

Emerging pests in forage corn and grass in British Columbia: Learning to deal with True armyworm (*Mythimna unipuncta*) and Western corn rootworm (*Diabrotica virgifera*)



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Introduction: The first known outbreak of **True Armyworm (Family: Noctuidae, *Mythimna unipuncta* (Haworth))** in British Columbia occurred in 2017, when Vancouver Island and Fraser Valley forage producers of grass, cereals, and corn experienced unprecedented losses from larval defoliation. This is a North American migratory insect that is introduced annually in spring to southern Canada on wind currents or storms.

Western Corn Rootworm (Family: Chrysomelidae, *Diabrotica virgifera virgifera* (LeConte)) was detected in 2016 in Fraser Valley for the first time in BC. Since 2017 it has caused crop damage in unmanaged forage and sweet corn fields from both root feeding by larvae and adult feeding on silks. Rootworm is native to the Americas and has been a significant pest for many years in major corn growing regions in eastern USA and Canada.

Methods and Results: True Armyworm, *M. unipuncta*

- True Armyworm was not known to outbreak in BC prior to 2017. However, specimens have been recorded in BC museums for over 100 years at irregular intervals.
- Annual surveys (2018-2022) with uni-traps and pheromone lures (Trece, OK, USA) were carried out in BC, as well as WA, OR, and northern CA, where outbreaks also occurred in 2017 (Fig.1).
- Moth wings from BC, WA, OR, and CA were sent for isotope analysis to Western University, lead by Dr. Jeremy McNeil. Early results suggest that moths caught in spring in BC came from northern California (CA), and summer moths caught in BC are residents.
- Results from field observations and lab trials show that *M. unipuncta* does not overwinter in BC.
- Moth catch numbers vary each year (Fig.2), but there have been no more outbreaks. Action threshold of 30 moths per night have not been reached.
- Annual trapping results demonstrate that *M. unipuncta* moths are caught every year in the Fraser Valley and Vancouver Island in BC. There are two peak moth flights per year (Fig.3).
- What causes large immigration of moths? Most likely: Spring storms, high spring moisture/rainfall, high populations in CA.

Figure 1. Western areas affected by True armyworm in 2017

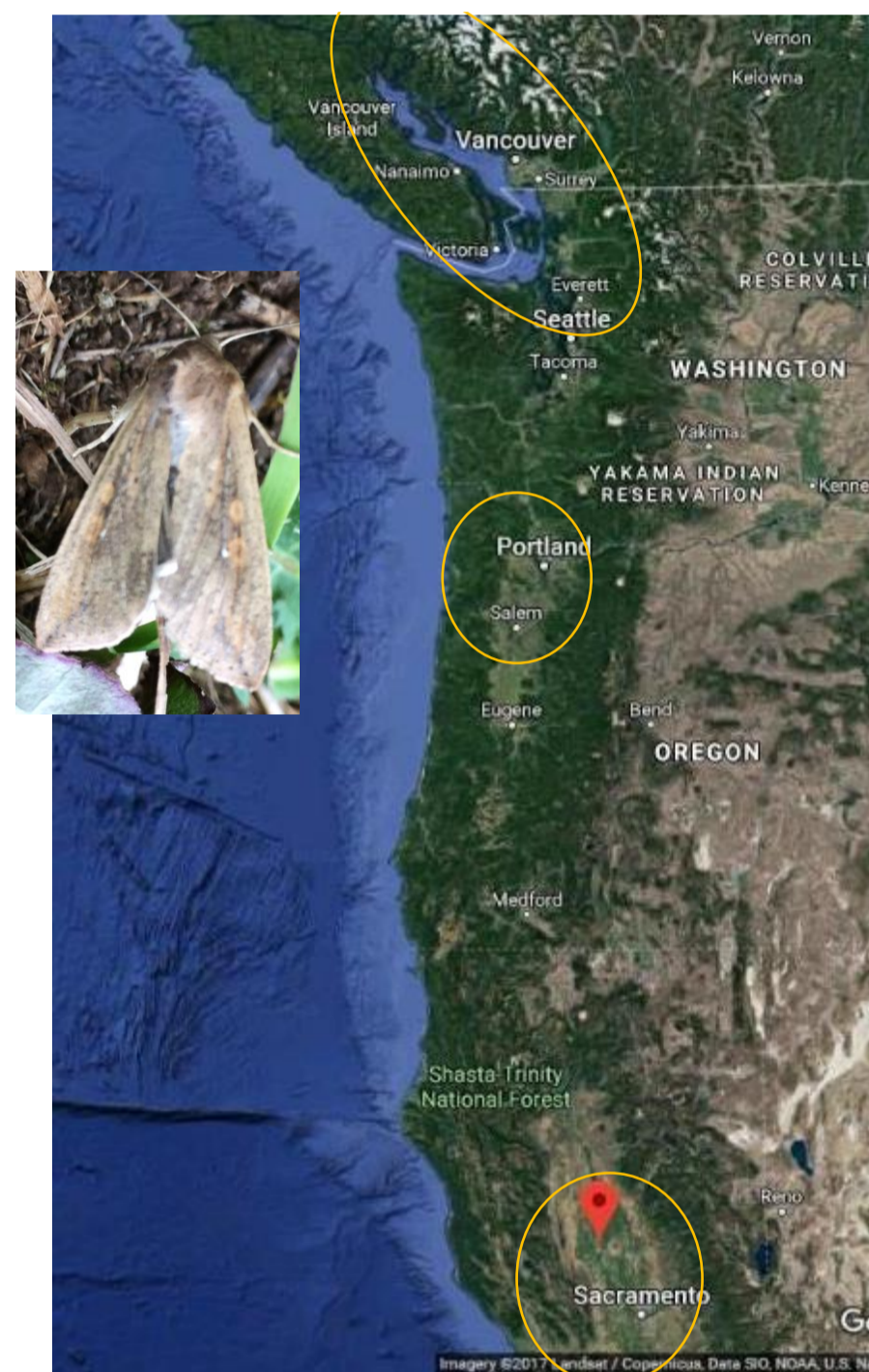


Figure 2. Annual total catches of *M. unipuncta* moths on Vancouver Island and Fraser Valley in pheromone baited traps, May-Sept, 2018-2022

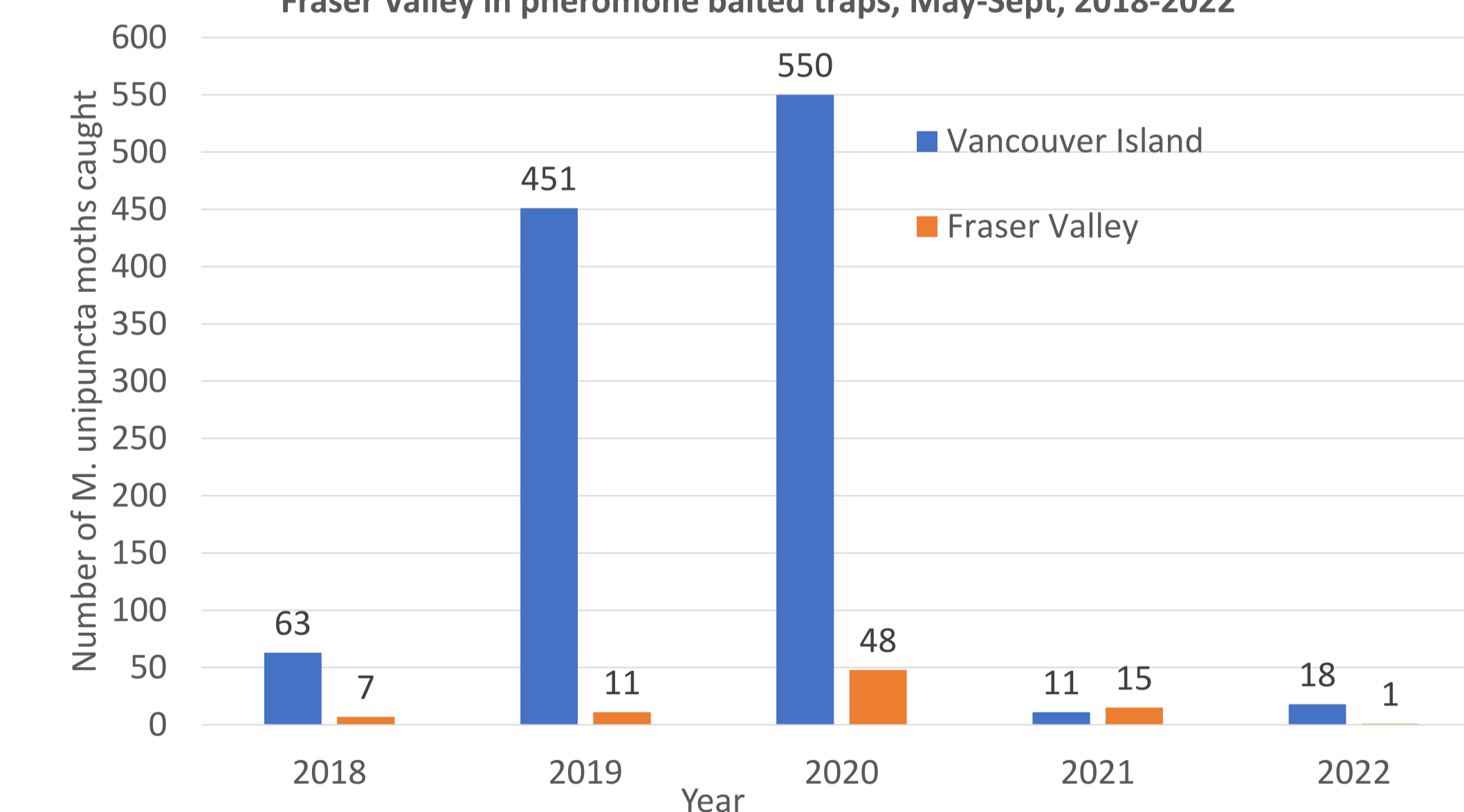
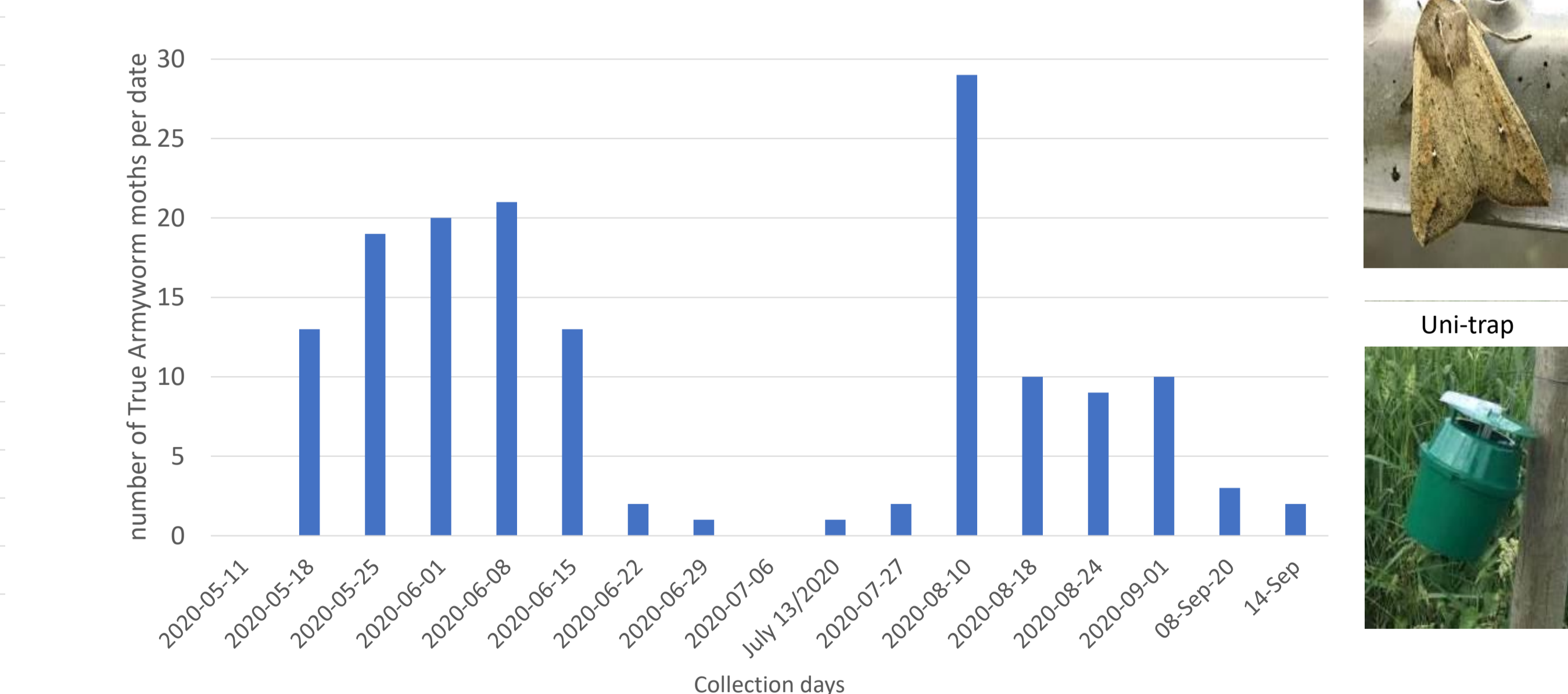


Figure 3. Port Alberni True Armyworm catch, 11 traps, May-Sept 2020, grass field edges, total moths = 155



True Armyworm moth, *Mythimna unipuncta*



Uni-trap



Methods and Results: Western Corn Rootworm, *D. virgifera*

- Prior to 2016, *D. virgifera* was not known to be present in BC. This pest was also detected in WA at the same time as BC.
- Annual surveys (2018-2021) with un-baited yellow sticky cards along edges of corn fields was carried out in BC (Fig.4). On average 150 traps were set per year, in mid July, checked every 7-14 days, and beetles were counted. Traps were removed in early September before corn harvest. This is the standard method used in eastern North America. Beetles are caught from mid July through harvest in September. Peak flight is in late August.
- Surveys confirmed that the pest is only present in the Fraser Valley and not in other parts of BC.
- Corn growers in the Fraser Valley of BC implemented preventive practices such as rotating out of corn every 5 years, and use of in-furrow insecticides at planting. While these tools are also used for other pests, the use of *Bacillus thuringiensis* (*Bt*)-traited corn varieties resistant to corn rootworm larvae was new to BC growers.
- Sweet corn growers also have applied foliar insecticide if beetles are abundant at silking (pollination).

Figure 4.

Yellow sticky trap in corn field



- With the goal to better forecast the pest risk, in 2021 we compared a commercial semiochemical lure (Fig.5) (Csalomon®, Budapest, Hungary) baited yellow sticky traps (Pherocon AM, Great Lakes IPM, MI, USA) to unbaited traps in corn fields. Baited traps caught about 10x more beetles than unbaited traps. (Van Herk et al, in press).
- In 2022, we paired baited and unbaited traps in forage corn fields. Baited traps caught more beetles overall and caught earlier than unbaited (passive) traps (Fig.6).
- Baited traps caught 7x times more beetles during the first week of August, and then gradually declined to 1.66x in later weeks of August.
- While the advantage of the lure decreases over time, its use may be worthwhile particularly in fields or regions with low populations of rootworm or to monitor spread of the pest to new areas.

Figure 6. Mean Number of *D. virgifera* beetles caught per trap in forage corn fields, Fraser Valley, July-August 2022, comparing lure-baited and unbaited (no lure) yellow sticky traps

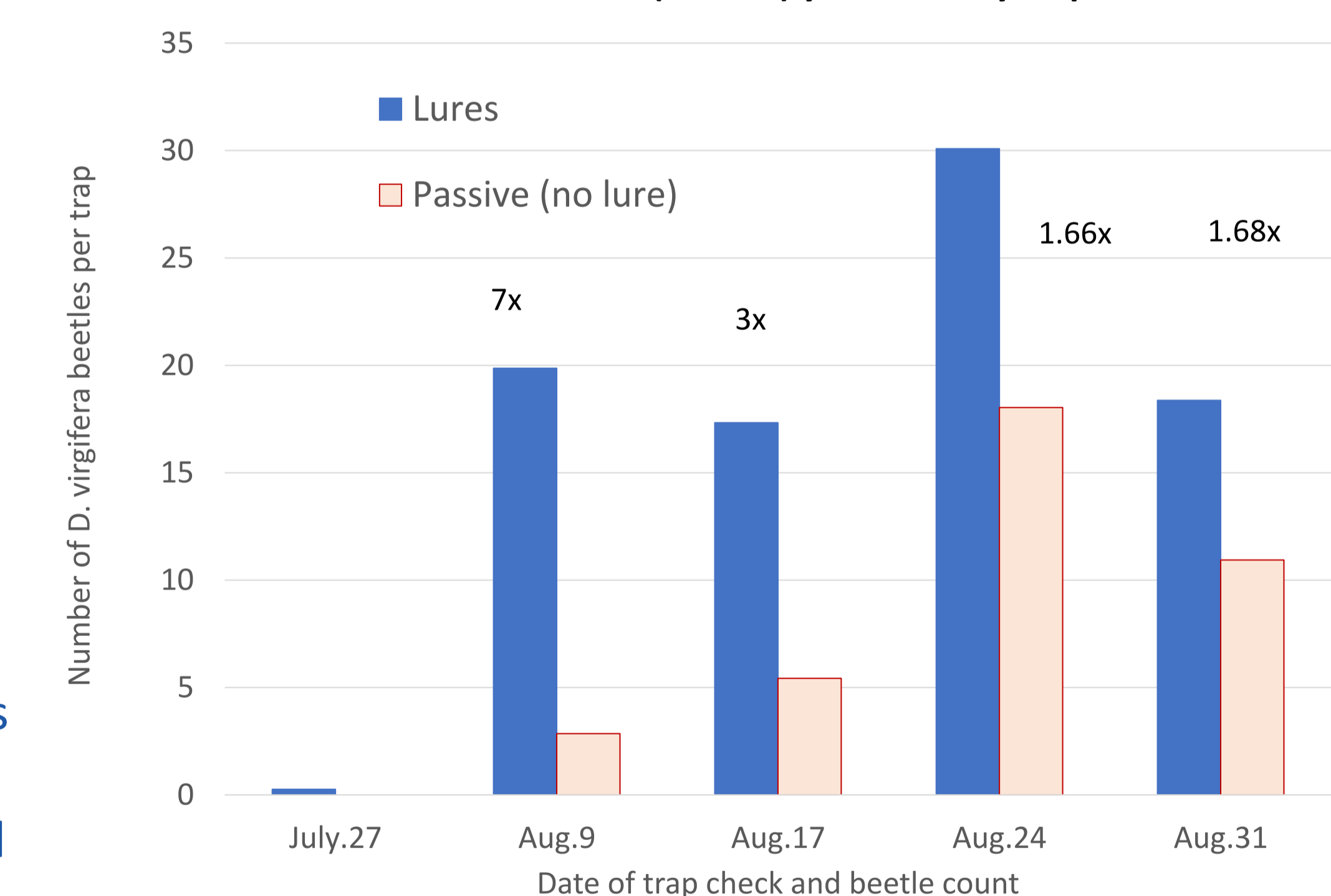


Figure 5. Yellow sticky trap with Lure circled. Many beetles caught!



Conclusions: While it is clear from our surveys that *M. unipuncta* migrates to BC every year, introduction of enough moths to cause an outbreak in grass and corn fields seems uncommon. Field scouting with pheromone traps and visual scouting for larvae when moth catches increase remain important tools for growers so pest management steps can be taken. Pest notices, articles, and presentations within the grower community helped raise awareness of this 'new' pest and how to deal with it.

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Conclusions: In BC, *D. virgifera* appears limited to the Fraser Valley. Through surveys with traps and visual searches in fields and communication with the agricultural industry and researchers in BC and eastern North America, we have been able to learn about the biology of this new pest in BC, try new tools, and enable growers to implement prevention and management approaches to minimize damage to both forage and sweet corn.