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NEW AMERICAN CYNIPID WASPS FROM OAK GALLS

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Twenty-three new species of cynipids are described herein; two are inquilines, while the others are gall makers. Twenty-one of these new species are from the United States, but two of the gall makers are from Mexico.

Types of the 23 new species are deposited in the U. S. National Museum. Paratypes are in institutions designated by the following abbreviations:

- AM: American Museum of Natural History.
CM: Chicago Museum of Natural History.
CA: California Academy of Sciences.
PA: Academy of Natural Sciences of Philadelphia.
C: Cornell University.
MCZ: Museum of Comparative Zoology.

Genus *Synergus* Hartig

Synergus magnificus, new species

FEMALE: THORAX black; head, except above antennae and on occiput, light-colored like legs and antennae; abdomen black or sometimes reddish. Vertex punctate, cheeks not broadened behind eyes, antennae 14-segmented, tapering to tip. Mesoscutum rugoso-coriaceous with a suggestion of transverse sculpture in low relief,

parapsidal grooves obsolete anteriorly, no median. Disk of scutellum rugose, pits transverse. Mesopleuron bare, entirely striate. Veins brown, areolet complete. Base of hind and middle coxae black. Abdomen longer than high, longer than head plus thorax, slightly gibbous at base. Big tergite deeply excavated behind in dorsal view so that four other tergites are visible in side view, lengths along dorsal margin as 35:9:7:6. Hind margin of big tergite and exposed parts of rest punctate, almost smooth in some individuals, VII pubescent, sheaths projecting. Length 3.4-6.05 mm. Average of 53 specimens, 4.74 mm.

MALE: Similar to female in color except that sides of pronotum and most of mesopleuron are not black, abdomen all black. Antennae 15-segmented, third very slightly excavated. Length 2.25-4.7 mm. Average of 74, 3.91 mm.

TYPES: USNM 63004, type female, allotype, and 10 paratypes. Paratypes in AM, CM, CA.

HABITAT: Guests in the ellipsoidal stem gall of *Disholcaspis truckeensis* (Ashm.) on *Quercus chrysolepis* Liebm. Types are from a series of 23 which emerged in April 1923 from galls collected at Idyllwild, Calif., in September 1922. Thirteen paratypes emerged May 18, 1911, from galls collected at Kanawyer, Tulare County, Calif., on July 4, 1910; two are from Colfax, Calif., two from Kyburz, Calif., and two are from Oregon Caves, Oreg. Eighty-five were reared Apr. 24 to May 6, 1954, by Hugh B. Lecch from galls collected at Mill Valley, Marin County, Calif.; these paratypes are in the California Academy of Sciences.

Genus *Ceroptres* Hartig

Ceroptres montensis, new species

FEMALE: Black; antennae brown, darker distally; legs light brown except for slight infuscation on base of coxae. Face pubescent with a median ridge and faint striae about mouth. Antennae 13-segmented, segments 3-5 subequal. Vertex bare. Pronotum and mesonotum coriaceous, dull, pubescent. Anterior and lateral lines smooth. Parapsidal grooves extending forward half-way, median groove shorter. Disk of scutellum finely rugose behind, pits at base indistinct, dull. Mesopleuron with a large, smooth, bare, polished area. Wing pubescent, cilia short, veins brown, areolet distinct, radial cell 2.3 times as long as broad. Claws simple. Abdomen longer than high, lengths of tergites II and III on dorsal margin as 25 : 45, III smooth, exposed parts of rest and sides of the hypopygium punctate, ventral spine twice as long as broad. Length 1.8-3.1 mm. Average of 42 specimens, 2.52 mm.

MALE: Antennae 15-segmented, third slightly shorter than fourth and not excavated. Abdomen short, tergites II and III as 24:38. Length 1.8–2.35 mm. Average of 23, 2.08 mm.

TYPES: USNM 63005, type, allotype and 12 paratypes. Paratypes in AM, CM, CA, PA, MCZ, C.

HABITAT: Guests in tan, smooth, ellipsoidal stem galls. The types are from a series reared Mar. 17, 1923, from galls of *Andricus reniformis* McC. and Egb. on *Quercus vaccinifolia* Kell., at Tahoe City, Calif. Paratypes are from Holland, Oreg., and Kyburz, Mount Wilson, and Idyllwild, Calif., from galls of *Disholcaspis truckeensis* (Ashm.) on *Quercus chrysolepis* Liebm.

Genus *Neuroterus* Hartig

Neuroterus floricomus, new species

FEMALE: Black; tibiae, tarsi, most of coxae and first three segments of antennae straw-yellow. Head coriaceous; from above broader than thorax, cheeks broadened behind eye, occiput concave; from in front broader than high, malar space one-sixth as long as eye, antennae 13-segmented. Mesonotum smooth, mesopleuron bare, smooth, bulging. Wing short-pubescent, ciliate, veins distinct, areolet reaching one-sixth way to basal. Abdomen sessile, collapsed, shorter than thorax, ventral spine short. Length 1.4–1.7 mm. Average of 11 specimens, 1.56 mm.

MALE: Head and abdomen black; antennae, thorax and legs pale yellow. Cheeks not broadened behind eyes. Antennae 14-segmented, third elongated and slightly bent. Length 1.9–2.05 mm. Average of 7, 1.98 mm.

TYPES: USNM 63006, type female, allotype, and 2 paratypes. Other paratypes in AM, CM, CA.

HOST: *Quercus reticulata* Humb. & Bonpl.

GALL (pl. 1, fig. 5): On staminate flowers in late June. A densely woolly enlargement of the axis up to 25 mm. long by 10 mm. in diameter with only the anthers protruding.

HABITAT: The type material (Hopkins No. 15618^d) was collected June 28, 1918, in the Santa Catalina Mountains, Ariz., and adults emerged up to July 9. Galls were seen in the Santa Catalina Mountains on *Quercus oblongifolia* Torr. and *Q. arizonica* Sarg., in the Huachuca Mountains on *Q. reticulata*, *Q. oblongifolia*, and *Q. arizonica*, in the Mule Mountains on *Q. arizonica*, and in the Chiricahua Mountains on *Q. arizonica* and *Q. toumeyii* Sarg.

Neuroterus lamellae, new species

FEMALE: Black except for light area about mouth, tibiae, tarsi, and three basal segments of antennae. Head microcoriaceous like thorax;

from above transverse, cheeks slightly broadened behind eyes; from in front malar space one-fourth of eye with a fine groove, antennae 13-segmented, the third longer than second or fourth. No parapsidal grooves. First abscissa of radius bent, areolet reaching one-sixth way to basal. Abdomen sessile, longer than thorax. Length 1.4–1.75 mm. Average of 10 specimens, 1.6 mm.

TYPES: USNM 63007, type and one paratype. Other paratypes in AM, CM, CA.

HOST: *Quercus subturbinella* = *Q. turbinella* Greene.

GALL: A thickening of the parenchyma of a part of the leaf area, deforming the leaf, almost half an inch thick. Pubescence on lower side white and short, on upper side, where exit holes are located, it is longer. Resembles the gall of *Neuroterus washingtonensis* Beut. on *Quercus garryana* Dougl.

HABITAT: Dead adults were cut out of galls in November 1944 from galls collected July 23, 1943, at Prescott, Ariz., by Mrs. N. W. Capron. As dark pupae were found in galls at Prescott on July 12, 1947, the normal emergence is probably in late July.

Neuroterus florulentus, new species

FEMALE: Black, except for pale area about mouth and on antennae, tibiae, and tarsi. Head microcoriaceous like thorax; from above massive, cheeks as long as eye, slightly broadened behind eyes; from in front, malar space one-seventh as long as eye without groove, antennae 13-segmented, scape and pedicel swollen distally, third shorter than fourth. No trace of parapsidal grooves. First abscissa of radius arcuate, areolet small. Femora of normal shape, claws simple. Abdomen sessile, higher than long, ovipositor projecting straight out behind. Using width of the head as a base, the length of mesonotum ratio is 1.4, antenna 2.0, wing 4.6, ovipositor 1.7. Length 1.15–1.6 mm. Average of 24 specimens, 1.36 mm.

MALE: Almost uniformly light-colored. Head massive, broader than thorax, cheeks greatly broadened behind eyes, antennae 14-segmented, scape and pedicel greatly elongated and obovate, third straight, last short, malar space without groove. Wing broadest one-third way from areolet to apex instead of midway as is usual. All femora greatly swollen on proximal two-thirds. Abdomen sessile, triangular, small. Length 1.15–1.7 mm. Average of 24, 1.36 mm.

TYPES: USNM 63008, type female, allotype, and 8 paratypes. Other paratypes in AM, CM, CA.

HOSTS: *Quercus dumosa* Nutt. and *Q. lobata* Née.

GALL: Thin-walled, tan, ovate cells scattered singly or in small clusters among the staminate flowers, bearing at apex on either side the shrunken darker anthers. The base is truncate and excavated, unlike the gall of *N. floricola* Kinsey. Length 1.5 mm.

HABITAT: Types are from galls collected on flowers of *Quercus dumosa* Nutt., on Santa Catalina Island, Calif., Mar. 31, 1922, when adults were emerging. More emerged by April 10, and more came out and died by April 15. Similar galls were collected at Palo Alto, Calif., on May 3 on flowers of *Quercus lobata* Née, and some of the paratypes are from this lot.

Genus *Liodora* Feerster

Liodora dumosae, new species

FEMALE: Black; basal segments of antennae and legs beyond coxae pale. Head coriaceous; from above as broad as thorax, occiput concave, cheeks slightly broadened behind eyes; from in front malar space one-fourth as long as eye without groove, antennae 14-segmented. Mesocutum bare, smooth and shining except at anterior end of the percurrent grooves. Scutellum punctate, pubescent, overhanging propodeum behind in side view, pits smooth. Mesopleuron bare, smooth, polished. Wing pubescent, ciliate, veins brown, radial cell long and narrow, areolet faint. Claws with a tooth. Carinae on propodeum bent. Abdomen in side view higher than long, lengths of tergites on dorsal margin as 42:10:5:2. Ventral spine in side view hardly longer than broad. Using width of the head as a base, the length of antenna ratio is 2.35, ovipositor 1.4, wing 4.3. Length 1.4–2.2 mm. Average of 7 specimens, 1.75 mm.

MALE: Antennae 15-segmented, third to fourth as 16:11 and slightly bent. Abdomen small, pedicel 7, tergites II and III as 38:7. Length 1.5–1.75 mm. Average of 8, 1.68 mm.

TYPES: USNM 63009, type, allotype, and 2 paratypes.

HOST: *Quercus dumosa* Nutt.

GALL: Conical, thin-walled, 3 mm. long, erect, at margin of leaf, black when dry.

HABITAT: The types are from galls collected at Stanford, Calif., May 3, 1922, the adults emerging May 10. Paratypes are from Newhall, Lakeport, and Ukiah, Calif. Galls have been seen also on *Quercus douglasii* Hook. & Arn., *Q. lobata* Née, and *Q. garryana* Dougl.

Genus *Amphibolips* Reinhard

Amphibolips murata, new species

AGAMIC FEMALE: A concolorous amber species. Mesoscutum irregularly rugose without a distinct median groove and with faint transverse sculpture to right and left of anterior lines. Disk of scutellum coarsely rugose without a median depression, rounded behind; pits large with faint transverse sculpture, septum thin. Wing neither banded nor smoky but with a dark cloud on base of

radial cell. Checks bulging behind eyes. Abdomen almost globular, all the tergites visible, bare except for usual pubescence at base of II and on VII, hind margin of II and exposed parts of the rest finely punctate, ventral spine longer than hind metatarsus. Length 3.85–4.8 mm. Average of 20 specimens, 4.31 mm.

Belongs in a group that emerges from bud galls in late fall or in early spring from galls that have overwintered.

Types: USNM 63010, type and 4 paratypes. Other paratypes in AM, CM, PA.

Hosts.—*Quercus myrtifolia* Willd., *Q. pumila* Walt., *Q. laurifolia* Michx., and *Q. cinerea*=*Q. incana* Bartr.

GALL: A smooth, tan bud gall in the fall, from 8–12 mm. in diameter, tapering slightly to point of attachment, the thin-walled larval cell not free and separated from the thick, dense outer wall by a thin layer of spongy tissue (not radiating fibers). Adults are cut out of the galls in November; the only emergence records are December 4, December 8, and April 11.

HABITAT: The type is from *Quercus myrtifolia* Willd. at Naples, Fla. Paratypes are from *Quercus myrtifolia* Willd. at Carrabelle, Fla.; *Q. pumila* Walt. at Ocala and Miami, Fla.; *Q. cinerea*=*Q. incana* Bartr., at St. Petersburg, Dade City, Sopchoppy, and River Junction, Fla.; and *Q. laurifolia* Michx. at Gainesville, Fla.

Genus *Andricus* Hartig

Andricus mendocinensis, new species

FEMALE: Red; head, mesopleuron, and abdomen dorsally darker. Head from above transverse, cheeks broadened behind eyes, occiput not concave; from in front malar space finely striate, antennae 13-segmented. Mesonotum somewhat shining, punctate with appressed pubescence, parapsidal grooves percurrent, median extending forward one-third way. Pits on scutellum smooth. Mesopleuron bare, smooth. Wing pubescent, ciliate, first abscissa of radius angulate, areolet distinct. Claws with a strong tooth. Carinae on propodeum straight and parallel. Abdomen as high as long, tergites smooth, lengths along dorsal curvature as 20:10:9. Ventral spine longer than hind metatarsus. Length 3.0 mm. Separated from *A. mamillaformis* (Weld), which has tergites punctate, mesopleuron striate in part, and disk rugose.

TYPE: USNM 63011, type. Paratype in CA.

HOST: *Quercus densiflora*=*Lithocarpus densiflora* (Hook. & Arn.) Rehd., the tanbark oak.

GALL: An abrupt woody swelling about 30 mm. in diameter, thought to be a "root gall," containing many separable cells.

HABITAT: Mendocino County, Calif. Collected May 29, 1917, by Dr. E. O. Essig. Described from two dead adults cut out of the gall at Stanford University in 1922. The gall can not now be located. If the host record is correct this is the first cynipid gall to be recorded on this host.

Genus *Disholcaspis* Dalla Torre and Kieffer

Disholcaspis edura, new species

Adults of *Disholcaspis* can hardly be described so as to be recognized from descriptions. The galls, however, are quite characteristic. The genus is known only from agamic females, reared in late fall from detachable stem galls on white oaks. No alternating generation has ever been recognized for any of the species. The only recognizable difference between this and the following species seems to be in color.

AGAMIC FEMALE: Head reddish brown like sides of pronotum and mesopleuron; antennae, tarsi, and abdomen darker. Eyes black, as are lateral lines and a large median area covering anterior parallel lines. Length 2.8–4.0 mm. Average of 33 specimens, 3.47 mm.

TYPES: USNM 63012, type and 8 paratypes. Other paratypes in AM, CM, CA, PA, C, and MCZ.

HOSTS: *Quercus oblongifolia* Torr. and *Q. arizonica* Sarg.

GALL (pl. 1, fig. 1): A bullet gall in clusters of 3–6 on twigs, sessile, rounded at end, yellowish, up to 12 mm. in diameter. Larval cell basal, its wall unusually thick and hard, persisting after the soft distal tissue has weathered away.

HABITAT: The types are from galls collected at Nogales, Ariz., Nov. 14, 1939, on *Quercus oblongifolia* Torr. Adults emerged Jan. 11 to Feb. 11, 1940. Paratypes are from galls collected at Magdalena, N. Mex., Nov. 9, 1921, then containing adults which emerged December 31. One paratype is from Patagonia, Ariz., and one from Oracle, Ariz. These galls have been noted also on *Quercus toumeyi* Sarg. and *Q. reticulata* Humb. & Bonpl.

Disholcaspis prehensa, new species

AGAMIC FEMALE: Similar in color to the preceding species. Length 2.65–3.35 mm. Average of 51 specimens, 2.99 mm.

TYPES: USNM 63013, type and 12 paratypes. Other paratypes in AM, CM, CA, PA, MCZ.

HOST: *Quercus dumosa* Nutt.

GALL (pl. 1, fig. 8): Single or in groups of up to 25. Sessile with a smooth brown basal part clasping the twig, the top enlarged, rugose, dull and darker in color, probably secreting honeydew when young. Larval cell basal.

HABITAT: The type is from galls collected in Sequoia National Park, Calif., on Sept. 9, 1922, when they contained full-grown larvae. Living adults were cut out Jan. 23, 1923. Paratypes are from Ukiah and St. Helena, Calif.

Disholcaspis mellifica, new species

AGAMIC FEMALE: Similar to *D. edura* (above) in color except that, never having emerged naturally, the abdomen is scarcely darker and the median dark area on mesonotum is not as large. It is also smaller than all the above species. Range in length, 1.85–3.0 mm. Average of 46 specimens, 2.71 mm.

TYPES: USNM 63014, type and 8 paratypes. Other paratypes in AM, CM, CA, PA.

HOST: *Quercus garryana* Dougl.

GALL: Bursting out of cracks in the bark, usually in rows, like galls of *Callirhytis excavata* (Ashm.) but extending only one or two millimeters up above the flaps of bark. On current year's growth in fall, often on sprouts close to the ground. The top is flat, rugose, and secretes honeydew. Larval cell basal and occupying most of the interior, the only thick dense tissue being directly above. Single galls from above measure up to 3 by 5 mm., but those in a row are much distorted by mutual pressure.

HABITAT: The types are from galls collected Sept. 8, 1922, above Cedar Creek checking station in Sequoia National Park, Calif. The galls then contained larvae and secreted so much honeydew that it dripped to the ground and in the sun was even evaporated to a white solid. Pupae were found in galls on October 1. Dead adults were cut out Mar. 17, 1923. This is the undescribed gall whose secretion has been described more fully by the author (Bull. Brooklyn Ent. Soc., vol. 20, p. 177, 1925).

Disholcaspis spissa, new species

AGAMIC FEMALE: Similar in general coloration but darker than either of the three preceding species, having black on face below antennae, on vertex, proepisternum, mesosternum, metapleuron, propodeum, and dorsal abdomen. The black areas on mesoscutum and at base of scutellum are larger also. Length 2.45–3.6 mm. Average of 80 specimens, 2.98 mm.

TYPES: USNM 63015, type and 20 paratypes. Other paratypes in AM, CM, CA, PA, C, MCZ.

HOSTS: *Quercus subturbinella*=*Q. turbinella* Greene, *Q. arizonica* Sarg., *Q. fendleri*=*Q. undulata* Torr., and *Q. havardi* Rydb.

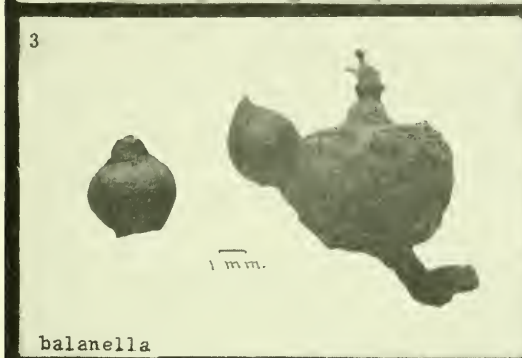
GALL (pl. 1, fig. 7): Single or in dense clusters on twigs or rarely on the peduncle. Yellowish when young, brown with a dull matte



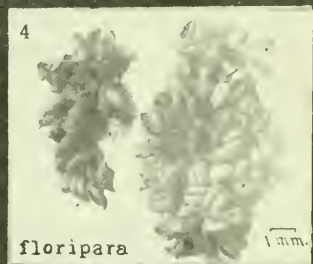
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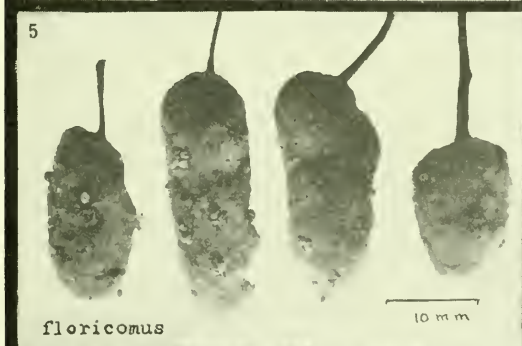
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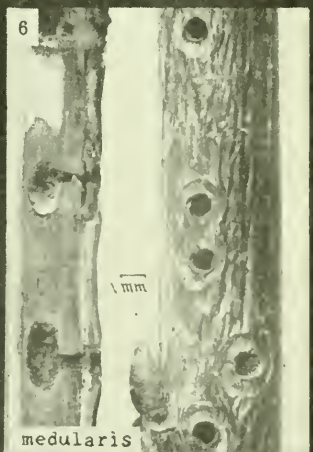
balanella



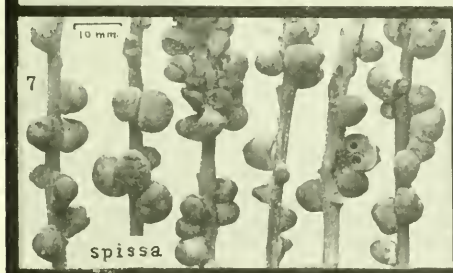
floripara



floricomus



medularis



spissa



prehensa

1, *Disholcaspis edura* on *Quercus oblongifolia*; 2, *Callirhytis glomerosa* on *Q. coccinea*; 3, *Callirhytis balanella* on *Q. emoryi*; 4, *Callirhytis floripara* on *Q. agrifolia*; 5, *Neuroterus floricomus* on *Q. reticulata*; 6, *Callirhytis medularis* on *Q. velutina*; 7, *Disholcaspis spissa* on *Q. subturbinella*=*Q. turbinella*; 8, *Disholcaspis prehensa* on *Q. dumosa*.



surface when mature. Sessile by a broad base, rounded and darker at apex, 6-7 mm. high. Larval cell basal, its wall thin, not free but imbedded in the dense cellular tissue of the distal part of the gall which is not cavernous as in *D. edura*.

HABITAT: The type is selected from galls collected at Tijeras, N. Mex., Nov. 1, 1921. Many adults had emerged by December 31, and adults continued to come out until January 14. Paratypes are from galls on *Quercus arizonica* at Oracle and in the Chiricahua Mountains, Ariz.; from galls on *Q. fendleri*=*Q. undulata* Torr. at Shoemaker, N. Mex.; from *Q. subturbinella*=*Q. turbinella* Greene at Camp Creek, Ariz., and one from *Q. havardi* Rydb. at Sayre, Okla.

Disholcaspis mamillana, new species

AGAMIC FEMALE: Almost uniform amber except for the darker distal segments of antennae, metapleuron, tarsi, and dorsal abdomen. Length 2.8-3.3 mm. Average of 9 specimens, 3.1 mm.

TYPES: USNM 63016, type and two paratypes. Other paratypes in AM, CM, CA.

HOST: *Quercus douglasii* Hook. & Arn.

GALL: A globular bullet gall drawn out at apex into a distinct blunt point like the pointed bullet gall of the Eastern States. Wall thick, central larval cell not separable. Covered when young with very dense, short pubescence which weathers away in late fall.

HABITAT: The types were collected at Stanford, Calif., on Dec. 10, 1935, when they contained adults which had already chewed their way nearly to the surface. Galls were seen also at Paso Robles, Paraiso Springs, and Jolon, Calif.

Genus *Antron* Kinsey

Antron tepicana, new species

AGAMIC FEMALE: A light-colored species with the habitus of a *Disholcaspis*. Malar grooves absent, antennae 14-segmented. Parapsidal grooves percurrent, lateral lines smooth. Disk entirely finely rugose, dull. Wing pubescent, cilia short posteriorly, first abscissa of radius angulate, second heavy, enlarged at margin, basal heavy. A cloud at base of radial cell, on break of anal, at base of cubitus, and a large double one in distal end of cubital cell. Claws with a heavy tooth. Area between curved carinae on propodeum broader than high. Abdomen longer than high, tergites II and III pubescent on sides, II foliiform. Ventral spine broad, bristly, tapering suddenly into a triangular point. Length 3.5-5.25 mm. Average of 16 specimens, 4.63 mm.

Related to *A. nubila* (Ashmead) which is smaller, darker, and the two clouds in the cubital cell are not fused together. Differs from *A. chica* (Kinsey) in having no black on thorax, a larger areolet (reaching one-fifth way to basal), and in its larger size.

TYPES: USNM 63017, type and 3 paratypes. Other paratypes in AM, CM.

HOST: *Quercus reticulata* Humb. & Bonpl.

GALL: Similar to that of *A. chica* (Kinsey) (Indiana Univ. Publ., Sci. Ser. No. 4, fig. 151, p. 244, 1936), up to 60 mm. in diameter, the inner pile with transparent, tapering tips 5 mm. deep, the long outer crumpled hairs not swollen at the base. Larval cell up to 12 mm. high by 6 mm. in diameter.

HABITAT: Galls were collected Jan. 22, 1936, at Tepic, Mexico. Adults emerged and died in box before April.

Antron magdalenae, new species

AGAMIC FEMALE: Similar in color to the preceding species. Antennae 13-segmented. Checks broadened behind eyes, malar groove absent. Lateral lines and area between the percurrent parapsidal grooves smooth and shining. Disk coriaceous with a large smooth and shining transverse groove at base. Wing pubescent, cilia short. Tergite II foliiform, III bare. Ventral spine broad, bristly, tapering abruptly to a triangular apex. Using width of the head as a base, the length of mesonotum ratio is 1.47, antenna 2.4, wing 5.0, ovipositor 1.87. Length 2.45–3.1 mm. Average of 12 specimens, 2.81 mm. Differs from preceding species in its smaller size, fainter spots in cubital cell, and smooth base of disk.

TYPES: USNM 63018, type and two paratypes. Other paratypes in AM, CM.

HOST: *Quercus subturbinella* = *Q. turbinella* Greene.

GALL: Globular, 3 mm. in diameter, with a dull, uneven surface covered with stellate hairs, sessile by a broad base on under side of leaf in the fall. Wall thin.

HABITAT: The types were cut out November 10 from galls collected Nov. 9, 1921, at Magdalena, N. Mex. Two paratypes are from Tijeras, N. Mex. Galls were seen also at Hillsboro, Kingston, and in the Burro Mountains, N. Mex.

Genus *Loxaulus* Mayr

Loxaulus beutenmuelleri, new species

FEMALE: Amber, abdomen darker posteriorly. Head coriaceous; from above massive, broader than thorax, slightly broadened behind eyes; from in front malar groove present, antennae 13-segmented.

Sides of pronotum with faint, irregular ridges. Mesoscutum coriaceous, parapsidal grooves obsolete anteriorly, no median. Disk rugose with a sculptured groove at base. Mesopleuron coriaceous. Pubescence and cilia on wing short, both cross-veins clouded. Claws simple. Carinae on propodeum almost straight, diverging slightly above, a distinct median present. Abdomen not as long as thorax, lengths of tergites along dorsal margin as 38 : 12 : 4. Ventral spine about twice as long as broad. Length 1.45–2.15 mm. Average of 32 specimens, 1.83 mm.

TYPES: USNM 63019, type and 7 paratypes. Other paratypes in AM, CM, CA.

HOST: *Quercus borealis*=*Q. rubra* L., northern red oak.

GALL: Probably a midrib cluster.

HABITAT: The type is selected from a series reared from galls collected by William Beutenmueller at Fort Lee, N. J., Oct. 21, 1916, and sent to me for rearing. They were picked up on the ground under a red oak tree and thought at the time to be galls of *Dryocosmus piperoides* (Bass.). Adults emerged Apr. 6, Apr. 22, and May 11, 1918. Paratypes are from what were thought to be all galls of *D. piperoides* picked up at the Chicago River west of Evanston, Ill., on Oct. 8, 1916. Adults emerged April 22–May 28, 1918, and some were *D. piperoides* (Bass.). One was captured at Vienna, Va., Apr. 29, 1945. Three are from Washtenaw County, Mich., May 13, 1951 (R. R. Dreisbach).

Genus *Callirhytis* Foerster

Callirhytis balanella, new species

FEMALE: A light brown species with dorsal abdomen darker. Head from above transverse, cheeks bulging behind eyes, occiput concave; from in front broadest above middle of eyes, antennae 13-segmented, twice as long as width of head. Mesoscutum with short, appressed pubescence, granulate with slight transverse sculpture posteriorly, parapsidal grooves obsolete anteriorly, anterior and lateral lines not infuscated. Scutellum disk transversely sculptured, pits smooth. Mesopleuron pubescent, with spaced, curved ridges. Wing hyaline, almost bare, nonciliate, areolet reaching one-fifth way to basal, first abscissa of radius angulate. Claws simple. Carinae on propodeum slightly bent. Abdomen longer than high, all tergites showing on dorsal curvature. Ventral spine as long as hind metatarsus. Length 3.4 mm. Belongs in Group A of *Callirhytis*. Nearest related species are eastern.

TYPES: USNM 63020, type. One paratype in CA.

HOST: *Quercus emoryi* Torr.

GALL (pl. 1, fig. 3): Similar to a "pip" gall in shape but produced on the side of the cup of an undersized acorn in June and July. Gall slightly flattened, 4 mm. high by 3 mm. in diameter.

HABITAT: The type and one paratype are from galls collected at Cherry, Ariz., by Mrs. N. W. Capron on Oct. 4, 1935. One adult emerged April 23 and the other May 1, 1937. One paratype is from a gall Mrs. Capron collected at Prescott, Ariz., Sept. 12, 1950, and the living adult was cut out Apr. 11, 1952. Galls were seen in the Santa Catalina and Huachuca Mountains and at Patagonia, Nogales, and Bisbee, Ariz., and at Alpine, Tex.

Callirhytis floripara, new species

FEMALE: Light brown, head darker, antennae and legs straw-yellow. Head coriaceous; from above transverse, as broad as thorax, slightly broadened behind eyes; from in front malar space about half as long as eye without groove, antennae 13-segmented. Mesoscutum coriaceous, parapsidal grooves percurrent, broader behind. Disk pebbled, from rear rugose, pits deep, smooth. Mesopleuron bare, striate. Wing hyaline, dotted, nonciliate, veins beyond second cross-vein pale. Claws small, simple. Carinae on propodeum slightly curved. Abdomen shorter than head plus thorax, lengths of tergites on dorsal curvature as 32:7:2. Tergite II smooth. Ventral spine three times as long as broad in side view. Using width of head as a base, the length of mesonotum ratio is 1.1, antenna 2.3, wing 4.0, ovipositor 2.5. Length 1.1–1.5 mm. Average of 100 specimens, 1.27 mm.

MALE: Almost black with antennae and legs yellow. Antennae 14-segmented, the third longest and slightly bent. Wing ciliate. Length 0.95–1.35 mm. Average of 100 specimens, 1.21 mm.

The well-developed second abscissa of radius and a distinct cubitus distinguish this from the other species in Group B reared from flower galls.

TYPES: USNM 63021, type female, allotype, and 10 paratypes. Other paratypes in AM, CM, PA, C, CA.

HOST: *Quercus agrifolia* Née.

GALL (pl. 1, fig. 4): A thin-walled, conical, tan gall measuring up to 2.2 mm. long by 1.0 mm. in diameter, developed from a filament and bearing distally trace of a shriveled anther, scattered in among normal stamens in a much-shortened inflorescence.

HABITAT: The types are from galls collected from a tree of *Q. agrifolia* Née at Carpinteria, Calif., on Apr. 29, 1918, when adults were emerging in large numbers and when adults (probably these) were observed ovipositing in young acorns. Adults continued to emerge until May 18 in material sent to Washington as "Hopk. U. S. No. 15606^d." This tree also had galls of *Callirhytis carmelensis*

Weld on acorns of the previous season. These flower galls were seen also at Paso Robles and Monterey, Calif., on trees which had *C. carmelensis* also, circumstantial evidence that this is the alternating generation of that species.

Callirhytis glomerosa, new species

FEMALE: Amber. Head from above transverse, narrower than thorax (48:50), occiput concave; from in front broader than high, cheeks broadened behind eyes, no malar groove, striate and pubescent about mouth, antennae 13-segmented. Mesoscutum almost bare, coriaceous, parapsidal grooves percurrent, broader and deeper behind, a median present posteriorly as a groove or as discontinuous punctures. Scutellum coriaceous behind the pits, rugose peripherally. Mesopleuron almost bare, coriaceous above, striate below. Wing hyaline, dotted, nonciliate, radial cell open at base, cubitus barely visible. Carinae on propodeum slightly bent. Abdomen with an interrupted ring of tangled pubescence at base with similar patches on sides of propodeum, metapleura, and hind coxae, all the tergites visible, the posterior ones punctate, ventral spine longer than hind metatarsus. Using width of head as a base, the length of mesonotum ratio is 1.1, antenna 2.1, wing 3.64, ovipositor 3.5. Length 1.8–2.05 mm. Described from four specimens, one on slide.

TYPE: USNM 63022, type and one paratype.

HOST: *Quercus coccinea* Muenchh.

GALL (pl. 1, fig. 2): A smooth greenish or brownish (in sun) bud gall in September or October about 3 mm. in diameter, over half of it projecting beyond the bud scales, dropping when full-grown and then slightly pubescent at the base. Adults emerge the second spring.

HABITAT: The type is from a gall collected at East Falls Church, Va., in late September 1933 and the adult cut out Oct. 16, 1934. Paratypes are from Vienna and Alexandria, Va. Similar galls have been seen on northern red oak, Spanish oak, and on *Quercus ilicifolia* Wangenh. Not in type series is one from Baldwin County, Kans., collected in May by J. C. Bridwell.

Callirhytis intersita, new species

FEMALE: Reddish brown; antennae, face in part, and legs beyond coxae light yellow. Head finely rugose; from above transverse, cheeks broadened behind eyes, occiput concave; from in front malar space striate, antennae 14-segmented. Sides of pronotum rugose. Mesoscutum broader than long, bare, transversely rugose, the parapsidal grooves obsolete anteriorly. Disk of scutellum entirely rugose, pits with longitudinal ridges. Mesopleuron rugose above and below a coriaceous area. Wing short-pubescent, nonciliate, veins clear, no

areolet. Claws simple. Abdomen as long as head plus thorax, as high as long, tergites shining, III-VI finely punctate, lengths as 60:18:18:4:3. Ventral spine very short. Length 2.1-2.75 mm. Average of 18 specimens, 2.44 mm.

Distinguished from *C. lapillula* Weld whose parapsidal grooves are percurrent with face coriaceous instead of rugose below the median ocellus.

TYPES: USNM 63023, type and 4 paratypes. Other paratypes in AM, CM.

HOST: *Quercus alba* L.

GALL: Unknown. These were taken ovipositing in the internodes of the green new growth of white oak twigs on April 25, 29, and May 5. What gall resulted, if any, is not known. There are cells in the pith of white oak twigs, but fragments of the only dead adults cut out so far are different from these.

HABITAT: The type is selected from adults taken ovipositing at Vienna, Va., on Apr. 29, 1945. Paratypes are from East Falls Church, Va., Apr. 25, 1941, and May 5, 1946.

Callirhytis manni, new species

FEMALE: Light red, mesopleura and propodeum darker. Head coriaceous but rugose above and below antennae; from above transverse, broader than thorax, cheeks bulging behind eyes, occiput concave; from in front, malar space not striate, antennae 14-segmented. Sides of pronotum striate. Mesoscutum bare, finely pebbled, parapsidal grooves percurrent, anterior lines smooth. Disk of scutellum coriaceous back of the smooth pits, rugose peripherally. Mesopleuron bare, coriaceous. Wing pubescent, ciliate, veins brown, first abscissa of radius angulate, areolet distinct. Claws simple. Abdomen shorter than head plus thorax, as high as long, tergites smooth, lengths as 65:15, ventral spine 3-4 times as long as broad. Length 2.5-2.85 mm. Average of 7 specimens, 2.58 mm. Distinguished from *C. suttoni* (Ashmead) which has mesonotum pubescent and punctate.

TYPES: USNM 63024, type and one paratype. Other paratypes in AM, CM.

HOST: An undetermined oak.

GALL: A spindle-shaped woody stem swelling similar to the gall of *Callirhytis floridana* (Ashmead).

HABITAT: The types are from galls collected Jan. 22, 1935, at Tepic, Mexico. Adults emerged in packet. Dr. William Mann collected these galls in March 1923.

Callirhytis medularis, new species

FEMALE: Amber, abdomen and hind tibiae darker. Head coriaceous; from above massive, broader than thorax, cheeks bulging behind eyes, occiput concave; from in front malar space faintly striate above groove, antennae 13-segmented. Mesoscutum transversely rugose, less coarsely so anteriorly, parapsidal grooves percurrent, no median. Scutellum rugose, the sculptured groove at base with indistinct septum. Mesopleuron bare, coriaceous. Wing dotted, nonciliate, veins clear beyond second cross-vein, no areolet. Claws simple. Carinae on propodeum diverging slightly behind. Abdomen as long as head plus thorax, tergite II bare at base, reaching back half-way, its hind margin and exposed parts of rest coriaceous. Ventral spine very short, valves exerted. Using width of the head as a base, the length of mesonotum ratio is 1.2, antenna 2.2, wing 3.15, ovipositor 8.7. Length 2.2–2.9 mm. Average of 25 specimens, 2.37 mm.

MALE: Body dark; antennae, parts of head, and legs amber. Antennae 15-segmented, tapering to tip, third strongly bent and almost as long as fourth. Wing pubescent and ciliate. Abdomen shorter than thorax, lengths of tergites on dorsal margin as 47 : 10 : 3, exposed part of III coriaceous. Length 1.25–2.0 mm. Average of 40 specimens, 1.55 mm.

Belongs in Group B of *Callirhytis*. Ruled out of *Bassettia* by its short ventral spine and bare base of abdomen. The sculpture suggests that this may be the sexual generation of a species making stone galls in acorns. The unusually long ovipositor also suggests this.

TYPES: USNM 63025, type female, allotype, and 6 paratypes. Other paratypes in AM, CM, PA, C.

HOSTS: *Quercus borealis*=*Q. rubra* L., *Q. velutina* Lam., and *Q. coccinea* Muenchh.

GALL (pl. 1, fig. 6): Cells in the pith of current year's growth of various red oaks with no visible evidence until exit holes are noticed, when it is too late to secure adults. Synergus and three species of chalcids emerged the next spring, April 27 to May 3.

HABITAT: The types are selected from a series of 16 females and 35 males reared by Dr. F. C. Craighead near Blain, Pa., from twigs of northern red oak, the males emerging July 15 to July 24, the females July 16 to Aug. 1, 1956, from current season's growth. He had cut out dead males and females in August 1955. Four paratypes were cut out of twigs of scarlet oak in August 1950 at Cincinnati, Ohio,

by R. B. Neiswander. From black oak are two paratypes from Vienna, two from Williamsburg, and one from East Falls Church, Va.

Nurseries at Cincinnati, Ohio, and at Southampton, Pa., reported that leaders of pin and scarlet oaks broke off where weakened by many exit holes causing lateral branches to form, resulting in poor-headed trees. The landscape superintendent at Williamsburg, Va., reported branches 12-18 inches long breaking off there. Similar cells in the pith of willow oak were noted at Durham, N. C., where 200 terminal twigs, weakened by exit holes, had been broken off or left hanging on one tree on the Duke University campus. Similar cells occur in the pith of twigs of red oak in Missouri and in blackjack and scrub oak in Virginia.

Callirhytis perobscura, new species

FEMALE: Reddish brown to black, base of abdomen red, legs, except hind and middle coxae, and antennae brown. Head rugose; from above transverse, cheeks broadened behind eyes, occiput slightly concave; from in front malar space 0.3 of eye, antennae 14-segmented. Sides of pronotum and propleura rugose. Mesoscutum beautifully coriaceous, parapsidal grooves percurrent, anterior and lateral lines sunken, median extending to middle of anterior lines. Disk of scutellum rugose, pits with longitudinal ridges. Wing pubescent, non-ciliate, venation complete, first abscissa of radius angulate. Claws simple. Abdomen longer than high, shorter than head plus thorax, bare at base, lengths of tergites as 33:7, hind margin of II and exposed part of III finely coriaceous. Ventral spine short. Length 3.5-4.25 mm. Average of 15 specimens, 3.93 mm.

Belongs in Group C, the root gall group, near *C. marginata* Weld, from which it is distinguished by its longer median groove and sunken anterior and lateral lines.

TYPES: USNM 63026, type and 3 paratypes. Other paratypes in AM, CM, PA.

HOST: *Quercus velutina* Lam.

GALL: Unknown.

HABITAT: The types were taken ovipositing in buds at East Falls Church, Va., on Apr. 18 and 20, 1927, Apr. 22, 1930, Apr. 23, 1932, Apr. 23, 1947, and at Takoma Park, Md., on Apr. 13, 1925.