

THE GENUS *ATRICHOPOGON* (DIPTERA, CERATOPOGONIDAE) IN OHIO AND NEIGHBORING STATES¹

M. W. BOESEL

Zoology Department, Miami University, Oxford, Ohio 45056

ABSTRACT

Nine species of *Atrichopogon* occur in Ohio and immediately adjacent states: *A. minutus*, known from the Palearctic and Nearctic regions generally; *A. websteri*, occurring widely in the eastern and southern states; *A. levis*, previously reported from Ohio and easily the most common ceratopogonid in the state; *A. fuscus* and *A. titanus* n. sp., both large and widespread but scarce; *A. peregrinus* and *A. fusinervis*, found in limited numbers; *A. geminus* n. sp., fairly common; *A. falcatus* n. sp., known from only 1 locality in Michigan. *A. websteri* and *A. levis*, not previously recorded from Canada, occur on Pelee Island, Ontario, as does also *A. geminus* n. sp.

INTRODUCTION

In the Nearctic region *Atrichopogon* is represented by 21 species. Of these, 15 have been found in the United States, 8 in the northeastern states, and only 1 in Ohio. Malloch (1915a) described and keyed 4 species (under *Ceratopogon*) for Illinois. Johannsen (1952) keyed 5 species for the northeastern states. All species covered by Malloch and Johannsen occur in the Ohio region, together with 3 species which are new. The present paper is based largely on rather extensive material collected in Ohio, but some new records from nearby states and Canada are included.

Various workers have emphasized the difficulties inherent in the study of the genus *Atrichopogon*. Edwards (1926) remarked that "the species are mostly very similar and difficult to distinguish satisfactorily." Wirth (1952) pointed out the lack of good clear characters even with respect to genitalia because of their "variation in appearance owing to degree of protrusion or contraction." Ewen and Saunders (1958) were most pessimistic in admitting that "we are forced to base the taxonomy to a great extent upon the developmental instars." In harmony with this statement they described larvae and pupae in much more detail than adults. In the present study a concerted search has been conducted for characters which are more reliable than some of those traditionally used in this genus. Those which have been found most useful appear in the descriptions and in the keys. The keys are constructed so that it should be possible to identify specimens regardless of whether they are dry or in some type of mounting medium. Absolute lengths of various parts are utilized to a greater extent than heretofore because they seem to be more dependable than relative lengths, possibly because they involve only one variable rather than two. The sexes differ in so many respects that they are described and keyed separately. It will be noted too that, in the key for males, characteristics are utilized which make determination possible without reference to slide mounts of genitalia.

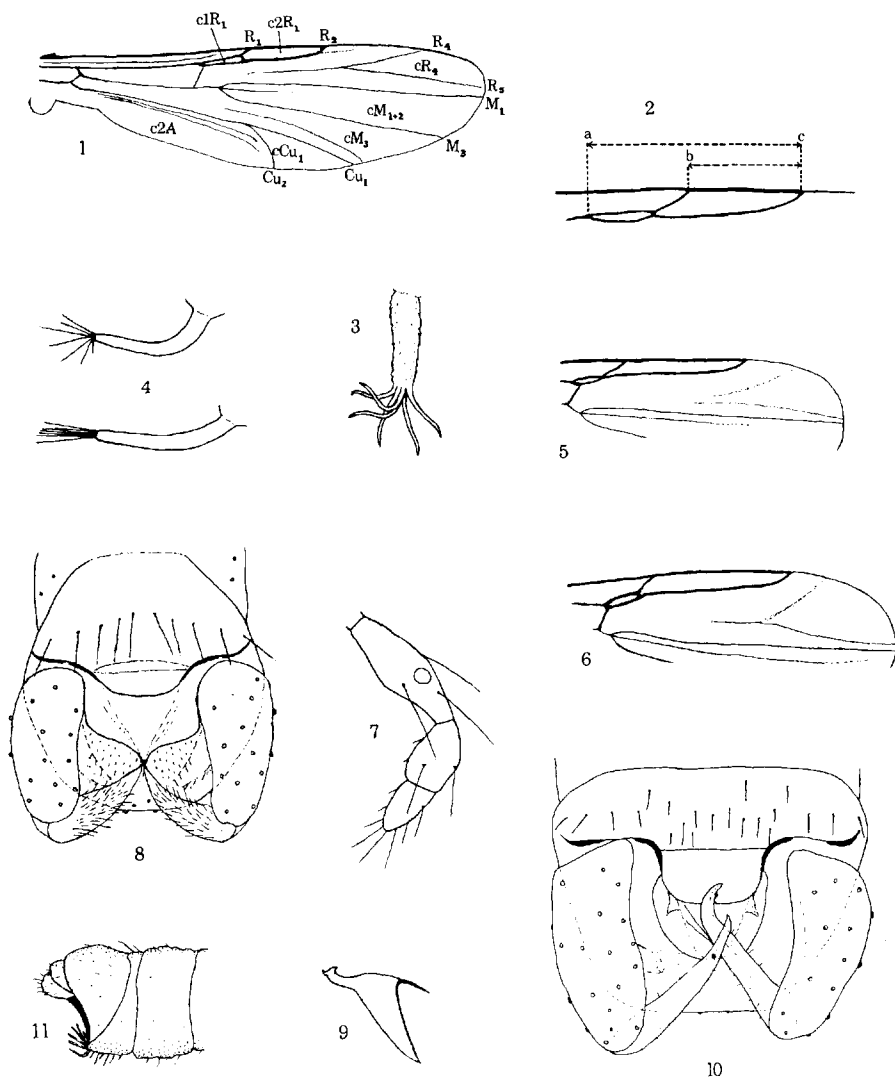
TERMINOLOGY

The terminology of the wing requires some explanation. The interpretation here adopted (fig. 1) implies the presence of crossvein r, a vestigial R_3 , and the atrophy of the base of R_{4+5} . Under the circumstances, the crossvein normally called rm is quite certainly a composite of rm and the base of R_{4+5} . However, because the degree to which the latter is represented must be in doubt, the entire vein will continue to be called rm. In two instances clearly identifiable areas

¹Manuscript received April 9, 1973.

which are actually parts of compound cells are, in the interest of simplicity, treated as if separate: the first is cell M_3 , which is really combined with $2M$ and possibly also with M_4 ; the second is cell $2A$, which obviously is not completely separated from cells Cu , $1A$, and $3A$.

Detailed measurements are given for a series of structures, particularly in the keys and descriptions. A single figure represents an average to the extent of the availability of material. Normally such a figure is followed by two figures in parentheses indicating the observed extremes of variation.



EXPLANATION OF FIGURES. Fig. 1 and 2, wing of *Atrichopogon*, illustrating terminology; 3, abdominal appendage of *A. fusinervis*, ♀; 4, abdominal appendage of *A. falcatus*, ♀, showing variation in curvature of base and position of terminal rods; 5, radial area of wing of *A. fuscus*, ♀; 6, radial area of wing of *A. titanus*, ♀; 7, end of palp of *A. geminus*, ♂; 8, genitalia of *A. geminus*, ♂; 9, median point of aedeagus of *A. geminus*, ventrolateral view; 10, genitalia of *A. titanus*, ♂; 11, end of abdomen of *A. falcatus*, ♀, lateral view.

Certain abbreviations are consistently used in the paper. These, together with several descriptive terms requiring explanation, are detailed and briefly defined below.

L: total length, excluding antennae

WL: length of wing, from base of alula to tip

WW: maximum width of wing

PL: length of proboscis, from base of clypeus to tip

AL: length of antenna

ALB: combined length of antennal segments 3-10

ALA: combined length of antennal segments 11-15

ALT: average length of antennal segments 11-15 in terms of mm/100

AR: ALA/ALB

1f, 2f, 3f: fore femur, mid femur, hind femur

1t, 2t, 3t: fore tibia, mid tibia, hind tibia

1x, 2x, 3x: fore tarsus, mid tarsus, hind tarsus

x_1, x_2, x_3, x_4, x_5 : first, second, third, fourth, fifth tarsal segment

3f-3 x_5 : average lengths of 3f to 3 x_5 in terms of mm/100

LR: $3x_1/3x_2$

c: cell, when used as a prefix in designating a wing cell; for example, cM_3 = cell M_3

w: wing

C over R_2 : length of costa above R_2 , measured as in fig. 2 (a-c)

C over $c2R_1$: length of costa above $c2R_1$, measured as in fig. 2 (b-c)

basal segments (of antenna): segments 3-10

prescutellar disc: flattened area of scutum immediately anterior to scutellum

prescutellar bristles: larger bristles, 1 on either side, on prescutellar disc

prescutellar shield: smooth area on prescutellar disc, adjacent to scutellum

prescutellar impression: rectangular impressed area behind prescutellar bristle

KEY TO SPECIES OF *Atrichopogon* (FEMALES)

1. Sternite 7 with a median terminal appendage; AR 1.1-1.3; PL not over 3.0 mm; eyes minutely hairy, narrowly separated; WL 1.2-1.6 mm; C over R_2 0.42 (0.38-0.45) mm. (2)
1. Sternite 7 simple, similar to more anterior sternites. (3)
2. Appendage on sternite 7 branched apically, the spiny branches curved and twisted, not capable of close apposition (fig. 3); scutellum with 4 rather spinous marginal primary bristles, the outer commonly smaller than the inner, with a few irregular secondary hairs; prescutellar bristles strong, spinous; w without macrotrichia; ALB 0.25 (0.20-0.28) mm; LR 2.3-2.8; scutum black. **fusinervis** (Malloch)
2. Appendage on sternite 7 consisting of a falcate spine bearing apically about 6 fine straight movable and closely apposable rods (fig. 4); scutellum with 2 slender marginal primary bristles and 2 or 3 smaller marginals on either side, the outermost of which may be stronger, with a few irregular secondary hairs; prescutellar bristles weak; w macrotrichia present but sparse, located in outer third of cR_4 , in middle outer fourth of cM_{1+2} , at apex of cM_3 , and irregularly in cCu_1 ; ALB 0.21 (0.20-0.22) mm; LR 3.0-3.1; scutum yellowish brown to brown. **falcatus** n. sp.
3. WL over 1.6 mm; WW over 0.6 mm; scutal hairs scattered, pale; C over R_2 0.61-0.76 mm; C over $c2R_1$ 0.40-0.50 mm. (4)
3. WL under 1.5 mm; WW under 0.6 mm; scutal hairs dark with reddish reflections, in irregular rows; C over R_2 0.29-0.49 mm; C over $c2R_1$ 0.21-0.33 mm. (5)

4. PL 0.54–0.64 mm; R_4 and R_5 subparallel basally, but not connected and therefore R_{4+5} not petiolate (fig. 5) **fuscus** (Coquillett)
4. PL 0.36–0.41 mm; R_4 weak, indicated by macrotrichia, and approaching R_5 at an angle of 30–40°; R_{4+5} distinctly petiolate (fig. 6) **titanus** n. sp.
5. Scutellum lighter than scutum, which is dark brown or blackish with at least the anterolateral angles slightly or considerably lighter; terminal palpal segment slightly smaller than penultimate segment and apically acute (fig. 7) (6)
5. Scutellum as black as the predominant black color of the scutum; terminal palpal segment apically rounded (7)
6. Scutellum normally clear yellow with 4 marginal primary bristles and no secondary hairs, rarely with 1 or 2; scutum with humeral area broadly yellow; middle third of scutum with about 3 irregular longitudinal rows of hairs; M_2 short, less than half as long as cM_{1+2} ; C over R_2 0.34 (0.29–0.39) mm; C over $c2R_1$ 0.24 (0.21–0.27) mm **levis** (Coquillett)
6. Scutellum light brown or dull yellow with 4 marginal primary bristles and 3 or 4 small secondary marginal hairs between the primaries; scutum with humeral area yellowish to brownish; middle third of scutum with about 5 irregular longitudinal rows of hairs; M_2 long, more than half as long as cM_{1+2} ; C over R_2 0.41 (0.39–0.47) mm; C over $c2R_1$ 0.30 (0.27–0.32) mm **geminus** n. sp.
7. Scutellum with only 2 primary bristles and typically 2 or 3 small marginal hairs on either side, commonly directed mesad; eyes nearly bare **minutus** (Meigen)
7. Scutellum with 4 primary bristles; eyes minutely hairy (8)
8. C over R_2 0.40 (0.36–0.43) mm; scutum with 2 longitudinal impressed lines; only the anteroapical half of cR_4 hairy; w behind cM_3 , and commonly cM_3 , bare; scutellum commonly with about 4 smaller secondary hairs, 1 before and 1 beside each inner primary; R_{4+5} obscurely petiolate; prescutellar shield apically acute **websteri** (Coquillett)
8. C over R_2 0.45 (0.43–0.49) mm; scutum without longitudinal impressed lines; cR_4 hairy except a band along R_5 ; macrotrichia present in cM_3 and sparse or absent in cCu_1 and $c2A$; scutellum with about 10 irregularly placed secondary hairs; R_{4+5} distinctly petiolate, with petiole about as long as R_4 ; prescutellar shield shallow, anteriorly rounded **peregrinus** (Johannsen)

KEY TO SPECIES OF *Atrichopogon* (MALES)

1. WL 1.69 mm or more; WW 0.46 mm or more; PL 0.28–0.40 mm; C over $c2R_1$ 0.32 mm or more; scutellum normally with 4 primary bristles and numerous pale secondary hairs similar to those on scutum; scutellum generally slightly paler than scutum; eyes bare or nearly so (2)
1. WL 1.60 mm or less; WW 0.45 mm or less; PL 0.16–0.24 mm; C over $c2R_1$ 0.23 mm or less; scutellum normally with 2 or 4 primary bristles, but otherwise bare or provided with as many as 6 more or less regularly placed secondary hairs; scutellum yellow to black; eyes hairy or bare (3)
2. PL 0.34–0.40 mm; R_{4+5} not petiolate, R_4 running nearly parallel to R_5 at base and not connected with R_5 (fig. 5); C over R_2 0.47 (0.43–0.55) mm; legs brownish (dry specimens); tergite 9 evenly rounded to subacute; antennal plumes blackish brown **fuscus** (Coquillett)
2. PL 0.28–0.30 mm; R_{4+5} long petiolate, but R_4 weak basally (fig. 6); C over R_2 0.58 (0.57–0.60) mm; legs yellowish (dry specimens); tergite 9 subtruncate, wide; antennal plumes yellowish brown **titanus** n. sp.

3. Scutellum yellow to brown, paler than scutum; last palpal segment smaller and shorter than penultimate segment, apically acute (fig. 7); eyes widely separated. (4)
3. Scutellum black, concolorous with scutum; last palpal segment variable in length but apically rounded; eyes narrowly separated or contiguous. (5)
4. Scutellum clear yellow, with 4 primary bristles and commonly without secondary hairs, 1 or 2 irregularly present; C over R_2 0.24 (0.22–0.26) mm; C over $c2R_1$ 0.14 (0.13–0.16) mm; about 3 rows of hairs in middle third of scutum; M_2 only about half as long as cM_{1+2} ; yellow prescutellar impressions present; prescutellar shield anteriorly acute or interrupted. . . **levis** (Coquillett)
4. Scutellum brownish yellow to dull yellow, with 4 primary bristles and 3 or more short marginal hairs between the primaries; C over R_2 0.32 (0.29–0.35) mm; C over $c2R_1$ 0.21 (0.19–0.23) mm; about 5 rows of hairs in middle third of scutum; M_2 extending into outer half of cM_{1+2} ; prescutellar impressions absent; no yellow behind prescutellar bristles; prescutellar shield evenly rounded anteriorly. **geminus** n. sp.
5. Basistyles slender, much exposed, extending conspicuously beyond end of tergite 9; C over $c2R_1$ 0.13 (0.11–0.13) mm; scutellum with 4 primary bristles, the outer commonly rather short and spinous, secondary hairs absent or irregular and limited to 2 or 3. **fusinervis** (Malloch)
5. Basistyles short, much concealed, barely or not at all exceeding end of tergite 9; C over $c2R_1$ 0.15–0.20 mm; scutellum with 2 or 4 primary bristles. (6)
6. Scutellum with only 2 primary bristles; secondary hairs variable but tending to form a marginal row of 3 on either side of primaries; eyes bare or nearly so. **minutus** (Meigen)
6. Scutellum with 4 primary bristles; secondary hairs variable but usually about 2 to 4 placed near inner primaries; eyes minutely hairy. (7)
7. Scutum with 2 longitudinal slightly impressed lines; prescutellar shield commonly apically acute; C over R_2 0.27 (0.25–0.29) mm; C over $c2R_1$ 0.16 (0.15–0.18) mm; petiole of R_{4+5} about three-fourths length of R_5 **websteri** (Coquillett)
7. Scutum without distinct longitudinal impressed lines; prescutellar shield short, rounded anteriorly; C over R_2 about 0.32 mm; C over $c2R_1$ about 0.20 mm; petiole of R_{4+5} about equal to length of R_5 **peregrinus** (Johannsen)

Atrichopogon minutus (Meigen) 1830

Female.—L 0.91 (0.78–1.09) mm; WL 1.05 (0.92–1.23) mm; WW 0.40 (0.38–0.46) mm; PL 0.24 (0.22–0.26) mm; ALB 0.16 (0.14–0.19) mm; ALA 0.33 (0.30–0.36) mm; ALT 5:6:6:7:9; AR 1.9–2.3; 3f-3x₅ 40:37:19:7:5:4:4; LR 2.8–3.0; C over R_2 0.33 (0.32–0.37) mm; C over $c2R_1$ 0.24 (0.22–0.27) mm. Eyes contiguous, nearly bare. Antennae yellowish. Last palpal segment shorter than penultimate, rounded apically. Clypeus gently rounded basally. Scutum blackish with short sparse dark hairs with reddish reflections and arranged in irregular rows; prescutellar shield slightly peaked, nearly rounded anteriorly; prescutellar impressions absent. Scutellum blackish, with only 2 marginal primary bristles and 2 or 3 small marginal hairs on either side. Legs yellowish. Macrotrichia sparse, confined to apical margin of w and cR_4 (rarely a few in cM_{1+2}); R_4 and R_5 equally strong; R_{4+5} distinctly petiolate, the petiole commonly about as long as R_4 , fading out; M_2 vague, short. Halteres apically white. Abdomen glossy brown to blackish, with short pale iridescent hairs; sternite 7 simple.

Male.—L 1.36 (1.31–1.40) mm; WL 1.36 (1.34–1.38) mm; WW 0.39 (0.38–0.40) mm; PL 0.18 (0.17–0.19) mm; ALB 0.35 (0.34–0.36) mm; ALA 0.40–0.41 mm;

ALT 3:7:9:10:11; AR 1.1–1.2; 3f-3x₅ 47:46:26:10:6:4:6; LR 2.6–2.8; C over R₂ 0.28 (0.27–0.30) mm; C over c2R₁ 0.18 mm. Eyes contiguous, bare. Antennae with basal segments about as long as wide. Last palpal segment shorter than penultimate, rounded apically. Scutum polished black; hairs short, dark, with reddish reflections, in irregular rows. Scutellum black, with only 2 primary marginal bristles; typically with about 3 small marginal hairs on each side, directed mesad. Legs yellow. Wings without macrotrichia; R₄ and R₅ equally strong, R₄₊₅ long petiolate; M₂ rather weak, fading out before middle of cM₁₊₂; M petiole shorter than rm. Abdomen brown with intermediate hairs except at apex where they are nearly as long as tergite 9. Tergite 9 rounded apically; basistyles barely exceeding tergite 9.

Discussion.—The species is widespread. It was originally described from Europe and has been reported from Scandinavia to central and western Europe (Goetghebuer and Lenz, 1933). It also occurs in Canada (Ewen and Saunders, 1958) and in the United States from California to Maryland and Virginia (Wirth, 1952). Except for a record from Indiana mentioned by Wirth (1952), it has not been recorded from the Ohio region. However, it occurs widely in Ohio, having been taken in the following counties: Ashtabula, Brown, Butler, Fairfield, Franklin, Highland, Lucas, Muskingum, Ottawa, Scioto, Shelby, Trumbull, Tuscarawas, Washington, and Wayne. Dates of capture range from April to October. I also have records from Ithaca, New York. Larvae occur on stones and on and under wood, particularly decaying wood, in swamps or in streams (Ewen and Saunders, 1958).

Atrichopogon websteri (Coquillett) 1901

Female.—L 0.94 (0.85–1.18) mm; WL 1.24 (1.05–1.34) mm; WW 0.48 (0.46–0.50) mm; PL 0.25 (0.24–0.30) mm; ALB 0.18 (0.16–0.21) mm; ALA 0.32 (0.30–0.34) mm; ALT 5:5:6:6:10; AR 1.8; 3f-3x₅ 44:42:21:7:6:4:5; LR 3.0; C over R₂ 0.40 (0.36–0.43) mm; C over c2R₁ 0.29 (0.27–0.30) mm. Eyes contiguous, hairy. Basal antennal segments transverse. Last palpal segment longer than penultimate segment, apically rounded; antepenultimate palpal segment rather broad. Scutum black or dark brown, with short dark hairs showing reddish reflections, irregularly arranged in longitudinal rows; 2 sublateral impressed lines present, tending to be lighter at ends (humeral and prescutellar areas), but rather obscure in darkest specimens; prescutellar shield acutely pointed anteriorly; prescutellar impressions present, varying from yellow to black. Scutellum blackish, with 4 marginal primary bristles, together with about 4 weak hairs, 1 just in front of and 1 just outside each inner primary bristle. Legs yellowish brown. Wings with macrotrichia in anteroapical half of cR₄ and in cM₁₊₂ (rarely several, but not many, in cM₃); R₄₊₅ obscurely petiolate; M₂ short but distinct; c1R₁ slightly open. Halteres whitish to light brown. Abdomen brown, with short hairs; sternite 7 simple.

Male.—L 1.33 (1.18–1.50) mm; WL 1.33 (1.25–1.44) mm; WW 0.40 (0.36–0.42) mm; PL 0.22 (0.18–0.24) mm; ALB 0.32 mm; ALA 0.40 mm; ALT 4:4:12:8:11; AR 1.25; 3f-3x₅ 49:43:25:9:6:4:5; LR 2.9; C over R₂ 0.27 (0.25–0.29) mm; C over c2R₁ 0.16 (0.15–0.18) mm. Eyes hairy, nearly contiguous. Last palpal segment apically rounded, longer and wider than penultimate segment. Scutum dark brown to black, with 2 sublateral slightly impressed lines, which are commonly not lighter than rest of scutum; scutal hairs dark, especially short anteriorly, with reddish or brassy reflections and tending to be arranged in irregular longitudinal rows; prescutellar shield commonly apically acute, extending into anterior half of disc; prescutellar impressions present. Scutellum concolorous with scutum, having 4 marginal primary bristles and about 4 secondary hairs, 1 in front of and 1 just outside each inner primary bristle. Legs dull yellowish to yellowish brown. Wing surface without macrotrichia; R₄₊₅ petiolate, length of petiole 0.33 (0.31–0.36) mm, about three-fourths length of R₅; M₂ short but distinct. Halteres white apically,

darkened basally. Abdomen with long brownish hairs, particularly long apically. Basistyles not exceeding apex of tergite 9; aedeagus with wrinkled appearance.

Discussion.—The species was originally described from Louisiana (Coquillett, 1901) but its known range now includes Florida, Missouri, Oklahoma, Texas, New Mexico, and Maryland (Wirth, 1952). Lewis (1959) found it in Connecticut. New York records seem to be in doubt (Johannsen, 1952). Snow, Pickard, and Moore (1957) recorded it from Tennessee. Wirth (1952) mentioned a record from Indiana. This study adds Ohio to the list, with records from the following counties: Butler, Erie, Franklin, Lucas, Ottawa, Tuscarawas, and Wayne. Collection dates range from April to October; on one occasion, a female was taken indoors in December. The species was also taken on Pelee Island, Ontario, Canada, the first Canadian record. Larvae and pupae described by Thomsen (1937) under the name of *websteri* apparently must be assigned to another species (Johannsen, 1952).

Atrichopogon levis (Coquillett) 1901

Female.—L 1.17 (0.90–1.32) mm; WL 1.08 (0.98–1.22) mm; WW 0.42 (0.37–0.46) mm; PL 0.22 (0.18–0.25) mm; ALB 0.25 (0.22–0.26) mm; ALA 0.41 (0.33–0.42) mm; ALT 6:7:8:8:11; AR 1.5–1.7; 3f-3x₅ 42:39:25:11:8:6:5; LR 2.3; C over R₂ 0.34 (0.29–0.39) mm; C over c2R₁ 0.24 (0.21–0.27) mm. Eyes hairy, distinctly separated. Antennae dark brown, basal segments spherical to longer than wide. Last palpal segment apically acute; shorter and smaller than penultimate segment. Scutum dark brown with anterolateral angles broadly yellow; area behind each prescutellar bristle yellow to a variable extent; scutal hairs sparse, dark, inconspicuous, with about 3 irregular longitudinal rows in middle third of scutum. Scutellum clear yellow with 4 marginal primary bristles and commonly without secondary hairs (1 or 2 rarely present). Wings with macrotrichia sparse, some in marginal area of cR₄ and cM₁₊₂, and several or none in cM₃; cubital and anal cells bare; R₄₊₅ distinctly petiolate; M₂ short, less than half as long as cM₁₊₂ and ending abruptly; c1R₁ narrow. Halteres yellowish white. Abdominal sternite 7 simple.

Male.—L 1.26 (1.00–1.40) mm; WL 1.19 (1.12–1.33) mm; WW 0.36 (0.34–0.38) mm; PL 0.20 (0.16–0.21) mm; ALB 0.33 (0.29–0.35) mm; ALA 0.40 (0.39–0.44) mm; ALT 4:6:10:9:11; AR 1.2; 3f-3x₅ 45:42:30:12:9:6:5; LR 2.5; C over R₂ 0.24 (0.22–0.26) mm; C over c2R₁ 0.14 (0.13–0.16) mm. Eyes widely separated, hairy. Last palpal segment acute, shorter and smaller than penultimate segment. Scutum blackish except for the yellowish prescutellar impressions; scutal hairs sparse, dark, in irregular longitudinal rows, with only about 3 rows in middle third of scutum; prescutellar shield anteriorly acute or interrupted. Scutellum clear yellow with 4 marginal primary bristles and commonly lacking smaller secondary hairs (1 or 2 irregularly present). Legs olive yellow. Wings without macrotrichia; R₄₊₅ distinctly petiolate; M₂ about half length of cM₁₊₂; c1R₁ nearly closed or slitlike. Halteres yellowish. Basistyles barely or slightly exceeding end of tergite 9.

Discussion.—This is easily the most common ceratopogonid in Ohio. The same is true in Illinois and probably elsewhere in this general region. Adults abound in grassy areas such as lawns, parks, and cemeteries to such an extent that the species has been nicknamed the "grass punky" (Boesel and Snyder, 1944). It occurs in nearly all parts of the United States, for there are records from 22 widely distributed states. Specimens have been taken from April to October in the following Ohio counties: Adams, Ashland, Ashtabula, Auglaize, Belmont, Brown, Butler, Columbiana, Franklin, Guernsey, Harrison, Hocking, Jackson, Jefferson, Lake, Lawrence, Licking, Lucas, Meigs, Morgan, Muskingum, Ottawa, Ross, Scioto, Shelby, Trumbull, Washington, and Wayne. I have also collected specimens on Pelee Island, Ontario. It is interesting that, in spite of the abundance of the species in our region, and the fact that it occurs in Maine, New York, Michi-

gan, and Washington, there have apparently been no previous Canadian records. Malloch (1915a) noted the high degree of variability within this species, particularly with respect to color. The present study suggests that, at least in the region principally under discussion, two very similar species have been carried under one name. Details will be presented later under the discussion of *A. geminus*.

Atrichopogon fuscus (Coquillett) 1901

Female.—L 1.52 (1.44–1.60) mm; WL 1.91 (1.70–2.06) mm; WW 0.69 (0.66–0.72) mm; PL 0.60 (0.54–0.64) mm; ALB 0.24 (0.22–0.26) mm; ALA 0.55 (0.51–0.60) mm; ALT 9:10:10:11:15; AR 2.3; 3f-3x₅ 64:67:40:14:10:6:7; LR 2.8 (2.6–2.9); C over R₂ 0.65 (0.61–0.70) mm; C over c2R₁ 0.43 (0.40–0.46) mm. Eyes bare, contiguous. Basal antennal segments transverse. Antepenultimate palpal segment subequal to last 2 segments combined, slightly enlarged on outer half; last and penultimate segments subequal. Scutum blackish, commonly with paler shoulders; scutal hairs pale, scattered, extending back almost to level of prescutellar bristles; some hairs on prescutellar disc irregularly long. Scutellum brownish yellow, with 4 marginal primary bristles and numerous pale secondary hairs. Legs brownish yellow; apex of 1t with prominent projecting brush on anterior margin. Wings with numerous macrotrichia on outer and posterior half; R₄₊₅ not petiolate, R₄ being evanescent basally, running subparallel to R₅ at base and not actually joining R₅ (fig. 5); M₂ long, indicated by macrotrichia; c1R₁ open. Halteres dull white. Abdomen brown with numerous short hairs and longer hairs at apex; sternite 7 simple.

Male.—L 1.85 (1.60–2.00) mm; WL 1.85 (1.69–1.94) mm; WW 0.49 (0.46–0.54) mm; PL 0.36 (0.34–0.40) mm; ALB 0.45 (0.41–0.47) mm; ALA 0.55 (0.52–0.59) mm; ALT 5:6:17:12:15; AR 1.2; 3f-3x₅ 70:66:42:17:11:7:7; LR 2.5; C over R₂ 0.47 (0.43–0.55) mm; C over c2R₁ 0.34 (0.32–0.37) mm. Eyes bare, contiguous. Basal antennal segments subspherical or somewhat longer than wide; antennal plumes blackish brown. Antepenultimate palpal segment subequal to last 2 combined, with outer half expanded. Scutum blackish; scutal hairs pale, scattered, extending back to level of prescutellar bristles. Scutellum light brown or brownish yellow, with 4 marginal primary bristles and numerous pale secondary hairs. Legs brownish (dry specimens); apex of 1t with prominent obliquely placed and projecting brush on anterior margin. Wing membrane bare; R₄₊₅ not petiolate, R₄ running subparallel to R₅ at base and not connected with R₅ (fig. 5); M₂ long, about half length of cM₁₊₂. Halteres white with dark stem. Abdomen brown, subshining, with moderately long hairs, longer near and at apex. Tergite 9 evenly rounded to subacute; basistyles reaching or almost reaching end of tergite 9; dististyles on outer third or half strongly curved, apically unequally bifurcate.

Discussion.—This species ranges from Canada (Wirth, 1952) to Brazil (Wirth, 1956b), and from coast to coast in the United States. It has been recorded from 19 states. Lewis (1959) found it to make up over 50 percent of all ceratopogonids trapped at Madison, Connecticut, where it seems to reach a peak of abundance in August. In the southern states it occurs from March (Snow, Pickard, and Moore, 1957) to November (Johnson, 1913). The species is widespread in California (Wirth and Stone, 1968). *A. fuscus* is not common in the area covered by this study. Malloch (1915a) mentioned only 5 records for Illinois. Johannsen (1952), who worked principally in the state of New York, must not have known females, for he keyed the species as having bare wings. Until now the species has not been recorded from Ohio. My experience is limited to 21 specimens, largely males collected from swarms in different years in Ottawa County. The 2 other counties represented are Belmont and Tuscarawas. All specimens were taken between June 27 and July 26. Malloch (1915a) swept adults from vegetation near streams in Illinois and found larvae and pupae on a log in a river and also on the submerged portions of a wooden float.

Atrichopogon peregrinus (Johannsen) 1908

Female.—L 1.16 (0.91–1.34) mm; WL 1.35 (1.30–1.46) mm; WW 0.53 (0.49–0.56) mm; PL 0.32 (0.29–0.34) mm; ALB 0.17 (0.16–0.18) mm; ALA 0.35 (0.32–0.41) mm; ALT 6:6:6:6:10; AR 2.1; 3f-3x₅ 53:45:25:10:6:5:6; LR 2.5; C over R₂ 0.45 (0.43–0.49) mm; C over c2R₁ 0.31 (0.28–0.33) mm. Eyes hairy, contiguous. Basal antennal segments transverse. Last palpal segment longer and wider than penultimate, apically rounded; antepenultimate segment broad, expanded especially on apical half. Scutum blackish brown, without longitudinal impressed lines, or with merely a suggestion of impressed lines; scutal hairs dark, with reddish reflections, in irregular rows; prescutellar shield shallow, apically rounded, rarely extending into anterior half of disc; hairs at or near anterior margin of shield irregularly larger than other scutal hairs; prescutellar impressions present, sometimes slightly paler than rest of scutum. Scutellum blackish brown with 4 marginal primary bristles and about 10 irregular secondary hairs. Legs olive to light brown. Macrotrichia present in about two-thirds of cR₄ (absent along R₅), in cM₃, and sparsely or not at all in cCu₁ and c2A; R₄₊₅ petiole distinct and about as long as R₄; M₂ short; c1R₁ slitlike or narrowly open. Halteres brownish white to white. Abdomen opaque, brownish black, with yellowish brown hairs shorter than intermediate segments; posterior segments with a few longer hairs; sternite 7 simple.

Male.—L 1.40 mm; WL 1.40 mm; WW 0.42 mm; PL 0.24 mm; ALB 0.35 mm; ALA 0.41 mm; ALT 4:7:9:9:12; 3f-3x₅ 49:46:27:10:7:4:6; LR 2.7; C over R₂ 0.32 mm; C over c2R₁ 0.20 mm. Eyes hairy, contiguous. Antennae brownish, with brownish plumes. Last 2 palpal segments subequal, last segment rounded apically. Scutum blackish brown, with a suggestion of impressed lines; scutal hairs dark, in irregular longitudinal rows; prescutellar shield shallow, rounded anteriorly, without hairs; prescutellar impressions present. Scutellum blackish brown with 4 marginal primary bristles and 2 smaller secondary hairs, 1 outside each primary bristle. Legs yellowish to brownish yellow. Wings bare; veins yellow, nearly clear posteriorly; R₄₊₅ petiolate, length of petiole about 0.41 mm, subequal to length of R₅; M₂ strong, ending abruptly before middle of cM₁₊₂; M petiole nearly as long as rm. Halteres whitish, slightly darkened, with brownish stem. Abdomen black with rather long yellowish brown hairs; terminal hairs about 2 times as long as intermediate segments. Basistyles about as long as tergite 9; tergite 9 evenly rounded, wider than long.

Discussion.—Johannsen (1908) originally described this species from the state of New York. Malloch (1915a) recorded it from 8 Illinois localities, with collection dates from April to November, and also mentioned records from 2 Michigan localities. Later Malloch (1915b) indicated that the species was "very common throughout the locality collected over" and described the feeding of females on a dead earthworm apparently dropped in a tree by a bird. Thomsen (1937) described larvae feeding on algae near a New York lake shore and also near the outlet of a spring in Missouri. Ohio is therefore the fifth state in which the species has been found, with records from Butler, Carroll, Columbiana, Harrison, Jefferson, and Ottawa Counties, and collection dates from June to September. There is some difficulty with respect to the male, which has never been adequately described. Johannsen (1952) evidently never saw a male. Malloch (1915a) described the male only sketchily, in relation to males of *fusinervis* and *levis*, with which it should not easily be confused. I have only 1 male, which I at first hesitated to assign to this species, only because it was not collected with females. However, the specimen checks out so well that a description has been presented above. Genitalia mounts have not been made because of the desirability of keeping the specimen intact with the preservation of other diagnostic features. As indicated in the keys, *peregrinus* is most likely to be confused with *websteri*, a species which Malloch, and possibly Johannsen, did not have. In some individuals there are suggestions of longitudinal scutal impressions which are so characteristic of *websteri*; the wing

too is more nearly similar to that of *websteri* than to that of *fusinervis* or *levis*. Evidently the western counterpart of *peregrinus* is *transversus*, which Wirth (1952) described from California.

Atrichopogon fusinervis (Malloch) 1915

Female.—L 1.27 (1.10–1.46) mm; WL 1.38 (1.24–1.56) mm; WW 0.52 (0.46–0.60) mm; PL 0.25 (0.24–0.30) mm; ALB 0.25 (0.20–0.28) mm; ALA 0.33 (0.32–0.37) mm; ALT 5:5:6:6:10; AR 1.3; 3f-3x₅ 53:50:23:10:7:4:6; LR 2.3–2.8; C over R₂ 0.42 (0.38–0.45) mm; C over c2R₁ 0.23 (0.21–0.26) mm. Eyes hairy, narrowly separated. Basal antennal segments slightly transverse to round. Palps rather massive, short, with last segment wider and longer than penultimate; antepenultimate segment broad. Scutum black; scutal hairs dark, sparse, in longitudinal rows; prescutellar impressions present; prescutellar bristles strong, spinous. Scutellum black, with 4 spinous marginal primary bristles, the outer somewhat to much smaller, and a few irregular secondary hairs. Legs brown to olive brown. Wings bare; R₄₊₅ vaguely petiolate, base of R₄ faint; M₂ short, evanescent apically; M petiole shorter than rm. Halteres white, with brownish stem. Abdomen opaque black with short hairs, longer hairs at apex; sternite 7 with median stalked spinous appendage (fig. 3), the stalk being straight, several times as long as wide, and bearing about 7 tapering apical branches which are informally curved and twisted and not capable of being closely apposed.

Male.—L 1.37 (1.30–1.46) mm; WL 1.39 (1.30–1.60) mm; WW 0.40 (0.38–0.43) mm; PL 0.22 (0.20–0.22) mm; ALB 0.31 (0.30–0.31) mm; ALA 0.37 (0.36–0.41) mm; ALT 4:7:8:7:11; AR 1.2; 3f-3x₅ 50:47:24:9:6:4:5; LR 2.6–2.7; C over R₂ 0.26 (0.23–0.28) mm; C over c2R₁ 0.13 (0.11–0.13) mm. Eyes hairy, nearly contiguous. Antennal segments incised asymmetrically, segment 12 constricted near middle. Last palpal segment expanded, longer and wider than penultimate, apically rounded. Scutum black; scutal hairs dark, sparse, inconspicuous; prescutellar bristles strong, rather spinous; prescutellar impressions present, yellowish to black. Scutellum black, with 4 rather spinous marginal primary bristles, the outer typically small; secondary hairs irregularly placed and sometimes absent. Legs dark olive to light brown. Wings bare; R₄₊₅ vaguely petiolate, R₄ tending to be basally evanescent; M₂ short but strong; c1R₁ closed or slitlike. Halteres white, with dark stem. Abdomen opaque black, with long brassy bristles. Genitalia with basistyles slender, much exposed; tergite 9 wider than long.

Discussion.—Malloch (1915a) reported this species from 6 localities in Illinois, with collection dates from April to June. Some adults occurred along the banks of the Mississippi River. Johannsen (1928) recorded the species from New York, with June and July collection dates. Procter (1946) listed the species for Maine, associated with spatterdock in a pond. I have specimens from Michigan and from 7 Ohio counties: Belmont, Butler, Fairfield, Franklin, Harrison, Lawrence, and Morgan. Adults have been taken in every month from April to August. The spinous appendage on sternite 7 of the female has not previously been mentioned in the literature. This is not too surprising, for the appendage may be inconspicuous when raised and held tightly against the body. Furthermore, as was his custom when both sexes were available, Malloch described the species principally on the basis of the male, including the striking genitalia and wing features, and gave only minor attention to the female. This species is apparently closely related to *A. arcticus* (Coquillett), but the spinous appendage of *arcticus*, as described by Wirth (1952), is much shorter and the terminal spines are arranged in groups.

Atrichopogon geminus n. sp.

Female.—L 1.24 (1.00–1.40) mm; WL 1.28 (1.14–1.41) mm; WW 0.50 (0.46–0.54) mm; PL 0.26 (0.22–0.28) mm; ALB 0.25 (0.24–0.28) mm; ALA 0.39 (0.37–0.40) mm; ALT 6:7:8:8:11; AR 1.6; 3f-3x₅ 51:46:24:11:8:5:6; LR 2.2; C over R₂

0.41 (0.39–0.47) mm; C over $c2R_1$ 0.30 (0.27–0.32) mm. Eyes hairy, narrowly separated. Basal antennal segments about as long as wide or wider than long. Last palpal segment smaller than penultimate and apically acute, tapering to apex. Scutum dark brown or blackish, anterolateral angles broadly yellow to brown; area behind prescutellar bristles variable, brown or yellow; middle third of scutum with about 5 irregular longitudinal rows of hairs; scutal hairs dark with reddish reflections. Scutellum brownish yellow, with 4 marginal primary bristles and 3 or 4 small marginal hairs, usually formally placed. Macrotrichia present in cR_4 , cM_{1+2} , usually in cM_3 , and sometimes a few in cCu_1 and $c2A$; R_{4+5} distinctly petiolate; M_2 long, more than half as long as cM_{1+2} , fading out apically; $c1R_1$ narrow, about one-third as long as $c2R_1$. Halteres yellowish white, with darker stem. Abdomen glossy brown, with hairs shorter than or about equal to length of intermediate segments and 2 longer apical hairs; sternite 7 simple, without appendage.

Male.—L 1.41 (1.20–1.70) mm; WL 1.36 (1.29–1.52) mm; WW 0.40 (0.38–0.45) mm; PL 0.21 (0.16–0.23) mm; ALB 0.36 (0.33–0.38) mm; ALA 0.47 (0.44–0.52) mm; ALT 5:8:11:10:13; AR 1.3–1.4; 3f-3x₅ 52:49:31:13:10:6:6; LR 2.4; C over R_2 0.32 (0.29–0.35) mm; C over $c2R_1$ 0.21 (0.19–0.23) mm. Eyes widely separated, minutely hairy. Last palpal segment smaller and shorter than penultimate segment, apically acute (fig. 7). Clypeus short, much wider than long, truncate basally. Scutum blackish, including humeral angles; scutal hairs dark, in irregular longitudinal rows, about 5 rows in middle third; prescutellar impressions absent; area behind prescutellar bristles blackish; prescutellar shield evenly rounded anteriorly. Scutellum brownish yellow to dull yellow, with 4 marginal primary bristles and 3 or more short marginal hairs, usually formally placed between the primaries. Legs olive yellow. Wings bare; R_{4+5} strongly petiolate; M_2 long, extending into outer half of cM_{1+2} ; M petiole shorter than rm ; $c1R_1$ narrowly open to almost closed. Halteres yellowish, with darkened stem. Abdomen dark brown, slightly pruinose; abdominal hairs brownish and about as long as intermediate segments, longer at apex of abdomen. Tergite 9 evenly rounded to slightly truncate; sternite 9 with a curved row of about 6 to 10 long setae (fig. 8); aedeagus with median point blunt in ventral view, terminally complex and appreciably recurved ventrad in ventrolateral view (fig. 9); basistyles extending slightly beyond end of tergite 9; dististyles curved inward, densely invested with hairs except at and near base and apex, with a single long hair on outer margin near middle.

Types.—Holotype ♂, preserved dry on point: Oxford, O., Oct. 19, 1971. Paratype ♂♂, preserved dry on points: 7 specimens with same data as holotype; 5 specimens from New Bremen, O., Sept. 18, 1926; 5 specimens from Columbus, O., Oct. 1, 1926; 3 specimens from Oxford, O., Oct. 25, 1970; single specimens as follows: Butler, Ky., Oct. 4, 1931; Put-in-Bay, O., Aug. 13, 1937; Ithaca, N. Y., Oct. 8, 1933; Lake Co., O., July 6, 1927; Columbus, O., June 9, 1926; Oxford, O., Oct. 6, 1972. Paratype ♂♂, mounted in diaphane on slides: 2 specimens from Oxford, O., Oct. 19, 1971; single specimens as follows: Oxford, O., Oct. 25, 1970; Oxford, O., Oct. 11, 1942; Columbus, O., Oct. 1, 1926; Put-in-Bay, O., collected as larva, Aug. 7, 1941, and reared to adult, Aug. 16, 1941; Put-in-Bay, O., collected as larva, Aug. 12, 1941, and reared to adult, Aug. 23, 1941; Put-in-Bay, O., collected as egg, Aug. 24, 1941, and reared to adult, Sept. 7, 1941. Paratype ♀♀, preserved dry on points: 4 specimens from New Bremen, O., Sept. 18, 1926; 2 specimens from New Bremen, O., Aug. 26, 1925; 3 specimens from Columbus, O., as follows: June 9, 1926, Oct. 2, 1926, Oct. 3, 1926; 3 specimens from Oxford, O., as follows: Sept. 27, 1972, Oct. 19, 1971, Oct. 25, 1970; single specimens as follows: Pelee Is., Ont., July 8, 1937; Put-in-Bay, O., Aug. 13, 1937; Middle Bass Is., O., July 12, 1937; North Bass Is., O., July 7, 1926; Meigs Co., O., June 21, 1927. Paratype ♀♀, mounted in diaphane on slides: Put-in-Bay, O., Aug. 13, 1944;

Put-in-Bay, O., collected as larva, Aug. 7, 1941 and reared to adult, Aug. 12, 1941; Put-in-Bay, O., collected as larva, Aug. 9, 1941 and reared to adult, Aug. 18, 1941. Collector M. W. Boesel in all cases; all specimens in author's collection.

Discussion.—In a number of features, this species is similar to *A. levis*. Originally I placed all of my specimens, sometimes a bit reluctantly, under *levis*. In Ohio, *geminus* is actually much less common than *levis*. However, it has been taken in the following counties: Auglaize, Butler, Franklin, Lake, Meigs, and Ottawa. Adults have been taken in every month from June to October. Specimens have been collected in 2 other states, New York and Kentucky, as well as in Canada (Pelee Is., Ont.). I have seen specimens from Illinois in the Illinois State Natural History Survey collection. For years I have considered this a variety of *levis*. Although *geminus* is here accorded specific rank, its close relationship to *levis* is evident. In 1944, Boesel and Snyder detailed the life history of *A. levis*. All available material from that study has been reexamined and found to belong to *geminus*. Furthermore, in 1957, in response to a request, much of the material used in the study was sent to Dr. L. G. Saunders and is now in the Canadian National Collection. In 1958 Ewen and Saunders, in the most extensive study of the genus thus far published in the Nearctic region, redescribed all stages on the basis of this material, with due acknowledgments. All references to *levis* in that paper should therefore now be assigned to *geminus*. The larvae of *geminus* are strictly terrestrial, feeding on algae growing on moist soil (Boesel and Snyder, 1944).

Atrichopogon tilanus n. sp.

Female.—L 1.54 (1.35–1.67) mm; WL 1.92 (1.82–2.01) mm; WW 0.74 (0.66–0.79) mm; PL 0.40 (0.36–0.41) mm; ALB 0.26 (0.22–0.27) mm; ALA 0.52 (0.50–0.53) mm; ALT 9:10:10:10:14; AR 2.0; 3f-3x₅ 69:68:43:17:12:7:6; LR 2.4–2.5; C over R₂ 0.71 (0.67–0.76) mm; C over c2R₁ 0.47 (0.45–0.50) mm. Eyes largely bare, contiguous. Antennae brown, segments 2 and much of 3 usually pale; basal antennal segments wider than long to nearly spherical. Third palpal segment wide, short. Proboscis straight. Scutum entirely black; scutal hairs pale, scattered, rather evenly distributed; prescutellar bristles delicate. Scutellum dark brown, only slightly, if at all, lighter than scutum; 4 marginal primary bristles with about 15 to 20 irregularly placed hairs of various sizes. Legs dull yellow. Wings with numerous macrotrichia on apical and posterior third, occupying almost all of cR₄, half of cM₁₊₂, part of cM₃, much of cCu₁ and c2A; R₄₊₅ petiolate if R₄ is projected but R₄ and R₅ not clearly connected; R₄ weak, particularly at base, indicated by macrotrichia, approaching R₅ at an angle of 30–40° so that, if R₄ may be assumed to be present, R₄₊₅ appears to be distinctly petiolate (fig. 6); R₅ strong; M₂ long, approaching wing margin; c1R₁ open, wider at middle. Halteres brownish white to pure white. Abdomen dark above, variably light below; much of abdomen with intermediate brassy hairs, with several longer hairs at apex; sternite 7 simple, without appendage.

Male.—L 1.88 (1.70–1.90) mm; WL 1.98 (1.93–2.03) mm; WW 0.53 (0.50–0.56) mm; PL 0.29 (0.28–0.30) mm; ALB 0.46 (0.45–0.46) mm; ALA 0.60 (0.56–0.63) mm; ALT 5:6:19:14:16; AR 1.3; 3f-3x₅ 68:70:44:18:11:6:6; LR 2.4–2.5; C over R₂ 0.58 (0.57–0.60) mm; C over c2R₁ 0.37 (0.36–0.37) mm. Eyes largely bare. Antennal plumes yellowish brown. Third palpal segment short, wide. Scutum blackish brown; scutal hairs pale, scattered. Scutellum concolorous with scutum or slightly paler at middle, with 4 marginal primary bristles and 15 to 20 irregular pale hairs like those of scutum. Legs yellowish (dry specimens). Wings bare; R₄₊₅ long petiolate but R₄ weak basally; c1R₁ slitlike to narrowly open. Halteres whitish. Tergite 9 subtruncate, wider than long; basistyles nearly concealed or exceeding end of tergite 9 by about one-fifth their length, depending on position; dististyles long, narrow, sharply incurved at apex; sternite 9 with about

20 short hairs irregularly arranged across the segment, particularly on middle half of segment; basal arch deep; shoulders of aedeagus rounded (fig. 10).

Types.—Holotype ♀, preserved dry on point: Oxford, O., Sept. 28, 1972. Paratype ♀ ♀, preserved dry on points: Jackson Co., O., May 1, 1926; Put-in-Bay, O., Aug. 14, 1937; Columbus, O., Aug. 18, 1927. Paratype ♀, mounted in diaphane on slide: Columbus, O., May 19, 1926. Paratype ♂, preserved dry on point: Middle Bass Is., O., Aug. 3, 1926. Paratype ♂ ♂, mounted in diaphane on slides: New Bremen, O., July 18, 1927; Lake Co., O., July 6, 1927. Collector M. W. Boesel in all cases; all specimens in author's collection.

Discussion.—*A. titanus* is robust and most likely to be confused with *maculosus* Ewen and *fuscus* (Coquillett). However, *maculosus* has a cream-colored scutellum, a much broader wing in the male, and the dististyles tapering to rounded apices. The length of the proboscis and the configuration of R_{4+5} easily separate *titanus* from *fuscus*. In the male the antennal plumes are pale as compared with those of *fuscus*. The species is comparatively uncommon in Ohio. I have seen only 8 specimens. However, these represent 6 counties: Auglaize, Butler, Franklin, Jackson, Lake, and Ottawa. On no occasion was more than a single specimen taken.

Atrichopogon falcatus n. sp.

Female.—L 1.15 (1.10–1.20) mm; WL 1.31 (1.26–1.40) mm; WW 0.48 (0.46–0.54) mm; PL 0.23 (0.22–0.26) mm; ALB 0.21 (0.20–0.22) mm; ALA 0.24 (0.23–0.26) mm; ALT 3(3–4):4:4:5(4–6):8; AR 1.1–1.2; 3f-3x₅ 50:45:21:7:6:4:5; LR 3.0–3.1; C over R_2 0.41 (0.38–0.45) mm; C over $c2R_1$ 0.25 (0.23–0.30) mm. Vertex blackish brown. Eyes hairy, narrowly separated. Basal antennal segments transverse to nearly spherical. Last palpal segment longer than penultimate, gently tapering to apex; penultimate segment with sides parallel or slightly narrower basally. Clypeus slightly wider than high, bulbous, slightly angular or rounded at base. Scutum indistinctly vittate; ground color yellowish brown, vittae brownish; scutal hairs dark but reflective, in irregular longitudinal rows; prescutellar bristles weak, not much more than twice as long as nearby scutal hairs. Scutellum brownish yellow, with 2 longer marginal primary bristles near middle; outer primaries weak but appreciably longer than secondary hairs; secondary hairs variable, typically 1 or 2 marginals between inner and outer primary and a group of about 3 anterior to level of inner primary. Legs yellowish. Wings with macrotrichia sparse: in outer anterior third of cR_4 , in middle outer fourth of cM_{1+2} , and to a variable extent in cM_3 and cCu_1 ; R_{4+5} petiolate; M petiole about equal to rm ; M_2 vaguely expressed or very short; $c1R_1$ slitlike. Halteres yellowish. Sternite 7 with median falcate spinous appendage (fig. 4), bent posteriorly gently (about 40°) to sharply (about 85°) near basal third, in some specimens appearing simple, in others showing the tip or apical fourth or third to be composed of about 6 fine straight movable rodlike units which may be held firmly together; sternite 8 bearing at least 8 much thickened hairs (fig. 11) attached just inside the posterior edge and commonly directed upward; sternite 8 tending to be telescoped into 7 so that the posterior edge of 7 and 8 are deceptively nearly coincident.

Types.—Holotype ♀, preserved dry on point: Douglas Lake, Mich., Nigger Creek, July 20, 1928, M. W. Boesel, collector. Paratype ♀ ♀: 2 dry specimens on points and 4 specimens mounted in diaphane on slides, all with same data as holotype. All types in author's collection.

Discussion.—This species does not seem to be closely allied to any other found in the area of study. It is known only from the type locality, where 7 females were collected. The sicklelike appendage on the seventh abdominal sternite is absolutely distinctive. The European *A. hamifer* Goetghebuer has a hooklike appendage on the sixth sternite with exceedingly short and apparently nonapposable terminal bristles (Goetghebuer and Lenz, 1933). As indicated above, *fusinervis*

has an appendage on sternite 7, but the terminal spines in *fusinervis* are curved, relatively thick, firmly attached, seem to be fixed in position, and certainly cannot be closely apposed. The minute terminal rods in *falcatus* break off easily in both dry and alcoholic specimens; if all break off, only a smooth hooklike or falcate appendage remains.

GENERAL DISCUSSION

It is of some interest to compare our list of species from the Ohio region with previous similar lists from other parts of the Nearctic region. Ewen and Saunders (1958) treated 8 Canadian species, only 1 of which, *minutus*, coincides with our list; 7 of their species have not been reported south of the Canadian border. Wirth (1952) listed 7 species from the California region, later adding an eighth (Wirth, 1956a). Of these, 4 are present in our area: *fusculus*, *levis*, *minutus*, and *websteri*. The remaining 4 seem to be strictly western, with ranges extending as far northward as British Columbia and Alaska. On the basis of present records, there are 2 species which occur only in the Atlantic coastal states, although 1 of these ranges into Canada and northern Europe. Florida has 2 species which have not been found elsewhere in the Nearctic region; at least 1 of these has Neotropical affinities, occurring also in Puerto Rico.

LITERATURE CITED

- Boesel, M. W., and E. G. Snyder. 1944. Observations on the early stages and life history of the grass punky, *Atrichopogon levis* (Coquillett) (Diptera: Heleidae). Ann. Entomol. Soc. Amer. 37: 37-46.
- Coquillett, D. W. 1901. New Diptera in the U. S. National Museum. Proc. U. S. Nat. Mus. 23: 593-618.
- Edwards, F. W. 1926. On the British biting midges (Diptera, Ceratopogonidae). Trans. Entomol. Soc. London 74: 389-426. 2 pl.
- Ewen, A. B., and L. G. Saunders. 1958. Contributions toward a revision of the genus *Atrichopogon* based on characters of all stages (Diptera, Heleidae). Can. J. Zool. 36: 671-724.
- Goetghebuer, M., and F. Lenz. 1933. Heleidae (Ceratopogonidae). In Lindner, E. Die Fliegen der Palaearktischen Region 77: 1-48. 6 pl.
- Johannsen, O. A. 1908. New North American Chironomidae. N. Y. State Mus. Bull. 124: 264-285.
- Johannsen, O. A. 1928. Order Diptera. In Leonard, M. D. A list of the insects of New York. Cornell Univ. Agr. Exp. Sta. Mem. 101: 687-868.
- Johannsen, O. A. 1952. Guide to the insects of Connecticut. Part VI. The Diptera or true flies of Connecticut. Fifth fascicle: midges and gnats. Heleidae (Ceratopogonidae). Connecticut State Geol. and Nat. Hist. Surv. Bull. 80: 149-175.
- Johnson, C. W. 1913. Insects of Florida. I. Diptera. Bull. Amer. Mus. Nat. Hist. 32: 37-90.
- Lewis, F. B. 1959. Abundance and seasonal distribution of the common species of Ceratopogonidae (Diptera) occurring in the state of Connecticut. Can. Entomol. 91: 15-28.
- Malloch, J. R. 1915a. The Chironomidae, or midges, of Illinois, with particular reference to the species occurring in the Illinois River. Bull. Illinois State Lab. Nat. Hist. 10: 274-544. pl. 17-40.
- Malloch, J. R. 1915b. Some additional records of Chironomidae for Illinois and notes on other Illinois Diptera. Bull. Illinois State Lab. Nat. Hist. 11: 303-364. pl. 80-83.
- Procter, W. 1946. Biological survey of the Mount Desert region. Part VII. The insect fauna. Wistar Institute, Philadelphia. 566 p.
- Snow, W. E., E. Pickard, and J. B. Moore. 1957. The Heleidae of the Tennessee River basin. J. Tennessee Acad. Sci. 32: 18-36.
- Thomsen, L. C. 1937. Aquatic Diptera. Part V. Ceratopogonidae. Cornell Univ. Agr. Exp. Sta. Mem. 210: 57-80. pl. 10-18.
- Wirth, W. W. 1952. The Heleidae of California. Univ. California Publ. Entomol. 9: 95-266.
- Wirth, W. W. 1956a. The biting midges ectoparasitic on blister beetles (Diptera, Heleidae). Proc. Entomol. Soc. Washington 58: 15-23.
- Wirth, W. W. 1956b. The heleid midges involved in the pollination of rubber trees in America (Diptera, Heleidae). Proc. Entomol. Soc. Washington 58: 241-250.
- Wirth, W. W., and A. Stone. 1968. Aquatic Diptera. Family Heleidae (=Ceratopogonidae). In Usinger, R. L. Aquatic insects of California. p. 406-438. Univ. California Press, Berkeley.