The planthopper genus *Phylloscelis* in the United States (Homoptera: Dictyopharidae)

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Abstract: The dictyopharid planthopper genus *Phylloscelis* is reviewed and a key to the four species provided. The morphology of adult male and female *P. pallescens* Germar, *P. atra* Germar, *P. rubra* Ball, and *P. pennata* Ball is described and illustrated in detail. The species are separated principally by color patterns, wing venation, and features of the male and female external genitalia.

Keywords. Homoptera, Fulgoroidea, Dictyopharidae, *Phylloscelis*, North America.

Introduction

The Nearctic dictyopharid planthopper genus *Phylloscelis* includes four species: *P. pallescens* Germar, *P. atra* Germar, *P. rubra* Ball, and *P. pennata* Ball (Ball 1930, 1937, Wilson and McPherson 1980 a,b). The genus was established by Germar (1839) for *P. pallescens* and *P. atra* (Ball 1930, Osborn 1904) with *P. pallescens* as the logotype (Kirkaldy 1906); two other species, *P. rubra* and *P. pennata*, were added by Ball (1930, 1937). A summary of information on the biology of each species is given in McPherson and Wilson (in prep.)

Phylloscelis pallescens ranges from Massachusetts and southern Ontario, south to northwestern Florida, and west to Iowa, Missouri, and Texas (Hamilton, pers. comm.; Wilson and McPherson, 1980; Wilson *et al.*, 1993b).

Phylloscelis atra is widely distributed throughout eastern North America, ranging from Massachussetts to southern Ontario, south to Florida, and west to Kansas and Texas (Ball 1930, Hamilton pers. comm., Wilson and McPherson 1980a,b). *Phylloscelis rubra* ranges from New York south to Florida, and west to Mississippi (Ball 1930). *Phylloscelis pennata* has only been recorded from southwestern Texas (Ball 1937).

Morphological descriptions of the species of *Phylloscelis* have included the color of various body segments, total body shape and size, shape of the profemora, carinae of the frons, and venation of the forewings (Ball 1930,1937; Dozier 1926; Germar 1839; Wilson and McPherson 1980a). At present, there is no complete key for separating all four species of *Phylloscelis*. Furthermore, keys which include two or three of the species (e. g., Wilson and McPherson 1980b), are incomplete because they lack illustrations of species-specific morphological characteristics.

This study presents descriptions and illustrations of the morphology of adults of the four species of *Phylloscelis,* an evaluation of the status of the varieties or color morphs, and a key for separating the species.

Methods

Specimens used for dissection were cleared in 10% KOH at room temperature for ca. 12 hours, rinsed in distilled H_2O, then transferred to glycerol for examination. Methods for removal and clearing of genitalia were given by Wilson and McPherson (1980a). Descriptions were based on 10 specimens, where possible.

Terminology, except for genitalia and wings, is that of Snodgrass (1935) and Kramer (1950) with more recent changes for the head by Matsuda (1965). Terminology of adult genitalia is that of Asche (1985). Terminology of wings is that of Emeljanov (1987), Fennah (1944) and Shcherbakov (1981a,b). For complete lists of references prior to 1945 see Metcalf (1946).

Genus *Phylloscelis* Germar

Phylloscelis Germar, 1839:191. Kirkaldy, 1906:257.

Type Species: *P. pallescens* Germar, logotype established by Kirkaldy (1906)

Description. The genus was described by Germar (1839) and Melichar (1906). Descriptions in English by Dozier (1926) and Osborn (1938) are very sketchy. The following description is after Melichar (1906).

Body elliptical, dorsally convex. Vertex as long as wide, bordered laterally on each side by carina; in dorsal view, anterior aspect convex, posterior aspect concave; with weak carinae and two small pits in middle of vertex. Frons elongate, parallel-sided; lateral margins carinate [outer carinae]; with a pair of lateral carinae [inner carinae] and a longitudinal median carina meeting near dorsal apex of frons; inner carinae usually indistinct, often distinct only in dorsal portion of frons; with small pits between each inner and outer carina. Clypeus with lateral margins carinate and with longitudinal median carina. Beak extending to metacoxae. Gena slender. Compound eyes hemispherical,. Antennae short. Stemma present between antenna and compound eye.

Pronotum with median length equal to that of vertex; anterior margin gently curved, posterior margin sinuate; length along lateral aspect only slightly shorter than that along midline. Mesonotum with median length more than twice that of the pronotum; triangular; convex in middle; without lateral carinae. Forewings elongate, oval, convex; with more or less strongly elevated longitudinal veins; lacking crossveins except for one near apex. Hindwings absent [in brachypter]. Legs elongate relative to body. Procoxae flattened and extending laterally on lateral aspect. Profemora strongly foliose especially on the posterior aspect. Protibiae simple, elongate. Mesofemora compressed and slightly widened. Metatibiae each with five strong spines [along shaft].

The following morphological descriptions and key will separate the four North American species of *Phylloscelis*. The morphology of *P. pallescens* is described in detail; only salient features are provided for the other three species. Reliable features for separating the species are color patterns of the head and pronotum, frontal carinae, wing venation, aedeagus and gonostyle size and shape, anal tube shape, and size and shape of the median gonapophysis of the 9th abdominal segment. The color morphs, or "varieties," of *P. atra* and *P. rubra* did not exhibit any differences in male or female genitalic morphology from their nominal species. This lack of morphological difference coupled with lack of consistent biogeographical separation of the color morphs supports subsuming the "variety" names under the nominal species names rather than establishing subspecific categories for them.

Key to the Species of *Phylloscelis*

1. Body dark brown to black 2
   Body reddish, cream colored, light brown or black with yellow markings 3

2. Dark brown to black; carina of frons weak and intermittent; mesonotal wings with 8 longitudinal veins, M and CuA1 cells large; anal tube angled in ventrally posterior 1/2 (Figs. 11B, 12C, 13A, 16C) ..... *P. atra*
   Black with cream colored spots on frons and clypeus; carina of frons distinct fading, dorsally; mesonotal wings more than 10 longitudinal veins, cells not as above; anal tube not as above (Figs. 11A, 12A, 14A, 16G) ..... *P.rubra*

3. Body yellow; mesonotal wings black with yellow veins, 8 longitudinal veins, M and CuA1 cells large; anal tube angled ventrally in posterior half; male, endosome bulbous, smooth, bifurcating to just dorsolateral of endosomal process; female with width of median gonapophysis of the 9th abdominal segment narrowest portion at least 2/3X width of widest distal portion, distal process angled ca. 45° narrowing strongly toward apex; gonapophysis of the 8th abdominal segment, in lateral view, with basalmost tooth short and weak (Figs. 11B; 12C; 14A,B; 15A) ..... *P. atra*
   Body reddish, cream or light brown; mesonotal wings, if dark colored, without yellow veins, and with 10 or more longitudinal veins; anal tube almost straight; male, endosoma, if smooth, does not

bifurcate; female with width of median gonapophysis of the 9th abdominal segment narrowest portion at least 3/4X width of widest distal portion, distal process angled ca. 30° or less; gonapophysis of the 8th abdominal segment, in lateral view, with basalmost tooth either distinct or rudimentary 4

4. Body reddish; branches of anterior cubitus of mesonotal wings with numerous cross-veins; male endosoma bulbous with many folds, bifurcating into distinct lateral processes; female median gonapophysis of the 9th abdominal segment narrowing strongly toward apex; gonapophysis of the 8th abdominal segment, in lateral view, with basalmost tooth rudimentary (Figs. 11A, 12A, 14B, 15B) ..... *P. rubra*

Body cream colored to brown, generally with numerous cream colored spots; branches of anterior cubitus of the mesonotal wings with few to no cross-veins; male endosoma with few to no folds and not bifurcating into distinct lateral processes; female median gonapophysis of the 9th abdominal segment almost truncate, slightly rounded toward apex; median gonapophysis of the 8th abdominal segment with basalmost tooth pronounced 5

5. Body brown with numerous cream colored spots; carina of frons distinct and entire; anterior cubitus 2 vein of mesonotal wing branching in basal 1/3, cross-venation between most veins in distal 1/2; male dorsal process of style in distal 1/4, process 1/4X height of style; endosoma smooth with no dorsally raised process in lateral view; aedeagus diameter 1/6X length; female gonapophysis of the 9th abdominal segment almost truncate, slightly rounded toward apex; median gonapophysis of the 8th abdominal segment with basalmost tooth pronounced (Figs. 1; 6A,B; 9B,C; 15C; 16A) ..... *P. pallescens*

Body cream colored with brown; longitudinal carina of frons weak and intermittent; media and anterior cubitus 1 veins of mesothoracic wings branching in basal 1/4, cross-venation between most veins in distal 1/4; male dorsal process of style in distal 1/2, process 1/2X style height; aedeagus diameter 1/4X length; endosome, in lateral view, a raised process beginning 1/2 aedeagus length ending as a double fold at apex of aedeagus (Figs. 12B; 14G,I; 16B) ..... *P. pennata*

Phylloscelis pallescens Germar

Figs. 1 - 10, 15C, 16A

Phylloscelis pallescens Germar, 1839:192.

Phylloscelis atra pallescens Glover, 1876:27 [in Metcalf (1946)].

Description: Length - male 4.2 ± 0.01; female 4.8 ± 0.01; N = 10♂, 10♀.

Head: Vertex subtriangular in dorsal view; lateral carinate margins anteriomedially meeting lateral carinae of frons; posterior margin concave. Frons subrectangular, where bordering clypeus slightly concave, ventrolateral margins acute; lateral margins convex and carinate, roughly paralleled by inner carinae on each side; inner carinae meeting median longitudinal carina dorsomedially. Clypeus narrowing distally, consisting of a subconical basal postclypeus and a distal anteclypeus which is triangular in cross-section; the latter separated from the postclypeus by a partial transclypeal suture; the small labrum is suspended from the anteclypeus. Gena subrectangular in lateral view, bordering frons with its sharp lateral carinate ridge; separated ventrally from the lorum and maxillary plate by a subgenal suture. Antennal pit totally surrounded by gena; lateral ocellus 0.05 mm in diameter, slightly dorsoanterior to antennal pit just below compound eye; antennae 3-segmented; scape short and cylindrical; pedicel 4.5X length of scape, subcylindrical with ca. 26 pits, each pit encircled by 7 to 8 sensory pegs; flagellum bulbous at base with an elongate, bristle-like extension distally, bulbous base area ca. 0.25X length of pedicel. Beak 4-segmented, cylindrical; segments 1 and 2 entirely hidden by anteclypeus and maxillary plate, segment 1 invaginated inwardly to form an apodemal process; segment 3 partially hidden by apex of anteclypeus and labrum, ca. 2X length of segment 4; segment 4 black in distal 1/2; labium with a longitudinal groove along the entire length of anterior aspect.

Thorax: Pronotum semi-crescentiform dorsally, with partial longitudinal carina along midline; anterior margin parallels posterior borders of eye and vertex; anterolateral margin carinate, lateral lobe not visible; posterior border sinuate. Reduced episternum extending 1/4 beyond ventral margin of lateral lobe of pronotum; epimeron concealed by lateral lobe of pronotum; episternum and epimeron separated by dorsoventral pleural suture, extending ventrally to coxal process. Sternum greatly reduced, connecting to episternum on each side by narrow, elongate procoxae; prosternum reduced, most sclerotization of region represented by furcal pits and associated large furcae;

Mesonotum with several distinct regions; mesoscutum large, subtriangular, anterior border a precostal ridge; mesoscutellum anterior to mesoscutum, posterior margin forms a reduplication continuing laterally to axillary cord of forewing; postnotum closely associated with metanotal tergum and concealed beneath reduplication, laterally uniting with mesothoracic epimeron by way of postalar bridge; prealar bridge uniting anteriorly with episternum. Base of the mesothoracic wing contains three axillary sclerites; the first axillary articulates laterally with second axillary and medially with anterior notal wing process; second axillary articulates with base of subcosta and radius, and the third axillary; third axillary articulates with base of annal region. Pleuron is with episternum and epimeron extending dorsally along pleural suture to form pleural wing process; ventrally, pleural coxal process articulates with coxa; mesothoracic spiracle anteriormedial to prealar bridge, hidden by lateral lobe of pronotum; basalar sclerite anterior to pleural wing process united to episternum; subalar sclerite posterior to pleural wing process articulating with third axillary. Mesosternum joined to episternum by precoxale; trochantin posterior to precoxale; furcal pits give rise to branched furcal apodemes internally, lateral branches unite with pleural apodemes; mesothoracic pleural apodeme developed dorsally, continuing into body cavity just below tergum. Prescutum of metanotum partially covered by mesothoracic scutellum; joined to mesothoracic postnotum and separated from latter by antecostal suture; prescutum isolated from metascutum by elongate membranous areas on each side; metascutellum poorly developed medially, larger and subtriangular laterally, broadly meeting metascutum; posterior margin a reduplication continuing to posterior margin of metathoracic wing as an axillary cord; postnotal region narrow medially, widening laterally; postcoxal bridge narrow, extending along posterior margin of pleuron meeting ventrally to form a median triangular sclerite; apex an elongate sclerotized process anteriorly between coxae, bifurcating into body cavity. Metathoracic pleuron modified for jumping (Kramer, 1950); border between large episternum and epimeron areas marked by pleural suture; pleural wing process located anterior of pleuron; epimeron border with meron indiscernible; coxae united to meron forming an immovable unit. Sternum laterally united to episternum by precoxal bridge; a large membranous area between precoxal bridge and coxae. Meso- and metathoracic wings in macropterous and brachypterous forms. Venation of wings as in other dictyopharids (Emeljanov, 1987; Fennah, 1944; Shcherbakov, 1981a,b). Mesothoracic wings macropterous, less sclerotized than brachyterous wing, elongate-oval, extending 0.1X length beyond anal plate; opaque, with brown interrupted by opaque spots along venation. Brachypterous wing highly sclerotized, elongate-oval in outline, forming a hardened cover over the dorsoposterior portion of the body. Metathoracic wing macropterous, nearly as long as mesothoracic wing, subtriangular; opaque. Brachypterous wing greatly reduced; venation reduced or absent.

Prothoracic and mesothoracic coxae short, triangular in cross section, posterolaterally directed; prothoracic coxae with elevated, longitudinal carina on the lateral surface; mesothoracic coxae carinate, less prominent than prothoracic coxae, both with a small lateral meron, usually not visible unless coxae are removed from body; metacoxae and meron rigidly joined to metapleuron. Prothoracic femora greatly foliose laterally; mesothoracic femora slightly foliose; metathoracic femora with no foliose process; all femora subtriangular in cross-section. Prothoracic and mesothoracic tibiae subtriangular in cross-section, each margin carinate; metathoracic tibiae slightly flattened and subtriangular in cross-section, longitudinal row of 4 lateral spines on shaft, transverse apical row of 8-9 spines (generally 8) on plantar surface. Pro- and mesothoracic tarsi each with 3 tarsomeres; tarsomere 1 wedge-shaped; tarsomere 2 sub-cylindrical; tarsomere 3 subcylindrical and curved. Metathoracic tarsi with 3 tarsomeres; tarsomeres 1-3 subcylindrical; tarsomere 1 with transverse apical row of 10-11 spines (generally 11) apically on plantar surface; tarsomere 2 with transverse apical row of 7-8 spines (generally 8) apically on plantar surface; tarsomere 3 similar to terminal tarsomere of other legs. All legs with terminal pair of dark brown curved tarsal claws with 4 spinelike setae on the basal lateral surface and a clear, membranous, lobate, median arolium with 2 dorsolateral plates and 4 setae on the plantar surface (Doering 1956, Fennah 1945).

Abdomen: Abdomen 11-segmented. Tergum 1 with two regions: anterior margin of first sclerite united to postnotum; bilobed posterior sclerite separated from anterior sclerite by narrow membranous area; bilobed areas on either side united dorsomedially to anterior sclerite by thin sclerotized bridge; first spiracle posterolateral to corner of postnotum. Tergum 2 with two sclerotized regions: anterior sclerite separated from posterior sclerite by membranous region; regions united laterally by thin sclero-

tized bridge; narrow posterior sclerite united to sclerotized region of tergum 3; second spiracle anteriolateral to tergum 2. Terga 3-8 uniform; each with a broad anterior sclerite, and a posterior membrane; spiracles located in membranous area ventral to tergites and dorsal to laterotergites. Sternite 1 narrow, semicircular; closely associated with the triangular union of the post coxal bridges. Sternite 2 with two sclerotized regions separated by a membranous region; posterior sclerite broadens laterally, uniting with laterotergite; anterior sclerite narrow throughout, fusing with lateral margin of posterior sclerite. Sternites 3-7 each with a broad anterior sternal plate, followed by membranous region.

Male genitalia: Pygofer 3X higher than wide in lateral view, dorsoposterior process present. Gonostyle, in lateral view, subquadrate; dorsal process at posterior 1/4 of gonostyle length, process 0.25X height of gonostyle; lateral process extending as a hook more lateral and ventral than posterior. Anal tube, in lateral view, extending posteriorly to just cover dorsal process of gonostyle, leaving posterior edge of gonostyle exposed. Aedeagus subcylindrical, 6X longer than wide; endosome a set of paired lobes, each extending beyond apex lateral to bifurcating endosomal processes; each endosomal process equal to length of aedeagus when deflated, apex a sclerotized spike.

Female genitalia: Lateral gonapophysis of the 9th abdominal segment, in lateral view, subtriangular; a slender process originating from the medial surface extends caudally to just beyond apex of gonapophysis, apex of process with 3 bristle-like processes that extend mediocaudally ca. 0.12 mm. Median gonapophysis of the 9th abdominal segment completely hidden by lateral gonapophysis; in lateral view, 5.5X longer than high; apex almost truncate, slightly rounded; posterior aspect weakly angled ventrally with greatest inflection near middle; lacking teeth; in ventral view, medial margins strongly concave with greatest point of inflection in middle. Median gonapophysis of the 8th abdominal segment, in lateral view, partially hidden by lateral gonapophysis; subtriangular; dorsal surface with 6 teeth which extend from their point of origin dorsolaterally.

Specimens examined: CANADA: ONTARIO: Walpole Island (1 specimen examined by Hamilton), Windsor (2 specimens examined by Hamilton) (CNC). USA: FLORIDA: **Nassau Co.**, Hilliard, 5 October 1938, P. J. Oman colllector (1♂, 1♀; examined by L. O'Brien) (O'BRIEN COLLECTION). MARYLAND: Annapolis, 18 September 1932 (1♀), P. J. Oman collector (NMNH). MISSOURI: **Johnson Co.**, Knob Noster State Park, K. R. McPherson collector, 11 September 1991 (2♂); BB Hwy 0.5 mi. S of Warrensburg (Belshe farm), 2 August 1991 (2♂, 2♀), 13 September 1991 (1♂, 2♀); Pettis Co., Paintbrush Prairie, 9 mi. S Sedalia, S. W. Wilson collector, 10 August 1991 (2♂), 16 August 1991 (5♂, 1♀), 23 August 1991 (10♂, 6♀), K.R. McPherson collector, 17 September 1991 (1♂, 3♀), all specimens collected from *P. tenuifolium*. (WILSON COLLECTION). TENNESSEE: 17 August, (1♀), Odent., label "Pruhler coll." (NMNH); Clarksville, 31 August 1915 (1♀), (NMNH).

Phylloscelis atra Germar

Figs. 11B, 12C, 13, 15A, 16C - E

Phylloscelis atra Germar, 1839:192.
Phylloscelis atrata [*sic*], Crevecoeur 1905:234 [in Metcalf (1946)].
Phylloscelis atra var. *albovenosa*, Melichar 1906:179.
Phylloscelis atra var. *albonervosa* [*sic*], Ball 1930:193.
Phylloscelis atra var. *ocala*, Ball 1930:193.

Description: Length - male 3.7 ± 0.13; female 4.8 ± 0.07; N = 5♂, 5♀.

Forewing venation appearing reduced due to branching of veins more distally than in other species; Media and Cu1 cells large.

Carina of frons weak, variable among individuals.

This species contains three color morphs: a) dark morph: entirely black, except for a lighter-shaded streak on lateral lobe of pronotum in frontal view, extending from junction of pronotum and proepisternum dorsolaterally .75X width of pronotum in same aspect, width of streak ca. 0.5X its length. b) yellow morph 1: forewings dark with yellow striped veins; frons and clypeus yellow, clypeus with four slightly darker bands extending dorsolaterally from medial carina and fade just prior to lateral longitudinal carinae; lateral lobe of pronotum, in frontal view, with cream colored bar extending from junction of pronotum and proepisternum dorsolaterally .75X width of pronotum in same aspect, bordered dorsally by a dark black band. c) yellow morph 2: wings as in yellow morph 1; frons and clypeus dark yellow, no bands on clypeus; frons with longitudinal line of cream spots on weak or absent carina; lateral lobe of pronotum cream colored bar similar to that of yellow morph 1, except bordered by black band both dorsally and ventrally.

Male genitalia: Anal tube, in lateral view, sharply angled ventrally in posterior 1/2. Aedeagus diameter 0.2X length; endosome bulbous, smooth, bifurcating at apex, each process extending slightly dorsolateral of endosomal process; endosomal process ca. 0.7X length of aedeagus when deflated.

Female genitalia: Anal tube, in lateral view, sharply angled ventrally in posterior 1/2. Median gonapophysis of the 9th abdominal segment, in lateral view, 7.5X longer than high, width of narrowest portion at least 0.75X width of widest distal portion; distal process in lateral view angled ventrally ca. 45°, narrowing strongly toward apex; in ventral view, medial margins moderately concave. Gonapophysis of the 8th abdominal segment, in lateral view, basal-most tooth short and weak.

Specimens examined: HOLOTYPE: DC: 24 August (1m), Heideman, with label "Type, No. 12153, U.S.N.M" [red paper] (NMNH); 30 August (1m), Heideman, with label "*atra* Germ. det. by Melichar" (CORNELL) 20 July 1893 (1m), Heideman (CORNELL) CANADA: ONTARIO: Walpole Island (12 specimens examined by Hamilton), Windsor (1 specimen examined by Hamilton) (CNC). USA: FLORIDA: 19 June 1927 (1m), E.D. Ball (NMNH); New Port Richey, 7 October 1938 (1f), Oman (NMNH); Sanford, 2 September 1925 (1f), 12 July 1928 (1f), E. D. Ball (NMNH); KANSAS: Onaga, (3m,2f), (NMNH); MISSISSIPPI: Romena, 20 August 1921 (1m), C. J. Drake (NMNH); Port Gibson, 20 July 1921 (1m), C. J. Drake (NMNH); MISSOURI: Pettis Co., Paintbrush Prairie, 9 mi. S. Sedalia, 16 August 1991 (2m,2f), S. W. Wilson (WILSON COLLECTION); VIRGINIA: Cornell, (1f), Heidemann (CORNELL) .

Phylloscelis rubra Ball

Figs. 11A; 12A; 14A - E; 15B; 16F, G

Phylloscelis rubra Ball 1930:194.
Phylloscelis atra, Sirrine and Fulton 1914:91. (synonymy in Ball 1930:194.).
Phylloscelis rubra var. *nigra,* Ball 1930:194.

Description: Length - male 3.8± 0.05; female 4.3 ± 0.19; N = 5m, 5f.

Forewing venation similiar to that of *P. pallescens*, except for 2 - 3 additional cross-veins within branches of Cu1 near middle of wing.

Carina of frons distinct at juncture with clypeus, fading dorsally.

This species contains two color morphs: a) red morph; entire body reddish; frons with cream colored spots; anteclypeus with five cream colored bars extending dorsolaterally from median carina; pronotum with cream colored bar bordered dorsally and ventrally by black band; length 1/2 frontal view of postnotum. b) dark morph; entire body black; frons and clypeus with cream colored spots in 2 irregular parallel longitudinal rows; pronotum, in frontal view, with cream colored bar on lateral lobe of pronotum extending from junction of pronotum and proepisternum dorsolaterally 0.5X width of pronotum in same aspect, bordered dorsally and ventrally by black bands.

Male genitalia: Dorsal process of pygofer not as pronounced, in lateral view, as *P. pallescens.* Aedeagus diameter 0.25X length; endosoma a dorsally raised sac, bulbous with many folds, bifurcating into lateral processes; endosomal processes ca. 0.7X length of aedeagus when deflated.

Female genitalia: Median gonapophysis of the 9th abdominal segment, in lateral view, 7X longer than high, width of narrowest portion at least 0.7X width of widest distal portion; distal process, in lateral view, angled ventrally ca. 30_ , narrowing strongly toward apex; in ventral view, medial margins moderately concave. Gonapophysis of the 8th abdominal segment, in lateral view, most basal tooth rudimentary.

Specimens examined: FLORIDA: Sanford, 29 July 1926 (1m), 22 June 1927 (1m,1f), 18 July 1927 (1f), 15 September 1927 (1f), 29 June 1928 (1m) E. D. Ball (NMNH); NEW JERSEY: New Egypt, 14 August 1914 (1m), H. B. Scammell (NMNH); Pasadean, 1 September 1914 (1m), H. B. Scammell, with labels "on Cranberry" and "*P. rubra* v. *nigra* Ball det. by P. W. Oman" (NMNH); Pemberton, 11 September 1913 (1f) labelled "Quaintance No. 10281", (1m) labelled "Quaintance No. 10282", H. B. Scammell; Southern, no date (1f), W. H. Ashmead (NMNH).

Phylloscelis pennata Ball

Figs. 12B, 14F-J, 16B

Phylloscelis pennatus [*sic*], Ball 1937:174.
Phylloscelis pennata, Metcalf 1946:119.

Description: Length - male 4.5 ± 0.04; N = 5m.

Forewing with crossveins present only in the distal 1/4. Ball (1937) also notes that *P. pennata* has a "herring-bone" pattern on the mesothoracic

wings which is not present in other species. This pattern appears as brown "zig-zag" or chevron-shaped lines that extend the entire width of the forewing.

Longitudinal carinae of frons weak and intermittent. Anteclypeus ca. 0.7X length of frons.

This species has one color morph. Frons cream colored with dark brown horizontal band in ventral 1/2 bearing cream colored spots; anteclypeus dark brown in distal 1/2, dorsal margin with 4 bars extending dorsolaterally from median carina; frontal view of lateral lobe of pronotum light brown in dorsal 1/2, and cream colored in ventral 1/2.

Male genitalia: Anal tube extends posteriorly covering aedeagus and style. Style elongate in posterior 1/2; dorsal process present in middle of style in lateral view, height of process ca. 0.5X height of style; lateral process projecting more posteriorly than laterally. Aedeagus subcylindrical, diameter 0.25X length; endosome, in lateral view, a dorsally raised process beginning in middle of aedeagus, ending as a double fold at apex; endosomal process ca. 0.7X length of aedeagus when deflated.

Female genitalia: Specimens unavailable for description.

Specimens examined: TEXAS: Comstock, 9 August 1936 (3♂), E. D. Ball (NMNH); Marathon, 8 August 1936 (1♂), E. D. Ball (NMNH).

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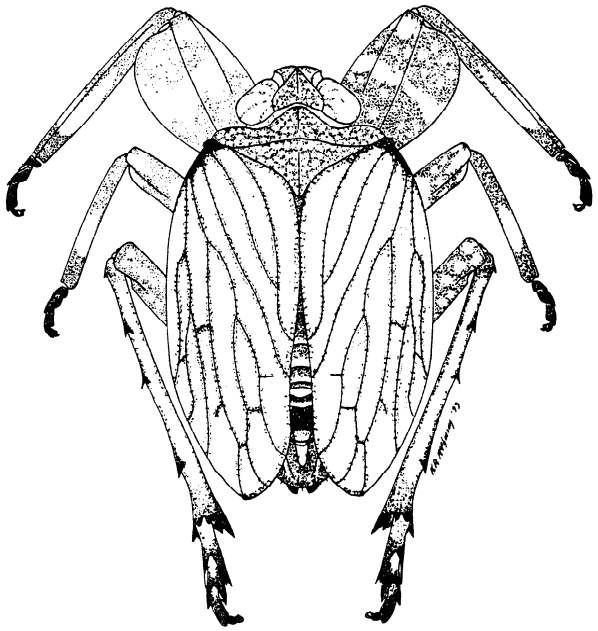

Figure 1. Habitus of adult *P. pallescens*.

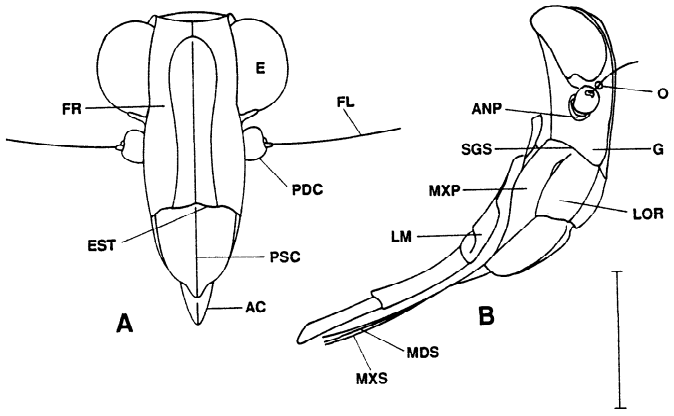

Figure 2. Head of adult *P. pallescens*. A. Frontral view. B. Right lateral view. AC - anteclypeus, ANP - antennal pit, E - eye, EST - epistomal suture, FL - flagellum, FR - frons, G - gena, LM - labium, LOR - lorum, MDS - mandibular stylet, MXP - maxillary plate, MXS - maxillary stylet, O - ocellus, PDC - pedicel, PSC - postclypeus, SGS - subgenal suture. Bar = 1 mm.

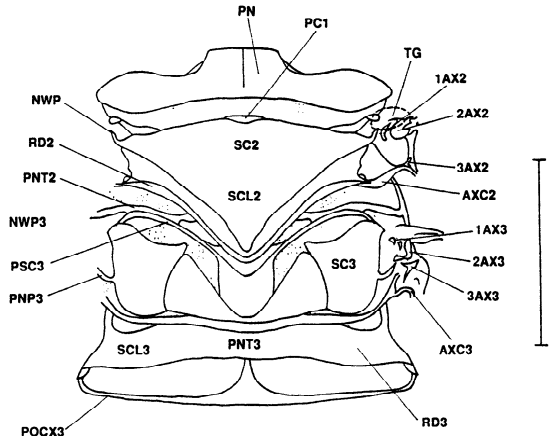

Figure 3. Thorax of adult *P. pallescens*, dorsal view. 1AX - first axillary, 2AX - second axillary, 3AX - third axillary, AXC - axillary cord, NWP - notal wing process, PC - precostal ridge, PN - pronotum, PNP - posterior notal wing process, PNT - postnotum, POCX - postcoxal bridge of the metanotum, PSC - prescutum of the metanotum, RD - reduplication of the scutellum, SC - scutum, SCL - scutellum, SCL - scutellum, TG - tegula. Bar = 1 mm.

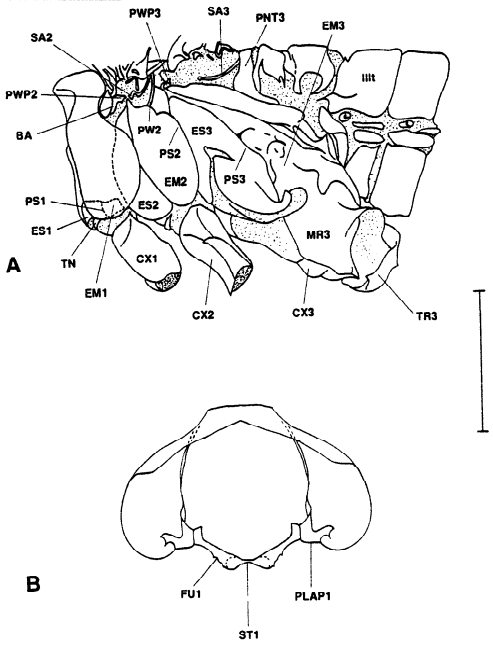

Figure 4. Thorax of adult *P. pallescens*. A. Left lateral view. B. Pronotum (posterior aspect). BA - basalar sclerite, CX - coxae, EM - epimeron, ES - episternum, FU - furcal apodeme, PLAP - pleural apodeme, PNT - postnotum, PS - pleural suture, PW - postalar bridge, PWP - pleural wing process, SA - subalar sclerite, ST - sternum, TR - trochantin, t - abdominal tergum. Bar = 1 mm.

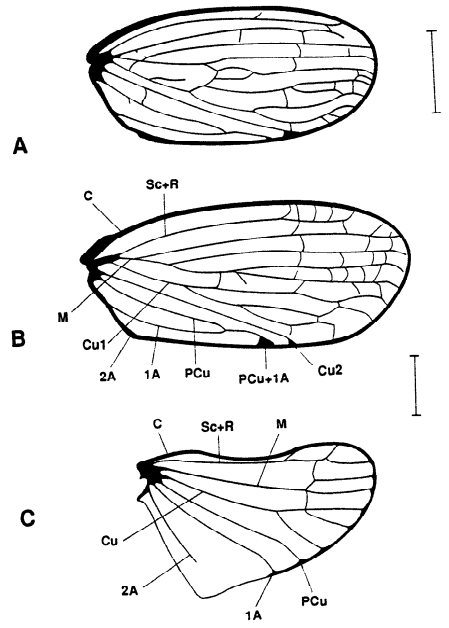

Figure 6. Wings of *P. pallescens*. A. Brachypterous mesothoracic right wing. B. Macropterous mesothoracic right wing. C. Macropterous metathoracic right wing. A - anal, C - costa, Cu - cubitus, M - media, PCu - posterior cubitus, R - radius, Sc - subcosta. Bars = 1 mm.

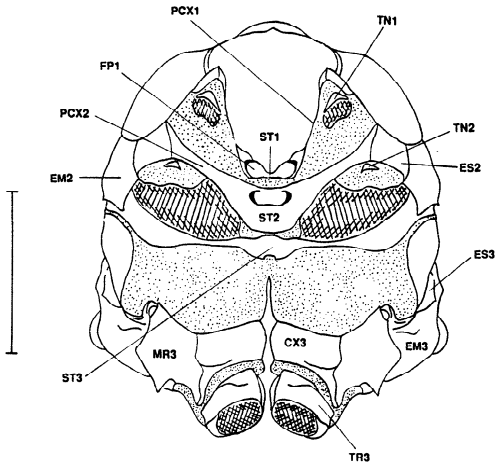

Figure 5. Thorax of adult *P. pallescens*, ventral view. CX - coxae, EM - epimeron, ES - episternum, FP - furcal pit, MR - meron, PCX - precoxale, ST - sternum, TR - trochantin. Bar = 1 mm.

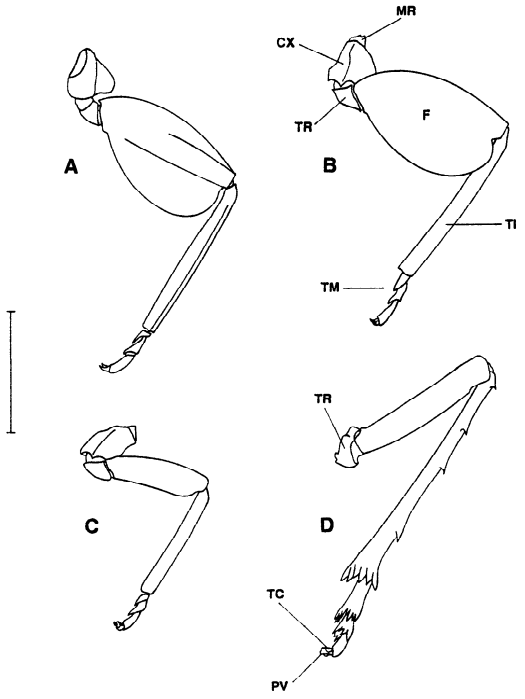

Figure 7. Legs of adult *P. pallescens*. A. Pronotal leg, lateral view. B. Pronotal leg, plantar view. C. Mesonotal leg, plantar view. D. Metanotal leg, plantar view. CX - coxae, F - femora, MR - meron, PV - pulvillus, TC - tarsal claws, TI - tibia, TM - tarsomere, TR - trochantin. Bar = 1 mm.

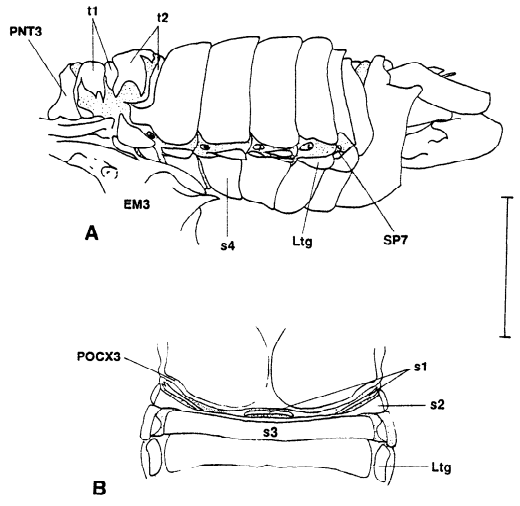

Figure 8. Abdomen of adult *P. pallescens*. A. Lateral view (male). B. Ventral view, first 4 segments. EM - epimeron, Ltg - laterotergite, PNT - postnotum, POCX - postcoxal bridge, t - tergum, SP - spiricle, s - sternite. Bar = 1 mm.

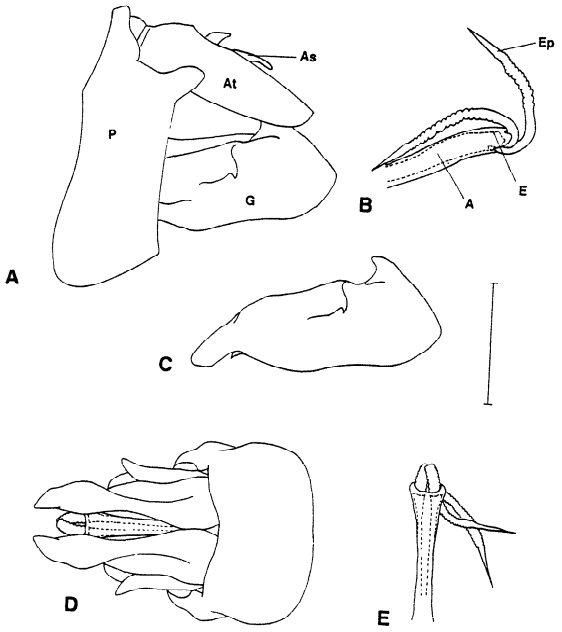

Figure 9. Male genitalia of *P. pallescens*. A. Left lateral view. B. Aedeagus, left lateral view. C. Gonostyle, left lateral view. D. Ventral view. E. Aedeagus, ventral view. A - aedeagus, At - anal tube, As - anal style, E - endosome, Ep - endosomal process, G - gonostyle, P - pygofer. Bar = 0.5 mm.

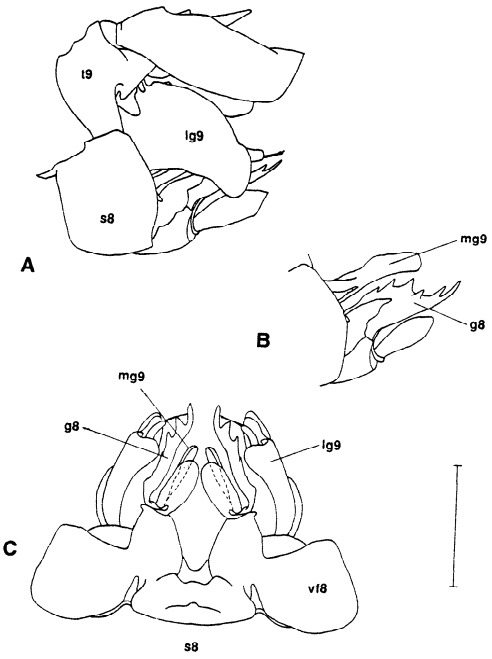

Figure 10. Female genitalia of *P. pallescens*. A. Left lateral view. B. Exposed gonapophysis, left lateral view. C. Ventral view. g8 - gonapophysis of the 8th abdominal segment, lg9 - lateral gonapophysis of the 9th abdominal segment, mg9 - median gonapophysis of the 9th abdominal segment, s - sternite, t - tergum, vf8 valvifer of the 8th abdominal segment. Bar = 0.5 mm.

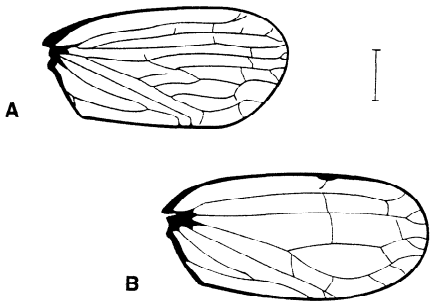

Figure 11. Macropterous mesothoracic wings of *Phylloscelis*. A. *P. rubra*. B. *P. atra*. Bar = 1 mm.

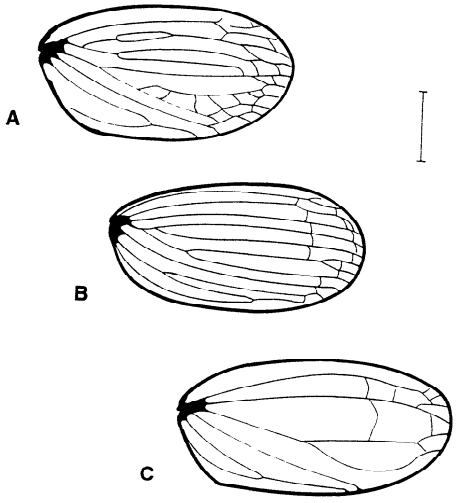

Figure 12. Brachypterous mesothoracic wings of *Phylloscelis*. A. *P. rubra*. B. *P. pennata*. C. *P. atra*. Bar = 1 mm.

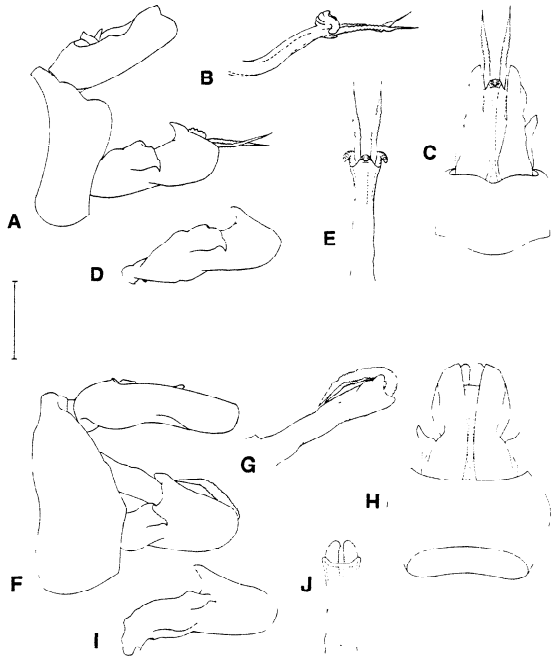

Figure 14. Male genitalia of *Phylloscelis*. A-E; *P. rubra*. A. Left lateral view. B. Aedeagus, left lateral view. C. Ventral view. D. Gonostyle, left lateral view. E. Aedeagus, ventral view. F-J; *P. pennata*. F. Left lateral view. G. Aedeagus, left lateral view. H. ventral view. I. Gonostyle, left lateral view. J. Aedeagus, ventral view. Bar = 0.5 mm.

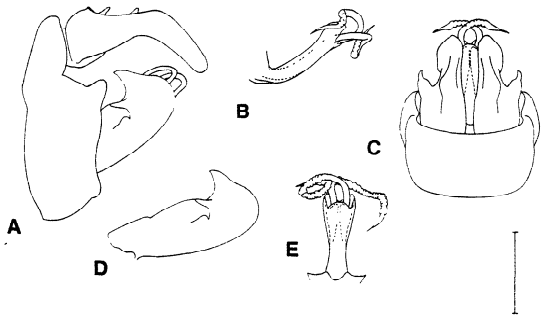

Figure 13. Male genitalia of *P. atra*. A. Left lateral view. B. Aedeagus, left lateral view. C. Ventral view. D. Gonostyle, left lateral view. E. Aedeagus, ventral view. Bar = 0.5 mm.

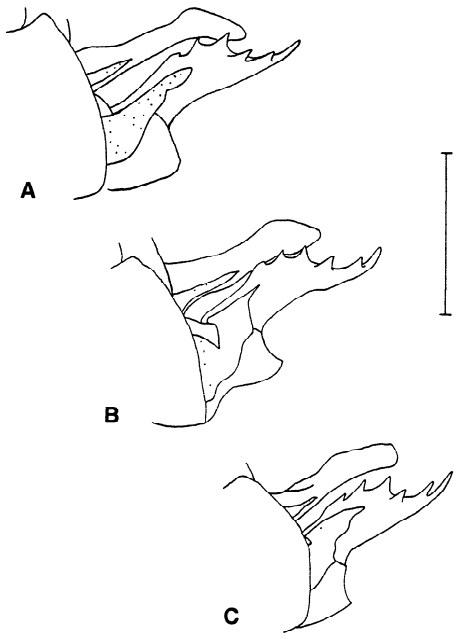

Figure 15. Exposed mg9 and g8 of female *Phylloscelis*. A. *P. atra*. B. *P. rubra*. C. *P. pallescens*. Bar = 0.5 mm.

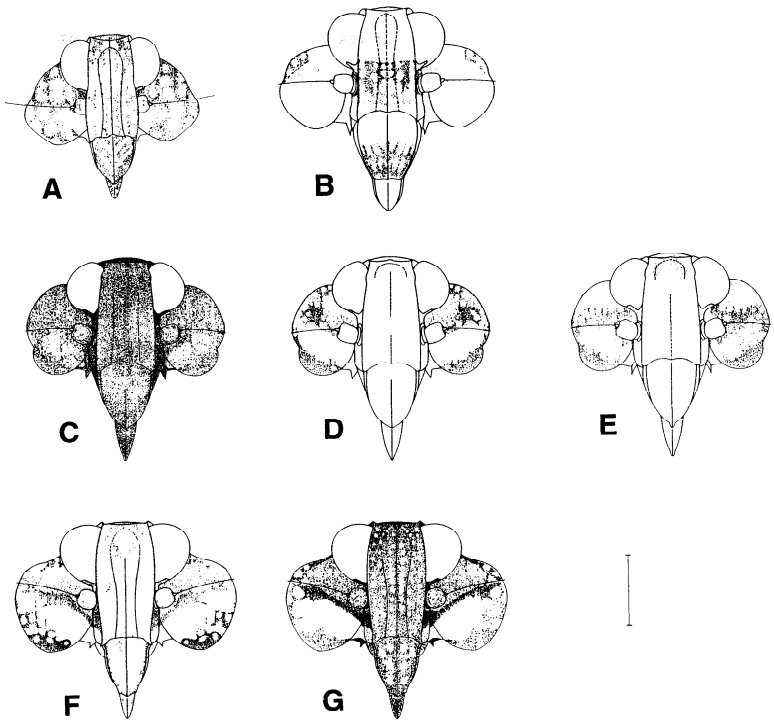

Figure 16. Frontal view of *Phylloscelis* heads. A. *P. pallescens*. B. *P. pennata*. C. *P. atra*, dark morph. D. *P. atra*, yellow morph 1. E. *P. atra*, yellow morph 2. F. *P. rubra*, red morph. G. *P. rubra*, dark morph. Bar = 1 mm.