Four new centipede (Myriapoda: Chilopoda) records from Penticton, British Columbia, and a new centipede record for Alberta

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ABSTRACT

Myriapod knowledge in Canada is unequally distributed among the provinces and territories. Examination of specimens from the Lyman Entomological Museum's (McGill University, Ste-Anne-de-Bellevue, Quebec, Canada) collection yields four new centipede records for British Columbia, including a previously unrecorded genus for Canada, and a new centipede record for Alberta. Known habits and past records of these species are examined, pointing overall to a need for an increase in myriapod studies in Canada.

INTRODUCTION

The earliest studies concerned with myriapod distributions in Canada examined myriapod populations in Nova Scotia (Jawlowski 1939) and Newfoundland (Palmén 1952). Shelley (1988) later reviewed Canadian millipedes for Ontario, Quebec, New Brunswick, Nova Scotia, and Prince Edward Island and followed this up with a second publication that focused on millipedes in Canada between the Rocky Mountains, Hudson's Bay, and Lake Superior, covering most of Alberta, Saskatchewan, and Manitoba (Shelley 2002). Kevan's (1983) and Kevan and Scudder's (1989) adjacent reviews of known and potential centipedes in Canada provided further insight into which species might be found in British Columbia. More recently, a checklist of centipede species (Langor and Langor 2022) lists 23 species occurring in British Columbia, making British Columbia the province with the highest centipede species count in Canada. Within these 23 species, only three are considered adventive in British Columbia, although two of these species most likely have become established in Canada (Langor and Langor 2022). However, many of the centipede species in British Columbia are listed as uncertain, due to missing specimens or singleton identifications, which do not constitute proof that the species is established in the area. The most recent estimate for the number of myriapod species present in Canada points to the presence of 147 species, with 55 species in the Chilopoda, 66 in Diplopoda, 24 in Pauropoda, and two in Symphyla (Langor *et al.* 2019; Langor and Langor 2022; Brousseau 2023; Brousseau *et al.* 2024).

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The lack of concrete and verified information reveals how understudied myriapods are in Canada. Targeted myriapod collection and identification efforts are necessary to better understand the distribution and ecology of myriapod species in Canada (Langor *et al.* 2019).

In this paper, we record four new centipede species from British Columbia, all of which were collected from Penticton, and one newly recorded centipede species from Alberta. All specimens are deposited in the collections of the Lyman Entomological Museum (McGill University, Ste-Anne-de-Bellevue, Quebec, Canada; Evenhuis 2023) and were identified during the process of curating the existing myriapod collection. Full specimen information is available in Supplementary material, Appendix 1.

RESULTS

Myriapoda

Chilopoda

Lithobiidae

Lithobius forficatus (Linnaeus, 1758)

Figure 1

This species, adventive in North America, had previously been recorded from all provinces east of Ontario (Langor and Langor 2022). One specimen, collected from a warehouse in Lethbridge, Alberta, in 1987, constitutes the first record for Alberta. One hundred and seventy specimens of this species, all of which were collected from various areas around Penticton, British Columbia by J.A. Garland between 1983 and 1985, are the basis for the record of this species in British Columbia. These specimens were identified using the key in Eason (1964) and the plectrotaxy table in Bonato *et al.* (2010). Many records of this species exist on iNaturalist, in Alberta (*e.g.,* metallikem 2020; rinrat 2023), British Columbia (*e.g.*, occam4973 2020; goose36 2023), and throughout Canada (*e.g.,* khrystey 2020; hhaughn 2023); however, given the minuteness of identifying characteristics for lithobiids, most of these records are uncertain, and few can be conclusively identified to species level. Lithobiidae identifications often require dorsal and ventral views and, in many cases, also require examination of the spines on the ventral and dorsal sides of at least the last five pairs of legs, making confident identifications of species in this family difficult without microscope examination.

Material examined. BRITISH COLUMBIA. Penticton: under boards in garden, 18.iii.1983, J.A. Garland (3 individuals); in house, 27.v.1983, J.A. Garland (1 individual); under board and compost, garden soil, 6.iii.1984, J.A. Garland (6 individuals); 2.ix.1984, J.A. Garland (28 individuals); yellow pan trap, bottom of ravine on "S-. 7, & 10", 3–10.iv.1985, J.A. Garland (26 individuals); yellow pan trap, bottom of ravine, 2–7.v.1985, J.A. Garland (16 individuals); yellow pan trap, 26–30.v.1985, J.A. Garland (13 individuals); yellow pan trap in ravine, 5–15.vi.1985, J.A. Garland (37 individuals). Ellis Creek: under rocks beside dry tributary drainage, 9.ix.1984, J.A. Garland (18 individuals). Lake Okanagan: shallow leaf litter on sand and substrate, rocks, and rotting tree hole, 8.ix.1984, J.A. Garland (19 individuals); under rock in litter, 10.iii.1985, J.A. Garland (3 individuals). ALBERTA. Lethbridge: in warehouse (floor), 7.vii.1987, J.A. Garland (1 individual).

Figure 1. *Lithobius forficatus* (Linnaeus) specimen collected from Penticton, British Columbia: dorsal (top) and ventral (middle) views, and ventral view of head (bottom).

Lithobius melanops Newport, 1845
Figure 2

This lithobiid, adventive in North America, was collected in 1984 in Penticton, British Columbia. The only other Canadian record of this species is from Newfoundland (Palmén 1952). This species can be identified using the key in Eason (1964).

Material examined. BRITISH COLUMBIA**.** Penticton: soil on orchard at base of trees, 22.x.1984, J.A. Garland (1 individual).

Figure 2. *Lithobius melanops* Newport collected from Penticton, British Columbia: dorso–medial (top) and ventral (middle) views, and ventral view of head (bottom).

Tidabius tivius (Chamberlin, 1909)
Figure 3

Kevan (1983) records this species as a potential Canadian species and notes that records of the species exist in Washington, United States of America, whence it was originally described by Chamberlin (1909). It is thought to be native to North America, with records from Washington, Utah (Chamberlin 1909), and Virginia (Hoffman 1995), United States of America, with some suggestions that it may be synanthropic (Hoffman 1995). This identification is the first Canadian record of this genus, which has not yet been recorded from any other Canadian locality. The species is recorded based on two female specimens, from which one ultimate leg was available for plectrotaxy examination. This specimen was identified using the key in Summers (1979) and the original description in Chamberlin (1909).

Material examined. BRITISH COLUMBIA. Penticton: yellow pan trap, 5–15.vi.1985, J.A. Garland (2 individuals).

Figure 3. *Tidabius tivius* (Chamberlin) collected from Penticton, British Columbia: dorsal (top left) and ventral (top right) views, and ventral view of head (bottom).

Schendylidae

Schendyla nemorensis (C.L. Koch, 1837)

Figure 4

This schendylid, previously known from eastern Canada, is adventive and also endemic in Europe. The swollen last pair of legs bearing two coxal pores and lacking a terminal claw, and the length of the metatarsus separated it from other potential Schendyla species. The examined specimens were collected in Penticton, British Columbia, between 1984 and 1985. Four specimens were found in compost soil and in a yellow pan trap.

Material examined. BRITISH COLUMBIA. Penticton: under boards and compost garden soil, 6.iii.1984, J.A. Garland (1 individual); garden boards and compost (grass), 6.iii.1985, J.A. Garland (3 individuals).

Figure 4. *Schendyla nemorensis* (C.L. Koch) collected from Penticton, British Columbia. Median view.

DISCUSSION

The large numbers of *L. forficatus* collected from British Columbia are intriguing, particularly given the rural collection locations. Investigations into the ecological effects of this invasive species on local invertebrate populations may reveal new information on the ecological role of this species. The collection of the Albertan specimen of the species is likely opportunistic, given the single specimen was found in a warehouse. More individuals potentially could be found in Alberta and more generally in the central provinces of Canada. Given the large number of specimens collected in British Columbia, establishing the current range and population size of this species in western and central Canada should be a priority to understand the potential ecological role of this adventive carnivorous species. Further investigation into the ecological dynamics of this

species would also yield insight into the ecological role this species plays in British Columbia.

Palmén's (1952) records of *Lithobius melanops* from two localities in Newfoundland establish the species as being introduced to Canada; however, additional material confirming its establishment in the province is needed.

Tidabius tivius has been recorded from Washington, United States of America (Chamberlin 1909), and as such, the species' establishment in British Columbia is likely, given proximity and similar climates. Understanding the full extent of the species' range in British Columbia and potentially in neighbouring provinces requires additional collection efforts.

The status of *L. melanops* and *T. tivius* in British Columbia is unknown, particularly given the known specimens were collected in the 1980s.

Schendyla nemorensis has previously been reported from Utah by Chamberlin (1909), and Kevan (1983) lists the species as possible for Oregon, United States of America. The record described in the present paper is therefore the northwesternmost occurrence of the species in North America and globally, and further exploration of this species' distribution across the Okanagan Valley and greater British Columbia is needed.

New collections and surveys need to be conducted to confirm the presence and establish the distribution of myriapod species in British Columbia. Additionally, many unidentified myriapod specimens likely exist in other natural history collections in Canada. Examination of Myriapoda collections is necessary to use specimens that have already been collected and potentially understand changes in myriapod distribution and diversity.

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Supplementary material. Please find the supplementary material associated with this paper at [typesetter to insert URL].

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