Survey for *Macrobiotus occidentalis* and *Diaforrobiotus* spp. in Victoria, British Columbia, Canada, and First Identification of *Parascon* sp. in Canada

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INTRODUCTION

Tardigrades:

- Invertebrates
- Often transparent, greyish, or colourless
- Average adult is between 250 - 500 µm in length
- Four pairs of locomotor appendages ending in claws
- Ubiquitous
  - Rely on the presence of water for respiration
- Epidermis
  - Cuticle
- Lunules

Figure 1. Ramazzotti and Maucci (1995)
MORPHOLOGY

Anterior Portion of the Digestive Tract

- No buccal lamellae
- No microplacoids
- No septula
- Pharynx
- Macroplacoids
- Apophyses
- Buccal tube
- Stylet

Figure 2. Ramazzotti and Maucci (1995)
THIS STUDY...

- Examined the tardigrade fauna in Victoria, British Columbia, Canada
- Focused on
  - *Macrobiotus occidentalis* (Murray 1910)
  - *Diaforobiotus* spp.

WHY?

- *M. occidentalis* was first identified by Murray (1910) at this location
- Species complex
- Re-examination of the morphological description of *M. occidentalis*
METHODS

Collection
- Locations kept close to those in Murray (1910)
- 6 samples from Centennial Park
- 4 samples from Songhees Walkway

Processing
- Samples were rehydrated
- Individual tardigrades observed
- 70% denatured ethyl alcohol
- Polyvinyl alcohol (PVA) mounting medium

Observation
- After one week, internal morphology observed
- Each tardigrade was classified
RESULTS

• Macroplacoid-microplacoid-septula sequence of 2-0-0
• No *M. occidentalis* or *Diaforobiotus* spp. found
• One potential 2-0-0 specimen
  • Buccopharyngeal apparatus was obstructed by the claws (Fig. 3)

Figure 3. Buccopharyngeal apparatus of a specimen from sample BC19 potentially lacking a microplacoid. Note that the buccopharyngeal apparatus has receded into the body cavity. 1000x magnification.
RESULTS

- One specimen closely matched Ramazzotti and Maucci’s (1995) description of *M. occidentalis*, which has a microplacoid.

Figure 4. Specimen from sample BC19, showing (A) ventral view at 200x magnification, (B) the buccopharyngeal apparatus at 1000x magnification, and (C) claws on first right side appendages in ventral view at 1000x magnification.
RESULTS

• One specimen classified as a *Parascon* sp.

Figure 5. Mounted *Parascon* sp. from sample BC22. 200x magnification.

Figure 6. Mounted *Parascon* sp. from sample BC22, showing (A) buccopharyngeal apparatus in ventral view with estimates showing anterior and posterior end and (B) claws on third, left side appendage in ventral view. (A) and (B) are at 1000x magnification.
DISCUSSION

- *Diaforobiotus* spp. are 2-0-0
  - Recently described genus (Guidetti *et al.* 2016)
- Challenges in identifying *M. occidentalis*
  - Locus typicus
  - Species complex
- Closest specimen to a 2-0-0 tardigrade
  - buccopharyngeal apparatus obstructed by the claws

Figure 3. Buccopharyngeal apparatus of a specimen from sample BC19 potentially lacking a microplacoid. Note that the buccopharyngeal apparatus has receded into the body cavity. 1000x magnification.
DISCUSSION

*M. occidentalis* Species Complex

**Subspecies:**
- *M. o. occidentalis*
- *M. o. striata*
- *M. o. primitivae*
DISCUSSION

*Parascon* sp.

**P. nichollsae**
- Holotype from Australia

**P. schusteri**
- Holotype from Tanzania

- *Parascon* sp. in this survey is the first recorded in Canada
  - Unable to be classified to either pre-recorded species
  - Possibly a new species
CONCLUSION

- Studied the tardigrade fauna in Victoria, British Columbia, Canada
- Focused on *M. occidentalis* and *Diaforobiotus* spp.
  - Neither were located
  - No tardigrades confidently identified as 2-0-0
- *Parascon* sp. was classified as the first of this genus in Canada

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