

**Article XVIII.—THE SPECIES OF *BIORHIZA*, *PHILONIX* AND ALLIED GENERA, AND THEIR GALLS.**

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PLATES XLI–XLIII.

This paper constitutes the fifth installment of a series of papers on North American Cynipidæ and their galls which have been published by me in this volume of the Bulletin. The first being on *Rhodites*, the second on *Holcaspis*, the third on *Amphibolips* and the fourth on *Diastrophus*. The species of *Biorhiza*, *Philonix*, *Zopheroteras*, *Parateras* and *Xystoteras* are small ant-like creatures, and in general appearance resemble ants belonging to the genus *Cremastogaster* or *Dolichoderus*. They are known by the females only and possibly may be parthogenetic generations with rudimentary wings or wingless forms of some other bisexual and winged species belonging to other genera. *Philonix*, *Zopheroteras*, *Xystoteras* and *Parateras* are vaguely distinct from *Biorhiza*. A synoptic table of these genera was published by W. H. Ashmead in 'Psyche,' Vol. X, 1903, pages 148–150.

***Biorhiza* Westwood.**

*Biorhiza* WESTWOOD, Intro. Class. Ins., Vol. II, 1840, Synop., p. 56; MAYR, Gen. Gallenb. Cynip., 1881, p. 31; CRESSON, Synop. Hymen. N. Am., 1887, p. 26; ASHMEAD, Psyche, Vol. X, 1903, p. 149.

*Teras* HARTIG, Zeitsch. für Ent., Vol. II, 1840, p. 185; MAYR, Gen. Gallenb. Cynip., 1881, p. 31; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 56.

*Apophyllus* HARTIG, Zeitsch. für Ent., Vol. II, 1840, p. 185; MAYR, Gen. Gallenb. Cynip., 1881, p. 31; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 56.

*Biarrhiza* FITCH, 5th Rep. Nox. Ins. N. Y. Trans. N. Y. Agricul. Soc., 1858 (1859), p. 781.

*Dryoteras* FÖRSTER, Verh. zool.-bot. Gesell. Wien, Vol. XIX, 1869, p. 331; MAYR, Gen. Gallenb. Cynip., 1881, p. 31; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 56.

*Biorrhiza* DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 59; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 56.

*Sphæroteras* ASHMEAD, Psyche, Vol. VIII, 1897, p. 67; *ibid.* Vol. X, 1903, p. 150; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 56.

*Xanthoteras* ASHMEAD, Can. Ent., Vol. XXIX, 1897, p. 262; Psyche, Vol. X, 1903, p. 149; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 56.

*Phylloteras* ASHMEAD, Psyche, Vol. VIII, 1897, p. 67; *ibid.*, Vol. X, 1903, p. 149.

*Female.* Head with a ridge between the antennæ. Antennæ 14-jointed, stout, third joint longer than the fourth, joints seven to fourteen stouter than the second to sixth. Tarsi shorter than or as long as the tibiæ. Parapsidal grooves present. Scutellum rounded and without distinct foveæ. Claws with or without a tooth within.

Type: *Cynips aptera* Bosc.

### ***Biorhiza forticornis* (Walsh).**

*Cynips quercus ficus* FITCH, 5th Rep. Nox. Ins. N. Y., Trans. N. Y. State Agricul. Soc., 1858 (1859), p. 782; OSTEN SACKEN, Proc. Ent. Soc. Phila., Vol. I, 1861, p. 69; GLOVER, Ill. N. Am. Ent., 1878, pl. viii, fig. 15; PACKARD, Bull. 7, U. S. Ent. Com., 1881, p. 39; 5th Rep. U. S. Ent. Com., 1890, p. 111. (Gall only.)

*Cynips q. ficus* OSTEN SACKEN, Ent. Zeit. Stettin, 1861, pp. 410, 413; Proc. Ent. Soc. Phila., Vol. II, 1863, p. 328; WALSH, Proc. Ent. Soc. Phila., Vol. II, 1864, p. 489.

*Cynips q. forticornis* WALSH, Proc. Ent. Soc. Phila., Vol. II, 1864, p. 490.

*Cynips (Teras) forticornis* OSTEN SACKEN, Proc. Ent. Soc. Phila., Vol. IV, 1865, pp. 340, 350, 353.

*Biorhiza forticornis* MAYR, Gen. Gallenb. Cynip., 1881, p. 32; ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 296; *ibid.*, Vol. XIV, 1887, p. 132; Bull. 1, Col. Biol. Assoc., 1890, p. 38; GILLETTE, 27th Rep. Agricul. Mich., 1888, p. 470; Psyche, Vol. V, 1889, p. 186; Proc. Iowa Acad. Sci., Vol. I, pt. II, 1892, p. 113; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist., Vol. IV, 1892, p. 259, pl. XIII, fig. 3; Am. Mus. Journ., Vol. IV, 1904, p. 105, fig. 36; Ins. Galls Vicin. N. Y., 1904, p. 19, fig. 36; BRODIE, Ann. Rep. Forest, Ontario, 1896, p. 114, fig. 1; BRIDWELL, Trans. Kans. Acad. Sci., Vol. XVI, 1899, p. 203; FELT, 7th Rep. N. Y. Forest, Fish and Game, 1901, p. 530, pl. x, fig. 2; Ins. Affect. Park and Woodl. Trees, Vol. I, 1905, pl. 48, figs. 1, 2; *ibid.*, Vol. II, 1906, p. 626; JARVIS, 38th Rep. Ent. Soc. Ont., 1907 (1908), p. 90, pl. c. fig. 2; FLETCHER, 38th Rep. Ent. Soc. Ont., 1907 (1908), p. 128.

*Biorrhiza forticornis* DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 60; DALLA TORRE, and KIEFFER, Gen. Ins. Hymen Fam. Cynip., 1902, p. 56.

*Xanthoteras forticornis* ASHMEAD, Can. Ent., Vol. XXIX, 1897, p. 262; Psyche, Vol. X, 1903, p. 149; COOK, 29th Rep. Dept. Geol. & Nat. Hist. Indiana, 1904 (1905), p. 833, fig. 26.

*Female.* Head rufous, scarcely polished, somewhat alutaceous. Eyes black. Antennæ stout, 14-jointed black or pitchy brown black. Thorax rufous, shining with the parapsidal groove deep and distinct, widely separated, converging at the scutellum. Scutellum shining, rounded, elevated, depressed at the base and with a few hairs. Pleuræ rufous, subopaque. Abdomen pitchy brown black, sometimes paler basally, compressed dorsally and ventrally, sides rounded. Ventral spine, hairy. Legs rufous, hind femora and tibiæ sometimes darker. Wings short, extending to about the second segment. Length 1.75 to 2.50 mm.

*Gall.* (Plate XLI, Figs. 1-7 and Plate XLII, Figs. 1, 2.) On the shoots of young white oaks (*Quercus alba*), dwarf chestnut oak (*Quercus prinoides*) and chestnut oak (*Quercus prinus*) in August to late in fall. Consists of many small, soft, thin shelled bladder-like bodies, each containing a single cell, which is held in position by many radiating fibers. They are closely pressed together and somewhat resemble figs packed in boxes,—hence the name “Fig Gall.” Pale yellow, often beautifully tinged with red. Brown and brittle in winter.

*Habitat.* Canada; New England and Middle States westward to Colorado; Virginia; North Carolina.

***Biorhiza mellea* Ashmead.**

*Biorhiza mellea* ASHMEAD, Trans. Am. Ent. Soc., Vol. XIV, 1887, pp. 138, 127.

*Biorrhiza mellea* DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 61; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 56.

*Sphæroteras mellea* ASHMEAD, Psyche, Vol. VIII, 1897, p. 67.

*Female.* Head dark honey yellow, finely punctate; eyes brown. Thorax dark honey yellow, smooth, shining with distinct parapsidal grooves. Scutellum dark honey yellow, rugose. Abdomen dark honey yellow, large, longer than the head and thorax combined, compressed and vertically as broad as long. Legs honey yellow. Wings rudimentary. Length 1.75–2 mm.

*Gall.* (Plate XLII, Figs. 3, 4.) On the upper side of the leaf of post oak (*Quercus minor*). Separately or in clusters of three or more. Small, globular and externally they are covered with minute warty pubescent dots. Internally they are fleshy and when matured are of a more or less cellular consistency and shrivel in drying. Attached by a slender point to the leaf and are easily detached. Diameter 2.50 to 3.75 mm.

*Habitat.* New Jersey (Lakehurst); Florida.

***Biorhiza rubina* Gillette.**

*Biorhiza rubinus* GILLETTE, 27th Rep. Agric. Mich., 1888, p. 472; Psyche, Vol. V, 1889, p. 215; Proc. Iowa Acad. Sci., 1887–89 (1890), p. 54; *ibid.*, Vol. I, pt. ii, 1892, p. 113.

*Biorrhiza rubina* DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 61.

*Phylloteris rubinus* ASHMEAD, Psyche, Vol. VIII, 1897, p. 67.

*Trigonaspis rubina* DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 55.

*Female.* Head black with shining hairs, clypeus with a number of rather stout hairs, a very few short hairs on the front border of epicranium and on the occiput, vertex bare. Antennæ brown-black, pubescent 13-jointed, reaching the middle of the abdomen, first and second joints nearly equal in length and rather stout, the first somewhat stouter than the second, third joint longest and most slender, fourth to twelfth gradually shortened, thirteenth one and a half as long as the twelfth. Thorax black, pubescent. Parapsidal grooves, shallow and indistinct, extending about one third of the way from the scutellum to the collar. Scutellum much rounded behind with two shallow foveæ at base. Abdomen smooth, glossy, black. Legs black with the joints yellowish brown, pubescent. Length 1.50 mm.

*Gall.* On the under sides of the leaves of white oak (*Quercus alba*) in autumn. Subglobular, juicy, and of a rosy color. Diameter 2 to 3 mm.

*Habitat.* New York; Iowa; Michigan.

This species is not known to me; the single type female is with Prof. C. P. Gillette.

**Biorhiza nigra Fitch.**

*Biarhiza nigra* FITCH, 5th Rep. Nox. Ins. N. Y., (Trans. N. Y. Agricul. Soc., 1858 (1859), p. 782).

*Biorhiza nigra* OSTEN SACKEN, Proc. Ent. Soc. Phila., Vol. IV, 1865, p. 353; ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 296; *ibid.*, Vol. XIV, 1887, p. 132; Proc. Ent. Soc. Wash., Vol. III, 1895, p. 262.

*Biorrhiza nigra* DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 61; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 56.

*Xystoteras nigra* ASHMEAD, Smith. Cat. Ins. N. J., 1890, p. 548.

*Female.* Black throughout, including the feet and antennæ. Head broader than the thorax, and appearing twice as broad as long when viewed from above. Antennæ 14-jointed, thread-like and as long as the body. Abdomen strongly compressed, and broad when viewed in profile; the sutures marked by fine impressed transverse lines, and the first segment very large, about equal in length to all the remaining segments. The abdomen is much more smooth and shining than the thorax and head, which are bearded with minute gray hairs. Wings wanting. Length 2 mm.

*Habitat:* New York (Albany).

This species is unknown in collections and I do not seem to recognize it from the description. The type is lost.

**Philonix Fitch.**

*Philonix*, FITCH, 5th Rep. Nox. Ins. N. Y. (Trans. N. Y. Agricul. Soc., 1858 (1859), p. 782); ASHMEAD, Cat. Ins. N. J. (Smith), 1900, p. 548; Psyche, Vol. X, 1903, p. 148.

*Acraspis* MAYR, Gen. Gallenb. Cynip., 1881, p. 29; CRESSON, Syn. Hymen. N. Am., 1887, pp. 26, 28; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 58.

*Female.* Wings rudimentary or absent. Head large, genæ with or without a very fine furrow. Antennæ 14-jointed, filiform, long, third joint longest, following joints gradually decreasing in length. Head behind the eyes broadened. Pronotum very narrow in the middle, very broad laterally. Mesonotum with or without parapsidal grooves, when present these do not extend to the anterior margin. Scutellum triangular, terminating in a blunt point posteriorly, foveæ at base wanting. Metanotum short. Abdomen large compressed laterally or globose, smooth or pubescent. Ventral spine with long bristle-like hairs. Claws with two teeth.

Type: *Philonix fulvicollis* Fitch.

Ashmead, in Psyche, Vol. X, 1903, p. 148, united *Acraspis* Mayr with *Philonix* Fitch and made *P. fulvicollis* the type of the genus. Fitch's description of *fulvicollis*, however, is too brief for recognition of the species, and perhaps it would be more appropriate to use *Cynips pezomachoides* O. S. for the type of *Philonix*. The males are not known.

**Philonix pezomachoides (Osten Sacken).**

*Cynips quercus pisum* FITCH, 5th Rep. Nox. Ins. N. Y. (Trans. N. Y. Agricul. Soc. 1858 (1859), p. 818, fig; OSTEN SACKEN, Proc. Ent. Soc. Phila., Vol. I, 1861, p. 59; Ent. Zeit. Stettin, 1861, pp. 408, 411. (Gall only.)

*Cynips pisum* ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 303; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist., Vol. IV, 1892, p. 258; Am. Mus. Journ., Vol. IV, 1904, p. 104, Fig. 34; Ins. Galls Vicin. N. Y., 1904, p. 18, fig. 34; COOK, Proc. Ind. Acad. Sci., 1904, p. 225; 29th Rep. Dept. Geol. & Nat. Hist. Indiana, 1904 (1905), p. 832; JARVIS, 37th Rep. Ent. Soc. Ontario, 1906 (1907), p. 72. (Galls only.)

*Cynips pezomachoides* OSTEN SACKEN, Proc. Ent. Soc. Phila., Vol. I, 1862, p. 250.

*Cynips (Teras) pezomachoides* OSTEN SACKEN, Proc. Ent. Soc. Phila., Vol. IV, 1865, pp. 340, 348, 352, 379.

*Acraspis pezomachoides* MAYR, Gen. Gallenb. Cynip., 1881, p. 31; ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 295; *ibid.*, Vol. XIV, 1887, p. 127; Bull. 1, Col. Biol. Assoc., 1890, p. 38; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 64; BRIDWELL, Trans. Kans. Acad. Sci., Vol. XVI, 1899, p. 203; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 58.

*Cynips q. pezomachoides* PACKARD, 5th Rep. U. S. Ent. Com., 1890, p. 113.

*Female.* Head black, rufous around the eyes or rufous with the vertex and face along the middle black, finely punctate, hairy. Antennæ brownish black, reddish basally, 14-jointed. Mesothorax reddish, parapsidal grooves extending well forward. Pleuræ dark brown black with a rufous patch. Scutellum rufous, pointed. Abdomen smooth, polished, dark brown black, basal segment with a large yellowish brown spot on each side or wholly yellowish brown. Ventral spine and tip of abdomen with long yellowish hairs. Legs rufous, tibiæ sometimes infuscated. Claws large. Wings very short. Length 2 to 3.25 mm.

*Gall.* (Plate XLIII, Fig. 1.) On the under or upper sides of the leaves of white oak (*Quercus alba*) in August and September. Pale yellowish sometimes tinged with red. Globular and somewhat resembling a pea. Its surface is finely netted with fissures or cracks and intervening elevated points. Inside are usually two larval cells divided by a thin partition. Diameter 5 to 7 mm.

*Habitat:* Canada; New England and Middle States; Virginia; North Carolina; Ohio; Illinois; Missouri; Indiana; Kansas; Colorado.

The insect described by Fitch as *Cynips quercus pisum* is a guest fly according to Osten Sacken. The types of *C. pezomachoides* are in the Museum of Comparative Zoölogy.

**Philonix erinacei sp. nov.**

*Cynips q. erinacei* WALSH, Proc. Ent. Soc. Phila., Vol. II, 1864, p. 483.

*Acraspis erinacei* MAYR, Gen. Gallenb. Cynip., 1881, p. 30; ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 295; *ibid.*, Vol. XIV, 1887, p. 128; Bull. 1, Col. Biol. Assoc., 1890, p. 38; GILLETTE, 27th Rep. Agricul. Mich., 1888, p. 470; Psyche,

Vol. V, 1889, p. 186; Proc. Iowa Acad. Sci., Vol. I, pt. ii, 1892, p. 112; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist., Vol. IV, 1892, p. 259, pl. xii, fig. 1; Am. Mus. Journ., Vol. IV, 1904, p. 104, fig. 35; Ins. Galls Vicin. N. Y., 1904, p. 18, fig. 35; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 64; BRIDWELL, Trans. Kans. Acad. Vol. XVI, 1899, p. 203; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 58; COOK, 29th Rep. Dept. Geol. and Nat. Hist. Indiana, 1904 (1905), p. 832, fig. 25; FELT, Ins. Affect. Park and Woodl. Trees, 1906, p. 627; JARVIS, 37th Rep. Ent. Soc. Ontario, 1906 (1907), p. 70.

*Female.* Head black, rufous on each side of the face, or around the eyes, finely punctate, with whitish pubescence. Antennæ black, basal joint rufous, 14-jointed. Thorax rufous, narrowly black around the sides and anteriorly. Pleuræ black, with a large rufous mark anteriorly. All minutely punctate, pubescent. Parapsidal grooves distinct posteriorly, obsolete anteriorly. Scutellum rufous, darkest basally, punctate and pointed posteriorly. Metathorax black. Abdomen piceous or rufopiceous, usually rufous basally and pubescent laterally. Ventral spine and tip of abdomen hairy. Legs yellowish rufous, tibiæ sometimes slightly darker. Wings aborted. Length 1.50 to 3 mm.

*Gall.* (Plate XLIII, Figs. 2, 3, 4.) Attached by a single point to the leaf and growing on one of the principal veins, but usually on the midrib of white oak (*Quercus alba*). It occurs on both sides of the leaves, and is fully developed late in August and September. Polythalamous rounded or elongate with the surface finely netted with fissures or cracks and more or less densely covered with spines. Yellow sometimes shaded with red with the spines usually red. Length 10–20 mm. Width 6–12 mm.

*Habitat:* Canada; New England and Middle States; North Carolina; Virginia, probably South to Florida; Michigan, Iowa, Illinois; Ohio; Kansas; Indiana; Colorado (?).

The adult does not appear to have been before described. I have retained Walsh's name *erinacei* which he applied to the gall only. The above description of the adult was made from eighteen specimens bred by the late H. F. Bassett from galls received from Ohio. The types are in the American Museum of Natural History. The gall is quite common in the vicinity of New York.

#### **Philonix echini (Ashmead).**

*Acraspis echini* ASHMEAD, Trans. Am. Ent. Soc., Vol. XIV, 1887, pp. 128, 140; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 64; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 58.

*Female.* Head reddish brown, finely rufous, eyes dark brown, ocelli red, shining. Antennæ 14-jointed, dark brown above, paler beneath, as long as the whole body, filiform, basal joint and some of the others slightly yellowish at the tip. Thorax reddish brown, finely rugose, slightly pubescent. Parapsidal grooves distinct posteriorly. Scutellum reddish brown, bluntly pointed, pubescent. Abdomen bright reddish brown, smooth, shining, compressed, second segment slightly pubescent laterally. Ventral spine hairy. Legs reddish brown, more or less infuscated, particularly along the outer edges of the tibiæ, pubescent. Wings short. Length 3.25 to 3.75 mm.

*Gall.* ♀ (Plate XLIII, Fig. 5.) On the leaves of swamp white oak (*Quercus platanooides*) in autumn. Almost globular, with the surface finely netted or fissured like a strawberry and covered with short spiny prickles. Yellowish in color. Internally there are from one to four cells, but usually only two cells. Diameter 5 to 7 mm.

*Habitat:* Florida.

The gall somewhat resembles that of *Philonix erinacei* and *Philonix pezomachoides*. It is smaller than *erinacei* and larger than *pezomachoides*. The surface is coarser than in *erinacei* and the spines are considerably shorter.

***Philonix prinoides* (Beutenmüller).**

*Cynips prinoides* BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist., Vol. IV, 1892, p. 257, pl. xi, fig. 6; DALLA TORRE and KEIFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 60; FELT, Ins. Affect. Park and Woodl. Trees, 1906, p. 627.

*Philonix prinoides* ASHMEAD, Cat. Ins. N. J. Smith, 1900, p. 548.

*Acraspis prinoides* BEUTENMÜLLER, Am. Mus. Jour., Vol. IV, 1904, p. 103, fig. 32, Ins. Galls Vicin. N. Y. 1904, p. 17, fig. 32.

*Female.* Head wholly black or dark rufous on the sides of the face, almost twice as broad as the thorax, sparsely pubescent. Antennæ 14-jointed, black, basal joints sometimes rufous. Thorax rufous or pitchy brown, very sparsely pubescent, somewhat shining. Parapsidal grooves distinct and extending well forward, convergent at the scutellum. Scutellum rufous, somewhat shining, and bluntly pointed posteriorly. Pleuræ dark rufous. Abdomen black, shining, smooth and inflated, not compressed; on the sides of the second segment are a few hairs, which are difficult to detect. Legs rufous. Wings very short. Length 1.50 to 3.25 mm.

*Gall.* (Plate XLIII, Figs. 6, 7.) On the upper or under side of the leaves of dwarf chestnut oak (*Quercus prinoides*), usually on the mid rib. In August and September. Monothalamous. Hard and woody. Globular with numerous cone-like projections, each with a long or short bristle. Green or yellowish usually tinged with red. Internally there is a rather large larval chamber. Diameter 6 to 12 mm.

*Habitat:* New York, New Jersey; Ohio.

The adult is very different from all other species of *Philonix*. The thorax is very narrow, the head is very broad, the parapsidal grooves are distinct and long, and the abdomen is globose. In general appearance the insect mimics a species of beetle of the genus *Anthicus*. The types are in the American Museum of Natural History.

***Philonix villosa* (Gillette).**

*Acraspis villosus* GILLETTE, 27th Rep. Agricul. Mich., 1888, p. 474; Psyche, Vol. V, 1889, p. 218, fig. 4; Proc. Iowa Acad. Sci., 1890, p. 55; *ibid.*, Vol. I, pt. ii, 1892, p. 113.

*Acraspis villosa* DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 64; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 58.

*Female.* Head punctate with the median line of the face black, cheeks and orbits cinnamon brown. Sometimes the face is nearly black in dark specimens, sparsely pubescent. Antennæ 13-jointed (14?). Thorax brown bordered anteriorly and posteriorly with black, pubescent. Parapsidal grooves wanting. Scutellum punctate, pubescent. Abdomen black, thickly set with yellowish gray pubescence that gives a decided velvety luster to the sides. Anterior dorsal portion of the second segment has a large bare spot that is continued as a line along the dorsum of the succeeding segments. The border of the segments show as black rings crossing the velvety surface. Legs brown, tarsi infuscated. Wings short. Length 4 mm.

*Gall.* (Plate XLIII, Figs. 8, 9.) On the midrib on the under side of the leaves of burr oak (*Quercus macrocarpæ*) in autumn. Hard globular with fissures and cracks somewhat like the gall of *P. erinacei*, but densely covered with very long bristle-like hairs. Pale yellow. Internally with a single larval cell. Diameter 9–11 mm. Hairs about 3 mm. long.

*Habitat:* Iowa; Michigan.

The adult of the species is not known to me and the types are with Prof. C. P. Gillette. Cotypes of the galls were kindly given to me by Prof. Gillette. The flies emerge in October.

#### **Philonix hirta** (Bassett).

*Cynips g. hirta* BASSETT, Proc. Ent. Soc. Phila., Vol. III, 1864, p. 688.

*Cynips hirta* OSTEN SACKEN, Proc. Ent. Soc. Phila., Vol. IV, 1865, pp. 340, 347, 353.

*Cynips (Teras) hirta* OSTEN SACKEN, Proc. Ent. Soc. Phila., Vol. IV, 1865, p. 379.

*Biorhiza hirta* ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 296; *ibid.*, Vol. XIV, 1887, p. 127; Bull. 1, Col. Biol. Assoc., 1890, p. 38; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist., Vol. IV, 1892, p. 260; BRIDWELL, Trans. Kans. Acad. Sci., Vol. XVI, 1899, p. 204.

*Biorrhiza hirta* DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 60; DALLA TORRE and KIEFFER, Gen. Ins. Hymen., Fam. Cynip., 1902, p. 56.

*Philonix hirta* Ashmead, Cat. Ins. N. J. Smith, 1900, p. 548.

*Female.* Head black, very dark rufous on each side of the face, minutely rugose. Antennæ pitchy brown black. Mesothorax dull rufous, somewhat infuscated on the disc, pubescent. Parapsidal grooves short. Pleuræ dark brown sometimes marked with rufous. Scutellum pointed, finely rugose, rufous, somewhat infuscated, pubescent. Abdomen pitchy brown, with a pubescent patch on each side of the second segment, the remaining segments, except the first bounded across the back and sides on the posterior edges by a belt of long, grayish white hairs, divided on the dorsal ridge by a shining, smooth narrow line, like the anterior portion of the segments. Legs dark brown, somewhat infuscated. Wings very short, extending a little beyond the scutellum. Length 2 to 3 mm.

*Gall.* (Plate XLIII, Fig. 10.) On the veins on the upper and under sides of the leaves of chestnut oak (*Quercus prinus*) in September and October. Green or yellowish green. Hard, round, with the outer surface composed of fissures each with a short point. Internally there is a single larval cell. Diameter 4 to 6 mm.

*Habitat:* Massachusetts; Connecticut; New York; New Jersey; District of Columbia; Pennsylvania; Kansas; Colorado (?).



The gall very much resembles that of *Philonix pezomachoides* but the adult is very different from this species. It is allied to *Philonix macrocarpæ*. The types are in the American Museum of Natural History and the American Entomological Society.

***Philonix macrocarpæ* (Bassett).**

*Acraspis macrocarpæ* BASSETT, Trans. Am. Ent. Soc., Vol. XVII, 1890, p. 84; GILLETTE, Proc. Iowa Acad. Sci., Vol. I, pt. II, 1892, p. 113; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 64; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 58; JARVIS, 37th Rep. Ent. Soc. Ontario, 1906 (1907), p. 69; BEUTENMÜLLER, Bull. Am. Mus. Nat. Hist., Vol. XXIII, 1907, p. 466.

*Acraspis undulata* GILLETTE, Ent. News, Vol. IV, 1893, p. 28.

*Philonix macrocarpæ* ASHMEAD, Cat. Ins. N. J. Smith, 1900, p. 548.

*Female.* Head black, finely punctate, with minute hairs, mandibles somewhat rufous. Antennæ 14-jointed. Thorax pitchy brown black, sometimes rufous along the lateral margins of the mesonotum; clothed with grayish hairs. Parapsidal grooves indistinct. Scutellum pitchy brown black, finely punctate, pointed posteriorly, pubescent. Pleuræ pitchy brown black. Abdomen pitchy brown black, sometimes paler basally, compressed and the sides covered with gray hairs. Venter, dorsum and tip of abdomen smooth and shining. Legs dark brown. Wings quite short. Length 2 to 2.75 mm.

*Gall.* (Plate XLIII, Fig. 11.) On the underside of the leaves of burr oak (*Quercus macrocarpæ* and *Quercus undulata*). Usually found on the lateral veins or on the midrib singly or in numbers. Pale green or yellow, oval or rounded. The surface presents a crackled appearance, fine fissures or lines dividing it into a large number of facets, each of which is crowned with a short hard point. Internally is a single larval cell and the space between the inner and outer surface of the gall is filled with a hard pinkish, crystalline, substance. Diameter 2 to 4 mm.

*Habitat:* Ohio, Michigan, Iowa, New York (St. Lawrence Co.); Colorado (Manitou); Canada (Ontario).

Closely allied to *Philonix macrocarpæ* Bassett. The types of *A. macrocarpæ* are in the American Museum of Natural History and the American Entomological Society and the types of *A. undulata* are with Prof. C. P. Gillette and the American Museum of Natural History.

***Philonix nigra* (Gillette).**

*Acraspis niger* GILLETTE, Bull. 7 Iowa Agric. Exp. Sta., 1889, p. 282; Ent. Amer., Vol. VI, 1890, p. 23; Proc. Iowa Acad. Sci., Vol. I, pt. II, 1892, p. 113.

*Acraspis nigra* DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 64; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 58.

*Acraspis gillettei* BASSETT, Trans. Am. Ent. Soc., Vol. XXVI, 1900, p. 323; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 58.

*Female.* Head black or dark reddish black, very minutely rugoso-punctate,

with a few pale hairs. Antennæ black or rufo-piceous, 14-jointed. Mesothorax varying from black to rufous, when rufous it usually has a blackish mark anteriorly. Prothorax black, scutellum black or rufous, metathorax black; all minutely punctate with decumbent, pale hairs; parapsidal grooves, present, distinct posteriorly, obsolete anteriorly. Scutellum pointed posteriorly. Pleuræ black sometimes marked with rufous. Abdomen black, large, with a patch of pale hairs on each side at the base. Ventral spine with long pale yellowish brown hairs. Legs dark brown, pubescent. Wings rudimentary, extending to nearly the middle of the abdomen. Length 2.50 to 3.50 mm.

*Gall.* (Plate XLIII, Figs. 12, 13.) On the underside of the leaves of white oak (*Quercus alba*), burr oak (*Quercus macrocarpa*) and dwarf chestnut oak (*Quercus prinoides*) in the fall. Monothalamous. Globular and covered with a short, dense pubescence, which give them the appearance of felt. Pale ashen gray brown, but brown if long exposed to the weather. Internally is a larval cell kept in place by a spongy mass that is loosely fibrous on the inner surface of the gall. The outer shell is thin and hard. Diameter 6 to 11 mm.

*Habitat:* Connecticut; New York; New Jersey; Pennsylvania; Ohio; Illinois; Michigan; Iowa.

The adult is subject to variation as regards the coloration of the head and thorax. These parts vary from black to rufous in twenty specimens before me. *Acraspis niger* was described from a single specimen with the head black and the thorax a little reddish brown above. *Acraspis gillettei* was described from specimens with the head and thorax dark reddish brown. The gall is usually quite abundant on the leaves of *Quercus prinoides*. They become easily detached and may be found on the ground under the trees. The fly emerges the following summer. The type of *A. nigra* is with Prof. C. P. Gillette and the types of *A. gillettei* are in the American Museum of Natural History and the American Entomological Society.

### ***Philonix lanæglobuli* (Ashmead).**

*Acraspis lanæglobuli* ASHMEAD, Trans. Am. Ent. Soc., Vol. XIV, 1887, pp. 128, 139; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 64; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 58.

*Female.* In size and general appearance very closely resembles *Acraspis echini*; but differs as follows: mandibles black; antennæ brown black from sixth to terminus, although the fifth joint is also sometimes black at base; the legs are not obfuscated and the posterior coxæ is very hairy; the abdomen is pale and the terminal segments are blackish. Length 4 to 4.50 mm.

*Gall:* On the under side of the leaves of swamp white oak (*Quercus platanooides*). Round or globular, slightly attached to the leaf and covered with a fine, dense, grayish pubescence. Internally of a pithy structure, with a large thin shelled kernel in the centre. Diameter 7.50 to 8 mm.

*Habitat:* Florida.

This species is not known to me; the type is in the United States National Museum.

***Philonix compressa* (Gillette).**

*Acraspis compressus* GILLETTE, Ill. State Lab. Nat. Hist., Vol. III, 1890, p. 197.

*Acraspis compressa* DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 64; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 58.

*Female.* Head and thorax rufous, abdomen black, head nearly twice as broad as thorax, the latter very small and narrow, abdomen very much compressed and when viewed from the side, appearing twice as large as the head and thorax together; vertex and occiput dark brown, mandibles black, clypeus punctured and with few hairs. The entire head covered with a net-work of depressed lines; antennæ rufous, 14-jointed. Thorax very small and narrow, seeming, when viewed from above, out of all proportion with the comparatively large and very broad head; sculptured like the head without the usual furrows. Scutellum very narrow and much elevated posteriorly, and appearing when viewed laterally, in the shape of a crow's beak; a shining transverse groove but no foveæ at base. Abdomen very strongly compressed, not broader in the thickest part than the thorax, shining black in color with some rufous at base, free from hairs or punctures, as deep as long, its length compared with that of the entire insect being as 3 to 5 and the second segment occupying fully two thirds of the dorsum. Feet dark reddish brown. Wings entirely wanting.

*Gall.* Attached to the underside of the leaves of red oak (*Quercus rubra*) and scarlet oak (*Quercus coccinea*) in the fall, about the time the leaves are beginning to turn brown. Subglobular bodies from 2 to 3 mm. in diameter. The galls appear like wax, and are either pure white or tinged with red while on the leaves, and when cut into are fleshy and juicy like a potato. They fall to the ground with or a little before the leaves, and each develops a single larva which gets its growth in the fall but does not emerge until the following summer. Only a very thin shell of the gall is left after the fly emerges.

*Habitat:* Iowa (Ames); New York (Westchester Co.).

The adult of this species is not known to me and Prof. Gillette's description of it and of the gall is here reproduced. I have taken the galls in numbers at Katonah, Westchester County, New York, on the undersides of the leaves of the Scarlet Oak (*Quercus coccinea*) but did not succeed in rearing the flies. The gall is a pretty wax-like object and is easily detached from the leaves. My specimens were collected in October and November. If I remember rightly, I have also taken the galls in New Jersey and on Long Island, New York, some years ago. The adult, according to Gillette, is destitute of wings, and the abdomen is very much compressed. The types are in the State Laboratory of Natural History, at Urbana, Illinois.

***Philonix polita* (Bassett).**

*Acraspis politus* BASSETT, Trans. Am. Ent. Soc., Vol. XVII, 1890, p. 85.

*Acraspis polita* DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 64; DALLA TORRE and KIEFFER. Gen. Ins. Hymen. Fam. Cynip., 1902, p. 58.

*Female.* Entirely black. Head smooth, shining. Antennæ 14-jointed, first

joint large, club-shaped, second joint oblong-ovate, third joint as long as the first and second together, fourth joint two thirds as long as the third, remaining joints rather short. Thorax very small, smooth and shining. Scutellum minute, short and without foveæ. Legs brownish black, shining; tarsi brownish. Wings wanting. Length 1.75 mm.

*Gall.* Unknown.

*Habitat:* Missouri (Washington County).

The smallest known species of *Philonix*. The types are in the American Entomological Society.

### ***Philonix fulvicollis* Fitch.**

*Philonix fulvicollis* FITCH, 5th Rep. Nox. Ins. N. Y. (Trans. N. Y. Agricul. Soc., 1858 (1859), p. 783); OSTEN SACKEN, Proc. Ent. Soc. Phila., Vol. IV, 1865, p. 333; ASHMEAD, Psyche, Vol. X, 1903, p. 143.

*Teras fulvicollis* OSTEN SACKEN, Proc. Ent. Soc. Phila., Vol. IV, 1865, p. 379.

*Biorhiza fulvicollis* ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 296.

*Biorrhiza fulvicollis* DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 60; DALLA TORRE and KIEFFER, Gen. Ins. Hymen., Fam. Cynip., 1902, p. 56.

According to Fitch this species measures .13 to .15 of an inch (= 3.25 to 3.75 mm.) and is black with the thorax tawny yellow, spotted anteriorly with black, the scutellum brighter yellow, and the legs dusky or blackish with the knees and hips of a paler dull yellowish color, the antennæ being black to their bases. The thorax when carefully inspected shows a broad black stripe on its fore part, on each side of which is a small oval black spot and further down upon each side, forward of the wing sockets, is a large triangular black spot. The insect is found in the latter part of November and the beginning of December.

### ***Philonix nigricollis* Fitch.**

*Philonix nigricollis* FITCH, 5th Rep. Nox. Ins. N. Y. (Trans. N. Y. Agricul. Soc., 1858 (1859), p. 783); OSTEN SACKEN, Proc. Ent. Soc. Phila., Vol. IV, 1865, p. 353.

*Cynips (Teras) nigricollis* OSTEN SACKEN, Proc. Ent. Soc. Phila., Vol. IV, 1865, p. 379.

*Biorhiza nigricollis* ASHMEAD, Trans. Am. Ent. Soc., Vol. XII, 1885, p. 296.

*Biorrhiza nigricollis* DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 61; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 56.

Fitch states that this species is smaller than *P. fulvicollis*, being less than .12 of an inch in length (3 mm.) and is black with the basal third of the antennæ and legs obscure yellowish brown and the scutellum yellow. The inner sides of the thighs are slightly dusky.

The species cannot be identified from the brief description.

**Zopheroterus Ashmead.**

*Zopheroterus* ASHMEAD, Can. Ent., Vol. XXIX, 1897, p. 261; Psyche, Vol. X, 1903, p. 148.

*Trigonaspis* DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 56.

Allied to *Philonix*. Scutellum rounded or semicircular, rounded off posteriorly and separated from the thorax by a delicate groove-like line. Antennæ 14-jointed, long, third joint as long or nearly as long as the fourth and fifth united, sixth to thirteenth joints a little more than twice as long as thick. Head and thorax feebly shagreened. Claws of hind tarsi without a tooth.

Type: *Acraspis vaccinii*. Ashmead.

**Zopheroterus vaccinii (Ashmead).**

*Acraspis vaccinii* ASHMEAD, Trans. Am. Ent. Soc., Vol. XIV, 1887, pp. 127, 136; DALLA TORRE, Cat. Hymen., Vol. II, 1893, p. 64.

*Zopheroterus vaccinii* ASHMEAD, Can. Ent., Vol. XXIX, 1897, p. 261.

*Trigonaspis vaccinii*. DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 56.

*Female*. Head and thorax dull brown, feebly shagreened. Antennæ black, brown from eighth joint to tip brown. Parapsidal grooves very indistinct, more or less distinct posteriorly. Scutellum separated from the thorax by a delicate groove. Abdomen black shining, sometimes brown basally. Legs pale with the tibiae dark brown along the outer edges. Wings entirely wanting. Length 2 mm.

Gall. (Plate XLII, Fig. 6.) In clusters on the midrib on the under side of the leaves of post oak (*Quercus minor*) in autumn. They grow in numbers on the opposite sides of the rib. Monothalamous, somewhat bell-shaped and greenish in color gradually becoming reddish late in the season. They are attenuated at the base into a short petiole, fastened to the rib, and at the opposite end they are truncated, and excavated, making their shape somewhat like that of a huckleberry blossom. Length 3 to 4 mm.

*Habitat*: New England States south to Florida and Texas.

The gall begins to develop in August, but does not reach maturity until late in the fall. The types are in the U. S. National Museum.

**Parateras Ashmead.**

*Parateras* ASHMEAD, Can. Ent., Vol. XXIX, 1897, p. 262; Psyche, Vol. X, 1903, p. 149; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 57.

Allied to *Biorhiza*. Antennæ 14-jointed, third joint long, but much shorter than the fourth and fifth united. Head and thorax finely shagreened. Parapsidal grooves distinct. Scutellum small, highly convex or elevated with a distinct transverse fovea at the base. Hind tarsi longer than the tibiae, the claw with a distinct tooth beneath.

Type: *Parateras hubbardi*.

**Parateras hubbardi** Ashmead.

*Parateras hubbardi* ASHMEAD, Can. Ent., Vol. XXIX, 1897, p. 262; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 57.

*Female.* Head and thorax reddish brown, finely alutaceous or leather-like. Antennæ black or brown black, first two joints ferruginous. Parapsidal grooves distinct and meeting at the base of the scutellum. Scutellum darker than thorax. Abdomen black pitchy brown toward the base. Legs pale brown with the tibiæ outwardly dark brown or blackish, tarsi more or less dark brown. Wings rudimentary. Length 2 mm.

*Habitat:* Michigan (Detroit).

Nothing is known regarding the habits of this species. The types are in the U. S. National Museum.

**Xystoteras volutellæ** Ashmead.

*Xystoteras volutellæ* ASHMEAD, Can. Ent., Vol. XXIX, 1897, p. 260; DALLA TORRE and KIEFFER, Gen. Ins. Hymen. Fam. Cynip., 1902, p. 57.

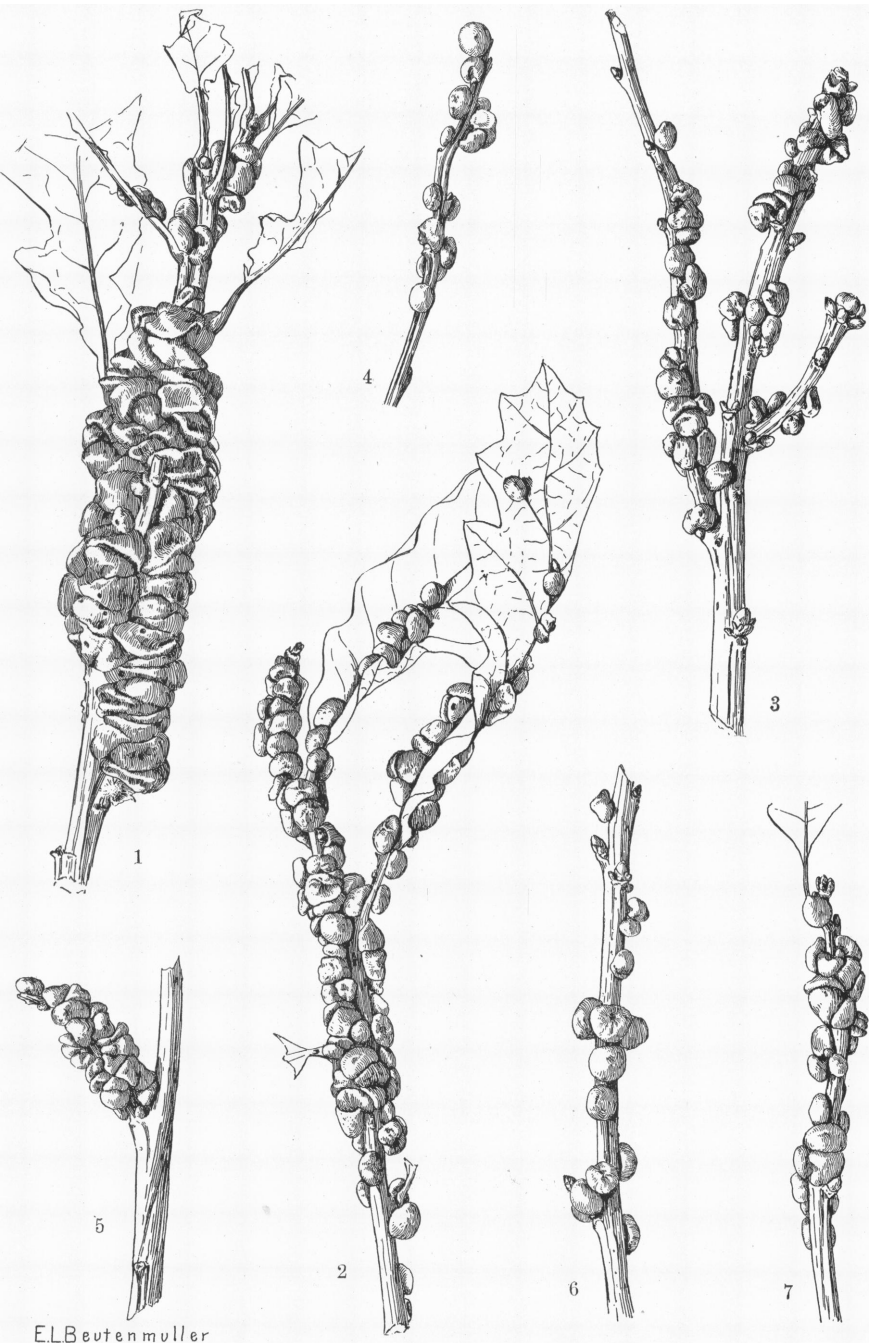
*Acraspis volutellæ* BRIDWELL, Trans. Kansas, Acad. Sci., Vol. XVI, 1899, p. 203.

*Female.* Wholly black and very sparsely pubescent. Head not punctate. Antennæ 14-jointed. Thorax smooth and without parapsidal grooves. Scutellum shagreened and somewhat densely pubescent, obtusely rounded posteriorly, foveæ at base wanting, but with a depression across the base. Mesothorax smooth, with a deep vertical femoral depression. Abdomen large, bare and polished. Ventral spine with spine-like pubescence. Legs honey yellow, entirely black, except that the knees are dull. Wings rudimentary. Length 2 mm.

*Gall.* (Plate XLII, Fig. 5.) Singly or in numbers on the under side of the leaves of burr oak (*Quercus macrocarpa*). Conical, bluish gray. Top truncate and internally it is hollow, with the larvæ cell or kernal, resembling a minute nipple, situated at its base. The gall is attached to a leaf by a few fibres and may easily be detached. The color of the gall is produced by a powdery or primrose bloom, which completely covers it when fresh. Height 3 to 3.5 mm., by 2.50 mm. in diameter at base.

*Habitat:* Kansas (Manhattan, Riley Co.); Ohio (Cincinnati).

This species was described from a single female and the male is not known. The types are in the United States National Museum. I received galls of this species on the leaves of a shingle oak (*Quercus imbricaria*) collected by Miss Annette Braun, near Cincinnati, Ohio. These galls only produced guest flies.

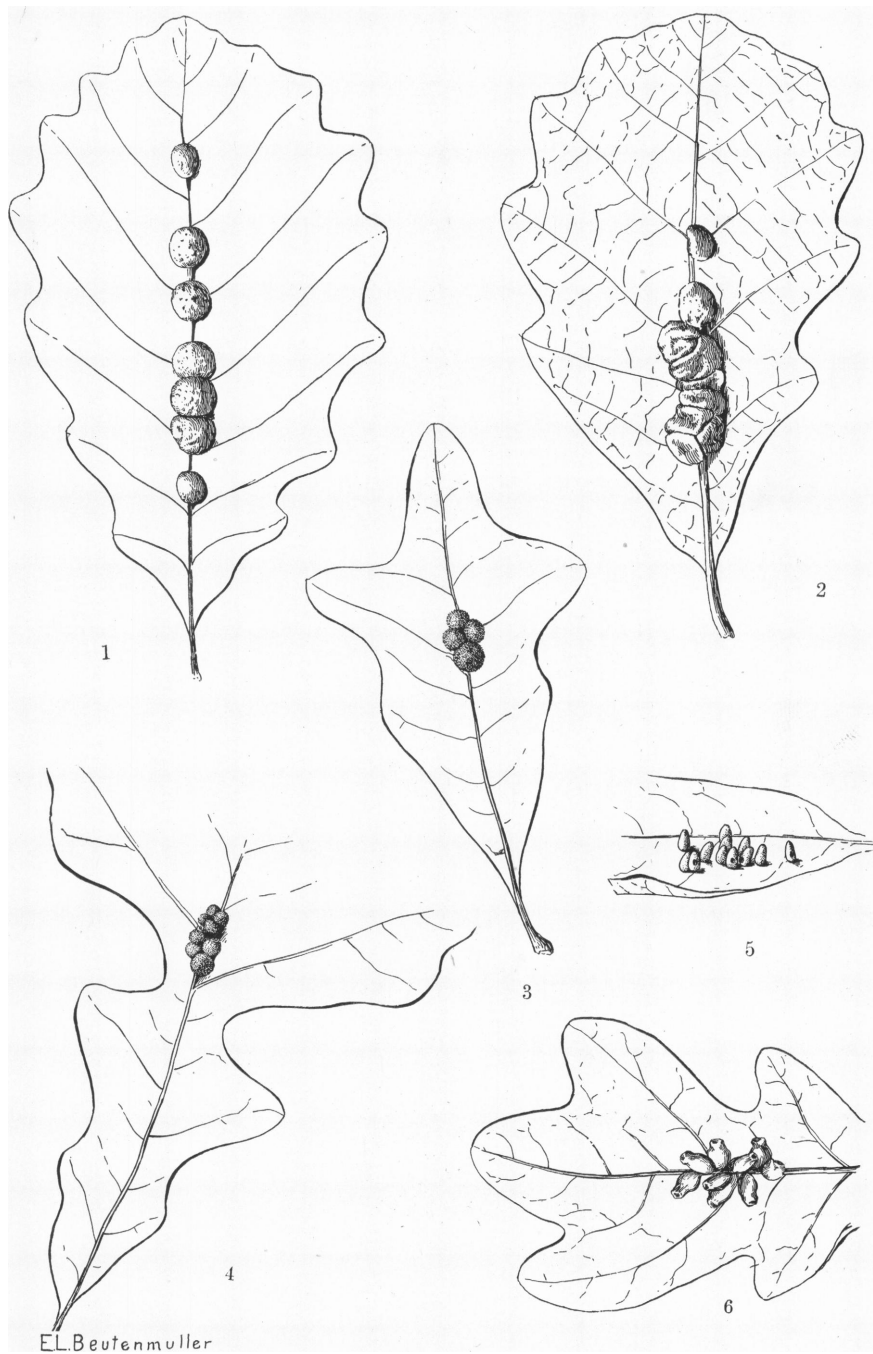


E.L. Beutenmüller

1. *Biorhiza forticornis* (Walsh), on white oak (*Quercus alba*).  
2-7. " " " on dwarf chestnut oak (*Quercus prinoides*).

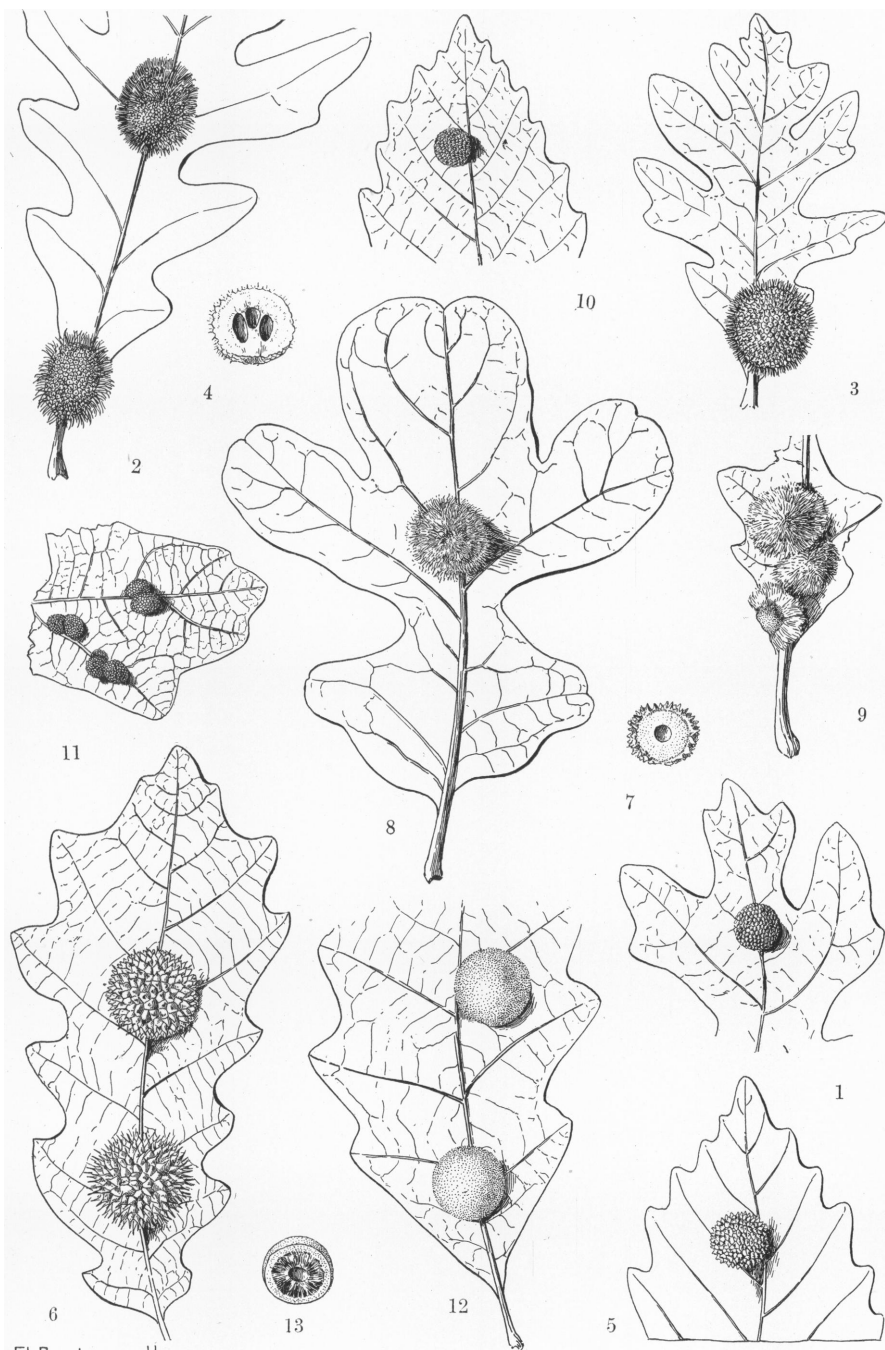






1, 2. *Biorhiza forticornis* (Walsh), on leaves of dwarf chestnut oak (*Quercus prinoides*).  
 3, 4. *Biorhiza mella* Ashm. 5. *Xystoteras volutellae* Ashm.  
 6. *Zopheroteras vaccinii* (Ashm.).





EL Beutenmüller

1. *Philonix pezomachoides* (O. S.).  
 2-4. " *erinacei* sp. nov.  
 5. " *echini* (Ashm.).  
 6, 7. " *prinoides* (Beuten.).

- 8, 9. *Philonix villosa* (Gill.).  
 10. " *hirta* (Bass.).  
 11. " *macrocarpæ* (Bass.).  
 12, 13. " *nigra* (Gill.).

