

Distribution of two European wireworms, *Agriotes lineatus* and *A. obscurus* in British Columbia

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ABSTRACT

We determined the distribution of two European wireworms, *Agriotes lineatus* and *A. obscurus*, in the Fraser Valley of BC. *Agriotes obscurus* is now present in farmland between Delta and Laidlaw, and the range of *A. lineatus* has expanded from Vancouver Island to the lower Fraser Valley between Delta and Vancouver. The first record of *A. obscurus* in Washington State was made in Lynden in 1997.

Key words: Wireworms, Elateridae, *Agriotes lineatus*, *A. obscurus*

INTRODUCTION

Of 369 species and subspecies of wireworms (family Elateridae) found in Canada, 194 occur in British Columbia (Bousquet 1991). Of these, at least 27 species are associated with agricultural land, but only eight are considered pests (Wilkinson 1963). Endemic species of wireworms of potential agricultural concern in BC are: *Agriotes sparsus* LeConte, a pest of potatoes in the lower Fraser Valley; *Limonius canus* LeConte and *L. infuscatus* Motschulsky, pests of vegetables on Vancouver Island, the lower Fraser Valley, and the Okanagan and Kootenay Valleys; *Ctenicera aeripennis* (Kirby) and *C. destructor* (W. J. Brown), widespread pests of grain and vegetables in BC; and *C. lobata* (Eschscholtz), a pest of potatoes in the lower Fraser Valley (Wilkinson 1963).

Two additional species, *Agriotes lineatus* (L.) and *A. obscurus* (L.), were introduced into BC from Europe, probably around 1900, and are now established on Vancouver Island and in the Fraser Valley (Wilkinson 1963, 1980). These European wireworms are considered common pests of agricultural crops in Europe and Asia (Eidt 1953), and Wilkinson (1980) predicted they would become serious threats to agriculture in BC. *Agriotes lineatus* was first discovered in BC near Cobble Hill on Vancouver Island (King 1950), and by 1980 was known to have spread to Vancouver in the lower Fraser Valley (Wilkinson 1980). *Agriotes obscurus* was also reported from Cobble Hill (King 1950), and was found in 1952 at the eastern end of the Fraser Valley near Agassiz (King *et al.* 1952). By 1980, *A. obscurus* had been reported from several farms in Surrey (Cloverdale), about 70 km west of Agassiz (Wilkinson 1980). Since then, no reports of the distribution of *A. obscurus* or *A. lineatus* in BC have been published.

In recent years, wireworm damage has increased dramatically in small fruit, vegetable and ornamental crops throughout the Fraser Valley. The damage appears to have been caused by *A. obscurus* or *A. lineatus* or both (Vernon, unpublished data) but because these species are extremely difficult to identify using larval characteristics alone (Wilkinson, 1963), it is not certain what species are damaging crops in certain areas. This is especially true for the Delta and

Abbotsford regions, where wireworm damage to crops has been severe, but neither *A. obscurus* nor *A. lineatus* has been previously recorded.

Because most effective insecticides for wireworm control have been withdrawn from use in BC, alternative management approaches are being investigated. To control *A. obscurus* in the Agassiz region, for example, trap crops for the larvae and devices for mass trapping walking adult elaterid beetles are being tested (Vernon, unpublished data). Behaviour and host preference of different species of wireworms vary. Consequently, different control strategies may be needed for different species in different areas. Before deciding which methods to use to control *A. obscurus* and *A. lineatus*, we checked their present distribution in the Fraser Valley, suspecting that their ranges had expanded since Wilkinson's survey in 1963. We examined previously collected and identified adult elaterid specimens in the collection of the Pacific Agri-Food Research Centre (PARC) in Agassiz, and adults collected in pitfall trap surveys in 1996 and 1997. In 1996, 26 pitfall traps were placed in three fields in Westham Island, 33 traps in two fields in Ladner (both of these locations in the Municipality of Delta in the lower Fraser Valley), 20 traps in three fields in Abbotsford (central Fraser Valley), and 6 traps in two fields in Agassiz (upper Fraser Valley). In 1997, 8 pitfall traps were established in Langley and 10 traps in Lynden, Washington. Sub-samples of elaterid beetles collected in 1996 were identified to species by Dr. Ed Becker at the Biosystematics laboratory in Ottawa. From these collections and previously published data, the known ranges of *A. lineatus* and *A. obscurus* in the Fraser Valley of BC and northwestern Washington are as follows. (Figure. 1):

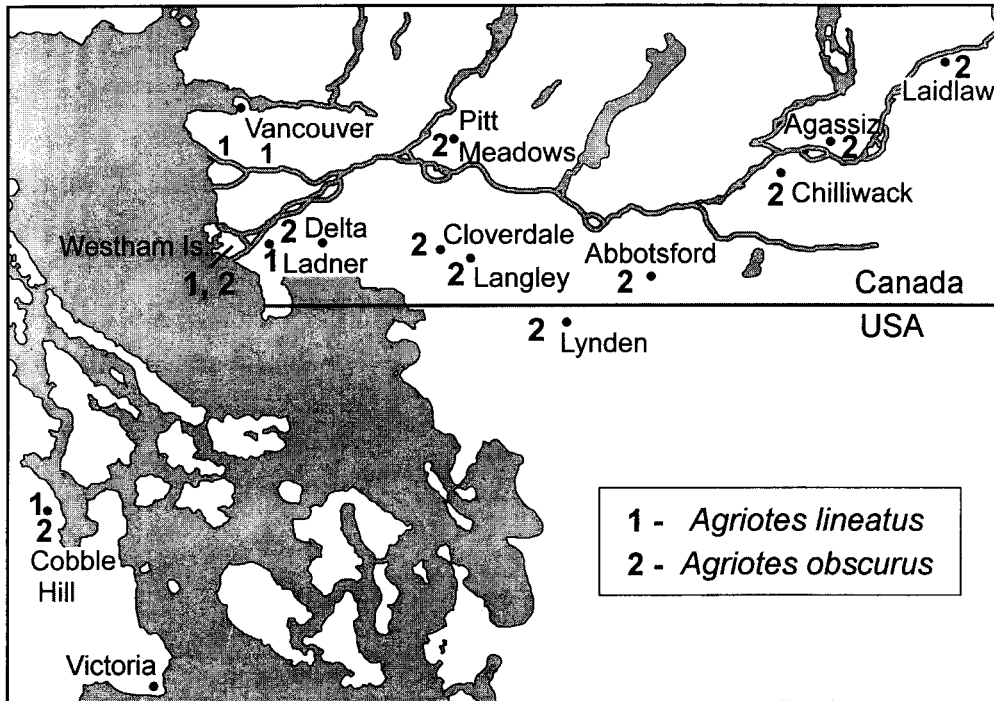


Figure 1. Map of regions of the Fraser Valley and Vancouver Island, BC, and Washington state, where *Agriotes obscurus* and/or *A. lineatus* have so far been confirmed.

Agriotes lineatus: Cobble Hill (King 1950); Vancouver (South and West Vancouver, Wilkinson, 1980); Burnaby (PARC, Agassiz collection, 1980); Delta (Ladner and Westham Island, 1996 survey).

Agriotes obscurus: Cobble Hill (King, 1950); Agassiz (King *et al.* 1952); Chilliwack (PARC, Agassiz collection, 1953); Laidlaw (PARC, Agassiz collection, 1973); Surrey (Cloverdale, PARC, Agassiz collection, 1973); Pitt Meadows (PARC, Agassiz collection, 1981); Abbotsford (1996 survey); Delta (Ladner and Westham Island, 1996 survey); Langley (1997 survey); Lynden, WA (1997 survey).

This survey was not exhaustive, but does show that *A. lineatus* has now become established in prime agricultural regions in Delta (Ladner and Westham Island). The highest numbers of *A. lineatus* were found in pitfall traps in Ladner surrounding a potato field that had previously been heavily damaged by *Agriotes* wireworms in 1994. No *A. lineatus* have been found east of Ladner in Delta. *A. obscurus* has been found in several locations as far west as Ladner and Westham Island, and as far east as Laidlaw. Specimens of *A. obscurus* were identified for the first time in Abbotsford in 1996, and in Langley, BC and Lynden, WA in 1997. *Agriotes obscurus* appears to be steadily moving westward from its original discovery in the upper Fraser Valley in Agassiz, and *A. lineatus*, now in the Fraser Valley, has moved eastward from its hypothetical starting point on Vancouver Island. The only region of overlap between the two species in the Fraser Valley was in Ladner and Westham Island in Delta. The single specimen of *A. obscurus* caught in a pitfall trap in a field of raspberries in Lynden is the first recorded occurrence of this species in Washington State.

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