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A NEW SPECIES OF *EXOTELEIA* (GELECHIIDAE) REARED FROM PONDEROSA PINE

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ABSTRACT. *Exoteleia anomala*, new species, is described from New Mexico and Arizona. The larvae are needle miners on ponderosa pine. Problems with recognition of North American species of *Exoteleia* are discussed.

A new species of *Exoteleia* was reared by R. E. Stevens from needles of ponderosa pine, *Pinus ponderosa* Douglas *ex* Lawson, near Silver City, Grant County, New Mexico. Reared adults were sent to me for identification. The moths proved to be an undescribed species that is most closely related to *Exoteleia pinifoliella* (Chambers). *Exoteleia anomala* Hodges is described to permit discussion of it and related species.

Exoteleia anomala, new species

A small dark-brown to black and pale-gray banded moth (Fig. 1). Most scales have shining yellowish reflections depending on angle of light incidence.

Description. Head: haustellum white, several gray-tipped scales basally; labial palpus mainly white, lateral surface of first and second segments with many dark brown-tipped scales, inner surface of second segment with a few dark brown-tipped scales near apex, apex of second segment white, third segment with a partial ring of dark brown-tipped scales at ⅓ length and a well-developed ring of dark brown-tipped scales at ¾ length; antenna, ventral surface mainly gray, scape off white ventrally and on anterior margin, dorsal surface dark brown, individual scales off white basally; shaft dark, alternate scale rows dark brown and gray; sensory cilia of male very short, scarcely visible at base of each segment at 100× magnification; frons, vertex, and occiput white, a narrow band of dark brown-tipped scales on anterior margin of eye, dark gray scales on posterior margin of eye. **Foreleg:** coxa and trochanter mottled pale and medium gray; femur darker gray; tibia dark gray, a few white scales at ⅕ length, ⅗ length, and apex; tarsus dark gray, base and apex of some scales paler; base and apex of 1st tarsomere with white scales, apex of 2nd and 5th tarsomeres with off-white scales. **Midleg:** similar to foreleg, apex of each tarsomere with white scales. **Hindleg:** coxa and trochanter off white; femur mottled pale and dark gray; tibia mottled pale and dark gray, dorsal tuft of long scales off white, outer spurs mainly off white; tarsus mottled off white and dark gray, base and apex of 1st tarsomere and apex of other tarsomeres white. Thorax mottled dark and pale gray-brown, individual scales with pale apexes and pale ridges. **Wings:** upper surface as illustrated; forewing mottled dark gray brown to black and pale gray to white; patches of upturned scales at approximately ⅕, ⅖, and ⅗ length; ventral surface of forewing with linear zone of dark brown scales (male only) that have the scale apexes directed toward the posterior margin, zone extending from before ½ length of wing nearly to posterior margin behind apex. **Wing length:** 4.9 mm (4.0–5.0 mm). **Abdomen:** dorsal and ventral surface of segments dark brown medially, off white laterally and distally. **Male genitalia:** as in Figs. 2 and 4. **Female genitalia:** as in Fig. 3.

Types. Holotype: male, New Mexico, 40 km NE Silver City; *Pinus ponderosa*, vi.1977;

FIG. 1. *Exoteleia anomala*, new species, holotype male.

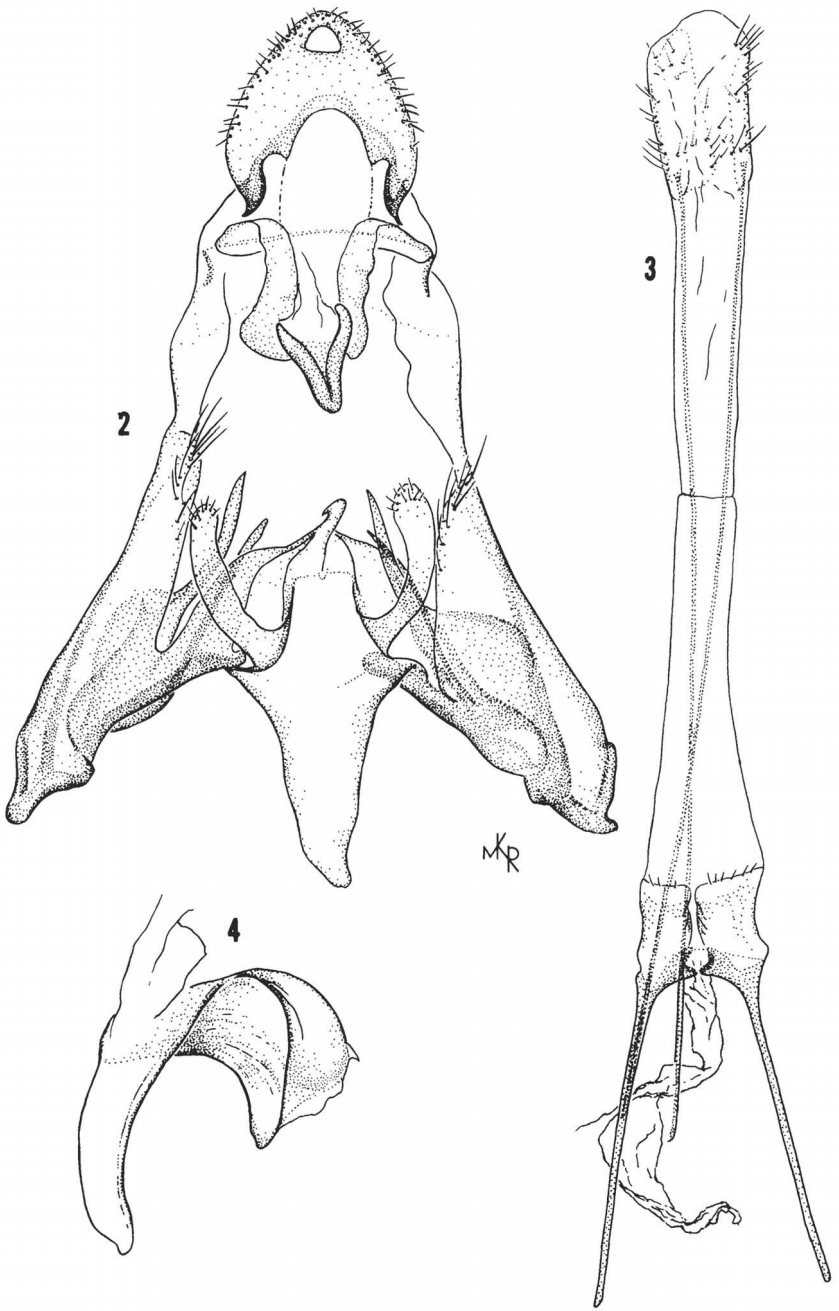
R. Stevens; Hopkins U.S. #36961. **Paratypes:** 11 males, 8 females; same data as for holotype; USNM genitalia slides #10893–10902. 2 males, 4 females; Arizona, 10 km N Fort Apache; *Pinus ponderosa*, J. M. Schmid; Hopkins U.S. #66729, reared 8/82; USNM genitalia slides 11745–11748. In collection U.S. National Museum of Natural History.

Host plant. *Pinus ponderosa* Douglas *ex* Lawson.

Variation. The description is based on the holotype. Major variation occurs in the color of the transverse dark fasciae on the forewing that may be dark gray brown to shining red orange brown. Some specimens have gray-marked scales on the vertex and occiput.

Discussion. Males of *Exoteleia anomala* can be recognized to genus by the series of dark brown raised scales on the under surface of the forewing. These scales are directed somewhat transversely with the long axis of the wing. *Exoteleia anomala* is nearest *pinifoliella* (Chambers) in genital characters; perhaps neither sex can be separated from *pinifoliella* consistently on them; males definitely cannot. The general coloration of the upper surface of the forewings and thorax of *anomala* is gray brown as viewed with the eye as contrasted with the warm red brown or brown of *pinifoliella*. *Pinifoliella* is known from southern Ontario and the New Jersey Pine Barrens, south along the Appalachian Mountains to Georgia, and from the Boston Mountains in northwestern Arkansas. *Anomala* occurs in New Mexico and Arizona.

When specimens of *anomala* were sent to me for identification, I anticipated writing a key to adults of species of *Exoteleia*; however, I have been utterly frustrated in an attempt to do so. In addition to the introduced *dodecella* (Linnaeus), *pinifoliella, burkei* Keifer, *chillcotti* Freeman, and *nepheos* Freeman occur in North America. *Exoteleia*



FIGS. 2–4. *Exoteleia anomala*, genitalia: **2, 4,** male; **3,** female.

graphicella (Busck) and *californica* (Busck) are not congeneric with *dodecella* and will be transferred at a future date. *Dodecella* is a large species (4.8–5.7 mm wing length) and is distinctly gray. It occurs in southern Ontario, Maine, and New York. Martin (1959) published on its bionomics for southern Ontario.

Study of genitalia of 80 specimens from populations throughout the range of the native species has shown that none of the genital characters cited by previous authors is significant to discriminate among species. In males the margin of the lightly sclerotized part of the uncus, the size and shape of the mediolateral lobes from the saccus, the relative length and shapes of the valvae and lobe from the posterior margin of the saccus all vary independently of other characters. In females the length of the extended external genitalia from the apex of the ovipositor to the anterior apex of the apophyses anteriores relative to the length of the first seven abdominal segments seems to allow for some grouping of entities. The genitalia cluster in groups from ⅔ to nearly equal to the length of the first seven segments of the abdomen. *Pinifoliella* and *anomala* have relatively long female genitalia, with *pinifoliella* having slightly the longer genitalia. Forewing coloration, host plants, and geographic distribution separate *pinifoliella* and *anomala*. What appears to be an undescribed species is small, dark, and has the shortest female genitalia relative to the first seven abdominal segments of the native species. It occurs in eastern North America from Lakehurst, New Jersey and Ithaca, New York, south to McClellanville, South Carolina, the southern Appalachian Mountains, and Hartford, Arkansas. The female genital group that includes *nepheos* has three very different looking moths: 1) the "large" dark brown forewinged, dark gray-brown hindwinged *nepheos*; 2) an undescribed entity from the type series of *pinifoliella* (Ithaca, New York) that has relatively dark brown forewings and medium gray hindwings; and 3) a series of populations from South Carolina, Florida, and Louisiana that has relatively light orange-brown and off-white banded forewings and pale gray-brown hindwings. These populations are unlikely to represent one species. The fifth group includes *burkei* and what probably is *chillcotti* from eastern Texas and Louisiana. The forewings of *burkei* are dark red brown, and the hindwings are dark gray brown; the forewings of the Texas specimens are pale orange brown and off-white banded, and the hindwings are very pale gray.

On the basis of the material that I have studied I can defend and define four species, *anomala*, *pinifoliella*, *dodecella*, and an undescribed species from the eastern United States. I have been unable to define *nepheos*, *burkei*, *chillcotti*, and potentially two other entities on adult characters.

It would appear that pupal characters may be useful to define species; however, because voucher material is not available to support some published observations, I am unable to associate the differences noted in the literature with the moths that I have studied. The type series of *pinifoliella* contains three species: *pinifoliella*; the small, dark species; and one very much like *pinifoliella* but that is associated with *nepheos* by the female genitalia. Bennet (1966) illustrated the pupa of *chillcotti*, showing that it lacks the cutting plate of the pupa of what may be *pinifoliella* (Bennett, 1954). Because any of three very similar species probably occur in the Syracuse, New York area, it is not possible to state with certainty the species that he studied and called *pinifoliella*. This uncertainty points to the need for well-prepared voucher material to be deposited in permanent collections to document publications on life history studies of insects. Subsequent, finer or different, taxonomic conclusions could then be associated with previous literature.

Larval behavior differs among the species. Burdick and Powell (1960) reported *burkei* as feeding on the needles of *Pinus radiata* D. Don. and *P. sabiniana* Dougl. into the fourth larval instar. Subsequently, the larva attacks the male staminate cones and rarely the developing buds. Stevens (1969), reporting on *burkei* (potentially) from Placerville, California, indicated that the species fed on *Pinus attenuata* Lemm. In this infestation the last instar larvae attacked developing shoots and not staminate cones. Also, pupation occurred in the last larval habitat as contrasted with the larva usually leaving the last larval habitat to pupate as reported by Burdick and Powell (1960). Lindquist and Trinnell (1967) found that the last instar larvae of *nepheos* fed on staminate cones and developing buds of *Pinus resinosa* Ait. and *P. sylvestris* L. and that pupation occurred in the last larval site. Freeman (1963) reported that *chillcotti* fed exclusively in needles of *Pinus palustris* Mill. and that pupation occurs there. Finnegan (1965) found the larva of *pinifoliella* feeding in the needles of *Pinus banksiana* Lamb.; and Bennett (1954) recorded *P. rigida* Mill., *P. resinosa* Ait., *P. virginiana* Mill., *P. echinata* Mill., *P. palustris* Mill., and *P. pungens* Lamb. as hosts.

On the basis of available material I have been unable to resolve the question of separation of species in nearctic *Exoteleia*. I strongly urge that anyone who has the opportunity rear and preserve samples of the immature stages and adults of the local species. In New Jersey a light, larger species and a dark, smaller species are present. In the coastal plain of the Southeast two species may be sympatric. In Louisiana and Texas one, two, or three species occur.

A generalized life history for all the species is that the moths appear to be univoltine with adults emerging from late spring to midsummer.

The adult female lays eggs in the entrance of an abandoned mine. Upon hatching, the larvae leave that site and attack other needles. Overwintering is in the larval stage, and the following spring the last instar larva may attack additional needles, staminate cones, or buds, apparently depending upon the species. Pupation usually occurs in the last instar larval feeding site; for *burkei* it may occur there or on or in the ground.

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