

Taxonomic note on *Sarata tephrella* Ragonot (Lepidoptera: Pyraloidea: Pyralidae: Phycitinae)

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Abstract

The female of *Sarata tephrella* Ragonot is described for the first time. Variation in males and females is illustrated and discussed. Photos of the habitat are presented, and the larval host is postulated.

Key words: Phycitinae, Pyralidae, Pyraloidea, *Sarata tephrella*, taxonomy, Wyoming

Introduction

Sarata tephrella was described by Ragonot in 1893 from a single male from “Washington Territory” with the type deposited in the Muséum National d’Histoire Naturelle, Paris, France. Heinrich (1956) provided a re-description of the holotype and illustrated the male genitalia. Neunzig (2003) briefly discussed the taxon and illustrated a male from Fremont Co., Colorado.

In Albany Co., WY, males of *Sarata tephrella* are the first pyralids to appear at lights in the early spring; we have never seen females at light. In UV-light traps during the past several years at our respective homes in Albany Co., WY and four other sites, we have taken a series of male moths that match the description of *tephrella*. Diurnal collecting in a nearby area on 30 March–4 April 2004 yielded series of both males and females. Although males apparently travel some distance to UV light, the area where we found both sexes during the day is restricted to about 2 ha., and there is a patch of *Artemisia tridentata* var. *wyomingensis* (Beetle & Young) (Asteraceae) growing within a widely distributed stand of *A. nova* A. Nels. The moths were restricted to the north-facing bank of a broad gully. The

habitat (Figs. 1–2) is a high plains environment defined as high-elevation mixed-grass prairie, sagebrush steppe. In addition to *Artemisia*, vegetation at the site includes *Cercocarpus montanus* Raf., *Juniperus scopulorum* Sarg., *Ribes* sp., and various forbes and grasses. The moths roost on the stems of *Artemisia* and flush when the vegetation is disturbed if the air temperature is above 10° C. Males may fly for several meters before alighting on vegetation or the ground. Females immediately take refuge at the base of *Artemisia* bushes, where they crawl rapidly and disappear into the leaf litter. Their cryptic wing markings render them difficult to see once they have settled. Because of the close association of the females with *A. tridentata*, we suspect this to be the larval host. Two females were extruding pale green eggs when removed from the net. 154 males and 18 females were examined for this study.

All of the specimen images were taken with a Fuji S1 FinePix Pro digital SLR camera. The genitalic images were taken through an Olympus SZ60 stereozoom microscope using the Fuji camera body attached to the microscope photo tube. In some instances, chlorazole black E stain was used to enhance genitalic features. Post processing of all of the images was done in Adobe Photoshop® 5.5. All specimens illustrated are in the Ferris collection.

Sarata tephrella Ragonot

MALE

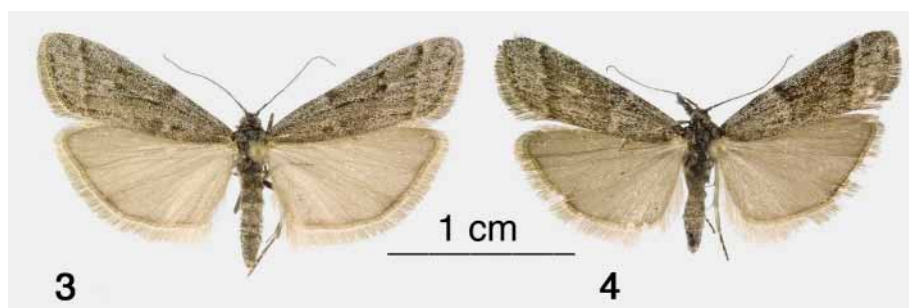
Diagnosis. Separated from similar species by its small size, dark thorax, pale grayish color, and absence of well-defined dorsal forewing transverse bands.

Description (Figs. 3–5). *Forewing length* (base to apex): 11–16 mm. *Head* (Fig. 5): Antennae with small spined tuft at base of shaft; labial palpi long, slender, porrect with mosaic of pale grayish brown and dark brown scales on dorsal ridge and laterally, changing to white basally below eye; frons, collar clothed in dark brownish-black to black scales, some white-tipped, with narrow fringe of whitish scales above eyes. *Body*: Thorax clothed in dark brownish gray to black scales, some basally pale with dark tips; abdomen covered with pale grayish brown scales, ventrally with pale distal terminal scales on each segment; legs covered with mixture of whitish and pale grayish brown scales with suggestion of weakly defined alternating light and dark bands. *Wings* (Figs. 3–4): Dorsal color of forewings variable from pale gray to drab charcoal gray; maculation varies from nearly absent to a weak bicolored postmedial band, whitish distad, blackish basad, with a weak dark antemedial band, very thin and poorly defined dark terminal band; fringe with basal row of short white-tipped pale grayish brown scales and outer row of similar but longer scales; hindwings thinly scaled, uniformly pale brownish-gray with terminal line and fringe similar to forewing; ventral wings uniformly medium grayish-brown. The type of *S. tephrella* was described as having the dorsal forewing heavily dusted with white. Upon magnification, fresh specimens that we collected manifested overlying white scales. As

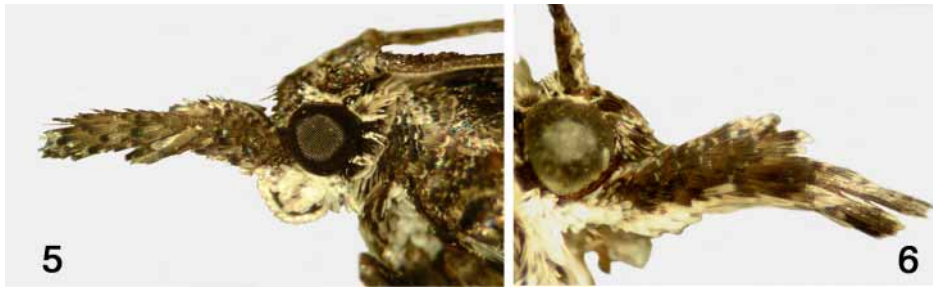
the moths age during flight, the white scales slough off exposing underlying gray, brownish, and charcoal gray scales, many of which are white-tipped. Aged individuals present a rather drab charcoal gray aspect. In flight, the moths appear pale gray regardless of age. **Genitalia** (Figs. 7–11; 17 dissections from 5 localities). The small process located toward the base of the costa varies in size from essentially absent to that shown in Fig. 8 (arrow). Heinrich's illustration (Fig. 405) does not show this feature, and the process was either absent, or so small that it was flattened against the costa and rendered invisible when the slide was prepared. The vesica is armed with a large, hollow, and robust spine and a small distorted crescentic chitinous piece, which is variable in size, shape, and degree of chitination. Figs. 9–10 illustrate variation in the aedoeagus. Fig. 11 shows the everted vesica. The robust spine is seated at the base of the funnel-shaped end of a diverticulum that has a stiff membrane; further eversion cannot be obtained by pulling on the spine. There is a large scobinate patch on the surface of the vesica (double arrows Figs. 10–11). The eighth abdominal segment and ventrolateral tufts of the specimens dissected agreed with Heinrich's drawings (Fig. 405b). Based on the illustrations in Heinrich, the male genitalia of *tephrella* and *rubrithoracella* (Barnes & McDunnough) are very similar. The latter species, however, is reported to have a rufous-ochreous shading on the thorax, while the thorax of *tephrella* is very dark brownish gray to nearly black.



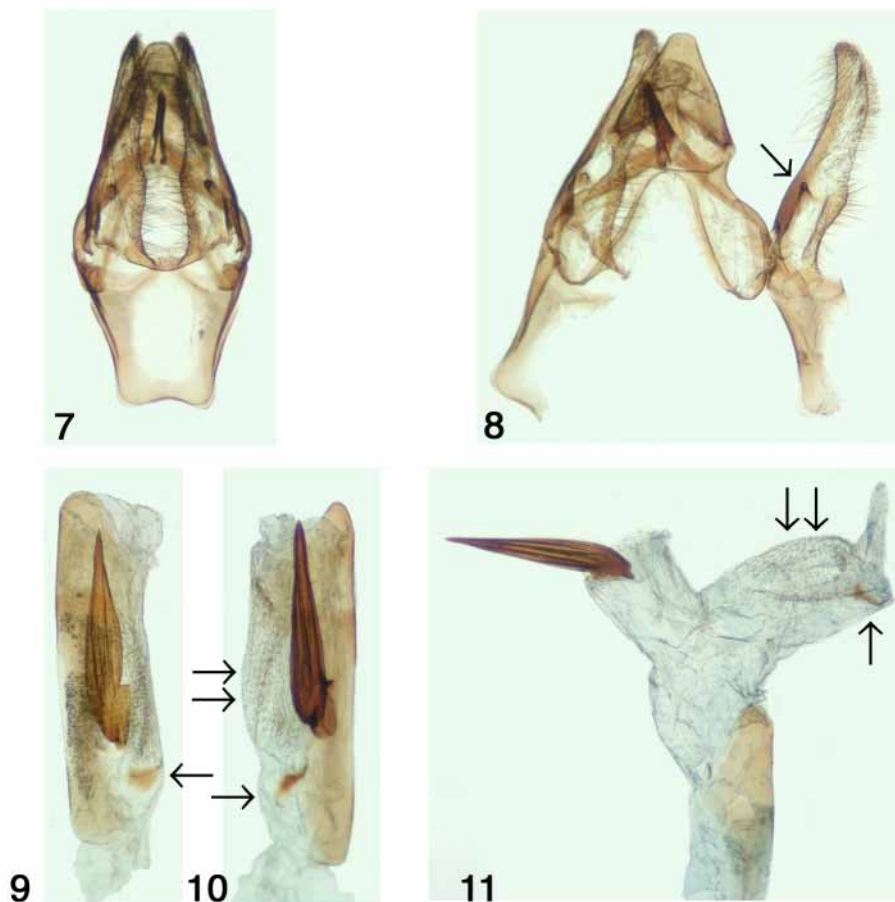
FIGURES 1–2. Habitat on April 1, 2004, WY, Albany, Co., 41°18.50'N, 105°30.75'W, 2333 m. 1, general view to east of north-facing bank; 2, bottom of gully with *Artemisia tridentata* (brown dead flower stalks) in foreground and *Juniperus scopulorum* at left and in background.



FIGURES 3–4. Males of *S. tephrella* from locality in Figs. 1–2, 31.iii.2004. 3, pale form; 4, strongly marked form.



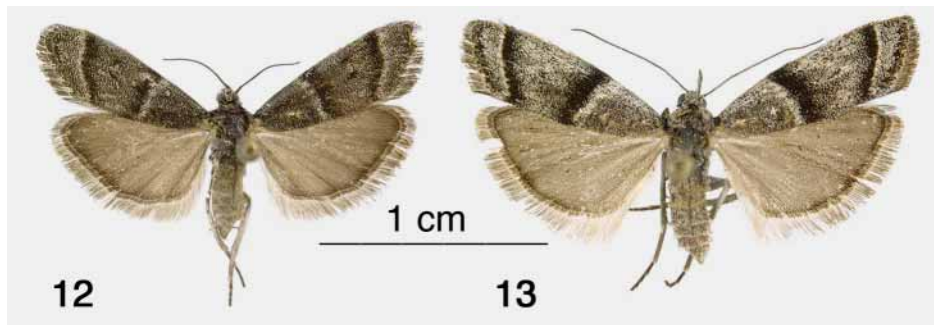
FIGURES 5–6. Heads of *S. tephrella*. 5, male; 6, female.



FIGURES 7–11. Male genitalia of *S. tephrella*. 7, genitalia less aedeagus; 8, genitalia less aedeagus with saccus cut to permit display of right valva and process (arrow); 9, aedeagus similar to Heinrich's drawing of type specimen (arrow points to small chitinous piece); 10, aedeagus of another specimen with smaller and differently shaped chitinous piece, single arrow points to small chitinous piece, double arrows point to scobinations on vesica; 11, everted vesica, single arrow points to small chitinous piece, double arrows point to scobinations on vesica.

FEMALE

Diagnosis. Female genitalia has fine spining on corpus bursae that occupies only one-quarter or less rather than the anterolateral half as in *epsilon* Heinrich, and of different shape and broader extent than in *delta* Heinrich.



FIGURES 12–13. Females of *S. tephrella* from locality in Figs. 1–2, 31.iii.2004. 12, small specimen with FW discal spots; 13, large specimen with vestigial FW discal spots.



FIGURE 14. Female genitalia of *S. tephrella*. a, partially inflated corpus bursae; b, fully inflated and flattened corpus bursae from another specimen.

Description (Figs. 6, 12–14). *Forewing length* (base to apex): 8–10 mm. *Head* (Fig. 6): Antennae simple; labial palpi porrect with white-tipped black scales on dorsal ridge, laterally covered with black scales with abrupt change to white scales ventrally and at base; frons, collar clothed in dark brownish-black to black scales, some white-tipped (as in males). *Body*: Thorax, abdomen, legs as in males. *Wings* (Figs. 12–13): Forewings short and stubby compared to males, with rounded outer margin; antemedial band white basad, black distad, complete postmedial black band with narrow white edging distad; two vertical black discal spots (absent in some specimens) separated by a narrow lateral band of white scales, narrow black terminal line, fringe with basal row of short white-tipped dark gray scales and outer row of long paler gray white-tipped scales, remaining wing areas covered by white-tipped blackish scales producing a dark gray aspect; hindwings uniformly medium brownish-gray with terminal line and fringe similar to forewing; ventral wings uniformly medium grayish-brown. **Genitalia** (Fig. 14a, b; 2 dissections). Membranous ostium bursae; simple ductus bursae, shorter than corpus bursae; corpus bursae with patch of microspines covering the fundus and about one-quarter of the anterolateral surface; ductus seminalis emerges close to middle of corpus bursae.

Material examined: WYOMING, Albany Co., ca. 41°17.88'N, 105°31.51'W, 2285 m, 39 males taken in UV-light traps (separated about 0.45 km) approximately 2 km east of Laramie with early and late dates ranging from 26 March–14 May 1992–2004; 41°17.9'N, 105°30.4'W, 2287 m, 13.iv.2003 (1f, JSN); 41°18.50'N, 105°30.75'W, 2333 m, 13.iv.2003 (5m, JSN), 30.iii–4.iv.2004 (101m, 17f, CDF, JSN); 41°13.8'N, 105°22.6'W, 2535m, UV-light trap, JSN, 1988: 30.iv (1m), 5.v (1m); 41°13.5'N, 105°22.5'W, 2545 m, 23.v.2003 (4m, UV-light trap, JSN); COLORADO, Larimer Co., T[ownship] 9N, R[ange] 71W, S[ection] 4, hill S. of Lone Pine Creek, 1950 m, 30.iv.88 (1m, JSN), 11.iv.2003 (6m, UV-light trap, JSN).

Discussion

Adults of both sexes are rather variable in habitus regarding the extent and intensity of maculation and color of the dorsal forewing. Based upon our collecting and literature information, *S. tephrella* is now known to have a broader distribution: Washington (type locality), Wyoming (Albany Co.), and Colorado (Larimer and Fremont Cos.). Emergence time of adults is dependent upon elevation (1950–2545 m) and annual local weather conditions, with records from 26 March to 23 May. In any given year, the flight period is less than two weeks. March 2004 was unusually warm and very dry, which apparently contributed to a strong and early emergence of *S. tephrella*. The first males were taken at light on 26 March, and very few individuals were seen in the field on 4 April, after two days of chilly, cloudy, and windy conditions.

From 1992–1995, JSN collected five *Sarata* females in the Laramie environs not in association with males. CDF dissected them and determined they were *S. epsilon* Heinrich and *S. phi* Heinrich, species that are known from Colorado. In addition to *tephrella*, we also obtained males of *S. caudellella* (Dyar), *incanella* (Hulst), and *pullatella* (Ragonot) in our light traps from late April into June. Presumably two of these species represent the corresponding males of *epsilon* and *phi*, but we have not determined the correct associations. It is possible that Heinrich's *Sarata delta* is a synonym of *S. tephrella*.

Acknowledgements

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