in length.

GALL.—Similar to other galls of the complex. Mature galls more or less hemispherical, with a broadly flattened base, shrivelling considerably so gall is usually irregular in shape; light red or purple brown in color, with some white scurf; up to 7.0 mm., averaging near 5.5 mm. in diameter.

HOSTS.—*Quercus intricata* (types); *Q. cordifolia*. The first is a shoulder-high scrub white oak, the second, the lowest dwarf oak of the region. Replaced on *Q. Pringlei* in the same area by *C. conspecta*.

RANGE.—Tamaulipas: Miquihuana, 7 SE, 6000′ (*Q. intricata*, types. Also on *Q. cordifolia.*)

Not yet known beyond this one locality in the southwestern corner of Tamaulipas, in a central portion of the Eastern Mexican Sierra.

TYPES.—17 females, numerous galls. Holotype, paratype females, galls: Kinsey collection. Paratype galls: American Museum of Natural History, California Academy, Museum of Comparative Zoölogy, Philadelphia Academy, U. S. National Museum.

Labeled: Miquihuana, 7 SE, 6000′, Tamaulipas: galls November 15, 1935; insects without date; *Q. intricata;* Kinsey collector.

This is one of the two species representing the *arida* complex near Miquihuana, in the southwestern corner of Tamaulipas. See the discussion under the other species, *C. conspecta*, in the present paper. As noted in that discussion, *rubella* is found on *Q. intricata* and *Q. cordifolia*, while *C. conspecta* is found on *Q. Pringlei* in the same area. The two cynipid species are not closely related. *Rubella* is most closely related to the species *saxifera* and *saxulum*. *Saxifera* also occurs in the Eastern Sierra of Tamaulipas, just east of the locality from which we have *rubella*. *Saxulum* is a widespread species in the Western Sierra of Mexico, from southern Chihuahua through Durango.

Rubella differs from *saxifera* in not having so much brown on the thorax, the parapsidal groove is not always continuous, the foveal groove is more rugose, the second abscissa of the radius is not so curved, its tip not so broadly triangulate, and the infuscation at the base of the radial cell and the splotch in the cubital cell are not so heavy.

Rubella differs from *saxulum* in having the anterior parallel lines light brown or rufous, the parapsidal grooves are not always continuous, the foveal groove is more rugose, the radial cell is not as broad, the infuscation at the base of the radial cell is not as large, and the splotches in the cubital cell are not as large.

Cynips (mellea) sagata, new species

agamic form

FEMALE.—In color almost entirely piceous and black; antennae black, only the first two segments dark rufous; mesonotum sparsely, shallowly punctate and sparsely hairy, nearly smooth over much of area, rougher anteriorly; anterior parallel lines fine but fairly evident, lateral lines very obscure or lacking; median groove absent; scutellum quite a little longer than broad, finely rugose, its median ridge distinct, quite prominent; foveal groove quite broad, quite smooth and shining at bottom, distinctly divided into foveae; abdomen almost entirely black, hardly elongate, the second segment somewhat tongue-shaped, covering about two-thirds of abdomen; legs dark brownish rufous, touched piceous, hind tibiae and tarsi uniformly brown; wings of normal length; areolet rather small; cloud on first abscissa rather heavy, protruding from angle of vein into radial cell; tip of radius not at all enlarged; body of moderate size, 3.2 to 3.5 mm. in length.

GALL.—As described for the complex. Finally naked, or retaining part of the microscopic, stellate pubescence; flesh-colored to light brown, with considerable solid matter; rounded or flat basally, occurring singly on leaves.

HOSTS.—*Quercus oblongifolia* (types); and a tree form of *Q. breviloba*. In this area, these are the two most abundant tree-forms of white oaks.

RANGE.—Coahuila: Muzquiz, 7 SW, 3600′ (*Q. oblongifolia*, types.) Muzquiz, 5 SW, 3000′ (a tree form of *Q. breviloba*).

Probably restricted to the most northern end of the Eastern Sierra of Mexico.

TYPES.—2 mature females, 1 immature female, many galls. Holotype, paratype females, galls: Kinsey collection. Paratype galls: American Museum of Natural History, California Academy, Deutsches Entomologisches Institut, Museum of Comparative Zoölogy, Philadelphia Academy, U. S. National Museum.

Labeled: Muzquiz, 7 SW, 3600′, Coahuila; galls October 30, 1935; insects without date; *Q. oblongifolia;* Kinsey collector.

Previously we have described 11 species of this *C. mellea* complex (see Kinsey 1930, Ind. Univ. Studies 84-86:314-338; and Kinsey 1936, Ind. Univ. Sci. Ser. 4:238-241). All of these are from the southeastern quarter of the United States, except for the one species *rydbergiana* in the mountains of northern New Mexico. Elsewhere in our Southwest and throughout most of Mexico the complex is replaced by the

C. arida complex, and the relations of the two groups are so certain that we never expected to find the *mellea* complex in Mexico. It is, therefore, an item of some moment to have located a species of this Eastern American group south of the Rio Grande.

This Mexican species, *sagata*, comes from the northern end of the state of Coahuila, from just south of the Edwards Plateau of Central Texas. Further east in Mexico and in the southeastern corner of Texas, there is a great area of mesquite desert which is an absolute barrier to the interchange of eastern American and Eastern Mexican cynipid faunas. This oak-free area is about 350 miles wide. But there are, nevertheless, some instances of Eastern American affinities in the Eastern Sierra of Mexico; and it took a great deal of field work, spread over many years, to discover that there really are present-day connections between these two faunas. The complete story must be detailed elsewhere. Enough here to record that two of the Central Texan oaks, the live oak, *Q. virginiana*, and the scrub post oak, *Q. breviloba*, come close to the border in the neighborhood of Del Rio and a few points further west; that the live oak on the Mexican side is nearly continuous to the border in that same region; and that there is a taller tree (an undescribed species of oak) in the mountains of northernmost Coahuila which is so close to the Texan *Q. breviloba* that all of its cynipid fauna has Eastern Texan affinities. The present species, *C. sagata*, is the first of these *breviloba* relatives to be described from Coahuila.

One additional item of interest is involved in the fact that we have the present species, *sagata*, from this northern end of Coahuila, from both the *Q. breviloba* and from the *Q. oblongifolia* complexes. *Oblongifolia* is an oak of southern Arizona and northern Chihuahua. It is the only western oak that I have found in the northern end of the Eastern Sierra. Its presence there is probably due to the near approach of the Western and Eastern Sierra in northeastern Chihuahua and northwestern Coahuila. Nearly all of the cynipids on this *oblongifolia* relative in Coahuila have Western Sierran and Rocky Mountain affinities. The present instance of a cynipid with Eastern American affinities getting onto the western oak is a noteworthy exception to the rule.

The Central Texan species of the *mellea* complex is as yet undescribed. The galls of that Texan species and of the species from Coahuila are indistinguishable and, it is to be noted, rather distinct from the galls of the Eastern American species of the complex. These galls are, however, close to those made by *C. (mellea) rydbergiana*, which occurs in the northeastern corner of New Mexico (and adjacent Colorado?); and the insects of *sagata* and *rydbergiana* are closer than either species is to any of the Southeastern American species. In the key to the complex given in Kinsey 1930 (Ind. Univ. Studies 84-86:494-495), this species *sagata* would run to *rydbergiana*. *Rydbergiana* and *sagata* are unique in the group in showing a well-developed median ridge on the scutellum; both species are very largely black on the head, thorax, and abdomen; and both have antennae that are dark on all but the first two segments. The galls of the two are larger, more strictly spherical, smoother on the surface, and thicker-walled than the

galls of any other described species. In all these characters, however, *sagata* is still closer to the Central Texan species from *Q. breviloba.*

Sagata differs from *rydbergiana* in being almost entirely black, with practically no rufous on the thorax or abdomen; the antennae are black (instead of brown); the median ridge of the scutellum is more distinct and the foveae consequently more distinctly separated; and the legs are much darker brownish-rufous to piceous.

Cynips (nubila) lanaris, new species

agamic form

FEMALE.—Head rich rufous; antennae rich rufous on all but the terminal segments which are brown; thorax rich rufous, brown or blackish on anterior parallel and lateral lines, in foveal groove, and on lines between segments on sides, but rufous between anterior parallel lines; abdomen rich rufous and (largely) rufo-piceous; legs bright red rufous, nowhere black; median groove indicated right at scutellum; parapsidal grooves clearly complete to pronotum; infuscation on first abscissa of radius usually light near subcosta but heavy along a line leading from tip of angle of first abscissa of radius, giving the appearance of a median (longitudinal) vein extending out from that angle for a third of the way across the cell; expanded tip of second abscissa distinctly bent to one side; areolet large; smoky patches in cubital cell rather large, not heavy, not fused; large insects 3.3 to 4.7 mm. in length.

GALL.—Central core red-brown, densely covered with short, hair-like cells most of which are swollen at tip. Long, hair-like spines forming body of gall light straw white, tinged yellow; bases of these spines almost never swollen; these spines wavy for their whole length and densely set. Galls appear as loose tangles of hairs.

HOST.—*Quercus sacame.* This is the largest tree among the evergreen white oaks of the region.

RANGE.—Tamaulipas: Miquihuana, 7 SE, 6000′. Possibly extending for some distance through a more northern end of the Eastern Mexican Sierra, east of the main divides.

TYPES.—4 females, 3 galls. All in the Kinsey collection.

Labeled: Miquihuana, 7 SE, 6000′, Tamaulipas; galls November 15, 1935; females December 10, 1935, and without date; *Q. sacame;* Kinsey collector.

LIFE HISTORY.—Adults: December 10.

In our previously published revision of this complex (Kinsey, 1936, Ind. Univ. Sci. Ser. 4:243-258) we reported on nine species: two from southeastern Arizona, and seven from Mexico. Six of the Mexican species were from the Western Sierra and from the more southern Cordillera. Only one species, *nigricula,* was described from the Eastern Sierra—from the eastern part of San Luis Potosí. North of that point the Eastern and Western Sierras are widely separated, and this may explain the comparative rarity of the *nubila* complex in the Eastern mountains of Mexico. To the previously described list of species, however, we can now add two from this Eastern Sierra—one from northern Hidalgo, and one from southern Tamaulipas; but north of these northermost localities there are still 400 miles of Eastern Sierra in which we have not found this group.

In the previously published key to this complex (Kinsey 1936:246-247), the two species here described would run to sections 7 and 8; and the phylogenetic relations of the present species are clearly with *incompta, nigricula,* and *chica,* which appear in those sections of the key. This now gives us 5 species which have the parapsidal grooves continuous to the pronotum. As their geographic positions would lead one to expect, the present species are closest to *nigricula* and *incompta.*

We have *lanaris* from a locality near the southern end of the boundary between Tamaulipas and Coahuila. *Lanaris* is most closely related to the more southern species *molucrum* (described in the present paper). *Lanaris* differs chiefly in showing brown or black in the foveal groove; in having the infuscation on the first abscissa of the radius narrowed down to a slender band which projects like a vein from the angle of the first abscissa into the radial cell; and in having the central core of the gall covered with hair-like cells, most of which are swollen at the tips.

From the species *nigricula*, *lanaris* differs principally in having the antennae rich rufous on all but a few terminal segments, in showing rufous between the anterior parallel lines, and in the vein-like form of the infuscation on the first abscissa. The galls of *lanaris* and *nigricula* are essentially the same.

From *incompta*, *lanaris* is to be distinguished by the darker thoracic lines, the darker abdomen, and the vein-like form of the infuscation on the first abscissa. The galls of the two species are essentially the same.

Cynips (nubila) molucrum, new species

agamic form

FEMALE.—Head rich, rather dark rufous; antennae rich rufous on all but the terminal half dozen segments which are brown; thorax rich, rather dark rufous; black on anterior parallel and lateral lines, but not between anterior parallel lines and not on scutellum or sides of thorax; abdomen rich rufous and (largely) rufo-piceous; legs yellow rufous and brownish rufous, nowhere black; median groove indicated right at scutellum; parapsidal grooves clearly complete to pronotum; infuscation on first abscissa of moderate weight, extending a third of radial cell; expanded tip of second abscissa triangulate but small; areolet large to very large; smoky patch in cubital cell rather large, distinctly light, not fused; quite large insects 3.0 to 5.0 mm., averaging 3.9 mm. in length.

GALL.—Central core tan or brownish, densely covered with short, hair-like cells, none of which are swollen at tip; long, hair-like spines forming body of gall light straw white, tinged yellow and still more golden tan near tips; bases of these spines almost never swollen; these spines wavy for their whole length, and densely set. Galls appearing as loose tangles of hairs.

HOSTS.—*Quercus reticulata* (types); *Q. polymorpha*. Large-leaved, evergreen, tree forms of white oaks.

RANGE.—Hidalgo: Jacala, 5 W, 5000′ (types on *Q. reticulata*. Also on *Q. polymorpha*). Probably widespread through a central portion of the Eastern Sierra of Mexico, extending north from more northern Hidalgo.

TYPES.—175 females, many galls. Holotype, paratype females, galls: Kinsey collection. Paratype females, galls: American Museum of Natural History, British Museum, California Academy, Deutsches Entomologisches Institut, Field Museum, Museum of Comparative Zoölogy, Philadelphia Academy, U. S. National Museum.

Labeled: Jacala, 5 W, 5000′, Hidalgo; galls November 30, 1935; females without date; *Q. reticulata;* Kinsey collector.

The type insects were all cut from the galls, and the series includes transitional stages between pupae and adults, as well as many fully matured adults with wings more or less folded.

This insect was collected along the Laredo-Mexico City highway, near Jacala, in the northern end of the state of Hidalgo. It may range more or less widely through the Eastern Mexican Sierra; but the complex is represented by the species *nigricula* in the Eastern Sierra of San Luis Potosí, and by the species *lanaris*, newly described in the present paper, from the northern end of the Eastern Sierra in Coahuila.

The full extensions of these several ranges must, therefore, be determined by further collection. The characters of the present insect, *molucrum*, are closest to those of its nearest neighbors, *C. incompta*, *C. lanaris*, and *C. nigricula* (see Kinsey, 1936, Ind. Univ. Sci. Ser. 4:248, 251).

Incompta, *lanaris*, and *molucrum* are the only species out of the eleven in the complex which show rufous between the anterior parallel lines. From *incompta*, the insect of *molucrum* differs in having the thoracic lines almost always black (in *incompta* the mesonotum is often uniformly bright rufous); the head, thorax, and abdomen are a richer, darker rufous; the abdomen is distinctly darker rufo-piceous; and the expanded tip of the second abscissa is never as large. The galls of *molucrum* differ (from those of *incompta*) in having the central core tan rather than brownish red; and the hair-like processes covering the central core are almost never swollen.

From *nigricula*, *molucrum* differs in having the antennae light rufous on its basal two-thirds, in being rufous between the anterior parallel lines, in having no rufo-piceous on the thorax except on the anterior parallel and lateral lines, and in having a larger areolet. The gall of *molucrum* differs from that of *nigricula* in having the central core tan (not red-brown), and practically none of the hairs covering this core show swollen tips.

From *lanaris*, *molucrum* differs principally in being rufous in the foveal groove, in having an extensive infuscation on the first abscissa of the radius which extends continuously to the subcosta (and not merely in a vein-like projection from the angle of the first abscissa, as in *lanaris*), and in having the central core of the gall covered with short hairs which do not have swollen tips.

Cynips (plumbea) torosa, new species

agamic form

FEMALE.—Head, thorax, legs, and abdomen with a rich, dark rufous background, but with all lines and often most of rest of mesonotum including scutellum dark brownish black; abdomen largely or even entirely piceous; legs touched darker brown than in *texcocana;* antenna entirely rufous, hardly darker at tip; thorax only moderately hairy; foveal groove naked, undivided or with a fine, low division; entire abdomen hairy (except dorsally); wings distinctly smoky yellow; veins very heavy, dark brown; first abscissa of radius with a fairly heavy infuscation, margin of radial cell clouded but without a vein; cubital cell with marks faint, often reduced to a single longitudinal line parallel to second abscissa of radius; the largest insects in the complex, 3.3 to 5.2 mm., averaging near 4.5 mm. in length.

GALL.—Large, spherical, rarely flattened on a small base, not pointed; dull, slightly shrivelling, with a conspicuous, moderately heavy scurf (stellate pubescence) which is so persistent that even old galls are conspicuously bluish gray; denuded surfaces of galls light tan to dark purplish brown; up to 9.5 mm., averaging near 7.0 mm. in diameter.

HOSTS.—*Quercus rhodophlebia* (types); *Q. texcocana*. These are the two largest trees among the oaks of the region.

RANGE.—Mexico: Mexico City, 22 E, 8200′ *(Q. rhodophlebia, Q. texcocana)*.

Puebla: El Seco, 19 NE, 8500′ *(Q. rhodophlebia*, types). El Seco, 5 SW, 8200′ *(Q. texcocana)*.

Apparently restricted to the mountains east and southeast of Mexico City, ranging possibly into the state of Vera Cruz. Replaced south and west of Mexico City by *C. texcocana* Kinsey.

TYPES.—8 mature females, 4 not wholly mature females, numerous galls. Holotype, paratype females, galls: Kinsey collection. Paratype galls: American Museum of Natural

History, U. S. National Museum, Philadelphia Academy, Museum of Comparative Zoölogy, California Academy, Vienna Museum.

Labeled: El Seco, 19 NE, 8500′, Puebla; galls December 8, 1935; females without date; *Q. rhodophlebia;* Kinsey collector.

From several points in the mountains south and west of Mexico City we have *C. (plumbea) texcocana* (see Kinsey 1936, Ind. Univ. Sci. Ser. 4:205). From collections made 15 miles east of Mexico City, in January, 1932, we obtained three insects which look like good *texcocana;* but from the more extensive collections made 22 miles east of Mexico City in December, 1935, and from our collections made in the more southeastern state of Puebla we get a different insect, the present species *torosa.* The galls of *texcocana* and *torosa* are practically identical, but the insects are so different that there seems no chance of error in our determinations; and we must conclude that the more eastern and more western species meet in the Valley of Mexico, or else that our earlier record for *texcocana* from east of Mexico City involved some error in data. We have several other cases of cynipid groups represented by different species on the two sides of the Valley of Mexico.

Torosa has its closest relative in *texcocana.* From that species, *torosa* is best distinguished by its generally darker and richer rufous color, the greater extent of the piceous on the thorax and abdomen, and the larger body size. The insect of *torosa* is so much darker, and so distinctly larger that it is readily recognizable by the naked eye.

Disholcaspis (cinerosa) pallens, new species

agamic form
Fig. 2

FEMALE.—Antennae uniformly bright yellow rufous, either uniformly so or with brown on very tips; head bright red rufous; thorax light red rufous, with limited marks of brownish black (not deep black) on anterior parallel and lateral lines; abdomen rich rufous with some piceous or sometimes with considerable piceous black; legs largely rich rufous, brown on posterior tibiae; all wing veins very light yellow, peculiarly so; areolet very large; moderate-sized insects 3.3 to 4.1 mm., averaging 3.5 mm. in length.

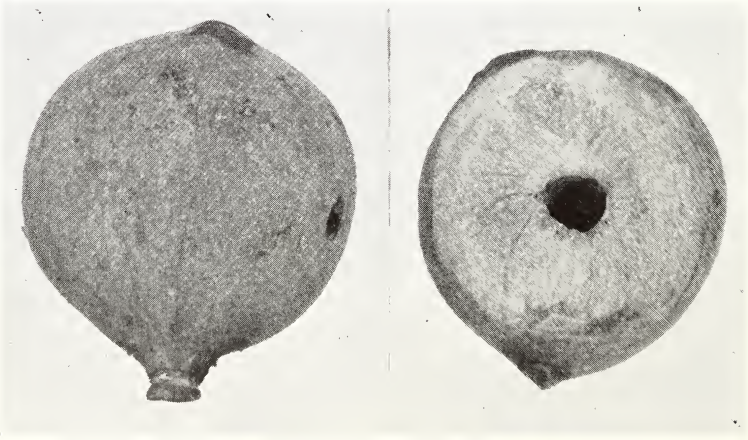

Fig. 2. Disholcaspis (cinerosa) pallens, new species
From Eastern Mexican lowlands, state of San Luis Potosí. Paratype galls, twice natural size.

GALL.—Practically identical with that of *Disholcaspis (cinerosa) cinerosa* (Bassett). Perhaps more often elongate and not as strictly spherical, more often drawn out to a slender point at base; averaging a bit smaller, up to 21.0 mm., mature galls averaging nearer 18.0 in diameter (Figure 2).

HOST.—*Quercus oleoides.* This narrow- and evergreen-leaved white oak is the common representative of the *Q. virginiana* complex in the northeastern portion of Mexico.

RANGE.—San Luis Potosí: Valles, 14 N, 900′.

Probably confined to a central portion of the more eastern Mexican lowlands, including the easternmost portions of the state of San Luis Potosí.

TYPES.—110 females, many galls. Holotype, paratype females, galls: Kinsey collection. Paratype females, galls: American Museum of Natural History, British Museum, California Academy, Deutsches Entomologisches Institut, Field Museum, Museum of Comparative Zoölogy, Philadelphia Academy, U. S. National Museum, Vienna Museum.

Labeled: Valles, 14 N, 900′, San Luis Potosí; galls November 27, 1935; females December 7, 14, 1935, January 1, 7, 8, 17, 20, 1936, and without date; *Q. oleoides;* Kinsey collector.

LIFE HISTORY.—Adults: December 7, 14, January 1, 7, 8, 17, 20. Two-thirds of the emergence over by the first of January, but goodly emergence continuing throughout most of January.

Two species of this complex have been previously described. The first, *D. cinerosa* (Bassett, 1881, Canad. Ent. 13:110) is widespread throughout the eastern two-thirds of Texas on the Texas live oak, *Q. virginiana. Disholcaspis unicolor* (Kinsey, 1920, Bull. Amer. Mus. Nat. Hist. 42:316) came from near Saltillo, in the northeastern part of Mexico. The present species, *pallens,* comes from a locality about 275 miles further south, halfway down the eastern Mexican coast and not far inland from Tampico. The locality, Valles, is on the Laredo-Mexico City highway. This is one of the relatively few cases of an Eastern American group having affinities in Eastern Mexico; for the host of the species, namely *Q. oleoides* of the *Q. virginiana* complex, belongs to one of the few groups of oaks which range without material interruption across the Rio Grande. An instance of a similar range on oaks of the *Q. breviloba* group is discussed under *Cynips (mellea) sagata,* newly described in the present paper. See *sagata* for a further discussion.

Pallens is most strikingly different from the previously described members of the complex in its very light yellow wing veins. It also differs in the several other ways given in the description above.

Disholcaspis (fungiformis) insulana, new species

agamic form

Fig. 3

FEMALE.—Antennae rather light yellow rufous, rather dark brown on terminal four or five segments; head and thorax light reddish rufous, more yellow rufous on sides of thorax, black on and between anterior parallel lines, on lateral lines, and in foveal grooves; anterior parallel lines almost entirely punctate, and lateral lines not particularly wide nor wholly smooth; entire foveal groove rugose at bottom; abdomen rich yellow piceous and dark brownish piceous; legs entirely light yellow rufous, nowhere darker; wing veins light yellow, browner on subcosta and first abscissa of radius, but very light and quite fine on other veins; radial cell rather slender; tip of second abscissa of radius fine, not expanded; areolet of moderate size to small; rather slender and distinctly small insects 1.7 to 3.0 mm., averaging near 2.4 mm. in length.

GALL.—A dense cluster of fungiform galls similar to those of *Disholcaspis fungiformis*

Fig. 3. Disholcaspis (fungiformis) insulana, new species
From Eastern Mexican Sierra, state of San Luis Potosí. Paratype galls, natural size.

Kinsey. Differing as follows: Usually topped with a slender and sharply pointed or broader tip which, however, is sometimes truncate, distorted, or lacking, the tips up to 7.0 mm. in length, the tip rising directly from the broader body of the gall which has a thin, irregularly circular rim extending about it, this apron more narrow, more irregular, more closely appressed against the body of the gall than in related species. There is no restricted neck or pedicel above or below this apron (as in the species *fungiformis).* The base of the gall rather small. Light red yellow when fresh, weathering to brown and black; entirely naked; individual galls averaging 7. mm. in diameter and 7. mm. high: the cluster consisting of up to 40 or more galls; the whole measuring up to 75. mm. in length and 17. mm. in diameter (Figure 3).

HOST.—*Quercus laeta,* the peach-leaved oak of the region.

RANGE.—San Luis Potosí: Rio Verde, 14 W, 5500′ (types).

Possibly restricted to this one mountain range west of Rio Verde, in the eastern part of San Luis Potosí.

TYPES.—801 females, many galls. Holotype, paratype females, galls: Kinsey collection. Paratype females, galls: American Museum of Natural History, British Museum, California Academy, Deutsches Entomologisches Institut, Field Museum, Museum of Comparative Zoölogy, Philadelphia Academy, U. S. National Museum, Vienna Museum.

Labeled: Rio Verde, 14 W, 5500′, S. L. P.; galls December 4, 1931; females December 6, 9, 1931, and February 10, 26, and "spring," 1932; *Q. laeta;* Kinsey collector.

LIFE HISTORY.—Adults: December 6, 9. Before February 10, and on February 26. Most of the emergence in January ("before February 10").

Disholcaspis (mexicana) largior, new species

agamic form
Fig. 4

FEMALE.—Insect for the most part rich red rufous, antennae brown, darkest terminally, rufous only on first two to six segments, black on anterior parallel and lateral lines, but with some rich rufous between anterior parallel lines; whole thorax coarsely puncto-rugose and densely hairy; foveae quite wide, distinctly rough at bottom; abdominal segments 3-6 distinctly punctate; areolet very large; insects large and distinctly robust; 3.2 to 5.0 mm., averaging near 4.3 mm. in length.

GALL.—Rosy to brownish tan, probably light and brighter when fresh, weathering darker brown; inner faces of galls which are pressed against other galls in the clusters are smooth and shiny, but exposed surfaces are very much wrinkled, and conspicuously reticulate; individual galls (in the rare instances where they occur singly) are more or less globose, but galls in compact clusters are very much compressed, making each one thin and flat with the exposed tops triangulate in outline; a whole cluster therefore with a surface much like that of an unopened pine cone; individual galls up to 24. mm. in diameter

Fig. 4. Disholcaspis (mexicana) largior, new species
From Western Mexican Sierra, state of Aguascalientes. Paratype galls, natural size.

and 19. mm. in height; whole clusters up to 83. mm. in length and 44. mm. in diameter (Figure 4).

HOST.—*Quercus rhodophlebia*, a large-leaved, evergreen white oak. Replaced on *Q. chihuahuensis* in the same area by *Disholcaspis (mexicana) mexicana*.

RANGE.—Pabellón, 20 W, 7000′ (types).

Probably restricted to a portion of the Western Sierra of Mexico, including the mountains of the state of Aguascalientes.

TYPES.—133 females, many galls: Holotype, paratype females, galls Kinsey collection. Paratype females, galls: American Museum of Natural History, British Museum, California Academy, Deutsches Entomologisches Institut, Field Museum, Museum of Comparative Zoölogy, Philadelphia Academy, U. S. National Museum, Vienna Museum.

Labeled: Pabellón, 20 W, 7000′, Aguascalientes; galls November 26, 1931; *Q. rhodophlebia;* Kinsey collector.

LIFE HISTORY.—Adults: mature at some unrecorded date after November 26 (probably within the next few weeks).

We found this insect occuring in the same locality with *Disholcaspis (mexicana) mexicana* (Beutenmüller), west of Pabellón, in the state of Aguascalientes; but *largior* was found on *Q. rhodophlebia*, while *mexicana* was found, in this region, on *Q. chihuahuensis*. The insects of *largior* differ from those of *mexicana* primarily in having the body richer rufous in color; the antennae are brown on all but the basal segments, while the antennae of *mexicana* are brown only at the tip; there is rufous between the anterior parallel lines of *largior*, while that area is largely black in *mexicana;* the thorax of *largior* is more coarsely

puncto-rugose and more densely hairy; the foveae are wider and more rough at bottom; and the abdominal segments are more distinctly punctate in *largior*. The insects of *largior* are so much larger and more distinctly robust than those of *mexicana* that it is possible to distinguish series of the two with one's naked eye. The galls of the two are even more different, for the individual galls of *mexicana*, even in compact clusters, are more globose and smooth and shining; while those of *largior* are conspicuously wrinkled and so distorted that they show triangulate ends in their cone-like clusters.

Neuroterus junctor, new species

bisexual form?

With the characters of the subgenus *Dolichostrophus* (see Kinsey 1923, Ind. Univ. Studies 58:78).

FEMALE.—Head, thorax, and abdomen almost entirely black, lower part of face and mouthparts rufo-yellow, antennae of fair weight, dark brown with first two segments very light yellow, with 13 segments, the third segment straight, not long but more than one and a half times the length of the fourth; thorax somewhat longer than high or wide; mesonotum including scutellum and mesopleuron superficially smooth and naked, but very microscopically crackled; abdomen no longer than high, hardly produced dorsally; legs brownish piceous on coxae and on most of femora, straw yellow on all joints and on trochanters, and rufo-yellow on tibiae and tarsi; wing veins moderately slender, well defined, medium brown; areolet quite large; basalis without a brownish cloud; terminal portion of subcosta rather long, but radial cell entirely open; length near 1.7 mm.

GALL.—Irregular, monothalamous or polythalamous swellings in the blade of the leaf, wholly inseparable, well developed on both surfaces of the leaf, though more developed on the under surface; covered with a short but dense pubescence, each gall separable or more or less fused with other galls.

HOST.—*Quercus texcocana.*

RANGE.—Mexico: Mexico City, 12 W, 8500′ (types).

TYPES.—2 females, one cluster of galls, in the Kinsey collection.
Labeled: Mexico City, 12 W, 8500′ D.F.; gall January 13, 1932; female March 15, 1932; *Q. texcocana;* Kinsey collector.

LIFE HISTORY.—Adults: March 15 (possibly of a bisexual, possibly of an agamic generation).

This insect provides an important link between two complexes which were recognized as related, but not understandably connected by the previously described American species. The first, the *irregularis* complex, is confined to the Eastern half of the United States. The second, *Neuroterus decipiens*, is a single species known only from California. The gall of *junctor* is very much like the galls of the *irregularis* complex, but the insect is closer to *N. decipiens*—in fact, closer than any species of the *irregularis* complex. It has been puzzling to understand how the Eastern American group, *irregularis*, could have a close relative, *decipiens*, in California, when neither group is represented in the Rocky Mountain area; but with this new species *junctor* as a clue, we shall direct our search into Mexico for the connecting links between the American complexes.

Since both *irregularis* and *decipiens* are known only from bisexual forms, it is quite possible that *junctor* represents a bisexual generation; but this is not determinable either from our limited material or from the collection and breeding dates with our series.

Neuroterus (niger) reconditus, new species

agamic form

With the characters of the subgenus *Diplobius* and the *niger* complex (see Kinsey, 1923, Ind. Univ. Studies 58:35, 41).

FEMALE.—Head, thorax, and abdomen dark piceous black; antennae rather light brown, yellowish on basal segments; legs dark brown, straw yellow on all joints and on trochanters and tarsi; wing veins very light brown; aerolet rather small; abdomen globose-triangulate, not produced dorsally or ventrally, rather crinkled; length 0.6 to 1.0 mm., averaging near 0.7 mm.

GALL.—Minute, inconspicuous pustules in the blade of the leaf; somewhat circular or more ovoid in shape, equally developed on both surfaces of the leaf, inconspicuous on both, but more conspicuous above because of the nature of the upper surface of the leaf; gall surface naked, without irregularities other than those normal to the leaf surface; fresh galls of the same color as the leaf, old galls becoming browner sooner than the rest of the leaf; averaging 1.0 mm. in diameter. Galls fairly numerous on single leaves.

HOST.—*Quercus macrophylla*, the largest-leaved white oak of the area.

RANGE.—Aguascalientes: Pabellón, 20 W, 7090′ (types).

Probably confined to a portion of the Western Sierra in Mexico, including the state of Aguascalientes.

TYPES.—50 females, numerous galls. Holotype, paratype females, galls: Kinsey collection. Paratype females, galls: American Museum of Natural History, California Academy, Museum of Comparative Zoölogy, Philadelphia Academy, U. S. National Museum.

Labeled: Pabellón, 20 W, 7000′, Aguascalientes; galls November 26, 1931; females April 10, 1932; *Q. macrophylla;* Kinsey collector.

LIFE HISTORY.—Agamic females: emerging April 10.

The *niger* complex has been known from the eastern U. S., from our Southwest (but not from the Rockies further north), and from California. The present species is the first to be described from Mexico. Like all the other described species of the group, *reconditus* differs chiefly in the minor color characters noted above; but the form of the gall provides some further basis of differentiation of the species.

Neuroterus (verrucarum) visibilis, new species

agamic form

With the characters of the subgenus *Diplobius* and the *verrucarum* complex (see Kinsey 1923, Ind. Univ. Studies 58:35, 67).

FEMALE.—Head, thorax, and abdomen usually jet black, sometimes touched piceous in places; antennae weak, light brown terminally, straw yellow basally; legs light brown, joints and tibiae straw yellow; mesonotum including scutellum and mesopleura entirely smooth, not showing any crackling even under high powers of microscope; abdomen globose-triangulate, about as high as long, not protruding dorsally, sometimes a bit protrudent ventrally; wing veins very light, only tinged brownish; areolet moderate or smaller; very small insects 0.6 to 0.9 mm., averaging near 0.75 mm. in length.

GALL.—Very minute, elongate-oval, hard but thin-walled cells; with a slightly elevated, circular apex in center of top surface; surfaces of galls minutely granular; each cell attached by a broad area to under surface of leaf, producing a barely evident elevation of upper surface of leaf, but cells not embedded in such a depression of under surface (*i. e.*, an elevation of upper surface) as is usual in the American species of the complex; cells sparsely hairy with rather long trichomes, this clothing however no heavier than that normal to under surface of leaf; cells averaging 0.8 mm. in length and 0.4 mm. in diameter. Galls abundant on single leaves.

HOST.—*Quercus macrophylla*, the largest-leaved white oak of the area.

RANGE.—Guanajuato: San Felipe, 8 NE, 7000′ (types).

Probably throughout a more central area in Mexico, including the state of Guanajuato.

TYPES.—346 females, many galls. Holotype, paratype females, galls: Kinsey collection. Paratype females, galls: American Museum of Natural History, British Museum,

California Academy, Deutsches Entomologisches Institut, Field Museum, Museum of Comparative Zoölogy, Philadelphia Academy, U. S. National Museum, Vienna Museum.

Labeled: San Felipe, 8 NE, 7000′, Guanajuato; galls December 6, 1931; females March 6, 14, 25, 1932; *Q. macrophylla;* Kinsey collector.

LIFE HISTORY.—Adults: March 6, 14, 25.

The *verrucarum* complex has been known previously only from the eastern half of the United States. The present species, and the two that follow, extend the records through the Western Sierra to the southwestern corner of Mexico. This is the first instance of an exclusively Eastern American group occurring in the Western Sierra of Mexico.

The gall of *visibilis* is, however, hardly different from the seed-like galls of the *saltatorius* complex (which are known both from the Eastern and the Western United States). None of these Mexican species has the gall embedded in as deep a depression as is common in the American species of the group, and the mode of attachment of this larval cell and the extent of the hairy covering of the gall are, after all, the chief differences between the *verrucarum* and the *saltatorius* complexes. Since the insects of the two groups differ in very few respects, it is not unlikely that these Mexican species will provide connecting links between them.

The insect of *visibilis* is to be distinguished from the other Mexican species described in the present paper by its very much smaller size, by the fact that the abdomen is not produced dorsally and usually not produced ventrally, and by its complete lack of crackling on the thorax (as seen by the same high powers that show crackled surfaces on the thoraces of *volutans* and *vulpinus*).

Neuroterus (verrucarum) volutans, new species

agamic form

With the characters of the subgenus *Diplobius* and the *verrucarum* complex (see Kinsey 1923: Ind. Univ. Studies 58:35, 67).

FEMALE.—Head, thorax, and abdomen almost entirely black, lower part of face piceo-rufous; antennae weak, dark brown, yellowish brown basally, with 13 segments, the third segment straight, not long but more than one and a half times the length of the fourth; thorax somewhat longer than high or wide; mesonotum including scutellum and mesopleuron superficially smooth and naked, but very microscopically crackled; abdomen triangulate, higher than long, more or less protruding ventrally; ovipositor often to brownish yellow on all joints and all tibiae; wing veins light brown; areolet of medium size only; cubitus faint but continuous to basalis; terminal portion of subcosta rather long, but radial cell entirely open; medium-sized insects 0.8 to 1.5 mm., averaging nearly 1.2 mm. in length.

GALL.—Minute, elongate-oval, hard but thin-walled cells with a slightly elevated apex in center of top surface; surfaces of galls minutely granular, each cell attached by a broad area to the under surface of the leaf, producing an inconspicuous, smooth but hardly elevated area on the upper surface of leaf; galls not embedded in any deep depression of under surface of leaf such as is characteristic of the American species of the complex; cells fairly well covered and more or less hidden by a circular tangle of long, brown trichomes which more or less contrast with the normally hairy under-surface of leaf; cells averaging 1.4 mm. in length and 1.0 mm. in diameter, the whole mass of hairs on each gall averaging 2.0 mm. in diameter. Galls often densely covering under surfaces of leaves.

HOST.—*Quercus texcocana*, the smaller-leaved tree which is the commonest white oak in the mountains about the Valley of Mexico.

RANGE.—Mexico: Mexico City, 17 S, 8200′.

TYPES.—230 females, many galls. Holotype, paratype females, galls: Kinsey collection. Paratype females, galls: American Museum of Natural History, British Museum, California Academy, Deutsches Entomologisches Institut, Field Museum, Museum of Comparative Zoölogy, Philadelphia Academy, U. S. National Museum, Vienna Museum.

Labeled: Mexico City, 17 S, 8200′, D.F.; galls January 12, 1932; females March 7, 14, 1932; *Q. texcocana;* Kinsey collector.

LIFE HISTORY.—Agamic females: March 7, 14.

The gall of *volutans* is superficially quite like those found in the *verrucarum* complex in the United States. Upon closer examination it will be seen to differ in having no real depression in which the larval cell is sunk—and consequently no great elevation on the upper surface of the leaf. From the related Mexican species, *volutans* differs as follows: From *visibilis*, in being distinctly larger, in showing a microscopic crackling on the thorax, and in having the abdomen somewhat produced dorsally. From *vulpinus*, in being a bit larger, in having the thoracic crackling a bit more evident, in having the abdomen produced dorsally instead of ventrally, and in having both the antennae and legs darker both in their brown and in their lighter colorings.

Neuroterus (verrucarum) vulpinus, new species

agamic form

With the characters of the subgenus *Diplobius* and the *verrucarum* complex (see Kinsey, 1923, Ind. Univ. Studies 58:35, 67).

FEMALE.—Head, thorax, and abdomen nearly jet black, touched piceous in a few places; antennae weak, light brown terminally, straw brown basally, with joints between basal segments very light straw; legs in part medium brown, both ends of all segments and all of tibiae light straw yellow; mesonotum including scutellum and mesopleuron entirely smooth, showing an indefinite crackling only under high powers of microscope; abdomen triangulate, higher than long, more or ess protruding ventrally; ovipositor often long protruded; wing veins light brownish straw; areolet of moderate size or a bit smaller; insect 0.8 to 1.2 mm., averaging a little less than 1.0 mm. in length.

GALL.—Minute, elongate-oval, hard but thin-walled cells, usually with a slightly elevated apex in center of top surface; surfaces of galls minutely granular, each cell attached by a broad area to the under surface of the leaf, not buried in the sort of depression characteristic of American species of the group, and showing no deformation unless a slight discoloration on upper surface of leaf; cells densely covered and entirely hidden by a circular tangle of long, whitish trichomes which contrast sharply with the normally hairy under surface of leaf; cells averaging 0.7 mm. in length and less in diameter, the whole mass of hairs on each gall averaging 2.5 mm. in diameter. Galls densely covering under surfaces of leaves.

HOST.—*Quercus macrophylla*, the larger-leaved white oak of the area.

RANGE.—Guerrero: Taxco, 8 NE, 8000′.

Probably confined to a southwestern portion of Mexico including at least a portion of the state of Guerrero.

TYPES.—33 females, numerous galls. Holotype female, paratype females, galls: Kinsey collection. Paratype females, galls: American Museum of Natural History, U. S. National Museum, Philadelphia Academy.

Labeled: Taxco, 8 NE, 8000′, Guerrero; galls January 7, 1932; females April 10, 1932, *Q. macrophylla;* Kinsey collector.

LIFE HISTORY.—Agamic females: April 10.

The gall of *vulpinus* is more densely hairy and, in its contrast with the normal surface of the leaf, more like the galls of the American species of the complex, than either of the two other species now described from Mexico. The larval cell is, however, still not in a depression, and there is, therefore, no elevation on the upper surface of the

leaf. The insect of *vulpinus* differs from that of *volutans* (its nearest described relative) in being a bit smaller, in having the thoracic crackling not quite as evident, in having the abdomen produced ventrally instead of dorsally, and in having the antennae and legs somewhat lighter in both of their colors.

Neuroterus (saltatorius) tumba, new species

agamic form

With the characters of the subgenus *Diplobius* and the *saltatorius* complex (see Kinsey 1923: Ind. Univ. Studies 58:35, 45).

FEMALE.—Head, thorax, and abdomen piceous black; cheeks narrow, eyes of moderate size; antennae with third segment nearly twice as long as fourth, mesonotum and mesopleuron entirely smooth, abdomen not as long as high, slightly produced dorsally; antennae dark brown, straw yellow basally; legs dark brown, all joints, trochanters, and tarsi straw yellow; cubitus very faint or discontinuous; areolet of moderate size; length 0.8 to 1.5 mm., averaging near 1.1 mm.

GALL.—An ovoid, naked cell, broadly attached to under surfaces of, and hence only poorly separated from the leaf. Cells averaging 1.5 mm. in length and 1.2 mm. in diameter, thin- but hard-walled, surface rough, the roughening sometimes more or less radiate from apex of gall, without hairs or other covering; each gall mounted on a slight elevation of under surface, and hence causing a distinct depression of upper surface of leaf. Galls usually abundant on single leaves.

HOST.—*Quercus macrophylla*, the larger-leaved white oak of the area.

RANGE.—Guerrero: Chilpancingo, 6 S, 4000′.

TYPES.—7 females, numerous galls. Holotype, paratype females, galls: Kinsey collection. Paratype galls: American Museum of Natural History, Museum of Comparative Zoölogy, Philadelphia Academy, U. S. National Museum.

Labeled: Chilpancingo, 6 S, 4000′, Guerrero; galls January 8, 1932; females March 24, 1932; *Q. macrophylla;* Kinsey collector.

LIFE HISTORY.—Agamic females: March 24.

This is the first insect of the *saltatorius* complex described from Mexico. The complex has previously been recorded from Eastern, Southwestern, and Pacific areas of the United States. The galls of *tumba* are most like those of *N. (saltatorius) saltarius* which Weld described from Indiana, and they are still more like undescribed species from Texas. It is interesting to find Eastern American, instead of the usual Rocky Mountain affinities, in this Southwestern corner of Mexico.