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CHIRONOMID MIDGE HATCH LEADS TO MASS MORTALITY EVENT FOR CHIMNEY SWIFTS (*CHAETURA PELAGICA*). — Breeding populations of the Chimney Swift (*Chaetura pelagica*) have declined in most sectors of its breeding range in eastern North America since the initiation of standardized breeding bird surveys in 1966 (Sauer et al., 2012). Most of the decline has been attributed to range-wide reduction in the number of suitable nesting sites in chimneys and other manmade structures (Cink & Collins, 2002). However, a recent study suggested that populations at the northern periphery of its breeding range were limited by factors other than the scarcity of nesting sites (Fitzgerald et al., 2014). A third study proposed that changes in the insect prey base after the broad-scale introduction of pesticides has adversely affected swift populations (Nocera et al., 2012). Finally, mass mortality events associated with strong storms have been implicated in the recent population decline (Dionne et al., 2008). Here we report a notable mortality event caused by vehicular traffic adjacent to a midge (Chironomidae) hatch.

On 6 October 2010, at 1715 h, CJA observed several hundred swifts foraging over Interstate 295 (38° 48.77′ N, 77° 1.27′ W) and the adjacent Blue Plains Advanced Wastewater Treatment Plant in Washington, District of Columbia. An estimated 300 swifts were dead on the north- and southbound lanes of the highway and mowed right-of-way (Fig. 1). CJA salvaged sixty of the more intact carcasses for preservation as museum specimens. On the morning of 7 October, we revisited the site and observed several hundred swifts foraging low over the wastewater treatment plant and highway. We salvaged an additional 30 carcasses from the highway right-of-way. A return trip on 8 October revealed only a few swifts foraging over the wastewater treatment plant. The closest treatment ponds were only 30 m from the mowed highway right of way. The District of Columbia Water and Sewer Authority (DCWSA) was contacted to determine if there was a direct connection between the swift mortality event and the sewage treatment plant. Representatives from the DCWSA, the District of Columbia Department of Health, Fire and Emergency Medical Services, and the National Guard Civil Support Team determined that there were no chemicals or hazardous materials at the wastewater treatment plant that could have caused the

Fig. 1. Chimney Swifts (*Chaetura pelagica*) killed by automotive traffic adjacent to the Blue Plains Advanced Wastewater Treatment Plant in the District of Columbia on 6 October 2010.

deaths and that the birds had most likely been struck by cars. During specimen preparation, we confirmed signs of blunt-force trauma, including broken sterna and pneumatized skulls filled with blood, further confirming the collision hypothesis.

Smithsonian and US Geological Survey staff prepared 79 individuals as museum skins and partial skeletal specimens. The stomachs, all packed with insects, were preserved in ethanol. Specimens consisted of 45 males, 24 females, and 10 that could not be sexed. The majority were hatch year individuals (n = 43). Twenty-three were adults (after hatching year) and the age of the remaining individuals (n = 13) could not be determined. JHE identified the stomach contents of two individuals (USNM 644439 and USNM 644447). One species of chironomid midge (*Chironomus calligraphus*) constituted 99.5% of the 1365 insects in the two stomachs. Bulk samples of stomach contents and swift specimens were deposited in the Division of Birds, National Museum of Natural History, Smithsonian Institution.

Chironomidae (non-biting midges), especially members of the genus *Chironomus*, are often dominant members of insect faunas of sewage treatment plants. Eutrophic conditions prevalent at these facilities can promote the growth of huge populations of emerging midges that may create severe nuisance situations for animals and humans. *Chironomus calligraphus*, a Neotropical species, was first reported in the United States from California (Spies, 2000). It was present in Florida at least as early as 1965 (Spies et al., 2002) but because of difficulties associated with species level identification of *Chironomus*, it remained essentially unnoticed. The northernmost record in the eastern United States was recently reported from southern Georgia (Gray et al., 2012). The collection of this species from the District of Columbia represents a significant northward range extension. The species may have been present for years, but, as noted above, difficulties associated with species level identification of many *Chironomus* species (see Spies et al., 2002) have allowed this species to remain taxonomically undetected. Laboratory and field investigations in Argentina have shown that *C. calligraphus* has a temperature-dependent life cycle with a minimum generation time of 18 days, with several overlapping cohorts in spring through summer and one to two generations in winter (Zilli et al., 2008).

The Blue Plains mortality event was one of the largest on record for swifts (Cink & Collins, 2002; Dionne, et al., 2008) and certainly the largest caused by automobile collision at a single site (Glista et al., 2008). The frequency of such events is unknown but if large chironomid midge hatches occur annually at the Blue Plains site during the first two weeks of October, then significant swift mortality may be a regular occurrence.

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Christopher M. Milensky
Department of Vertebrate Zoology, MRC 116
National Museum of Natural History
Smithsonian Institution
P.O. Box 37012
Washington, DC 20013-7012

Claudia J. Austin
2602 Horseshoe Road
Creedmoor, North Carolina 27522

John H. Epler
461 Tiger Hammock Road
Crawfordville, Florida 32327

Christina A. Gebhard
Department of Vertebrate Zoology, MRC 116
National Museum of Natural History
Smithsonian Institution
P.O. Box 37012
Washington, DC 20013-7012

Gary R. Graves
Department of Vertebrate Zoology, MRC 116
National Museum of Natural History
Smithsonian Institution
P.O. Box 37012
Washington, DC 20013-7012

Center for Macroecology, Evolution and Climate
University of Copenhagen
2100 Copenhagen Ø, Denmark
email: gravesg@si.edu