REVISION OF THE NEARCTIC SPECIES OF Trichacis Foerster
(Hymenoptera: Proctotrupoidea: Platygastridae)

LUBOMIR MASNER
Biosystematics Research Institute, Agriculture Canada, Ottawa K1A 0C6

Abstract
Can. Ent. 115: 1071-1093 (1983)
The Nearctic species of the genus Trichacis are revised. Nine out of 15 species recognized are new to science: T. alticola (New Mexico, Colorado), T. bison (Ontario, Florida, Louisiana, Illinois, Texas), T. celticola (Mississippi, Ontario, Louisiana, Texas), T. dracula (Illinois), T. elongata (Missouri), T. huberi (California), T. mandibulata (Illinois), T. pyramidalis (Ontario), and T. striata (Florida). Six previously described Nearctic species are redescribed, viz. T. arizonensis (Ashmead), T. cornicola (Ashmead), T. cornuta Fouts, T. rufipes Ashmead, T. texana Fouts, and T. virginiensis Ashmead. The males of T. arizonensis, T. texana, and T. virginiensis are described for the first time. A generic diagnosis of Trichacis and keys to Nearctic species are given. The higher classification, bionomics, world distribution, and character states of Trichacis species are discussed.

Résumé
La taxonomie du genre Trichacis de la région néarctique est revue. Des 15 espèces incluses dans le genre, nous décrivons 9 nouvelles espèces: T. alticola (Nouveau Mexique, Colorado), T. bison (Ontario, Floride, Louisiane, Illinois, Texas), T. celticola (Mississippi, Ontario, Louisiane, Texas), T. dracula (Illinois), T. elongata (Missouri), T. huberi (Californie), T. mandibulata (Illinois), T. pyramidalis (Ontario), et T. striata (Floride). Les six autres espèces, viz. T. arizonensis (Ashmead), T. cornicola (Ashmead), T. cornuta Fouts, T. rufipes Ashmead, T. texana Fouts, et T. virginiensis Ashmead sont redécrites, et les mâles de T. arizonensis, T. texana et T. virginiensis sont décrits pour la première fois. Nous pourvoyons une diagnose du genre et un tableau de détermination des espèces néarctiques. La classification supraspécifique, la biologie, la répartition géographique mondiale et la polarité de transformation des caractères des espèces du genre Trichacis sont discutées.

The genus Trichacis, proposed by Foerster (1856) for several Palearctic species, was at first not properly recognized in North America. Ashmead (1893) described two Nearctic species in Synopeas Foerster and Isorhombus Foerster respectively. At the same time (1893), however, he described under the name Trichasis (emendation for Trichacis) two species now classified in Metanopedias Brues, and earlier (Ashmead 1887) one species, now also considered to belong to the latter genus (Masner and Jackson 1966). Fouts' (1924) concept of Trichacis was blurred with that of Metanopedias; he also could not define satisfactorily the limits between Trichacis and Isocybus Foerster, believing that the two genera intergrade. Muesebeck and Masner (in Krombein and Burks 1967) and Masner and Muesebeck (1968) recognized six Nearctic species in Trichacis. Muesebeck (in Krombein et al. 1979) again catalogued the six Nearctic species considered to belong to Trichacis.

The members of Trichacis may be recognized among all genera of the Platygastrinae by having a specialized area with a tuft of fine dense erect hairs on the top of the scutellum. This tuft is rarely situated below the apex of the pointed specialized area (T. arizonensis, T. pyramidalis). Other generic character states encountered in members of Trichacis are the smooth frons, receding temples behind eyes, non-abrupt 3-5 segmented antennal clava in females, as well as 6 visible tergites in female metasoma. By contrast, the members of Isocybus may have scattered erect hairs on the scutellum, not organized in a dense tuft, frons with more or less rugulose sculpture, temples behind eyes full or even slightly bulging, as well as a distinct 6-segmented antennal clava in females. Similarly, the members
of *Metanopedias* should be distinguished at once from those of *Trichacis* by the absence of a specialized area and no erect tuft of hairs on the scutellum in both sexes, as well as by the metasoma in female with fewer than 6 visible tergites. In addition to the above character states *Trichacis* and *Metanopedias* could also be distinguished by fundamental differences in structure of the antennae in both sexes. However, the latter character is not clearly visible under lower magnification due to the minute size of antennomeres 3 and 4 in members of *Metanopedias*. *Trichacoides* Kieffer can be easily distinguished from *Trichacis* in having the scutellum covered with numerous tiny spines and with no tuft of hairs, and tergite 2 almost entirely striate longitudinally.

Kozlov (1970) classified *Trichacis* in the tribe Platygastrini of the Platygastrinae. He stressed the non-spinose scutellum as well as the antennal clava in female not distinctly 4-segmented as commonly encountered among the members of the tribe Synopeadini. In my opinion the above criteria are hardly exclusive, with numerous exceptions on both sides. I prefer to keep *Trichacis* in the tribe Platygastrini based, however, on the two following character states, viz. the palpal formula 2-1 and the tibial spur formula 1-2-2. The members of the tribe Synopeadini appear to have the palpal formula 1-1 and the tibial spur formula 1-1-1. There seems to be also a good biological character as a criterion of tribal classification, viz. a remarkable vernal seasonality of most *Trichacis* species, shared with other members of the Platygastrini. The Synopeadini seem to have an autumnal peak of occurrence, although slightly less pronounced than the almost exclusive vernal peak of the Platygastrini. The above difference in relative seasonality of members of the two tribes may be caused by association with two different groups of cecidomyiid hosts.

The recorded world distribution of *Trichacis* comprises the entire Holarctic region, with seven species in Europe (Kieffer 1926), and with six species in North America (Muesebeck in Krombein et al. 1979). Recently, more species were described from Europe (Szelényi in Székessy 1953; Szabó 1977); however, the species described by Szelényi appears to belong to *Isocybus* and the four species described by Szabó are difficult to interpret because of inadequate descriptions and superficial figures. *Trichacis* is also well represented in the Neotropical region though no species were formally described from south of the United States. I examined numerous undescribed species in the Canadian National Collection from Mexico, Costa Rica, Guatemala, Panama, Brazil, Colombia, Ecuador, and Peru. One species was described from the Oriental region (Java) and one from the Australian region (Lord Howe Is.). The placement of the latter two species in *Trichacis* remains problematic as types were not available for examination and no other members of *Trichacis* were encountered in materials from the Old World tropics.

All members of *Trichacis* are probably primary parasites of various gall midges (Cecidomyiidae) though only a few reliable host records are so far available. The best studied species is the Palearctic *T. remulus* (Walker), a monoembryonic parasite of *Mayetiola* spp., pests of wheat and oats (Marchal 1906; Gahan 1933). The first instar larva is cyclopoid, the following two instars are segmented hymenopteriform larvae. *T. remulus* and possibly also other species of *Trichacis* are important agents in biological control of pests. Very little is known about association of *Trichacis* species with plants through their respective cecidomyiid hosts. Ashmead (1893) and Fouts (1924) listed *T. cornicola* (Ashmead) associated with dogwood in Missouri. *T. arizonensis* (Ashmead) associated with dogwood in California.

All Nearctic species of *Trichacis* studied are predominantly to strictly vernal, with only one generation per year. Members of some species are frequently caught by sweeping on both herbaceous plants and shrubs or trapped by Malaise and interception traps. The Nearctic species of *Trichacis* are encountered in biotopes of various altitudes, from lowlands and hills to the alpine zone in the Rocky Mountains. An interesting correlation exists between the development and pigmentation of wings of platygastrid wasps and the altitude
of the biotope (Masner 1981). With the increasing altitude the wings are progressively longer and darker, reaching the extremes among the species from high Andes (around 4000 m) in South America. The only Nearctic species that displays this striking feature is *T. alticola* recorded from altitudes 2000–3000 m in New Mexico and Colorado. Several lowland species of Nearctic *Trichacis* (e.g. *T. celticola, T. virginiensis*) show wings with various degrees of infuscation but the length of the wings is normal.

By the time this study was undertaken the number of Nearctic species of *Trichacis* had increased from 6 to 15. Nevertheless, this significant increase is considered only a beginning of yet another phase of research. Vast areas of the North American continent, harbouring potentially many new species, remain virtually unexplored. New collecting methods (e.g. screen-sweeping) aimed at amassing whole populations rather than a few individuals should accelerate the above process of species recognition, study of problems of variability, etc. Fouts’ (1924) material did not exceed 30 specimens; the present paper is based on 1129 specimens. Detailed biological studies linking *Trichacis* species to their respective hosts as well as host plants are urgently needed. The correct association of sexes could be achieved only through careful rearings. The role of *Trichacis* species in biological control of pests should also be explored.

A classification of the Nearctic species of *Trichacis* into species groups is not attempted at this time. The present knowledge is considered to be rather incomplete, with many important data not available.

The Nearctic members of *Trichacis* appear to be a morphologically very homogeneous complex. Relatively few characters appear to be diagnostic; therefore, the descriptions of species are focused on a restricted number of character states. Useful cephalic characters appear to be: general shape and length/width ratio of head, with cephalic measurements from dorsal view (head termed transverse if wider than long); mutual ratios of eye height/interorbital space, with measurements from frontal view, where eye height is measured from lowermost to uppermost point of orbit and the interorbital space is the shortest distance between inner orbits; length of scape, measured excluding the radicle; mutual ratios of OOL/LOL; shape of mandibles and teeth; shape of processes on temples; female antenna, especially the type of clava and the location of the sensilla on clavomeres; male antenna, especially the shape of A4. The number of sensilla and their exact location on female clavomeres appear to be highly species-specific. However, the sensilla are often deeply embedded in receptacles with only the tips protruding beyond the outline of the clavomeres. This will pose difficulty in observing them even on slides, under a high magnification of a compound microscope. In some species the sensilla are virtually invisible from the dorsal view since they are both deeply embedded in receptacles and the latter ones are located below the curvature of the clavomere (e.g. in *T. celticola* Masner). The use of phase contrast is recommended while observing the almost transparent sensilla on slide mounts.

The mesosoma offers relatively fewer diagnostic characters than the head. However, the shape of scutellum in peculiar in two, and the wings are characteristically infuscated in three species.

Useful diagnostic characters of the metasoma are: length/width ratio of T1; total length/width ratio of metasoma; shape and length/width ratio of T6 in female; sculpture of base of T2; microsculpture of T3–T6.

The measurements are figured in direct readings of an ocular scale at 160 ×; they represent fractions of 1 mm, with 100 = 1 mm. Direct readings are preferred over w:l ratios to permit mutual comparisons of length and width of individual parts of the body (e.g. length of scape vs. interorbital space).

The morphological terms and their respective abbreviations used in this paper are those proposed by Masner (1980).
Trichacis Foerster

1856, Trichacis Foerster, Hymenopterologische Studien 2: 108, 115.
Type-species: Platygaster pisis Walker. Designated by Ashmead (1893).
1859, Trichasis Thomson (emendation), Owers K. VetenskAkad Forh. 16: 70, 78.

Mid- to large size (1.3–3.0 mm) platygastrid wasps, with body moderately to distinctly elongate. Body black, legs and antennae often bright orange-yellow, wings usually clear but infuscated in several species. Head transverse, subellipsoidal or subrectangular; mandibles bidentate, with teeth subequal, rarely the lower tooth longer; clypeus not protruding; palpal formula 2-1; cheeks not striate, without subocular suture; antennal process not prominent; frons predominantly smooth, at most with scattered punctures mainly along inner orbits; ocelli in a low triangle, OOL equal to or slightly shorter or longer than LOL; eyes glabrous or with scattered hairs; temples behind eyes protruded into points or horn-like structures in several species; hyperoccipital carina developed in most species at least in its middle part; antennal formula 10-10, in female clava 3-5 segmented, non-abrupt, clavomeres with 1 sensillum each; in male A4 modified as sex segment; mesosoma arched, cylindrical, about as wide as high; notaui and anterior parallel lines well developed in most species; scutellum moderately to acutely arched, smooth, in posterior half with a specialized area filled with dense compact hairs forming a tuft or brush erected at an angle less than 90°, rarely tuft flanking pointed glabrous part of scutellum wedged between two isolated hairy areas, thus giving impression of spinose scutellum; mesopleuron without depression, with at most indication of sternaulus in its anterior part, generally glabrous, with only few scattered hairs; metapleuron and propodeum densely pubescent; propodeum medially with 2 parallel keels; fore wing veinless but often with rudiment of submarginal vein, usually indicated by darker pigmentation; marginal cilia of fore wing moderately long; hind wing veinless; tarsal formula 5-5-5; tibial spur formula 1-2-2; T1 with only sparse hairs, not covered with dense, compact pilosity; T2 largest of all tergites, with 2 hairy pits situated anterolaterally, with anteromedian part glabrous and in most species shortly striate; metasoma in female with 6, in male with 7 visible tergites; ovipositor sheaths in female not exposed.

KEY TO NEARCTIC SPECIES OF Trichacis

Females, Males

1. Temples above or behind eyes pointed or protruded into horn-like processes (Figs. 29–31) ................................................................. 2
   - Temples unarmed .................................................................................. 4

2. Temples with points situated below upper orbit level (frontal view) (Fig. 31); Texas .... 6. T. cornuta Fouts ?
   - Temples with points or processes situated above upper orbit level (frontal view) (Figs. 29, 30) .............................................................................. 3

3. Temples with points not exceeding level of vertex (Fig. 30); anteromedian part of T2 not striate; Ontario, Illinois, Texas 3. T. bison n. sp. ?
   - Temples with big processes distinctly exceeding level of vertex (Fig. 29); T2 with distinct striation anteromedially; Illinois 7. T. dracula n. sp. ?

4. Mandibles sickle-shaped, widely crossing at tips, with lower tooth much longer than upper tooth, with lower edge twisted forward by 90° (Fig. 35) .................................................. 5
   - Mandibles clasp-like, not particularly crossing at tips, with lower tooth at most slightly longer than upper tooth, with lower edge not twisted forward .............................................. 7

5. A1–A5 bright orange yellow; A2 in females subequal to both A3 and A4 (Figs. 7, 8) .... 6
   - A1–A5 dark brown; A2 in females distinctly larger than either A3 or A4 (Fig. 10); Illinois .................................................................................. 10. T. mandibulata n. sp. ?

6. Scutellum with regular dense tuft of hairs; sensillum on A10 in female located below apex (Fig. 7); Texas, Illinois, Ontario .............................................. 14. T. texana Fouts ?
Scutellum with tuft divided medially into two parts by glabrous spine (Fig. 33); sensillum on A10 in female located near apex (Fig. 8); Ontario 11. T. pyramidalis n. sp. ♀ ♂

(7) Scutellum terminating in glabrous spine, with only narrow bands of hairs at sides (Fig. 34); A6–A10 in female with sensilla (Fig. 15); Arizona, California ........................................ 2. T. arizonensis (Ashmead) ♀ ♂

(8) Fore wings with distinct brownish and clear patterns in basal third (Figs. 26–28) ......... 9

(9) Scape with apex distinctly surpassing level of vertex; New Mexico, Colorado .................. 1. T. alticola n. sp. ♀ ♂

(10) Antennal process hook-like (Fig. 32) and fore wing distinctly surpassing apex of metasoma in female; male individuals not longer than 1.5 mm; A8–A10 in female with prominent sensilla (Fig. 1); from Virginia to Quebec and Ontario .......... 15. T. virginiensis Ashmead ♀ ♂

(11) Mesopleuron with dense horizontal striations; T2 with longitudinal striation in anterior half; Florida ........................................ 13. T. striata n. sp. ♀

Frons above antennal process with only few fine transverse striations .......................... 13

(12) Frons above antennal process with multiple strong transverse striations ........................ 14

Hyperoccipital carina weak, indistinct, occiput smooth medially; female metasoma more elongate, combined length of T3–T6 almost equal to width of T2; A7–A10 in female with sensilla (Fig. 12); California ........................................ 9. T. huberi n. sp. ♀

Hyperoccipital carina sharp, distinct, occiput with fine transverse striae medially; female metasoma more plump, combined length of T3–T6 equal to half width of T2; A8–A10 in female with sensilla (Fig. 2); Missouri, Illinois, Florida .......... 5. T. cornicola (Ashmead) ♀ ♂

T2 anteromedially (between pits) smooth and convex; metasoma in female greatly elongate, combined length of T3–T6 greater than width of T2; male metasoma elongate, combined length of T3–T7 only slightly shorter than width of T2; frons above toruli with multiple transverse wrinkles; Missouri ........................................ 8. T. elongata n. sp. ♀ ♂

T2 anteromedially (between pits) usually sculptured and concave, with lateral margins sharp; female metasoma less elongate, combined length of T3–T6 shorter than width of T2; male metasoma shorter, combined length of T3–T7 much shorter than width of T2; frons above toruli with fewer transverse wrinkles; eastern U.S.A. from Florida to Canada (Ontario, Quebec) ........................................ 12. T. rufipes Ashmead ♀ ♂

1. Trichacis alticola n. sp.

Female. Length 2.10 mm. Black; mandibles, scape, and legs (except for darker coxae) yellowish brown; A2–A10 brown; wings distinctly infuscate.

Head transverse, fully twice as wide as long (25:50); occiput smooth and glabrous medially; temples behind eyes coriaceous and hairy; postgenae smooth and almost glabrous; hyperoccipital carina sharp and prominent; OOL = LOL; frons smooth, unpunctured; EH < IOS (22:30); antennal process short, truncate; mandibles clasped, with teeth equal; antenna rather slender, with moderate 3-segmented club, A8–A10 with sensilla; apex of A1 (lateral view) distinctly exceeding top of vertex.

Anterior parallel lines fine, surrounded by coriaceous sculpture in anterior third of mesoscutum; notaui almost percurrent, obliterate in extreme anterior part; specialized area of scutellum almost heart-shaped, moderately elevated, with rather broad tuft of hairs; fore wings long, greatly surpassing apex of metasoma.
Figs. 1–8. Female antennae of Nearctic Trichacis spp. 1, *T. virginiensis* Ashm.; 2, *T. cornicula* (Ashm.); 3, *T. dracula* n. sp.; 4, *T. bison* n. sp.; 5, *T. alticola* n. sp.; 6, *T. cornuta* Fouts; 7, *T. texana* Fouts; 8, *T. pyramidalis* n. sp.
FIGS. 9–15. Female antennae of Nearctic Trichacis spp. 9, T. rufipes Ashm.; 10, T. mandibulata n. sp.; 11, T. striata n. sp.; 12, T. huberi n. sp.; 13, T. elongata n. sp.; 14, T. celticola n. sp.; 15, T. arizonensis (Ashm.).
Metasoma moderately elongate; T2 anteromedially (between pits) smooth and flattened; combined length of T3–T6 shorter than width of T2 (41:55); posterior margin of T2 and entire T3–T6 with dense fine punctations.

**Male.** Differs from female in structure of antenna (Fig. 24) and metasoma; wings are slightly longer than in female (Fig. 25).

**Type material.** Holotype: ♂ (CNC No. 17671), USA, New Mexico, Santa Fe Co., 14 mi NE Santa Fe, June 18-July 3 1979, Malaise trap in aspen grove, 9600', Stewart and Jarmila Peck; allotype: ♀, with same data as holotype (CNC); paratypes: 6♀ 9♀ 22♂ 2♀, SAME LOCALITY AS HOLOTYPE (CNC); NEW MEXICO: 9♀, Sacramento Mts., Lincoln National Forest, Karr Canyon (nr. Cloudcroft), 8600', July 30 1977, L. Masner (CNC); COLORADO: 9♀, Doolittle Ranch, Mt. Evans, 9800', July 17 1961, S.M. Clark (CNC).

**Distribution.** Canadian zone of SW USA (New Mexico, Colorado); however, the real range of this species is expected to be considerably wider in the SW USA, possibly also in the adjacent mountainous parts of Mexico.

**Biology.** Unknown; the type series was collected in an aspen grove.

**Variability.** Only little variation was observed. The body length may vary from 1.5 to 2.2 mm in both sexes.

**Remarks.** *T. alticola* is a very distinct species among all Nearctic members of *Trichacis* because of its long scape exceeding the top of vertex, the long wings widely surpassing tip of metasoma, and A8–A10 in female antenna distinctly longer than wide. The name *alticola* (in Latin) refers to the occurrence of this species at high altitudes. *T. alticola* is the only Nearctic species of *Trichacis* that exhibits the typical correlation of excessively long and dark wings with its high altitude habitat.

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2. *Trichacis arizonensis* (Ashmead)

Figs. 15, 19, 34

1893, *Isorhombus arizonensis* Ashmead, Bull. U.S. natn. Mus. 45: 277

1924, *Trichacis arizonensis*: Fouts, Proc. U.S. natn. Mus. 63: 16–17

1979, *Trichacis arizonensis*: Muesebeck in Krombein et al., Catalog of Hymenoptera in America North of Mexico, Vol. 1: 1176. Smithsonian Institution Press, Washington, D.C.

**Female.** Length 1.80 mm. Black; mandibles and legs brown, trochanters, knees and tarsi lighter; antennae brown; wings almost clear, slightly infuscate in basal third.

Head transverse (30:60); occiput smooth and glabrous medially, with fine coriaceous sculpture and hairs at sides; temples behind eyes unarmed, coriaceous, and hairy; postgenae smooth and almost glabrous; hyperoccipital carina sharp, strongly developed; OOL distinctly shorter than LOL (7:9); frons smooth, under high magnification (160×) with delicate transverse microsculpture below posterior ocelli, with few fine transverse wrinkles above antennal process and toruli; EH < IOS (25:38); antennal process short, truncate; mandibles clasped, with teeth subequal; antenna (Fig. 15) short, with 5-segmented clava, A6–A10 with sensilla.

Anterior parallel lines inconspicuous; notauli almost percurrent, abbreviate only in extreme anterior apices; anterior scutellar pits unusually large and deep; scutellum in lateral view (Fig. 34) cone-shaped, pointed, with specialized area situated below and behind the point; fore wings shortly surpassing apex of metasoma.

Metasoma moderately elongate; T1 strongly transverse (11:28); T2 slightly longer than wide (60:54), anteromedially (between pits) smooth and flat; combined length of T3–T6 shorter than width of T2 (32:54); posterior margin of T2 almost smooth, with few
inconspicuous punctures; anterior half of T3 smooth, posterior half with fine punctures; T4 almost entirely punctured, T5–T6 punctured; T6 broadly triangular, distinctly shorter than wide (9:25).

Male (hitherto unknown). Similar to female except for structure of antennae (Fig. 19) and metasoma.

Material examined. Holotype ♀, (USNM No. 2270) ARIZONA, Fort Huachuca, May 8 1883, H.K. Morrison; CALIFORNIA: ♀♂, San Diego Co., Anza-Borrego State Park, Box Canyon, February 17 1979, gall on Ephedra, J. LaSalle (CNC); ♀, San Bernardino Co., Baldy Mesa, May 29 1980, J. Woolley (CNC); ♂, San Bernardino Co., New York Mts. 5400', Keystone Canyon, 4.5 mi S. Ivampah, April 12 1978, Malaise trap, M. Wasbauer and T. Eichlin (DFAS); 9 ♀♂ San Bernardino Co., Baldy Mesa, 7 mi E. Phelan, May 9 1981, G. Gibson (CNC); MEXICO: ♂, Baja California, 12 mi E. El Rosario, March 25 1979, reared from gall on Ephedra, J. La Salle (CNC).

Distribution. Southwestern USA (Arizona, California) and Mexico (Baja California).

Biology. Individuals reared from galls on Ephedra along with two species of gall midges, viz. Lasioptera ephedrae (Cockerell) and Neolasioptera near ephedicola (Cockerel) (det. R.J. Gagné).

Variability. Only little variation encountered. Total body length in both sexes varies from 1.7 to 2.2 mm.

Remarks. Trichacis arizonensis is peculiar among all Nearctic species of the genus because of the sharply pointed scutellum in both sexes and because in the female, of the presence of sensilla on A6–A10.

3. Trichacis bison n. sp.
Figs. 4, 20, 30

Female. Length 1.75 mm. Black; legs brown, coxae dark brown, trochanters, knees, and tarsi light brown; mandibles and radicle light brown, antennae brown; wings almost clear.

Head transverse (26:54); occiput medially glabrous, predominantly smooth, with fine transverse microsculpture, hairy and coriaceous at sides (behind points); hyperoccipital carina sharp and distinct, not reaching the points; area between hyperoccipital carina and points strongly coriaceous; temples with points not exceeding level of vertex (Fig. 30); OOL subequal to LOL; area between anterior and posterior ocelli distinctly coriaceous; frons smooth, with few transverse wrinkles above antennal process and toruli; EH < IOS (25:30); antennal process short, truncate; mandibles clasped, with teeth subequal; antenna (Fig. 4) short, sensilla on A8–A10.

Anterior parallel lines distinct; notauli abbreviate in anterior third; scutellum moderately arched, with specialized area heart-shaped, tuft of hairs broad, dense; fore wings slightly surpassing apex of metasoma.

Metasoma rather short; T1 broadly transverse (10:26); T2 almost as long as wide (52:53), anteromedially (between pits) with fine, short longitudinal striae, with inconspicuous narrow band of micropunctures along posterior margin; combined length of T3–T6 distinctly shorter than width of T2 (25:53); T6 broadly triangular (9:21).

Male. Similar to female except for structure of antennae (Fig. 20) and metasoma; fore and mid legs (except darker coxae) orange-yellow.

Type material. Holotype ♀ (CNC No. 17672), Canada, Ontario, Point Pelee National Park, June 9 1968, Malaise trap; allotype ♂, with same data as holotype (CNC); paratypes 1♀ 2♂, with same data as holotype but trapped also on May 19; FLORIDA: 2♀, Alachua Co., High Springs, March 15 1977, L. Masner (CNC); ILLINOIS: 5♀ 3♂.
FIGS. 16-20. Male antennae of Nearctic Trichacis spp. 16, T. pyramidalis n. sp.; 17, T. mandibulata n. sp.; 18, T. celticola n. sp.; 19, T. arizonensis (Ashm.); 20, T. bison n. sp.
Figs. 21–25. 21–24, male antennae of Nearctic Trichacis spp.: 21, *T. rufipes* Ashmead; 22, *T. texana* Fouts; 23, *T. virginiensis* Ashmead; 24, *T. alticola* n. sp. 25, *T. alticola* n. sp. ♂. 
Union Co., Shawnee State Forest, Pine Hill, 120 m, May 1-2 1979, interception trap, H. Goulet; LOUISIANA: ♂, 11 mi SW Alexandria, March 26 1960, J.G. Chillcott (CNC); TEXAS: ♂, nr. Sinton, Welder Wildlife Refuge, March 23, 1965, J.G. Chillcott (CNC).

**Distribution.** From Florida to Ontario, also Louisiana, Illinois, and Texas.

**Biology.** Unknown.

**Variability.** Considerable variability exists in total body length (1.1–1.8 mm). The colour of the legs may be considerably lighter, particularly in males. The points above the eyes tends to be smaller in smaller individuals. The occiput medially may have coarser sculpture than in the holotype.

**Remarks.** *T. bison* can be distinguished from *T. cornuta* by having the points on the temples situated immediately above upper orbits of eyes (frontal view). From *T. dracula* it may be distinguished by much smaller temporal points. The name of this new species refers to the American buffalo (*Bison*).

### 4. Trichacis celticola n. sp.

**Figs. 14, 18, 28**

**Female.** Length 2.60 mm. Black; legs and antennae dark brown to black, trochanters and tarsi brown; wings strongly infuscate in posterior 2/3, with distinct brownish and clear pattern in basal third (Fig. 28).

Head transverse (35:71); occiput medially glabrous, partly smooth, with distinct transverse striae under hyperoccipital carina, with hairs and vertical striae at sides; hyperoccipital carina distinct and sharp; temples unarmed, coriaceous; OOL subequal to LOL; space between anterior and posterior ocelli strongly coriaceous; frons smooth, with streak of fine punctures from below posterior ocellus down along inner orbit, with several strong transverse wrinkles above antennal process and toruli; EH < IOS (32:41); antennal process short, slightly emarginate; mandibles clasped, with teeth subequal; antenna (Fig. 14) short, A7–A10 with sensilla almost entirely sunken (not visible in dorsal view).

Anterior parallel lines delicate; notauli abbreviate in anterior third; scutellum rather arched, with specialized area heart-shaped, cone-like elevated, covered with dense tuft; fore wings slightly surpassing base of T6, i.e. apex of metasoma exposed.

Metasoma rather elongate, sharply pointed apically; T1 transverse (16:31); T2 slightly longer than wide (72:70), anteromedially (between pits) with dense longitudinal striae as long as T1, with posterior margin unpunctured; combined length T3–T6 slightly longer than width of T2 (73:70); T3–T6 with extremely fine punctures; T6 smooth, with only narrow band of micropunctures on anterior margin, triangular, as long as wide (26:26).

**Male.** Similar to female but differs in structure of antenna (Fig. 18) and metasoma; fore femur and tibia light brown.

**Type material.** Holotype: ♂ (CNC No. 17673), USA, Mississippi, Starkville, February 23 1980, from soil under hackberry (*Celtis*) infested with cecidomyiids, M. MacGown; allotype: ♂, with same data as holotype (CNC); paratypes: 38 ♂♂, with same data as holotype (CNC); LOUISIANA: 8 ♂♂, 11 mi SW Alexandria, March 26 1960, J.G. Chillcott (CNC); ONTARIO: 9 ♀♀, Point Pelee National Park, May 19 and June 9 1968, Malaise trap (CNC); TEXAS: Brazos Co., College Sta., March 13-19 1982, pan trap, (R. Wharton’s collection).

**Distribution.** Mississippi, Louisiana, Texas, Ontario.

**Biology.** Host unknown; apparently associated with cecidomyiids injurious to hackberry (*Celtis*).

**Variability.** The body length varies slightly. The shape of metasoma in the female is variable due to partly telescoped T3–T6; T6 in particular may vary from slightly shorter...
than wide to 1.5 times longer than wide. Fore wings tend to be more clear and less distinctly patterned in individuals from Ontario than those from Mississippi.

**Remarks.** The individuals of this species are the most robust of the Nearctic species of *Trichacis*. *Trichacis celticola* may be also recognized by the fore wings not exceeding the tip of metasoma in female, furthermore by A7–A10 in female with deeply sunken sensilla, and by the markedly patterned wings in both sexes. The name of this new species refers to its presumed association with hackberry (*Celtis*).

### 5. *Trichacis cornicola* (Ashmead)

Fig. 2

1893, *Synopeas cornicola* Ashmead, Bull. U.S. natn. Mus. 45: 286, 288.
1924, *Trichacis cornicola*: Fouts, Proc. U.S. natn. Mus. 63: 17, 18.
1979, *Trichacis cornicola*: Muesebeck in Krombein et al., Catalog of Hymenoptera in America North of Mexico, Vol. 1: 1176. Smithsonian Institution Press, Washington, D.C.

**Female.** Length 1.50 mm. Black; legs brown, trochanters, fore femora and all tibiae brown, mandibles, radicle and base of scape yellowish brown, distal part of scape and A2–A10 uniformly brown; wings clear.

Head transverse (25:42); occiput medially glabrous, with fine transverse striae, with sparse hairs and coriaceous sculpture at sides; hyperoccipital carina sharp; temples unarmed, coriaceous; OOL subequal to LOL; space between anterior and posterior ocelli finely coriaceous; frons smooth, with few delicate transverse striations above antennal process and toruli; EH < IOS (22:25); antennal process short, truncate; mandibles clasped, with teeth subequal; antenna (Fig. 2) short, A8–A10 with very prominent sensilla.

Anterior parallel lines delicate; notauli abbreviate in anterior third; scutellum rather low, with specialized area almost heart-shaped, moderately elevated, with short tuft; fore wings slightly surpassing apex of metasoma.

Metasoma rather short; T1 transverse (11:18); T2 (48:47), anteromedially (between pits) with dense longitudinal striae slightly shorter than T1; combined length of T3–T6 shorter than width of T2 (28:44); posterior margin of T2 almost smooth; T3–T6 with only inconspicuous micropunctures; T6 broadly triangular (8:19).

**Male.** Similar to female except for antennal structure and metasoma; legs considerably lighter than in female, yellowish brown, with coxae and hind femora darker.

**Material Examined.** Lectotype ♂ (USNM No. 2273), USA, MISSOURI: Kirkwood, April 3 1887, from cecidomyiid gall on *Cornus paniculata*, Mary Murfiedt; allolectotype ♀ and 7 ♂ ♀ ♀ paralectotypes, with same data as lectotype; FLORIDA: 2 ♀ ♂, Jacksonville, St. John’s Bluff, March 14 1977, L. Masner; ILLINOIS: 10 ♀ ♂ ♂ ♂, Union Co., Shawnee State Forest, Pine Hill, 120 m, May 1-2 1979; interception trap, H. Goulet (CNC).

**Distribution.** Florida, Illinois, Missouri.

**Biology.** Host unknown; type series reared from cecidomyiid gall on dogwood (*Cornus*).

**Variability.** Legs considerably lighter in individuals from Florida. Also in the type series appendages much lighter due to age of the material.

**Remarks.** Individuals of *T. cornicola* can be distinguished from those of *T. rufipes* by considerably shorter metasoma, unpunctured frons as well as by T3–T6 with only very delicate punctures.
6. *Trichacis cornuta* Fouts

Figs. 6, 31

1925, *Trichacis cornuta* Fouts, Proc. ent. Soc. Wash. 27: 93.

1979, *Trichacis cornuta*: Musebeck in Krombein et al., Catalog of Hymenoptera in America North of Mexico, Vol. 1: 1176. Smithsonian Institution Press, Washington, D.C.

**Female.** Length 1.40 mm. Black; A1–A6 and legs in greater part brown, antennal clava, coxae and femora darker; wings clear.

Head transverse (25:53); occiput predominantly smooth and glabrous medially, hairy and longitudinally aciculate at sides; hyperoccipital carina distinct and sharp; few transverse striae on vertex in front of hyperoccipital carina; temples armed with points situated (frontal view) below upper orbit level; OOL < LOL (5:7); space between anterior and posterior ocelli coriaceous; space between posterior ocelli with delicate transverse sculpture; frons smooth, with indistinct patch of fine coriaceous sculpture along inner orbits, with delicate few transverse striae above antennal process and toruli; EH < IOS (22:29); antennal process very short, truncate; mandibles clasped, with teeth subequal; antenna (Fig. 6) with rather slender clava, A8–A10 with sensilla.

Anterior parallel lines delicate but distinct; notauli short, better indicated only in posterior third of scutum; scutellum moderately arched, with specialized area very small, almost heart-shaped, moderately elevated, with short tuft; fore wings slightly surpassing apex of metasoma.

Metasoma short and plump; T1 broadly transverse (10:25); T2 broad, as long as wide (45:45), anteromedially (between pits) with dense longitudinal striae as long as T1; combined length of T3–T6 considerably shorter than width of T2 (25:45); posterior margin of T2 smooth; T3–T6 appearing smooth, with delicate micropunctures (160 ×); T6 broadly triangular (10:20).

**Male.** Unknown.

**Material Examined.** Holotype ♀ (USNM No. 67830), Texas, Brownwood, May 1 1924, R.M. Fouts; left antenna on slide (L. Masner, May 1982).

**Biology.** Unknown.

**Distribution.** Texas.

**Remarks.** *Trichacis cornuta* can be conveniently recognized among all Nearctic species of *Trichacis* by the points on temples situated below the level of upper orbit of the eyes.

7. *Trichacis dracula* n. sp.

Figs. 3, 29

**Female.** Length 1.25 mm. Black; legs dark brown, trochanters, tibiae and tarsi lighter; mandibles, radicle, base and apex of scape and A2 light brown, remainder of antenna brown; wings clear.

Head transverse (25:53); occiput at meson partly smooth, with distinct transverse striae below hyperoccipital carina, striate-coriaceous behind processes; hyperoccipital carina blurred with transverse striation on vertex; temples with big horns distinctly exceeding level of vertex (frontal view), with lateral apices of processes sharp, and apically truncate; OOL subequal to LOL; space between posterior ocelli with fine transverse striation; space between anterior and posterior ocelli coriaceous; frons smooth, with patches of delicate coriaceous microsculpture along inner orbits, with very delicate transverse striae above antennal process and toruli; EH < IOS (19:28); antennal process short, truncate; mandibles clasped, strong, with teeth subequal; antenna (Fig. 3) short, A8–A10 with prominent sensilla.
Mesosoma short, arched dorsally, only slightly longer than high (47:45); anterior parallel lines delicate; notauli present only in posterior half of mesoscutum; scutellum moderately arched, with specialized area heart-shaped, slightly elevated, with short tuft; fore wings distinctly surpassing apex of metasoma.

Metasoma rather short and plump; T1 strongly transverse (6:17); T2 shorter than wide (37:40), anteromedially (between pits) with distinct longitudinal striae slightly longer than T1; combined length of T3–T6 distinctly shorter than width of T2 (26:40); posterior margin of T2 and T3–T6 appearing smooth (160×), with extremely fine micropunctures; T6 broadly triangular (9:19).

**Male.** Unknown.

**Type material.** Holotype ♀ (CNC No. 17674), USA, Illinois, Union Co., Shawnee State Park, Pine Hill, 120 m, May 1–2 1979, H. Goulet; paratypes: 3 ♀ ♀ , with same data as holotype (CNC).

**Distribution.** Illinois.

**Biology.** Unknown.

**Variability.** Legs and antennae light brown in one paratype, mesosoma brown in another paratype (? teneral specimen).

**Remarks.** *Trichacis dracula* is unique among Nearctic species of *Trichacis* because of its unusual horn-like processes on temples. The name of this new species refers to the horned collar of the mystical creature Dracula.

8. *Trichacis elongata* n. sp.

_Fig. 13_

**Female.** Length 2.65 mm. Black; legs (except dark brown coxae) bright orange-yellow, posterior apices of hind femora brownish; radicle and scape concolorous with legs, orange-yellow; A2–A5 yellowish brown, A6–A10 brown; wings clear.

Head transverse (31:53); occiput medially mat, coriaceous, with one row of hairs, coriaceous and hairy at sides; hyperoccipital carina strong, distinct; area between posterior ocelli and hyperoccipital carina with fine transverse striations; temples unarmed, strongly coriaceous; OOL < IOS (6:8); space between anterior and posterior ocelli distinctly coriaceous; frons smooth, with scattered deep punctures in upper half, with zone of fine coriaceous sculpture along inner orbits, with slight depression and delicate sculpture immediately below anterior ocellus, with multiple (7–8) rows of strong transverse striae above toruli occupying almost 1/3 of frons; EH subequal to IOS (27:30); antennal process short, truncate; mandibles clasped, with equal teeth; cheeks with rough irregular longitudinal striae; antenna (Fig. 13) rather strong, with non-abrupt 5-segmented clava, A7–A10 with deeply sunken sensilla.

Mesosoma distinctly longer than high (80:54); anterior parallel lines delicate but distinct; notauli abbreviate in anterior quarter; scutellum only moderately arched, with specialized area heart-shaped, moderately elevated, with short, broad tuft; fore wings not reaching apex of T6.

Metasoma distinctly elongate; T1 only slightly transverse (15:22); T2 distinctly elongate (70:49), anteromedially (between pits) smooth, slightly convex; pits distinctly elongate, narrow; combined length of T3–T6 greater than width of T2 (72:49); posterior margin of T2 smooth; T3–T6 with dense, strong punctures; T6 elongate (27:22).

**Male.** Differs from female in structure of antennae and metasoma; combined length of T3–T7 only slightly shorter than width of T2 (46:51).

**Type material.** Holotype ♀ (CNC No. 17675), USA, Missouri, Williamsville, May 8–27 1972, Malaise trap, J.T. Becker; Allotype ♂ , with same data as holotype but caught
April 22-May 13 1970 (Malaise trap) (CNC); paratypes: 19♀♂, with same data as in holotype but caught April–May 1970–1972.

**Distribution.** Missouri.

**Biology.** Unknown.

**Variability.** The combined length of T3–T6 in females may vary, also the length of T6; consequently, wings may reach the apex of metasoma in individuals with shorter metasoma.

**Remarks.** Individuals of *T. elongata* are the longest among all Nearctic species of *Trichacis*. *Trichacis elongata* is closely related to *T. rufipes* but differs from the latter by more elongate metasoma in both sexes; the transverse striae above antennal process are much more developed in *elongata* than in *rufipes*, and so is also the hyperoccipital carina. The name of this new species refers to its remarkably elongate shape of body.

9. *T. huberi* n. sp.

**Fig. 12**

*Female.* Length 1.7 mm. Black; legs and antennae predominantly dark brown, knees, apices of fore tibiae and all tarsi light brown; wings clear.

Head transverse (25:42), almost subrectangular; occiput smooth and glabrous medially, hairy and coriaceous at sides; hyperoccipital carina indistinct, almost blurred by delicate transverse striae across vertex; temples unarmed, coriaceous; OOL < LOL (5:8); space between anterior and posterior ocelli finely coriaceous; space between posterior ocelli smooth; frons smooth, with few scattered punctures in upper half, with only few delicate striae above antennal process and toruli; EH < IOS (21:28); antennal process short, truncate; mandibles clasped, with teeth equal; antennae (Fig. 12) rather slender, with non-abrupt 4-segmented clava, A7–A10 with prominent sensilla.

Mesosoma rather elongate (62:42); anterior parallel lines delicate, better indicated in posterior half;notauli deeply incised, almost percurrent, abbreviate only in anterior corners; scutellum moderately arched, with specialized area subcircular, rather elevated, with short, dense tuft; fore wings barely exceeding apex of metasoma.

Metasoma rather elongate; T1 transverse (10:19); T2 slightly elongate (55:45), anteromedially (between pits) smooth and slightly convex; combined length of T3–T6 only slightly shorter than width of T2 (38:35); posterior margin of T2 smooth; T3–T6 with scattered fine punctures; T6 broadly triangular (10:18).

*Male.* Unknown.

**Type material.** Holotype ♀ (CNC No. 17676), USA, California, Inyo Co., Panamint Valley, Surprise Canyon, April 28 1981, J.T. Huber.

**Distribution.** California.

**Biology.** Unknown.

**Remarks.** This remarkably melanic species appears to be closely related to *T. rufipes* because of its subrectangular head, sparsely punctured upper frons and the elongate metasoma. It differs from *rufipes* in having hyperoccipital carina almost indistinct, frons above antennal process with only few delicate transverse striae, and by considerably dark antennae and legs. This new species is named in honour of Mr. John T. Huber (U. California, Riverside), who kindly donated numerous proctotrupoid wasps to the Canadian National Collection.

10. *Trichacis mandibulata* n. sp.

**Figs. 10, 17**

*Female.* Length 1.4 mm. Black; legs and antennae dark brown, fore tibiae, all trochanters and tarsi light brown; wings clear.
Head subrectangular, transverse (26:45); occiput medially mostly smooth, with delicate transverse striae immediately below hyperoccipital carina; hyperoccipital carina sharp, strong; temples unarmed, strongly coriaceous; OOL equals LOL; space between anterior and posterior ocelli distinctly coriaceous; frons smooth, with extremely delicate stria above antennal process and toruli; EH < IOS (22:25); antennal process short, truncate; mandibles long, sickle-shaped, widely crossing at apices, with lower tooth much longer than upper tooth, with lower edge twisted forward at 90°; antenna (Fig. 10) short, with semiabrupt clava, A7–A10 with prominent sensilla.

Mesosoma considerably short, highly arched dorsally; anterior parallel lines inconspicuous; notauli abbreviate in anterior third; scutellum almost cone-shaped, with specialized area subcircular, elevated medially, with small dense tuft; fore wings surpassing apex of metasoma.

Metasoma short and plump; T1 broadly transverse (8:21); T2 slightly transverse (41:44), anteromedially (between pits) with short fine longitudinal striae shorter than T1; combined length of T3–T6 considerably shorter than width of T2 (22:44); posterior margin of T2 smooth; T3 almost smooth, T4–T6 with extremely delicate punctures; T6 broadly triangular (8:20).

Male. Similar to female, differs in antennal structure (Fig. 17) and metasoma; legs distinctly lighter than in female, fore and mid legs predominantly yellowish brown.

Type material. Holotype ♀ (CNC No. 17677), USA, Illinois, Union Co., Shawnee State Forest, Pine Hill, 120m, May 1-2 1979; interception trap, H. Goulet; allotype ♂, with same data as in holotype (CNC); paratypes 6 ♀ ♀ ♀ ♀ ♀ ♀, with same data as holotype (CNC).

Distribution. Illinois.

Biology. Unknown.

Variability. Fore and mid legs lighter brown in some female paratypes.

Remarks. Trichacis mandibulata shares the same type of mandibles with T. texana and T. pyramidalis, however, differs from both in structure of female antenna, structure of metasoma in both sexes, as well as in colour of antennae. The name of this new species refers to its remarkable mandibles.

11. Trichacis pyramidalis n. sp.

Figs. 8, 16, 33

Female. Length 1.60 mm. Black; legs and antennae predominantly bright orange yellow, with hind coxae, hind femora and posterior half of hind tibiae light brown, A7–A10 light brown; wings clear.

Head transverse (25:48); occiput medially with small smooth, glabrous area, with transverse striae immediately below hyperoccipital carina, with irregular longitudinal rugulae at sides; hyperoccipital carina sharp and strong; temples unarmed, coarsely coriaceous; OOL slightly longer than LOL (7:6); space between anterior and posterior ocelli coriaceous; frons smooth, with very delicate micropunctures along inner orbits, with delicate transverse striae above antennal process and toruli; EH < IOS (22:30); antennal process moderately protruding; mandibles long, sickle-shaped, widely crossing at apices, with lower tooth considerably longer than upper tooth; antenna (Fig. 8) long and slender, A3–A5 in particular, with non-abrupt 3-segmented clava, A8–A10 with very prominent sensilla, sensillum on A10 situated near apex.

Anterior parallel lines delicate but distinct; notauli abbreviate in anterior fifth; scutellum in lateral view cone-shaped pointed, with specialized area pointed prominent, partly obscured by thin tuft (Fig. 33); wings surpassing apex of metasoma.

Metasoma moderately elongate; T1 transverse (10:20); T1 moderately elongate (50:43), anteromedially (between pits) smooth, slightly excavate; combined length of
T3–T6 slightly shorter than width of T2 (35:43); posterior margin of T2 smooth; T3–T6 with delicate punctures; T6 sharply pointed, triangular (14:20).

**Male.** Similar to female except for structure of antenna (Fig. 16) and metasoma; antennae uniformly bright yellow throughout.

**Type material.** Holotype ♀ (CNC No. 17678), Canada, Ontario, Point Pelee National Park, June 9 1968, Malaise trap; allotype ♂, with same data as in holotype but caught May 19; paratypes: 10 ♀ ♂ ♂, with same data as holotype, caught in May or June 1968 (CNC); 1 ♀ paratype, same locality as above but caught May 29 1979, L. Masner (CNC).

**Distribution.** Ontario.

**Biology.** Unknown.

**Variability.** The occiput may be more coarsely rugulose in some individuals; the specialized area of scutellum is less elevated in some paratypes.

**Remarks.** *Trichacis pyramidalis* is undoubtedly closely related to *T. texana* because of the similarity in antennal structure and in the shape of the mandibles. These two species may be distinguished by the shape of the scutellum, which is sharply pointed apically in *pyramidalis* and only slightly elevated in *texana*. The name of the new species refers to the pyramidal shape of its scutellum (in lateral view).

12. *Trichacis rufipes* Ashmead

Figs. 9, 21

1893, *Trichasis (!) rufipes* Ashmead, Bull. U.S. natn. Mus. 45: 295.
1916, *Trichacis rufipes*: Brues, Bull. 22, Conn. geol. Nat. Hist. Survey, 1916 (1917), p. 534.
1924, *Trichacis rufipes*: Fouts, Proc. U.S. natn. Mus. 63: 13, 14.
1979, *Trichacis rufipes*: Muesebeck in Krombein et al., Catalog of Hymenoptera in America North of Mexico, Vol. 1: 1176. Smithsonian Institution Press, Washington, D.C.

**Female.** Length 2.20 mm. Black; most of the legs, radicle, scape, A2–A5 bright orange-yellow, coxae dark brown to black, A6–A10 brown; wings clear.

Head subrectangular, transverse (30:50); occiput medially partly smooth, with fine dense transverse striae below hyperoccipital carina, densely coriaceous at sides; hyperoccipital carina rather delicate, blurred by transverse striation behind it; temples unarmed, strongly coriaceous; OOL equals LOL; space between anterior and posterior ocelli strongly coriaceous; frons smooth, with streak of fine coriaceous sculpture along inner orbits, frons below anterior ocellus with scattered punctures, with several transverse striae above antennal process and toruli; EH < IOS (27:33); antennal process short, moderately projecting, truncate, slightly excavate; mandibles clasped, with teeth equal; antenna (Fig. 9) rather short, with non-abrupt pentamерous clava, A7–A10 with rather prominent sensilla.

Mesosoma relatively long, longer than high (70:50); anterior parallel lines delicate; notauli deeply incised, almost percurrent, abbreviate only in anterior corners; scutellum rather flattened, specialized area heart-shaped, only moderately elevated, with short, dense tuft; fore wings slightly surpassing apex of metasoma.

Metasoma rather elongate; T1 slightly transverse (16:24); T2 distinctly elongate, longer than wide (65:52), anteromedially (between pits) slightly excavate, with irregular fine sculpturing; combined length of T3–T6 shorter than width of T2 (46:52); posterior margin of T2 with narrow zone of delicate punctures; T3–T6 with dense punctures, intensity of punctation increasing gradually from T3 to T6; T6 bluntly triangular (17:20).

**Male.** Similar to female except for structure of antenna (Fig. 21) and metasoma; legs including coxae and entire antenna orange-yellow.
Material examined. Lectotype ♂ (USNM No. 2277), VIRGINIA, Arlington; allolectotype ♂, and 2 ♀ ♂ paralectotypes with same data as on lectotype (USNM); numerous individuals examined from following provinces and states: New Brunswick, Ontario, Quebec; Arkansas, Arizona, Florida, Georgia, Louisiana, Maryland, Missouri, North Carolina, Tennessee, Virginia.

Distribution. Widespread common species ranging from Florida to Maritime Canada, also Arkansas and Arizona in southwestern USA.

Biology. Host unknown; a vernal species flying from April in the lower austral zone and May-June in more northern regions; rarely individuals encountered in late summer and fall indicating a possible second generation.

Variability. A highly variable species. Total body length varies considerably, from 1.30 to 2.40 mm. Variability of several character states seems to be correlated to length of the body; in smaller individuals the sculpture of the occiput is finer, the transverse striae above the toruli are less developed, punctation of T3–T6 is finer, and antennomeres in both sexes are shorter, e.g. the clavomeres in female are more transverse. Metasoma may be longer or shorter in some individuals, thus determining the degree by which it is surpassed by fore wings. Coloration of antennae and legs may vary in females from bright orange-yellow to predominantly light brown.

Remarks. Trichacis rufipes appears to be related to T. elongata, T. striata, and T. huberi. It is closest to T. elongata from which it may be distinguished by shorter metasoma, finer striae on frons, sculpturing and shape of anteromedian area of T2 as well as by weaker hyperoccipital carina.

13. Trichacis striata n. sp.

Female. Length 1.90 mm. Black; legs including fore and mid coxae, radicle and scape orange-yellow, hind coxae brown, A2–A10 light brown; wings clear.

Head transverse (24:43); occiput mostly smooth medially, with delicate transverse striae immediately below hyperoccipital carina, coarsely coriaceous laterally; hyperoccipital carina exceptionally sharp, almost rim-like; temples unarmed, coarsely coriaceous; OOL distinctly shorter than LOL (6:8); space between anterior and posterior ocelli roughly coriaceous; frons smooth, with few scattered punctures below anterior ocellus, with narrow zone of fine coriaceous sculpturing and some scattered punctures along inner orbits, with distinct transverse striae above antennal process and toruli, and with very delicate transverse striation above those striae reaching about the middle of frons; antennal process short, truncate; EH almost equal to IOS (24:25); mandibles clapsed, with teeth equal; antenna short, with non-abrupt pentamereous clava, A7–A10 with moderately prominent sensilla.

Mesosoma longer than high (70:45), with very distinct patch of yellowish dense pilosity in anterolateral corner of pronotum, and a smaller patch in ventral corner of pronotum (above fore coxa); anterior parallel lines delicate; notauli deep, almost percurrent, abbreviate only in extreme anterior corners; scutellum rather flattened, with specialized area small, almost heart-shaped, moderately elevated, with short tuft; fore wings barely covering tip of metasoma; mesopleura with distinct, dense, (predominantly) horizontal striations over all.

Metasoma distinctly elongate; T1 only slightly transverse (13:18); T2 clearly elongate (55:38), anteromedially (between pits) deeply concave and rugulose; T2 densely striate in anterior half; combined length of T3–T6 equal to width of T2 (38:38); posterior margin of T2 with delicate punctuation; T3–T6 densely punctured; T6 sharply triangular (15:15).

Type material. Holotype ♀ (CNC No. 17679), USA, Florida, Ocala National Forest, Juniper Springs, August 13 1980, L. Masner; paratypes 2 ♀ ♂, with same data as holotype.
Distribution. Florida.

Biology. Unknown; apparently with more than one generation per year in Florida.

Variability. One paratype smaller than holotype (1.50 mm); T6 in two paratypes slightly wider than long.

Remarks. T. striata shares some character states encountered in T. rufipes, but could be distinguished from the latter as well as from all Nearctic species of Trichacis by the unique striation of the mesopleura as well as by the extremely long striation of T2. The name of this new species refers to this peculiar sculpturing.

14. Trichacis texana Fouts

Figs. 7, 22, 35

1925, Trichacis texana Fouts, Proc. ent. Soc. Wash. 27: 94.

1979, Trichacis texana: Muesebeck in Krombein et al., Catalog of Hymenoptera in America North of Mexico, Vol. 1: 1176. Smithsonian Institution Press, Washington, D.C.

Female. Length 1.59 mm. Black; A1–A6 and legs in greater part brown, club joints, coxae and femora darker; wings clear.

Head transverse (27:51); occiput smooth and glabrous medially, with few transverse striae below hyperoccpital carina, coriaceous and hairy laterally; hyperoccpital carina sharp and distinct; temples unarmcd, coriaceous; OOL slightly longer than LOL (7:5.5); space between anterior and posterior ocelli finely coriaceous; space between posterior ocelli and hyperoccpital carina with fine transverse striae; frons smooth, with few transverse striae above antennal process and toruli; antennal process extremely short, truncate; EH < IOS (21:32); mandibles long, sickle-shaped, widely crossing at tips, with lower tooth remarkably longer than upper tooth, with lower edge twisted forward by 90º (Fig. 35); antenna slender, antennomeres A3–A5 in particular, antennal clava semiabrupt, 3-segmented, A8–A10 with partly sunken sensilla, A10 with sensillum below apex.

Mesosoma only slightly longer than high (57:47); anterior parallel lines delicate; notauli abbreviate in anterior third; scutellum moderately arched, with large subcircular specialized area, only moderately elevated, with short dense tuft; fore wings slightly surpassing apex of metasoma.

Metasoma rather short; T1 transverse (12:20); T2 as long as wide (47:47), anteromedially (between pits) slightly concave and almost smooth; combined length of T3–T6 shorter than width of T2 (30:47); posterior margin of T2 with narrow zone of fine punctures; T3–T6 with dense fine punctures; T6 broadly triangular (9:20).

Male (hitherto unknown). Similar to female except for structure of antennae (Fig. 22) and metasoma; antennae uniformly bright yellow.

Material examined. Holotype ♀ (USNM No. 67381), TEXAS, Brownwood, April 24 1924, R.M. Fouts; ILLINOIS: ♂, Union Co., Shawnee State Forest, Pine Hill, 120 m, May 1-2 1979, interception trap, H. Goulet; ONTARIO: 260 ♀ ♀ ♂ ♂, Point Pelee National Park, May 19 1968 and June 9 1968, Malaise trap (CNC); TEXAS: ♂, Kerrville, April 2 1959, L.J. Bottimer (CNC); ♀ ♂, Welder Wildlife Refuge nr. Stinton, March 23 1965, J.G. Chillcott (CNC).

Distribution. Texas, Illinois, Ontario.

Biology. Unknown.

Variability. In the material examined the total body length varies between 1.40 and 1.90 mm. Sculpturing is more distinctly developed in larger individuals, e.g. the occiput may
be rugulose striate medially and the space between posterior ocelli and hyperoccipital
carina with strong transverse striae. In some males OOL equals LOL, and A4 is longer
than in Fig. 22. Length of mandibles may also vary in both sexes, however, the lower
tooth is always longer than the upper tooth.

Remarks. T. texana is closest to T. pyramidalis; the two species may be conveniently
distinguished by different shape of scutellum, which is of a clearly pointed cone-shape in
pyramidalis but only slightly elevated in texana.

15. Trichacis virginiensis Ashmead
Figs. 1, 23, 27, 32

1893, Trichasis (!) virginiensis Ashmead, Bull. U.S. natn. Mus. 45: 295, 297.
1924, Trichacis virginiensis: Fouts, Proc. U.S. natn. Mus. 63: 18.
1979, Trichacis virginiensis: Muesebeck, in Krombein et al., Catalog of Hymenoptera in
America North of Mexico, Vol. 1: 1176. Smithsonian Institution Press, Washington,
D.C.

Female. Length 1.30 mm. Black; legs predominantly light brown, with fore and mid
legs lighter, hind femora and posterior part of hind tibiae darker, all coxae dark brown;
antennae brown, radicle and scape lighter; wings distinctly infuscate in posterior two
thirds, with darker and lighter patterns in basal third (Fig. 27).

Head strongly transverse (24:50), almost lens-like in dorsal view, with temples be-
hind eyes strongly receding; occiput medially smooth and glabrous, hairy and wrinkly-
pustulate laterally; postgenae perfectly smooth; hyperoccipital carina strong, sharp, almost
rim-like; temples unarmed, partly transversely striate, partly coriaceous; OOL longer than
LOL (9:7); space between anterior and posterior ocelli with small patch of fine coriaceous
sculpture; frons smooth, with one or two transverse wrinkles above antennal process and
toruli; antennal process (lateral view) prominent, hook-like overlapping clypeus (Fig. 32);
EH < IOS (20:28); mandibles clasped, with teeth subequal; antenna rather short, with
non-abrupt seemingly 4-segmented clava, A8–A10 with prominent sensilla.

Anterior parallel lines inconspicuous; notauli abbreviate in anterior third; scutellum
rather arched, with large heart-shaped specialized area, moderately elevated, with dense
tuft; fore wings slightly surpassing apex of metasoma.

Metasoma rather elongate; T1 strongly transverse (10:23); T2 slightly longer than
wide (50:46); combined length of T3–T6 only slightly shorter than width of T2 (39:46);
posterior margin of T2 almost smooth; T3–T6 finely punctured; T6 predominantly smooth,
sharply triangular (16:20).

Male (hitherto unknown). Similar to female but differs in structure of antennae (Fig.
23) and metasoma; legs generally slightly lighter than in female.

Material examined. Holotype (?) (USNM No. 25429), VIRGINIA, Arlington; numerous
specimens from following states and provinces: Arizona, Illinois, Maryland, Missouri,
New York, Virginia; New Brunswick, Ontario, Quebec.

Distribution. Widespread; common, vernal species in eastern Nearctic, extending to
Arizona.

Biology. Unknown; most individuals swept from forest undergrowth.

Variability. Antennal process in some individuals is not hook-like but rather short and
truncate; T6 may be broader, more transverse in some females (up to ratio 12:20).

Remarks. T. virginiensis is a peculiar species, with no distinct ties to any species known
to me. The strongly transverse (almost lens-like) head, distinctly patterned wings, and a
hook-like antennal process in most individuals will distinguish it from other species.
FIGS. 26-35. Nearctic *Trichacis* spp. 26, *T. alticola* n. sp., fore wing; 27, *T. virginiensis* Ashmead, fore wing; 28, *T. celticola* n. sp., fore wing; 29, *T. dracula* n. sp., head; 30, *T. bison* n. sp., head; 31, *T. cornuta* Fouts, head; 32, *T. virginiensis* Ashmead, head; 33, *T. pyramidalis* n. sp., scutellum; 34, *T. arizonensis* (Ashmead), scutellum; 35, *T. texana* Fouts, mandibles.

**Acknowledgments**

Dr. P. M. Marsh (Systematic Entomology Laboratory, U.S. Department of Agriculture, Washington, D.C.) loaned all necessary types. Drs. A. Smetana and J. R. Vock-
eroth (Biosystematics Research Institute, Agriculture Canada, Ottawa) reviewed the manuscript. Miss S. Rigby and Mr. H. E. Bisdee (Biosystematics Research Institute, Agriculture Canada, Ottawa) prepared the drawings and the SEM photographs respectively.

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(Received 1 October 1982; accepted 27 January 1983)