New Asian "Jumping Worm" Records (Oligochaeta: Megascolecidae) in Ontario, Canada

Reynolds JW*

Oligochaetology Laboratory, 9-1250 Weber Street East, Kitchener, ON Canada N2A 4E1, and Research Associate, Canada

***Corresponding author:** John Warren Reynolds, Oligochaetology Laboratory, 9-1250 Weber Street East, Kitchener, ON Canada N2A 4E1, and Research Associate, New Brunswick Museum, Saint John, NB E2K 1E5, Canada

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Abstract: This is the first record of megascolecid "jumping worms" from Wellington County, Ontario. *Amynthas agrestis* has previously been reported from Essex, Wentworth and York Counties, and *Amynthas tokioensis* from Chatham-Kent and Wentworth Counties in Ontario. Finding megascolecids under sod in the middle of a lawn is believed to be a second report.

1. Introduction

The Asian "jumping worms" (Oligochaeta: Megascolecidae) are expanding their range in Canada. Although there are 16 species† reported in North America north of Mexico, only five species have been reported to date in Canada (Chang *et al.*, 2016). The first literature report for Canada was from the Ojibway Prairie in Essex County, Ontario) (*Amynthas agrestis* and *Metaphire hilgendorfi* as *Amynthas hilgendorfi*) (Reynolds, 2014). The second was also from Ontario: Chatham-Kent Co., Wheatley (*Amynthas tokioensis*, *Metaphire hilgendorfi*), Wentworth Co., Dundas (*Amynthas agrestis*, *Amynthas tokioensis*), and York Co. (East York, Toronto) (*Amynthas agrestis*, *Metaphire hilgendorfi*, *Pithemera bicincta*) (Reynolds and McTavish, 2021). The following year pheretimoid earthworms were collected in New Brunswick, York County (Burton) (*Amynthas minimus*, *Amynthas tokioensis*, *Metaphire hilgendorfi*) (McAlpine *et al.*, 2022). Earlier this year, *Amynthas tokioensis* was reported from Saint-Jerôme, Region of Montréal, Québec (Moore and Reynolds, 2024).

I have been studying them in Canada for over a decade, although my first research on these species was in the southeastern United States in the late 1960s (Reynolds, 1978). At that time, very few collections of megascolecids from natural habitats were found north of Virginia (Reynolds, 2010). There were a few reports from New England, in greenhouses and golf courses (Gates, 1954, 1958; Grant, 1955a,b,c).

There have been citizen reports for years, claiming they are present in various regions. During some of my lectures this spring, several participants told me they had "jumping worms" in areas where pheretimoids had not been previously recorded on their property and/or in their fields. I told them I would come and collect samples when they informed me that adults were present. Since these species overwinter as cocoons, it was necessary to give the cocoons time to mature for reliable identification. Fortunately, for these property owners the earthworms in their fields and gardens turned out to be the normal European Lumbricidae found throughout Canada (Reynolds, 2024).

Citizen reports on sites like *iNaturalist* may or may not be accurate. Frequently, the photograph does not show an external character needed for identification to species. In the case of the Asian "jumping worms" (Megascolecidae) and the North American native species of *Diplocardia* (Acanthodrilidae) internal dissection is required to confirm the species. To remedy this, some of us have set up a program to help improve the situation (Mathieu *et al.*, 2023).

2. Objectives of the Study

• Examine the range of pheretimoid earthworms in Ontario

• Identify the specimens collected to species level

• Record detailed habitat data

3. Methods

The earthworms were dug with a pitch fork from compost piles, under debris and sod where the property owners have collected "jumping worms" this year. Collection data included location, date, co-ordinates, soil temperature, elevation and collectors (Figure 1). The samples were brought back to the Oligochaetology Laboratory, preserved and identified to species.

Figure 1: The locations (M) and 3 of the habitat photos in Puslinch Township, Wellington County, Ontario, Canada. A – Amynthas in garden bed, B – Amynthas in compost pile, C – Amynthas under sod.

3. Methods

3.1. Material examined

Ontario, Wellington Co., Puslinch Township, 2744 Concession 11, 43. 32.196°, -80 00.000°; elevation 2241 metres asl, soil temperature at 5 cm 24°C, flower garden, under sod, etc., canopy over the grassy areas white pine (*Pinus strobus* L.) and birch (*Betula papyrifera* Marshall) with maples (*Acer* spp.) in the fence rows, 3 August 2024, collectors George and Diane Tyszka with John W. Reynolds.

Amynthas agrestis 0-0-34 (Figure 2), Amynthas tokioensis 0-0-9 (Figure 3).

Figure 2: Dorsal view of Amynthas agrestis

Figure 3: Lateral view of Amynthas tokioensis

For age classification formula explanation, see Reynolds *et al.* (1974) or Reynolds (2022).

3. Discussion

These specimens represent the first record of Asian "jumping worms" from Wellington County, Ontario. The two species, *Amynthas agrestis* and *A. tokioensis* have been reported previously from Ontario including the adjacent county of Wentworth (Reynolds and McTavish, 2021). Recently, there have been unconfirmed reports that pheretimoid worms may be present in the Arboretum at the University of Guelph (Wellington County). Over a decade ago, when I collected at that location, no pheretimoid ("jumping worms") were found (Reynolds, 2011).

I have been collecting these megascolecid worms for more that 55 years and this is the first time I have seen or heard of them being under sod in a residental grass lawn. From my own collections and other literature reports, *Amynthas agrestis* and other megascolecid species have been found in gardens where commercial mulch has been used (Reynolds, 2014; Belliturk *et al.*, 2015). This is usually

the method of spreading these earthworms (Nouri-Aiin *et al.*, 2022). My first collections of the megascolecids were in the Cherokee National Forest in east Tennessee (Reynolds, 1978). Subsequently, *A. agrestis* and others have been reported from deciduous forests of the mid-Atlantic USA (Chang *et al.*, 2017). *Amynthas agrestis*, *A. tokioensis* and *Metaphire hilgendorfi* are frequently found together in the same habitat (Chang *et al.*, 2016). Two or three of these species have co-habitated in other Canadian provinces, Ontario (Reynolds and McTavsh, 2021) and New Brunswick (McAlpine *et al.*, 2022). The recent first record of a pheretimoid earthworm in Quebec yielded only *A. tokioensis* (Moore and Reynolds, 2024).

The current distribution of pheretimoid earthworms ("jumping worms") is shown in Figure 4 (below). There are numerous reports of these worms in other parts of Ontario but they are only referred to as "jumping worm(s)" without genus or species designation. Hopefully, in the future samples will be obtained by an oligochaetologist, so that we can produce a complete range of these worms in Ontario and Canada.

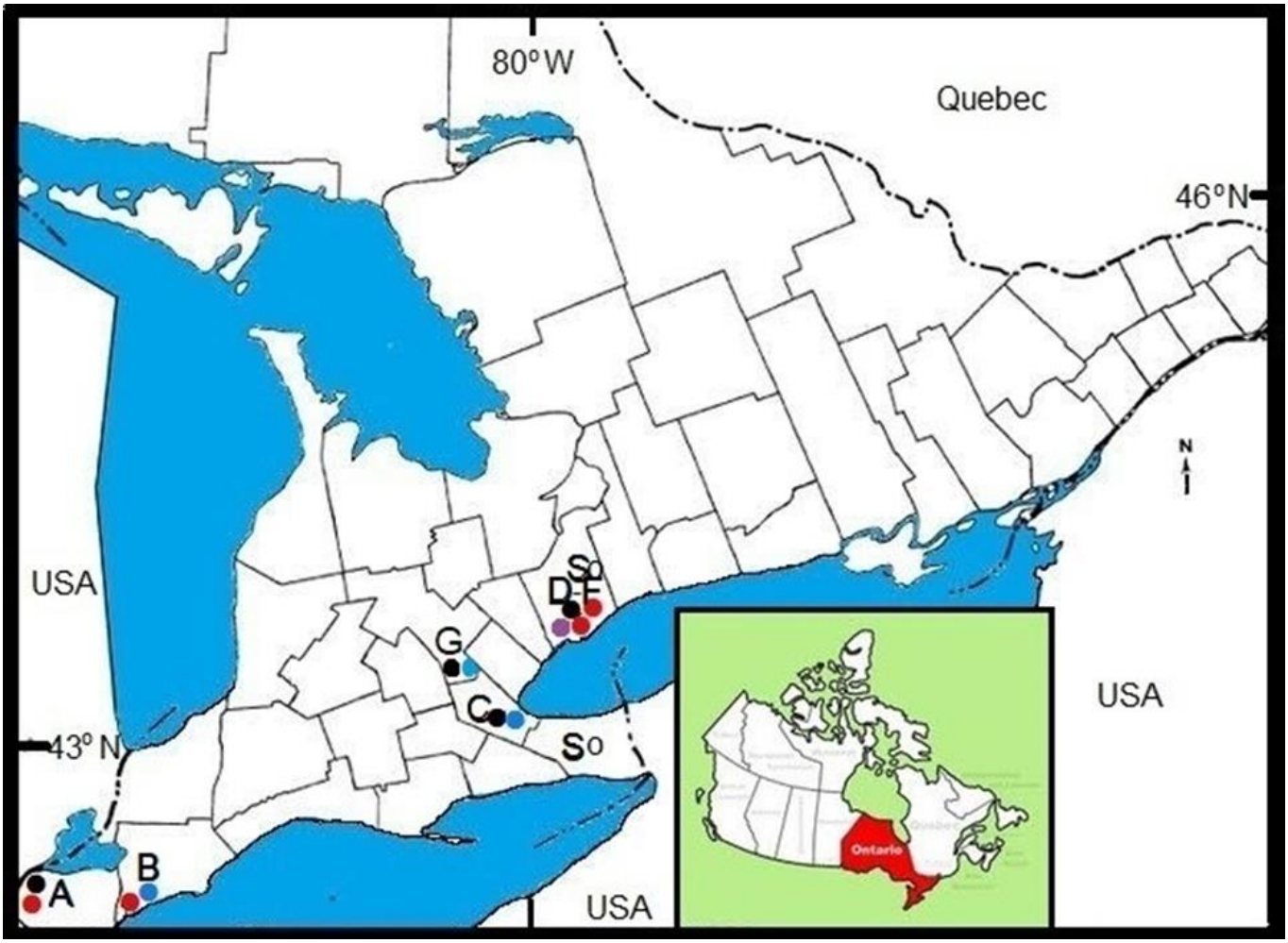

Figure 4: Location of pheretimoid collections in Ontario, Canada. **A** – Ojibway Prairie Provincial Nature Reserve (Essex Co.), **B** – Wheatley (Chatham-Kent Co.), **C** – Dundas (Hamilton, Wentworth Co.), **D** – East York (Toronto, York Region), **E** – Toronto, **F** – Blythwood Ravine (Toronto), **S** – Fonthill (Niagara Region) and Toronto (York Region), **S** – suspected species, unconfirmed. Species collection sites: • *Amynthas agrestis*, • *Amynthas hilgendorfi*, • *Amynthas tokioensis*, • *Pithemera bicincta*. New records **G** – Puslinch (Wellington Co.) (modified from Reynolds and McTavish, 2021).

4. Conclusions

This study extends the range of pheretimoid earthworms in Ontario, including the first record of two species in Wellington County, *Amynthas agrestis* and *A. tokioensis*. This is believed to be the second report of these earthworms living under lawn sod as opposed to their usual habitat in forests, flower/ornamental gardens or cultivated fields.

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