

## *Limoni* *californicus* (sugarbeet wireworm) – Lesser or regional pest

Area where reported as pests: southern Alberta, Saskatchewan, Manitoba (van Herk and Vernon 2014). Found mostly on irrigated land (Brooks 1960).

Wireworm (larval) stage: Wireworms (larvae) of this species are yellow, hard-bodied and, interestingly, have no eyes (Lanchester 1946). At maturity, they are 17–22 millimetres (0.7–0.9 inches) long (Glen et al. 1943). Different from the other main pest wireworm species, the caudal notch of *L. californicus* (sugarbeet wireworm) is nearly closed, like a keyhole shape (Figure 20). The urogomphal prongs are much smaller than those of *H. bicolor* and *S. a. destructor* (Prairie grain wireworm).

Beetle (adult) stage: The slender adult beetles are 8.5–11 millimetres (0.3–0.4 inches) long and have very short hind angles. Their pronotum (thorax cover) is black and their elytra (wing covers) are reddish brown. Both are covered in dense white or yellow hair. (Figure 20).

Life cycle: The biology of *L. californicus* (sugarbeet wireworm) in the Prairies is not well known, and what is presented here is based on studies done in California by Stone (1941). *L. californicus* (sugarbeet wireworm) wireworms pass through 10–13 instars and, in California, complete development in 2–3 years (Stone 1941). It is likely that development lasts longer (probably 3–4 years) on the Prairies due to colder climate. In Stone's (1941) studies, pupation occurred in summer and fall, 17–30 centimetres (7–12 inches) below the soil surface, and lasted approximately 21 days. The new adults overwinter in the soil and emerge in the spring. Females become active several days after males, and mate soon after.

Reproduction: Males can apparently mate more than once, dying approximately one month after mating. As with other species, the adult life span can last longer under

cold conditions (Stone 1941). In southern Alberta, adult males are active in May, starting when mean daily temperatures are still low (4°C / 39°F) (van Herk et al., unpublished data).

Females begin laying eggs (oviposition) approximately one week after mating and are largely finished after one week, but, depending on temperature, can continue up to nine weeks. Females produce an average of 250 or more eggs, and die after completing egg laying. Eggs are laid in soil with 10–20% soil moisture, generally in cracks in the soil surface, but female beetles will burrow 10 centimetres or more to find suitable soil moisture to lay in. Egg laying in fields does not appear to be affected by the type of vegetation present. Eggs hatch on average 30 days after they are laid (Stone 1941).

Feeding/damage: A study in Washington state and Idaho found that *L. californicus* (sugarbeet wireworm) wireworm feeding, especially by small wireworms, is aggressive from May to August (Milosavljević et al. 2017). This was different than the close relative *Limoni* *infuscatus* (western field wireworm), for which feeding activity dropped off as the summer went on.

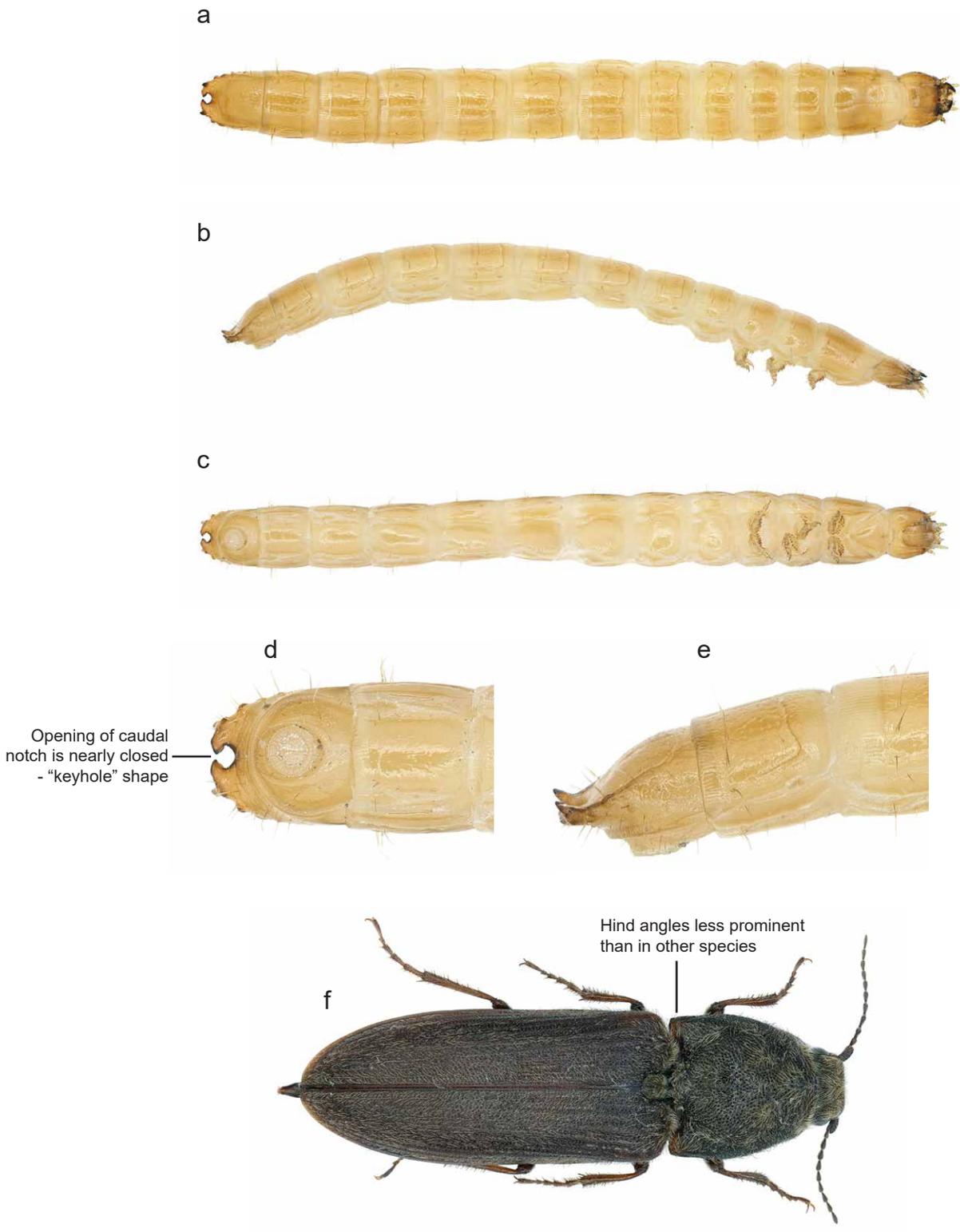


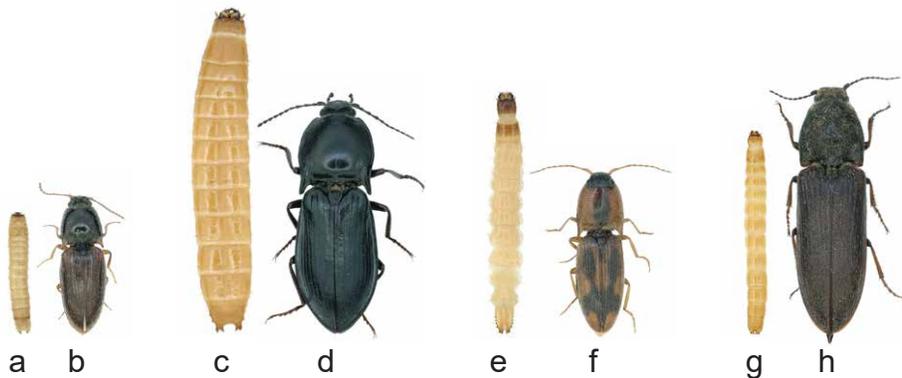
Figure 20. *Limonius californicus*. a) larva - top view; b) larva - side view; c) larva - bottom view; d) larva - caudal notch, top view; e) larva - caudal notch, side view; f) adult. Photos: J. Saguez, CÉROM



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Front cover species: *Hypnoidus bicolor* a) larva; b) adult; *Selatosomus aeripennis destructor* c) larva; d) adult; *Aeolus mellillus* e) larva; f) adult; *Limonius californicus* g) larva; h) adult

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# FOREWORD

This guide is intended to provide information on wireworm damage, biology, management, research and challenges in crop production on the Canadian Prairies. We have summarized the knowledge of this persistent and complicated pest on the Prairies by discussing the general life cycle, behaviours, and management options for the main pest species in this region. We have also identified major gaps in knowledge and where research is needed. Our target audience include farmers, agronomists, crop scouts, extension personnel and anyone else interested in the impact of wireworms on Prairie crop production.

*Note that this guide is a summary of the scientific literature. No content of the guide should be considered as an endorsement of any product.*

# TABLE OF CONTENTS

<b>ACKNOWLEDGEMENTS.....</b>	<b>i</b>
<b>FOREWORD.....</b>	<b>ii</b>
<b>INTRODUCTION.....</b>	<b>1</b>
What are wireworms? .....	1
What is the problem? .....	3
How big is the problem? .....	6
What research is out there for the Canadian Prairies? .....	7
History of wireworm research on the Prairies .....	7
<b>PRAIRIE WIREWORM LIFE CYCLE AND ACTIVITY.....</b>	<b>17</b>
Adult click beetles and eggs .....	17
Newly hatched wireworms (neonates) — a vulnerable stage .....	18
Resident wireworms — resilient and damaging .....	19
Pupal stage and overwintering adult .....	21
<b>PROBLEM WIREWORM SPECIES ON THE PRAIRIES.....</b>	<b>23</b>
<i>Hypnoidus bicolor</i> (no common name) .....	24
<i>Selatosomus aeripennis destructor</i> (Prairie grain wireworm) .....	26
<i>Limoniuss californicus</i> (sugarbeet wireworm) .....	28
<i>Aeolus mellillus</i> (flat wireworm) .....	30
<i>Hadromorphus glaucus</i> (no common name) .....	32
<i>Agriotes mancus</i> (wheat wireworm) .....	34
<b>MONITORING.....</b>	<b>37</b>
Wireworm trapping .....	37
Bait trapping for wireworms .....	37
Types of bait traps .....	38
Adult click beetle trapping .....	39
<b>INTEGRATED PEST MANAGEMENT OPTIONS.....</b>	<b>45</b>
Cultural control .....	45
Biological control .....	51
Chemical control .....	53
<b>RESEARCH NEEDS.....</b>	<b>57</b>
Biological information .....	57
Decision support tools .....	57
Integrated pest management methods and their effects .....	58
<b>TABLES .....</b>	<b>59</b>
<b>RESOURCES.....</b>	<b>65</b>
<b>REFERENCES.....</b>	<b>67</b>