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**The Status of *Pezotettix bohemani* Stål (Orthoptera: Acrididae), with Designation of a Lectotype and Restriction of the Type Locality**

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In his paper on the Orthoptera of Colorado, Hebard (1929) suggested that a southern form of the *Melanoplus dodgei* complex be recognized as a distinct subspecies of *M. dodgei*. He used Stål's name *bohemani* (*Pezotettix bohemani*—though he erroneously referred to it as *P[odisma] bohemani*), stating that "Comparison of large series before us from the mountains of southern Colorado and northern New Mexico with the description of *bohemani* and paratypes of *altitudinum* convinces us that *bohemani* is a southern race of *dodgei*, with *altitudinum* a synonym. Scudder had placed *bohemani* as a synonym of *dodgei*." (The reference to *altitudinum* is to *Pezotettix altitudinum* Scudder (1879), which was described from northern New Mexico and southern Colorado.) Later, Hebard (1935) stated that

he had decided, on the basis of examination of concealed genitalia, that *M. bohemani* was a species distinct from *M. dodgei*.

When I examined Stål's description (1878) I found nothing to indicate that his specimens came from southern Colorado, nor, in fact, that they corresponded with specimens of the *dodgei* group from southern Colorado. The complete description follows: "*P. Bohemani* Stål.—*P. frigido* simillimus et maxime affinis, differt autem magnitudine minore, genis minus tumescentibus, elytris alisque nonnihil brevioribus, cercis marium angustioribus, segmenti ventrali ultimo marium apice macula parva rotundata nigra notato. ♂♀ Long. 14–21 mill. Patria: Colorado. (Mus. Holm.)"

Specimens of *M. dodgei* do indeed have somewhat shorter tegmina and narrower cerci than does *Pezotettix frigido* Boheman, which is *Bohemanella frigida* as used by Harz (1957) or *Melanoplus frigidus* as used by Bei-Bienko and Mishchenko (1963 and earlier)—the only species of *Melanoplus* in the Old World as recognized by Bei-Bienko and Mishchenko. The black spot on the last ventral segment is an individual variation, and it is not "apical" in Stål's specimen referred to later in this paper. The only significant feature of Stål's description is in the measurements, these suggesting extremely small specimens. Specimens from the populations to which Hebard applied the name *bohemani*, even those from alpine areas, are typically larger.

My examination of Stål's description suggested to me that Scudder's synonymy was probably correct. Whereas Hebard had apparently not seen any of Stål's types, Scudder had. In his synonymy of *Podisma dodgei* (Thomas), Scudder wrote (1897): "By the kindness of Doctor Aurivillius, of Stockholm, I have received one of the type specimens of Stål's *Pezotettix bohemani*, and been able to compare it with the types of the other nominal species mentioned in the synonymy."

Hebard's comments (1935) about differences in the genitalia were not accompanied or followed by descriptions. In 1950, Fehlmann reported on a comparison of the internal genitalia of

males from southern Colorado populations with those from the type locality of *Melanoplus dodgei* (Thomas), which is Pikes Peak, concluding that the variations within each population were as great as the differences between the Pikes Peak population and those from further south. Our assumption is that the differences Hebard found were individual variations.

With the use of the name *bohemani* in this apparent state of confusion, I asked Dr. Harold Grant if he would, on his recent trip to Stockholm, look for Stål's types of *Pezotettix bohemani*. They were in the Riksmuseum, in excellent condition. Through the courtesy of Dr. Erik Kjellander, three syntypes, one male and two females, were sent me for examination. An examination of them proved to be critical to a solution of the problem, for as soon as I saw them I realized that they were from an alpine area but were not typical of "southern" Colorado populations.

Each specimen bears, in addition to the Riksmuseum label and number, a locality label with the one word "Colorado," and a label stating that the specimen is a syntype of *Pezotettix bohemani* Stål. The male, however, has an additional label below that of the locality, bearing the one word "Morrison." This almost certainly refers to Herbert Knowles Morrison, who collected insects in Colorado in the 1870's and sent specimens to specialists in Europe as well as America. We have no definite information on Morrison's itinerary, but I am indebted to Mr. F. Martin Brown (several letters, 1965) for information on the year the specimens were obtained and their possible source. He wrote that Morrison's only visit to Colorado for which he had concrete evidence was in 1877. On the basis of 140-odd species of butterflies collected by Morrison, Mr. Brown wrote, "it is possible to say that he collected west from Pueblo into the Wet Mountains around Rosita and probably south to Greenhorn Mt. There is no evidence that he visited Pikes Peak, although he may have. There is no evidence that he collected in alpine areas." These last comments were in response to my statement that the specimens appeared to have come from the alpine areas on Pikes Peak. Mr. Brown suggested, however, that the specimens may have been given Morrison by H. W. Nash, an

entomological collector in Pueblo who wandered all over the mountains, had collected on Pikes Peak, and was quite generous in giving away his specimens.

The problem of restricting a type locality is easier in this group than with many insects. Members of the *dodgei* complex are brachypterous, and there is little gene flow between populations from different sections of the mountains. Populations from alpine areas that are isolated from each other by intervening lower elevations are phenotypically distinct. Thus, a comparison of Stål's syntypes with specimens from different populations in Colorado has given us a clue to the population represented by Stål's series.

Fortunately, through collections made in 1949 by Dr. H. A. Fehlmann, I have had available for comparison large series of specimens from the alpine areas where Morrison might have collected and where Hebard may have thought the type series was collected—Greenhorn Mountain and the Sangre de Cristo Range, west of the West Mountain Valley. The syntypes of *Pezotettix bohemani* differ from members of these populations in several respects. They are slightly smaller in overall size, the hind femora are definitely smaller in proportion to general body size, the tegmina are relatively shorter, and the hind femora in all populations from southern Colorado (south and southwest of Pikes Peak) are dark red in a broad ventral band while the syntypes are greenish yellow in the same region with only a trace of red along the ventral edge. The dark red in southern Colorado populations varies between Ridgway's (1912) coral red and jasper red; it may be as dark as pompeian red in specimens from southwestern Colorado. Femur color is similar in the syntypes, the Pikes Peak population, and in populations from further north, but only the Pikes Peak population agrees in both size and color with Stål's syntypes. These data, for males, are summarized in Table 1. Though not here given in detail for females, these differences are as marked in females as in males. And in those respects in which comparison can be made, the male used by Stål closely resembles the type of *Caloptenus Dodgei* Thomas (1871), which is in the U. S. National

TABLE 1. Extremes of Measurements of Males from Various Colorado Populations of *Melanoplus dodgei* (Thomas) Compared with the Same Measurements from the Male Lectotype of *Pezotettix bohemani* Stål.

All measurements are in millimeters, made to the nearest 0.1 mm. under 8X magnification. (Each set of measurements from a population is based on five specimens *selected* from the series available, to include the two largest and two smallest as determined by visual inspection, hence no averages are used.) The alpine populations came from the highest elevations of *M. dodgei* populations in each area; the differences in altitude are not significant.

	Total Length	Pronotum		Hind Femur		Tegmen Length	Color Lower Part Hind Femur
		Length	Width	Length	Width		
<i>Pezotettix bohemani</i> Stål, lectotype	14.7	3.6	2.4	8.4	2.5	3.9	
Pikes Peak, 12,500'-13,000'	13.5-16.0	3.5-4.0	2.4-2.8	8.3-9.0	2.4-2.7	2.8-4.4	Greenish yellow
Greenhorn Mtn., 12,300'	15.8-18.1	3.7-4.4	2.6-2.8	9.1-9.9	2.6-2.9	3.5-5.0	Greenish yellow
Sangre de Cristo, Horseshoe Lake, 12,400'	15.6-17.9	3.9-4.6	2.6-2.7	9.0-10.2	2.6-3.1	3.5-4.9	Deep red
Sangre de Cristo, Trincheras Peak, 12,300'	16.1-17.8	4.0-4.5	2.6-2.8	9.3-10.6	2.8-2.9	4.0-5.5	Deep red
Front Range, Goliath Peak, 12,100'	15.2-17.9	3.8-4.1	2.5-2.7	8.9-9.8	2.6-2.8	4.3-4.8	Greenish yellow
Front Range Foothills, near Boulder, 6,700'	16.6-24.4	4.2-5.1	2.8-3.1	9.6-10.3	2.6-3.3	4.6-6.8	Buff yellow

Museum, and which, through the courtesy of Dr. Ashley B. Gurney, I examined and made scale drawings of some time ago. Thomas's type is fragmentary and in a Riker mount, but the head and pronotum, part of the abdomen (including the terminal segments), and one hind leg have been preserved.

On the basis of comparison of three of Stål's syntypes with populations of the *Melanoplus dodgei* complex from different parts of Colorado, and from what we can surmise of the activity of the probable collector, I wish to restrict the type locality of *Pezotettix bohemani* Stål to the alpine area above 12,000 feet in altitude on Pikes Peak, Colorado. (On the basis of Thomas's description of *Caloptenus Dodgei* we might conclude that the type Thomas used came from approximately 10,000 feet, as this is the elevation he mentioned, but this elevation is below

timber line and probably was an error.) *Pezotettix bohemani* Stål is a synonym of *Melanoplus dodgei* (Thomas), and the type specimens of both came from the same locality.

I wish to designate the male syntype that has been the principal basis of this comparison as the lectotype of *Pezotettix bohemani* Stål. This specimen, which is in the Riksmuseum, Stockholm, bore the following labels when I received it: Colorado/Morrison/168 [over] 65/Riksmuseum Stockholm/ Syn-

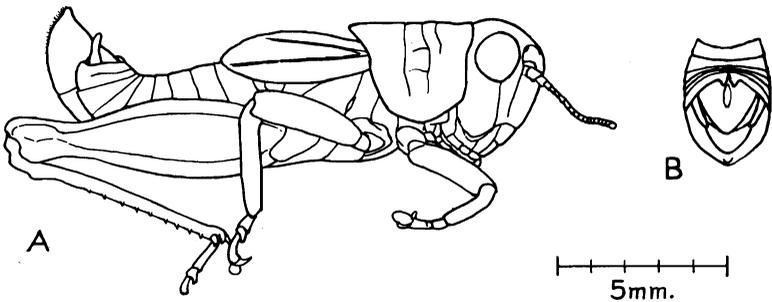


FIG. 1. Lectotype of *Pezotettix bohemani* Stål. A. Side view. (The terminal portion of the hind tarsus is missing.) B. Dorsal view of last abdominal segments.

type *Pezotettix bohemani* Stål. It now bears the additional label: lectotype *Pezotettix bohemani* Stål designated Alexander 1965. It is illustrated in Fig. 1. The female syntypes I examined bear the same sequence of labels, with the exception that neither bears the name "Morrison." Their numbers are 169 [over] 65 and 170 [over] 65. I am particularly grateful to Drs. Grant and Kjellander for their part in making possible my examination of these specimens.

Since *Pezotettix bohemani* Stål is based on a series of specimens from the type locality of *Melanoplus dodgei* (Thomas), a synonym, its name is not available for the northern form of *M. dodgei*. If this southern form merits recognition by name, such a name may be available in Scudder's *Pezotettix altitudinum* (1879). (Scudder's 1897 description emphasizes the deep red color of the lower portion of the hind femur, a feature I

have commented upon.) Before a final decision is reached on the forms of *M. dodgei*, however, a thorough investigation of populations from New Mexico to Canada should be carried out in as much detail as the recent studies by Van Horn (1965) on populations of *M. dodgei* in the Front Range of the Colorado Rockies.

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