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Julie A. Craves
University of Michigan

Darrin O'Brien
University of Michigan

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***Tramea calverti* (Odonata: Libellulidae):
New for Michigan with Notes on Other New Reports
for the Great Lakes Region**

Julie A. Craves^{1,2} and Darrin O'Brien²

Abstract

Beginning in late summer 2010, the Neotropical dragonfly *Tramea calverti* Muttkowski, striped saddlebags, was observed in a major northward movement in eastern North America. This species appeared for the first time in three Great Lakes states and Canada (Ontario). A specimen from Michigan is the first and only voucher in the Great Lakes, and an observation in Minnesota established a new northernmost report for North America.

Tramea Hagen is a cosmopolitan genus of 24 species, of which ten occur in the New World (Garrison et al. 2006), with seven in North America (Abbott 2005). *Tramea calverti* Muttkowski, striped saddlebags, is a Neotropical species found in the West Indies, Mexico, and Central America, south to Argentina; it is the most common *Tramea* in Middle America (Needham et al. 2000, Abbott 2005, Esquivel 2006). It is rare in the United States, typically restricted to south Texas, southern Arizona, and south Florida (Needham et al. 2000, Abbott 2005).

Tramea calverti is known to wander and is considered a vagrant in the eastern U.S. (Paulson 2009). Prior to 2010, there were few observations of *T. calverti* north of 38° latitude. The exception was in late summer and early fall 1992, when there were numerous (>20) sightings (with at least two vouchers obtained) from coastal New Jersey and New York (Soltesz 1992). Aside from that event, there were reports of *T. calverti* from three coastal states north of 38° before 2010: a voucher from Maryland in 1976 (Anon. 1994); observations in New Jersey in 1993, 1994, and 2007 (Anon. 1993, May and Carle 1996, Abbott 2007); and Massachusetts in 1997 (sighting), 1999 (voucher), and 2007 (photo) (Nikula et al. 2001, Nikula 2007). The three inland states north of 38° with *T. calverti* records prior to 2010 were Missouri, with a voucher in 1988 (Beckemeyer 1998); Ohio in 2006, 2007, and 2008, all photographic records (Gardella 2007, Nirschl 2008, Nirschl 2010), and Iowa in 1972 (Hummel 1999). The Iowa specimen, from the Yellow River State Forest in Allamakee Co. at approximately 43.2°N was the northernmost record of this species prior to 2010.

A northward movement of *T. calverti* in 2010 exceeded the 1992 event in both geographic and temporal scope. Between 11 August and 27 October, this species was reported north of 38° in eight states and one Canadian province, never having been previously reported in five of those states or Canada. Four of these new locations were in the Great Lakes region.

On 29 September, we observed at least three *T. calverti* at the Humbug Marsh Unit of the Detroit River International Wildlife Refuge, located along the lower Detroit River in Wayne County, Michigan. We had been conducting regular Odonata surveys at this site since 2007 (Craves 2007, Craves 2008); this

¹Corresponding author: (e-mail: jcraves@umd.umich.edu).

²Rouge River Bird Observatory, University of Michigan-Dearborn, Environmental Interpretive Center, Dearborn, MI 48128.

is where we collected Michigan's first *Erythrodiplax umbrata* L., band-winged dragonlet, another tropical species, in 2007 (Craves and O'Brien 2007). A portion of the Unit is a former brownfield. Areas nearest to the Detroit River consisting of old field and scattered shrubs had yielded fall aggregations of *Tramea* spp. in the past, mostly *T. lacerata* Hagen, black saddlebags, but also *T. carolina* Hagen, Carolina saddlebags, and *T. onusta*, red saddlebags.

The observations of *T. calverti* were also in this field/shrub zone. Initially, they were most often seen in flight. One of us (DO) eventually netted a female *T. calverti*, and this specimen has been deposited in the Insect Division of the University of Michigan, Museum of Zoology (specimen number MOS0033743). We were unable to locate any additional individuals the following day at this site.

Three other Great Lakes locations reported *T. calverti* in 2010, although no specimens were obtained: 1) 4 September: A sight report from Lighthouse Point, Two Harbors, Lake County, Minnesota (Lind 2010). This location north of Duluth along Lake Superior represents the northernmost report of *T. calverti* in North America; 2) 7 September: One female *T. calverti*, among dozens of other *Trameas*, mostly *T. lacerata*, was photographed at Montrose Dunes on the Lake Michigan shoreline, Chicago, Cook County, Illinois (Spitzer 2010); 3) 29 September (the same day we found the Michigan individuals): A single female *T. calverti* was photographed at Point Pelee National Park, Essex County, Ontario on the east side of the tip, along Lake Erie (Curry and Slessor 2010). This represents a first report for both Ontario and Canada. Other individuals were photographed on 4 and 8 October; on the latter date at least two *T. calverti* were present (Lamond 2010a,b).

Ohio also reported *T. calverti* in 2010, although photographs of this species for the state date back to 2006 (Rosche et al. 2008). In 2010, there were multiple sightings (at least one individual photographed) at Metzger Marsh Wildlife Area, Lucas County, in late September through late October, and another observation from Lake County in late October (Pogacnik and Nirschl 2010).

Two states outside the Great Lakes also reported *T. calverti* for the first time in 2010. The first was Delaware (Kent County, 11 August), followed by New Hampshire (Merrimack County, 13 August) (White 2010). These were both photographed, but not collected.

The Michigan record described here is the only one represented by a voucher specimen in the Great Lakes region, and to our knowledge the only specimen collected in the 2010 incursion in the eastern U.S. While the New Hampshire and Minnesota sites are farther north than the Michigan location, there are only two voucher specimens further north than the Michigan record: the 1972 Iowa specimen described above, and a 1999 specimen from Ipswich, Essex County, Massachusetts (Goodwin 1999, Nikula et al. 2001). The northernmost sighting in the western U.S. is believed to be in Inyo County, California at 36.9°N (Biggs and Oriti 2010), and is therefore farther south than the reports discussed above.

Among Odonata known to migrate, *Tramea* spp. are one of the best-represented genera (Corbet 1999, Russell et al. 1998, May and Matthews 2008). Odonata migration is roughly defined as a one-way flight spanning tens or thousands of kilometers, or $\geq 20^\circ$ of latitude, from near the adult emergence site to new reproductive habitat (Corbet 1999). *Tramea* spp. are examples of typical migrant dragonfly species which inhabit ephemeral to semi-permanent water bodies that are prone to drying up (Corbet 1999, May and Matthews 2008).

Southern states, and particularly south Texas where there are resident populations of *T. calverti*, were largely unaffected by drought conditions in the six months leading up to the first reports in the Northeast (USDM 2011). Conversely, by September 2010, the northeast and mid-Atlantic regions had experienced several months of below-normal rainfall and were experiencing

drought conditions, considered moderate to severe in New Jersey (NRCC 2010). So although obligate migration in dragonflies is usually associated with seasonal drought in the emergence region (Corbet 1999), significantly dry regional conditions do not appear to have been a major causal factor in the 2010 movement of *T. calverti*.

Large movements of migratory dragonflies are often associated with the passage of strong, broad-scale cold fronts or tropical low pressure systems (Russell et al. 1998, Needham et al. 2000, Moskowitz et al. 2001), although migrant dragonflies also commonly occur in small groups or as scattered individuals (May and Matthews 2008). There were no obvious organized weather fronts immediately preceding most appearances of *T. calverti* in 2010. The exception was a strong synoptic cold front that passed through the western Great Lakes region on 3 September. It may explain the reports in Minnesota and Illinois in the following days.

The uptick in observations of *T. calverti* in the U.S. over the last decade could be due, at least in part, to a heightened awareness and increased reporting of Odonata sightings in recent years. That the occurrence of this species in northern latitudes is genuinely increasing and is being influenced by climate change is speculative. Odonata species which are expanding their ranges in Britain, Germany, and the Netherlands, or appearing in these areas for the first time, are mostly species with southern distributions expanding northward, and increasing temperatures are thought to play a role (Ott 2010, Parr 2010, Termaat et al. 2010). The ponds typically occupied by New World migrant Odonata such as *T. calverti* can be reduced by higher temperatures and increased evapotranspiration rates, decreased precipitation, and/or unsuitable water temperatures (Matthews 2010), conditions which may be influenced by climate change. A decrease in habitat suitability may increase the tendency for long-distance movements by *T. calverti* and other dispersal-prone Odonata species. Concurrently, anthropogenic changes to the landscape, e.g., the proliferation of stormwater detention/retention basins constructed for compliance with federal regulations since 1990, provide additional habitat for pond-breeding species. The availability of new habitats over a wide geographic area is likely to facilitate colonization attempts by far-ranging odonates.

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