

**THE HISTORICAL SPREAD OF THE BLACK SOLDIER FLY,  
*HERMETIA ILLUCENS* (L.) (DIPTERA, STRATIOMYIDAE,  
HERMETIINAE), AND ITS ESTABLISHMENT IN CANADA**

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**Scientific Note**

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The Black Soldier Fly, *Hermetia illucens* (Linnaeus), is a synanthropic, polysaprophagous fly native to the Neotropics, but now found in every zoogeographic region following decades of spread throughout the warmer parts of the world. In the last few decades there has been considerable interest in using larvae of *H. illucens* for organic waste control, composting, and as animal food supplements. It has been studied as an agent for manure control (Sheppard *et al.* 1994), for controlling house fly infestations in chicken production (Furman *et al.* 1959, Sheppard 1983), and as a food supplement for fish (Bondari and Sheppard 1981) and swine (Newton *et al.* 1977). More recently, there has been considerable interest in using *H. illucens* as an agent for composting (Lalander *et al.* 2015). An internet search on “Black Soldier Fly” demonstrates that this use is reaching a household level.

Although it has been suggested that *H. illucens* might have been first brought to Europe around 500 years ago (Benelli *et al.* 2014), the first verifiable Palaearctic record of the species is from southern Europe (Malta) in 1926 (Lindner 1936). The subsequent spread of this large, easily recognized species in Europe has been mainly along the Mediterranean coast of Spain, France, and Italy in the 1950s and 1960s (Leclercq 1969, 1997). In more recent years, the species has been documented spreading northwards in Central Europe: Ssymank and Doczkal (2010) recorded it from Germany and Roháček and Hora (2013) recorded it from the Czech Republic. We have seen specimens from South Africa collected as early as 1915 and from Malaysia, Hawaii, Solomon Islands, New Caledonia, Mariana Islands, Palau, and Guam in the 1940s. Probably by the 1960s, *H. illucens* had spread over most of the range it occupies today. The apparent spread of this species along coastlines and islands suggests that maritime transport may have played a role in repeated accidental introductions.

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Although we do not know the exact original distribution of the Black Soldier Fly and it cannot be excluded that it originally occurred in the southeastern United States, its current North American range seems to reflect a northward spread from a native range in Central America and the northern parts of South America in historical times. It was present in the southern United States by the late 1800s. The earliest specimen we are aware of is from 1881 from Fernandina, Florida (United States National Museum). Riley and Howard (1889) recorded it (misspelled as *Hermetia mucens*) on the basis of a specimen collected from beehives in Alabama in 1887. We know of further records from 1897 (Louisiana), 1899 (Texas), 1911 (South Carolina), 1923 (southern California), 1926 (Virginia), 1931 (Iowa), 1938 (Ohio), 1940 (northern California), 1943 (Maryland), and 1945 (New York City). The northernmost record we are aware of is from Warner, Merrimack County, New Hampshire, 16 September 1972 (University of New Hampshire Collection). The species was not listed in works on the Diptera of Kansas (Adams, 1903) or Oregon (Cole and Lovett 1921). James (1960) shows a distribution map for California, in which the most northern specimen is at the northern end of the Central Valley. However, he also gives a North American map and mentions records from Oregon, Washington state, and North Dakota, which he discusses as “temporary local introductions”. Woodley (2001) did not include these records in his World catalog. By now, there are many records available from Oregon and Washington State, and we consider the species established in these states. One of us (NEW) did a considerable amount of collecting in southeastern Washington from about 1972 to 1980, and *H. illucens* was never seen. It now occurs there, indicating its spread in that area has been relatively recent. We know of no verified records from western Canada, the Rockies, and most of the Great Plains states.

*Hermetia illucens* is not currently recorded as occurring naturally in Canada, which is a significant issue because there is a great deal of interest in utilizing this species in Canada for waste processing, compost production, and protein production. Because Black Soldier Flies are easily reared on a wide range of decomposing materials, including animal and human waste, the large, slow-moving larvae of these flies have become popular both for manure management and pet food, and are now widely mass-reared for a variety of commercial uses in the United States, Costa Rica, Europe, and South Africa. At the moment, this species can only be imported into Canada as sterilized larvae shipped without any manure or sewage sludge (B. Gill, Canadian Food Inspection Agency, personal communication). Therefore, the question of whether or not *Hermetia illucens* occurs naturally in Canada is an important one.

There are no verifiable published Canadian records of the Black Soldier Fly, although the species is erroneously recorded from Edmonton, Alberta in the CANADENSYS database (Biodiversity Institute of Ontario, 2015). This entry is apparently an error due to contamination; there are no *Hermetia* specimens from Alberta in the Biodiversity Institute of Ontario collections (J. deWaard, Biodiversity Institute of Ontario, personal communication).

Although the Edmonton records are in error, we here record *H. illucens* from Canada for the first time on the basis of specimens collected in southern Ontario and deposited in the University of Guelph insect collection as early as 2007 (Windsor, Black Oak Savannah Park, 20 June 2007, S.M. Paiero, DEBU 002268353). This record is not surprising given the many other new Canadian records from the same area (Paiero *et al.* 2010) and given the

known occurrence of *H. illucens* in nearby Michigan. Further Black Soldier Fly specimens were documented in the course of a forensic investigation near Aurora, Ontario in August 2011 (S. VanLaerhoven, personal communication). So we can here confidently record *H. illucens* as collected repeatedly in Ontario, and it is probably established here.

Several questions remain unanswered about the history and current status of the Black Soldier Fly in Canada. The records reported here might reflect natural northward movement of this synanthropic fly, but it is more likely that the captured flies were escaped adults that emerged from imported larvae. These adults would be sterile if they hatched from legally imported sterile larvae, but is also possible that this species has been established in the province as a result of illegal importation and rearing of viable populations. Trinh *et al.* (2013), for example, indicate that their viable cultures of Black Soldier Flies originated with a supplier in Georgetown, Ontario, and it is likely that other viable cultures have been brought across the border by well-intentioned organic gardeners, fishermen, or pet owners. We suspect that the Black Soldier Fly is here to stay, but the data available to us do not allow us to say how and when it arrived.

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