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A NEW SPECIES OF *BOREUS* (MECOPTERA: BOREIDAE)  
FROM COLORADO

BY GEORGE W. BYERS

SEVERAL specimens of *Boreus* received for identification from the University of Colorado Museum represent an undescribed species. Collected about 400 miles from the nearest previously known population of this genus (in northwestern Wyoming), these are not only the first *Boreus* but also the first Mecoptera to be recorded from Colorado. In the west, *Boreus* ranges southward into northern California and Nevada, and in the Appalachian highlands it has been collected as far south as the Smoky Mountains of Tennessee.

I should like to express my gratitude to Dr. Hugo Rodeck and Dr. Robert Gregg, of the University of Colorado, for making these specimens available to me for study, and to the staff of the University of Colorado's Institute for Arctic and Alpine Research, particularly Mr. William S. Osburn, for making the collections.

*Boreus coloradensis*, new species

TYPES.—Holotype, male; Colorado, Boulder County, near University Camp, 9500–11000 feet, 24 April 1952, W. S. Osburn; in the University of Colorado Museum. Allotype, data same as for holotype. Paratypes, 16 males and 15 females, preserved together with the holotype and allotype, and four males and four females in the collection of the University of Michigan Museum of Zoology.

DESCRIPTION.—This species resembles *Boreus unicolor* Hine in general appearance and will be identified as that species by existing keys. Its color is black, giving a bronzy reflection in certain lights. The modified wings in both sexes have the same color as the rest of the body; the legs may appear dark brown, particularly in specimens preserved in alcohol. The eyes vary in color from a deep plum to dark brown or black, depending upon the method of preservation. Membranous portions of the

body surface are brown. A whitish pubescence covers much of the body but is most conspicuous on the abdominal sternites, on the anterior surfaces of the prothoracic coxae, and in elongate patches on either side of the rostrum below the eyes.

In making measurements, the amount of contraction or other distortion of the dried insects was not considered, although it was noted to be rather uniform among all specimens. Males averaged a little more than 2.5 mm. in over-all length, excluding the antennae, the range being 2.5 to 3.0 mm. (holotype 2.5 mm.). Specimens in alcohol are variously distended. The forewings of males are 1.4 to 1.5 mm. long. The rostrum from eye to tip measures about 0.8 mm., longer by half than that of *Boreus unicolor*. The antennae are approximately 1.5 mm. in length. Over-all length of females varies from 4.5 to 5.0 mm. (allotype 4.5 mm.), of which length 1.1 to 1.4 mm. represents the ovipositor, measured from the posterior margin of the ninth tergite to the tip. Antennae of females average about 1.8 mm. long. The ratio of rostral length to length of ovipositor varies from 1:1.25 to 1:1.38.

A broad, rounded ridge crosses the pronotum slightly caudad of its mid-length, conspicuous on the dorsal surface but tapering away at the sides (Fig. 2). Such a pronounced ridge is not found in *B. unicolor*. Further, the pronotum of *Boreus coloradensis* lacks prominent bristles and has a pattern of fine wrinkles, except in the region of the spiracle. The forewings of the males are narrowed rather abruptly near their mid-length (Fig. 4). Those of the females extend backward sufficiently to cover the vestigial hindwings.

Probably the most significant differences between *Boreus coloradensis* and *B. unicolor* are found on the terminal abdominal segments of the male. Seen from the side, the ninth tergite of *coloradensis* appears elevated and produced caudad, forming above the sockets for the spine-like tips of the forceps, or dististyles (Fig. 3), a roof, such as is found also in *unicolor*. The process separating the sockets (see Fig. 1), however, is broad and densely set with long hairs in *coloradensis*, while it is slender and relatively bare in *unicolor*. At the sides of the ninth tergite are surfaces bearing heavily sclerotized, short, stout spines, which are abundant and have rounded tips in *unicolor* but which are less numerous and acutely tipped in *coloradensis*.

There is marked variation in the outline of the hypandrium in the 21 males of the type series. In the past, the shape of this structure has been used as a specific character, but I prefer to place more reliance in the consistency of characteristics of the ninth tergite and of the pronotum and general features. Twelve of the males, including the holo-

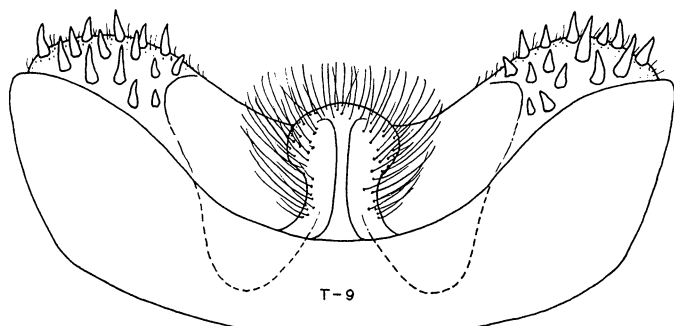


FIG. 1. Ninth tergite of male, in dorsal aspect.

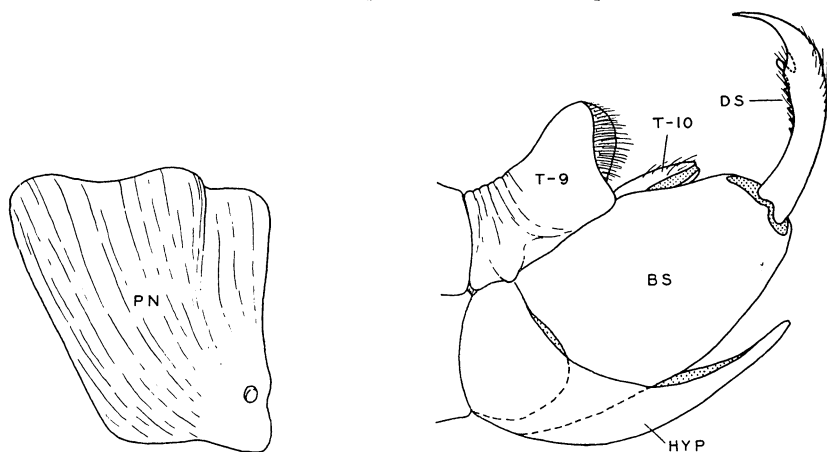


FIG. 2. Pronotum of male, seen from left side. PN—Pronotum.

FIG. 3. Terminal structures of male, seen from the left side. BS—Basistyle; DS—Dististyle; HYP—Hypandrium; T-9—Ninth tergite; T-10—Tenth tergite.

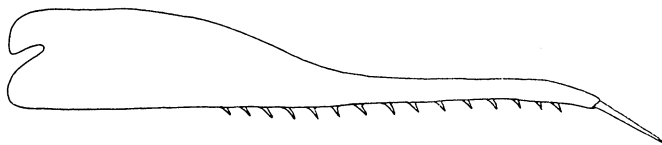


FIG. 4. Right forewing of male.

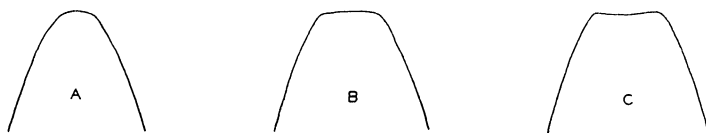


FIG. 5. Variations in the form of the male hypandrium, seen from below.

type, possess an almost squarely truncate hypandrium as illustrated in Figure 5B. One has a narrow hypandrium with rounded tip (Fig. 5A). Four have the distal edge of the structure slightly emarginate (Fig. 5C). Two intergrades were found that are between the forms depicted in Figure 5A and 5B, and two others fall between those in Figure 5B and 5C in this characteristic.

GEOGRAPHICAL DISTRIBUTION.—All known specimens of this species were collected on the eastern slopes of the Continental Divide, between 12 and 20 miles west of the city of Boulder, Boulder County, Colorado. (In the collection of the Colorado Agricultural and Mechanical College, there is a specimen determined as *Boreus unicolor*, taken in Rist Canyon, Larimer County, Colorado. I have not seen it, but suspect it may be conspecific with *B. coloradensis*.) It is impossible to say where the ranges of *coloradensis* and the evidently quite closely related *unicolor* meet or overlap, but I believe that the actual range of *coloradensis* must include most of the northern Colorado Rocky Mountains.

ECOLOGICAL DISTRIBUTION.—Ranging from 7500 to 12200 feet up the mountain slopes, *Boreus coloradensis* has been found to occur from the zone of ponderosa pine upward through the Douglas fir and lodgepole pine forests, the spruce and limber pine, and to roughly 700 vertical feet above the local timberline. All specimens were taken during periods of their activity on the surface of the snow, when air temperatures varied from 23° to 44° F. and snow surface temperatures from 25° to 46° F. How the insects gain access to the snow surface is not known. Probably, they ordinarily ascend tree trunks or the stems of bushes and other plants. Collections in the tundra zone were made only in late March and April, when there was often a patchy distribution of snow.

SEASONAL DISTRIBUTION.—*Boreus coloradensis* has been collected only during the late winter and early to mid-spring (from 28 February to 24 April), apparently reaching greatest abundance about mid-April. The collecting seasons were of about the same extent in both 1952 and 1953. A single male was found on 28 February; one male and three females were taken in the last half of March; and one male and seven females were collected during the first half of April. The remaining 18 males and 10 females were taken between 17 and 24 April. Studies by the University of Colorado's Institute for Arctic and Alpine Research which resulted in the discovery of this new species have been carried on with uniform intensity throughout the year. I therefore believe that there are no other seasonal periods of emergence of adults, such as are suggested in the cases of *Boreus brumalis* and *B. unicolor*.

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