Species Complexes in the Genus *Trichoprosopon*

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ABSTRACT. The genus *Trichoprosopon* is diagnosed and its internal classification discussed. Most of the 21 included species belong to one of four complexes, the *Tr. digitatum*, *Tr. lampropus*, *Tr. compressum* or *Tr. pallidiventer* complex. Notes on the taxonomy, distribution and ecology of these complexes are presented, and the criteria used to recognized species in this taxonomically difficult group are mentioned.

The genus *Trichoprosopon* has been reclassified and divided into four segregate genera, *Trichoprosopon*, *Shannoniana*, *Runchomyia* and *Johnbelkinia* (Zavortink 1979a, 1979b). This discussion deals with species complexes in the newly defined, more restricted genus *Trichoprosopon*.

The genus *Trichoprosopon* is characterized by the following significant taxonomic features: In the adults, the proboscis is short; the row of setae on the lower sternopleuron is long; and the postmedian light band on the hind tibia is absent. In the larvae, the foramen magnum is circular and has a distinct collar; the mandible is elongate; the maxilla is unmodified and has a long, distinct palpus; seta 8-M is absent; many abdominal setae arise from sclerotized tubercles; the siphon is short and has a large, multiple-branched seta I; and the pecten is absent. In the pupae, a dorsal sensillum is absent from segments III-V; and seta 5 is very small on segments III-VI. Genitalia of the male are simple and generalized; the IX-T lobes are large and bear numerous strong setae; the paraproct is well developed and has apical teeth; the aedeagus is simple and more or less oval in outline; the side-piece has a distinct basal mesal lobe; and the clasper is simple and long.

The geographical distribution of *Trichoprosopon* is from the tropical parts of central Mexico south through Central America to Ecuador and Argentina in South America. Ecologically, most of the species are restricted to breeding in bamboo internodes, particularly those internodes that have only a small opening leading to the water. Unlike the larvae of many other sabethine mosquitoes, those of *Trichoprosopon* do not lie on their backs under water for long periods of time; instead, they are active swimmers that return to the water surface to rest periodically.

The redefined genus *Trichoprosopon* is comprised of at least 21 species. A few of the species, as for example *Tr. lanei*, occupy isolated positions within the genus and do not appear to be particularly closely related to any other species. Most of the species, though, belong to one of four complexes: the *Tr. digitatum* complex, the *Tr. lampropus* complex, the *Tr. compressum* complex and the *Tr. pallidiventer* complex. The delimitation of species in these complexes is difficult for several reasons: sometimes simply because adequate material of all stages is not yet available for study; sometimes because the

morphological differences separating species are very minor in nature or even lacking in some stages; sometimes because the morphologically distinct populations are allopatric; and sometimes because of morphological variation exhibited by these mosquitoes.

The *Tr. digitatum* complex consists of *Tr. digitatum* and at least two undescribed species. By any measure, *Tr. digitatum* is the most successful species in the genus *Trichoprosopon*. It is widespread geographically, occupying the entire range of the genus from Mexico to Ecuador and Argentina. It is diverse ecologically, with the immatures being found in water in bamboo stumps and tree holes, in fallen fruits and nuts, in *Heliconia* flower bracts, and in fallen leaves and palm spathes. And it is abundant, with about 95% of the specimens of *Trichoprosopon* that I have examined being this one species. The undescribed species of this complex occur sympatrically with *Tr. digitatum*, one in the Pacific versant of eastern Panama and Colombia, the other farther south in the Pacific versant of Ecuador. The immatures of only one of the undescribed species are known, and they have been found most often in leaf axils, a habitat not utilized by *Tr. digitatum*. The differences between *Tr. digitatum* and the undescribed species whose immatures are known can be used to illustrate the size of the morphological gap separating related sympatric species in this genus. In the adults of *Tr. digitatum*, the mesepimeron is light in color and contrasts with the darker sternopleuron and the lateral light markings of the abdominal tergites are much broadened caudally. In the new species, the integument of the mesepimeron is dark like that of the sternopleuron and the lateral light markings of the tergites are not as broadened caudally. In the larva of *Tr. digitatum*, seta 7-P is usually single or double, while in the new species it is usually 6-8 branched. The pupa of *Tr. digitatum* has the typical countershading seen in many mosquito pupae, with the pigmentation of the tergites becoming lighter on the more posterior segments. The pupa of the undescribed species has, however, a striking pattern of dark blotches on a light background. One of the distinguishing features of the *Tr. digitatum* complex is that the aedeagus of the male has large preapical teeth. In true *Tr. digitatum*, the teeth become progressively larger toward the apex of the aedeagus; in the new species, they become progressively smaller. Also in the male genitalia, some cercal setae extend proximad of the main patch of setae in *Tr. digitatum*, but do not do so in the new species. The nature of the differences between *Tr. digitatum* and the new species are important to note, because these species are sympatric and their specific distinctness cannot be doubted. The degree of difference between these species can be used as a measure to decide whether morphologically distinct allopatric populations in other complexes should be recognized as distinct species or not.

Even after the separation of two undescribed species, *Tr. digitatum* remains a variable species and may indeed still be a complex. Particularly striking variants I have seen are two giant females from Guyana and a single female with unusually long palpi from the highlands of Colombia. If these females are representative of their populations, and if the other stages of these populations are equally distinctive, then these populations may represent additional undescribed species.

The *Tr. lampropus* complex consists of two taxa that have been given the names *Tr. lampropus* and *Tr. evansae*. The adults of this complex differ from all other *Trichoprosopon* in lacking scales in the post-spiracular area. The ecology of the immatures is distinctive also, as they occur only in the water that collects in fallen palm leaves and spathes. *Tr. lampropus* and *Tr. evansae* are allopatric, the former being known only from Panama and the latter from Venezuela and Colombia, so the question arises as to whether they are really distinct species or not. In the adults of *Tr. lampropus*, the fore tarsus is usually dark and the abdominal sternites have a weakly to moderately pigmented median longitudinal line. In *Tr. evansae*, the fore tarsus usually has light marking and the sternites have a strongly pigmented median longitudinal line. In the larvae of *Tr. lampropus*, the branches of setae 3-VIII and I-S are few in number, strong and deeply pigmented. In *Tr. evansae*, the branches of these setae are more numerous and not as strongly developed or pigmented. In the pupae, seta 6 on segments II-V is weaker and shorter in *Tr. lampropus*, stronger and longer in *Tr. evansae*. And finally, in the male genitalia, the IX-T lobes are separated by a broad U-shaped emargination in *Tr. lampropus* and by a narrower V-shaped emargination in *Tr. evansae*. In my opinion, the differences between *Tr. lampropus* and *Tr. evansae* are comparable to those between the sympatric species of the *Tr. digitatum* complex, and so I recognize these taxa as distinct species. Additional collecting, particularly in the geographical region between these species, may show them to be sympatric in some area and thus prove their specific status, or it may show that the populations I recognize as distinct species are only the extremes of clinal variation in one species.

The *Tr. compressum* complex consists of *Tr. compressum* and two closely related allopatric taxa, and *Tr. obscurum*, a more distantly related species that is sympatric with *Tr. compressum*. The immatures of *Tr. compressum* and the two closely related allopatric taxa occur in bamboo internodes and are apparently indistinguishable. However, in characteristics of the adults and male genitalia, these taxa differ to a much greater extent than do the sympatric species of the *Tr. digitatum* complex, and so I consider these allopatric taxa to be distinct species. Again, additional collecting may show whether this hypothesis is correct or not.

The largest and most difficult species complex in *Trichoprosopon* is the *Tr. pallidiventer* complex. The members of this complex are distinguished as follows: In the adults, the tarsi are completely dark. In the larvae, the mandible is very elongate; many of the setae of the thorax and abdomen are multiple-branched, in particular setae 6-I-III, 7-I-II and 2, 4-X; and a few comb scales are present. In the pupae, the paddle margin is serrated and seta 4-VIII is on the ventral surface near seta 9-VIII. This complex includes at least six species: *Tr. pallidiventer*, *Tr. castroi*, *Tr. brevipes*, *Tr. simile*, *Tr. andinum* and one undescribed, all of which breed in bamboo internodes. As many as three of these species may occur in one area. *Tr. pallidiventer* is widespread, fairly common, and geographically variable. *Tr. castroi* is widespread but rarely collected. The four other species are more restricted in

distribution. Resolution of this complex has been particularly difficult because of the scarcity of material, the subtle differences between the species, the variable nature of the species, and the fact that some species are well marked in one stage only. As with the other complexes, much additional collecting needs to be done in order to resolve problems that remain.

The genus *Trichoprosopon* appears to include at least 21 species, most of which belong to one of four complexes. The present study of *Trichoprosopon* is only the first step down the long road to refining the taxonomy of this genus. The number of species, and even the number of complexes, may change when more and better specimens are available for study.

LITERATURE CITED

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