

# First state records and habitat characteristics associated with occurrence of *Telopelopia* Kieffer (Diptera: Chironomidae) from wadeable streams in Missouri

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**Abstract:** We report first records on occurrence of the midge genus *Telopelopia* Kieffer in wadeable streams in Missouri based upon aquatic macroinvertebrate community samples collected during years 2010 through 2019 from 30 reaches of 15 wadeable streams within three Ecological Sections of the state. Physical habitat and water quality characteristics of the reaches where *Telopelopia* was found to occur are also provided.

**Key words:** Missouri, wadeable streams, Chironomidae, *Telopelopia*

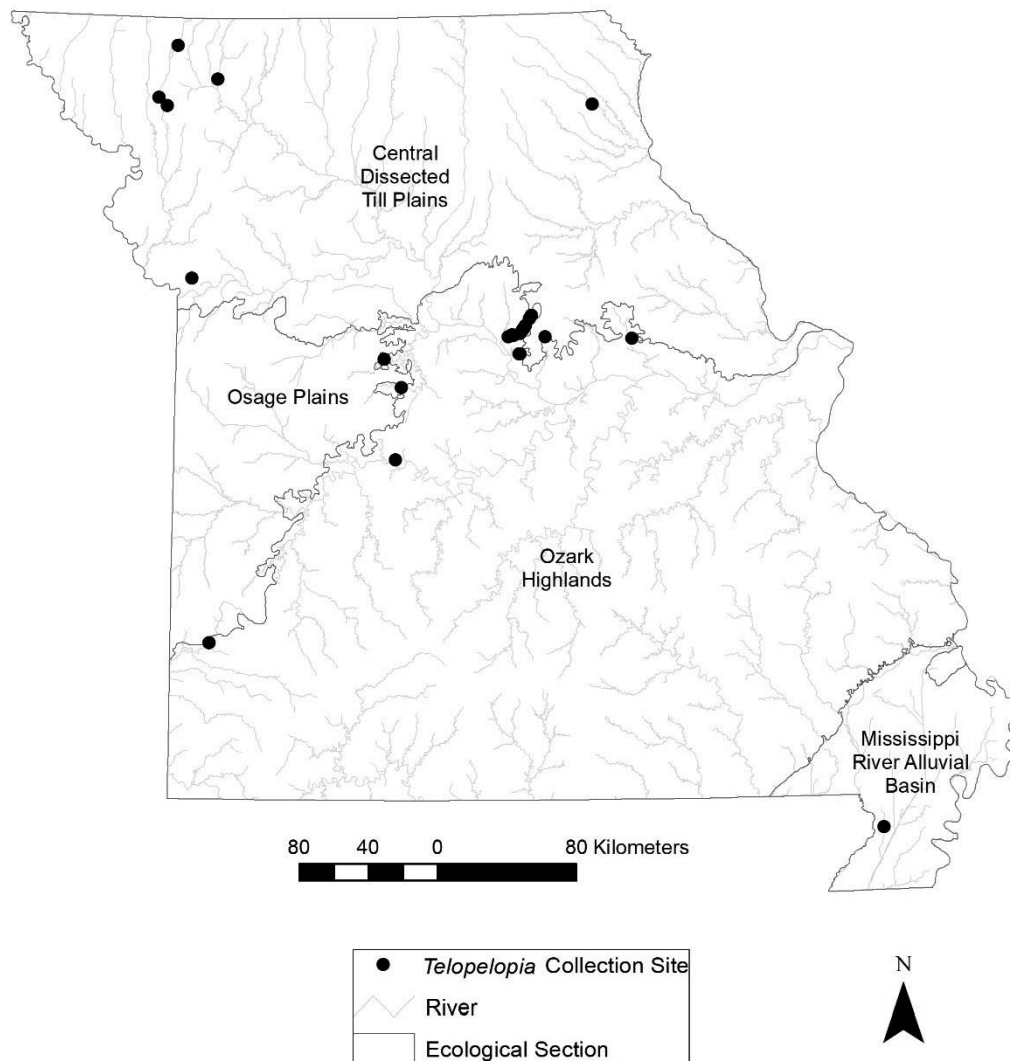
The chironomid genus *Telopelopia* Kieffer has a Holarctic distribution (Fittkau and Roback 1983; Murray and Fittkau 1989; Cranston and Epler 2013) with two known species: *Telopelopia fascigera* Verneaux in the Palearctic Region (Reiss 1977, 1986; Laville and Viaud-Chauvet 1983; Rossaro 1988) and *Telopelopia okoboji* Walley in the Nearctic Region (Roback 1971, 1981; Oliver et al. 1990; Sæther 2011; Cranston and Epler 2013). *Telopelopia* has a general Midwestern distribution in North America (Ferrington et al. 2008; Ferrington and Berg 2019) and researchers have reported *T. okoboji* to occur as far north as Manitoba to as far south as Texas and New Mexico (Oliver et al. 1990; Ziser 2011; Sæther 2011; Cranston and Epler 2013) and as far west as Colorado (Herrmann et al. 2016). We sampled macroinvertebrate communities from reaches of 581 wadeable stream sites statewide in Missouri during warm seasons of years 2010 through 2019 and identified larval specimens of *Telopelopia*

from macroinvertebrate community samples collected from 30 reaches of 15 of the stream sites sampled in three of the four ecological sections of the state (Cleland et al. 1997; Nigh and Schroeder 2002) (Fig. 1).

We collected the macroinvertebrate community samples using 500 µm mesh aquatic kick nets in flowing water over coarse substrate (coarse-flow), pool (depositional), and submerged rootmat habitats according to methods outlined by Sarver et al. (2002). We also sampled woody debris habitat by brushing surfaces of submerged portions of woody debris into a 500 µm mesh bag according to methods provided by Sarver et al. (2002). We processed the samples in the laboratory according to general procedure provided by Missouri Department of Natural Resources (2012).

*Telopelopia* is considered eurythermic and researchers have found larvae of this midge to occur in both lotic (flowing water: streams and rivers) and lentic (standing water: lakes, reservoirs, ponds, and wetlands) habitats (Murray and Fittkau 1989; Epler 2001; Sæther 2011; Cranston and Epler 2013), but primarily are found associated with sandy bottoms of rivers in North America (Ferrington et al. 2008; Ferrington and Berg 2019), agreeing with records on collection of larval *Telopelopia* in samples from potamon (that part of a river in which the water is typically slow-moving, still-surfaced, deep, and relatively warm) of the Missouri River in Missouri (MDNR, unpublished data). However, there is no published documentation on occurrence of *Telopelopia* in wadeable streams in Missouri. The primary

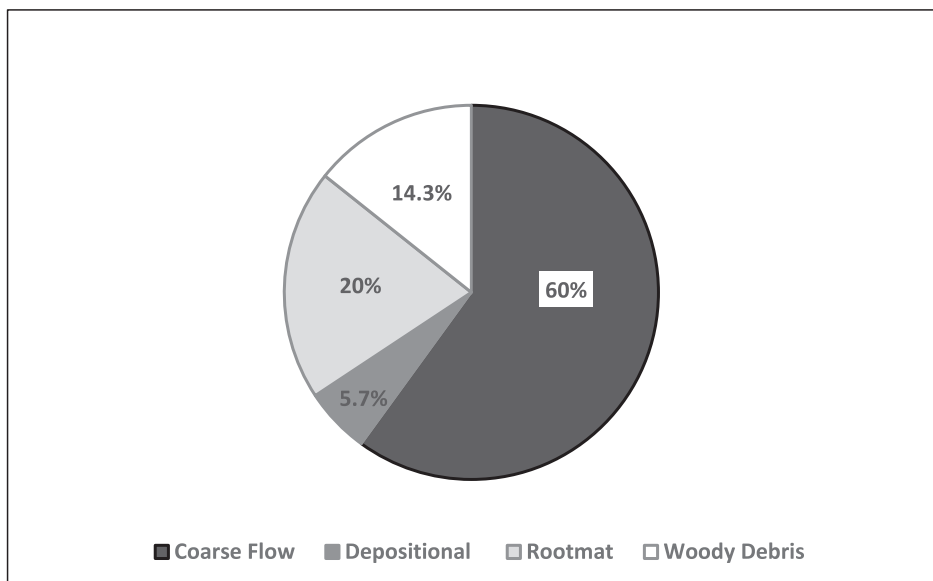
Figure 1. Locations of 30 reaches of 15 wadeable streams where larval *Telopelopia* were collected in Missouri during years 2010 through 2019.



purpose of this report is to officially document the occurrence of *Telopelopia* in wadeable streams in Missouri and provide habitat characteristics where this midge was found in the state. We found larval specimens of *Telopelopia* in macroinvertebrate community samples collected from all four of the habitats we sampled, with majority of specimens found in samples collected from flowing water over coarse substrate habitat followed, respectively, by those found in samples collected from rootmat, woody debris, and depositional habitats (Fig. 2). Stream order of the streams where we collected larvae of *Telopelopia* ranged from 3<sup>rd</sup>–5<sup>th</sup> order. Mean watershed area of stream reaches where the larvae were collected was 292.4 km<sup>2</sup> (range 7.0–1047.9 km<sup>2</sup>) and mean discharge was 14.38 m<sup>3</sup>/s (range 0.05–80.93 m<sup>3</sup>/s). Although not all the same environmental parameters were measured at each of the 30 reaches in the 15 streams where we collected

*Telopelopia*, select physical characteristics were measured from five reaches of five streams where larvae of this midge were found and three or 60% of those five reaches had a dominant substrate of sand (< 2.0 mm) followed by one with coarse gravel (16–64 mm) and one with cobble (64–250 mm) dominant substrates. Mean wetted-width of those five reaches was 15.0 m (range 9.4–19.9 m), mean depth was 10.2 cm (range 7.2–14.8 cm), and mean concentration of non-volatile suspended solids, volatile suspended solids, and total chlorophyll was, respectively, 88.9 mg/L (range 27.8–173.7 mg/L), 13.7 mg/L (range 6.2–24.7 mg/L), and 30.5 µg/L (range 19.8–55.7 µg/L). Riparian overstory and understory canopies both ranged from 96%–100% while riparian ground cover was 100% at all five reaches of the five streams where larvae of *Telopelopia* were collected and physical characteristics of the streams were examined. Means and ranges for

Figure 2. Percentage occurrence of *Telopelopia* larvae in habitats sampled from 30 reaches of 15 wadeable streams in Missouri during years 2010 through 2019.



select water quality characteristics for all 30 reaches of the total 15 streams where we found *Telopelopia* larvae are provided in Table 1.

We mounted chironomid larvae and pupae collected from the streams on glass-slides and examined the specimens with a compound light microscope. Taxonomic keys and descriptive information provided in Wiederholm (1983, 1986), Epler (2001), Ferrington et al. (2008), and Anderson et al. (2013) were used to identify the specimens. Larvae of *Telopelopia* can be distinguished by morphology of the antennae, mandible, maxilla, mentum, ligula, paraligula, pecten hypopharyngis, and body (for full description see Cranston and Epler 2013). *Telopelopia* is a member of the *Thienemannimyia*-group of genera, but the large basal tooth of the mandible and size and arrangement of granulation on the pseudoradula of larval *Telopelopia* distinguishes larvae of this midge from those of morphologically similar taxa (Cranston and Epler 2013). Although the *Telopelopia* larvae we found were not identified beyond genus, they are probably *T. okoboji* because *T. okoboji*

is the only species representative of the genus known to occur in the Nearctic Region (Cranston and Epler 2013) and Missouri is within the general Midwestern range of North America noted for *Telopelopia* by Ferrington et al. (2008) and by Ferrington and Berg (2019). Our reference specimens of *Telopelopia* are retained in collections of slide-mounted Chironomidae at the Missouri Department of Conservation, Central Region Office and Conservation Research Center, Columbia, Missouri, and at the Missouri Department of Natural Resources, Environmental Services Program, Aquatic Bioassessment Unit Laboratory, Jefferson City, Missouri.

This report provides the first published documentation on occurrence of *Telopelopia* in wadeable streams in Missouri and adds to knowledge of diversity of midge fauna inhabiting wadeable streams in the state. This report also contributes to knowledge of the habitat of *Telopelopia* in North America. Additional macroinvertebrate sampling in streams will likely increase knowledge about the distribution, habitat, and ecology of *Telopelopia*.

Table 1. Means and ranges of select water quality characteristics from 30 reaches of 15 wadeable streams where larval *Telopelopia* were collected in Missouri during years 2010 through 2019. Temp = water temperature (°C), DO = dissolved oxygen (ppm), Cond = conductivity (µS/cm), pH = standard units (pH), Turb = turbidity (NTU), TP = total phosphorus (µg/L), TN = total nitrogen (mg/L).

	Temp	DO	Cond	pH	Turb	TP	TN
Mean	16.7	9.8	508	8.2	38.3	185.8	0.95
Range	(11.0-27.8)	(5.7-14.8)	(241-876)	(7.1-9.7)	(2.0-537.0)	(0.4-1970.0)	(0.05-6.61)

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