

Germar recognized two species in the group, a black one (*P. atra*) and a gray one (*P. pallescens*) and all subsequent writers have followed him in this matter. When the writer began to collect in this group in Florida he soon discovered that he was taking black forms mingled with reddish-brown ones on one food plant and black forms intermixed with striped ones on several other plants. A careful study indicated that two strikingly distinct species each with a black form were being confused. Later examination of a number of the larger collections established the fact that both species were widely distributed in collections but all under the name *atra* Germ.

KEY TO THE SPECIES OF PHYLLOSCELIS Germ.

- A —Apical third of elytra with 3 or 4 longitudinal nervures 1. *atra* Germ.
- AA—Apical third of elytra with 8 or more longitudinal nervures.
- B —Elytra reddish or black, nervures concolorous; anterior tibiae definitely expanded in the middle 2. *rubra* nov. sp.
- BB—Elytra pale; nervures narrowly dark interrupted with white flecks; anterior tibiae slender, margins parallel 3. *pallescens* Germ.

1.—*Phylloscelis atra* Germ.

Globose, elytra leathery with three longitudinal veins on the corium, the outer one obscure, the inner one broadly forked beyond the middle. These veins sometimes fork again just before the apex. Anterior femora extremely broad and foliaceous towards the apex, abruptly narrowing before the base. Anterior tibiae slender, parallel margined. Length 4-6 mm.: width 3 mm. This species is distributed from southern New York to Florida and west to Kansas, Texas, and Mexico. It appears to be limited to the warmer and more humid regions and does not occur on the typical short grass plains. The writer has taken the nymphs and adults from a number of species of shrubs of the families *Ericaceae* and *Vacciniaceae* growing in damp grass lands. The various shrubs that used to be placed under the genus *Andromeda* appear to be favorite hosts in Florida. Two generations were found there, the nymphs appearing in May, the adults in June and running on into July. The second brood nymphs appeared in August, the adults in September running on into October.

Dozier states that all (2) members of the genus are grass feeders but in all the writer's many years of collecting they have never been taken on pure grass stands, but only where clumps of shrubs occurred. The above shrubs are, however, normally found in damp grass lands.

KEY TO THE VARIETIES OF *P. atra* Germ.

- A —Black shining the nervures concolorous 1. (typical) *atra* Germ.
- AA—Elytral nervures rather broadly pale or saffron.
- B —Pronotum and elytra dark brown, the nervures narrowly saffron 2. var. *ocala* n. var.
- BB—Pronotum saffron, elytra with the nervures broadly saffron 3. var. *albonervosa* Mel.

P. atra var. *ocala* n. var.

Resembling typical *atra* in form and size and var. *albonervosa* in general pattern but much darker, intermediate between *albonervosa* and typical *atra* in depth of color. Front, vertex and pronotum brown, scutellum sulfur yellow. Ely-

THE TOADHOPPERS OF THE GENUS PHYLLOSCELIS GERM.
(RHYNCHOTA FULGORIDAE).

BY E. D. BALL,
Univ. of Arizona, Tucson, Ariz.

The insects of this genus are all North American and are strikingly distinct from all other forms in this region in their almost hemispherical outline and leathery opaque elytra. Although they jump with great agility, when seen strutting about on their broadly foliaceous legs they appear awkward and grotesque in the extreme. They rest on the stems of the shrubs head upwards and the body inclined outwards at about a 30-degree angle. When they leap it is with such speed that the human eye cannot follow them but they must spring away from the plant almost bottom up and it is possible that the broad leaf like membranes on their fore legs serve as rudders to guide their flight and finally land them right side up. A number of different genera in the Fulgoridae have foliaceous expansions on the fore legs and most of them agree in being heavy bodied and short winged, a combination that might easily use a gliding surface for orientation purposes. A light-bodied long-winged insect would not need such a device, as its initial jump need be only far enough to clear the foliage and give it an opportunity to open its wings.

*—c.f. Hardy and Preece, in the Pan-Pacific Ent. for April, 1927, page 190.

tra dark brown with most of the longitudinal nervures narrowly banded with saffron.

Holotype ♀ Sanford, Florida, 10-30-26, (E. D. Ball), *allotype*, ♂ Fairfax, Virginia, Aug. 30, 1924 (Ball). *Paratypes* Sanford, Florida, (Ball & Stone) Miss. (Drake) and Onaga, Kansas. (Crevecoeur). This variety is not as common as the black forms or the pale *albonervosa* forms. In general appearance this variety is dark with narrow light nervures while *albonervosa* is pale saffron yellow with narrow dark lines between the nervures.

***Phylloscelis rubra* n. sp.**

Size and general form of *atra* with the elytra slightly longer and more inclined to be flaring. Reddish brown with the nervures concolorous. The two inner nervures of the corium forking and rejoining to form an anastomosing network of eight or ten longitudinal veins before the apex. Anterior femora even more broadly foliaceous than in *atra*. The expanded margin extending to the base, anterior tibiae narrowly but very definitely foliaceous middle femora expanded about as in *atra*, length 5-6 mm., width 3 mm. *Holotype* ♀, *allotype* ♂, and eleven paratypes, Sanford, Florida, 6-22-27, (Ball and Stone) and 5 paratypes Sanford, July 18-27, (Ball, Stone & Reeves).

These examples were all taken feeding exclusively, both nymphs and adults, on a small shrubby heather (*Xolisma fruticosa* Mich.) that grows in relatively damp pine lands. Although this plant was often found growing in mixed clumps of the shrubs given as food plants of *atra* above, this species was never taken on the other shrubs unless the clumps had been disturbed. This species has also been taken by the writer at Seabring, Ft. Meyer and Mt. Dora, Florida, and examples have been examined from various places along the Atlantic and Gulf coast, from Gulfport, Miss, to New York. As mentioned above, most of the larger collections have many examples of this species mixed with those of *atra*. Sirrene and Fulton¹ discuss the cranberry toad bug at length under the name *P. atra* giving details of egg lying, feeding and the consequent injury to the cranberry plants, on Long Island New York. They found a single generation with the nymphs in July and adults in August and September. Their descriptions and figures were evidently all taken from this species and not *atra* as they show the eight or more nervures in the elytra, the expanded front tibiae, and mention the reddish color and other characters typical of this species. They record the species as feeding exclusively on cranberries in that region. Schammel² repeats much of the above and records it from the New Jersey bogs. His fig. 29 shows the multiple nervures and the expanded tibiae and is clearly of this species. Just how many of the other references to *atra* are really to this species cannot be determined but if one is to judge by the collections more than half of them have been. No examples of this species have been seen from regions away from the Atlantic Coast and it will likely be found to be limited to low damp meadow and bog conditions.

***P. rubra* var. *nigra* n. var.**

Size and form of typical *rubra* color of typical *atra*. Black shining, with the oblique white bands below the antennae and two spots on the outer margin of the anterior femora and a band beyond the middle of the anterior tibiae white.

1.—Bull. 377 Geneva, New York Experiment Sta. (p. 383 to 404 in Annual Rep.) 1914).

2.—U.S. Farmers' Bul. 860, p. 33-34, fig. 29 1917.

Holotype ♀, *allotype* ♂, and 3 paratypes, Sanford, Florida, July 18, 1927, 10 paratypes, Sanford, Florida, June 22 and Sept. 19, 1927, all taken by Ball, Stone & Reeves—on the same host as the species. This variety also occurs in all large collections examined with the same limitation to the Atlantic coast

***Phylloscelis pallescens* Germ.**

Size and general form of *atra* but with the venation as in *rubra*. Globose, pale grey, elytra pale, irrorate with brown points, the nervures darker interrupted with white flecks. Anterior femora broadly foliaceous, the tibiae slender and parallel margined.

This species has almost the same distribution as *atra* but is much rarer in collections and the food plant has not been recorded. The writer took a single female from an *Andromeda* in Florida. This species has the venation of *rubra* but the anterior tibiae are slender as in *atra* and the front is tricarinate.