

Potato Beetle Populations to Imidacloprid, 2007

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INTRODUCTION

Colorado potato beetle (CPB), *Leptinotarsa decemlineata* (Say), is the most significant pest of potato in N. America. Imidacloprid (Admire® 240F, Bayer CropScience Canada Inc.) is used reliably by Canadian growers for CPB control since 1995.



Fig. 1: Colorado potato beetle larvae defoliating potato plants.

Imidacloprid-tolerant CPB populations identified across N. America.

Annual monitoring for insecticide resistance in field CPB populations essential for successful IPM program.

Present study updates the current status of imidacloprid tolerance in 13 selected CPB populations from 4 Canadian provinces: Ontario, Quebec, New Brunswick and Prince Edward Island.

MATERIALS AND METHODS

Chemicals

Imidacloprid (Admire 240F, 240 gai/L).

Serial dilutions prepared, ranging from 0.1 -100 ppm.

Insect Collection and Culture

Reference strain of CPB from AAFC (London, ON).

Adults from 13 field populations in PE(2), QC(2), NB(3), ON(6)

collected and shipped to U of G.

10 adults (60:40 F:M) from each population placed in oviposition cages at 25°C, 16:8 [L:D] (Fig. 2).

Egg masses excised from plants, held in labeled Petri dishes at 25°C, 16:8 [L:D] until larvae hatched.

Bioassays conducted on 1st instar larvae.

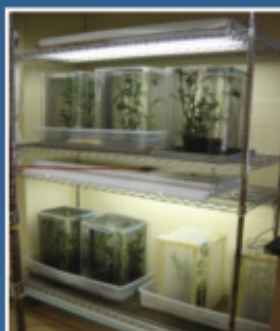


Fig. 1: Colorado potato beetle adult cages in rearing room.

Bioassay

- Leaf discs dipped in insecticide solution and air dried.
- 2 leaf discs and 5 larvae placed on filter paper in bioassay tray wells (Fig. 3).
- Sealed trays held at 25°C, 16:8 [L:D] (Fig. 3).
- Mortality assessments conducted at 48 h.

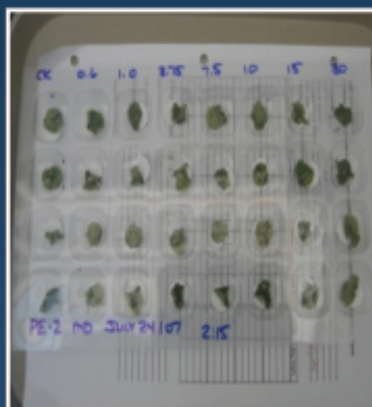


Fig. 3: Bioassay tray placed in growth room for 48 hours.

RESULTS

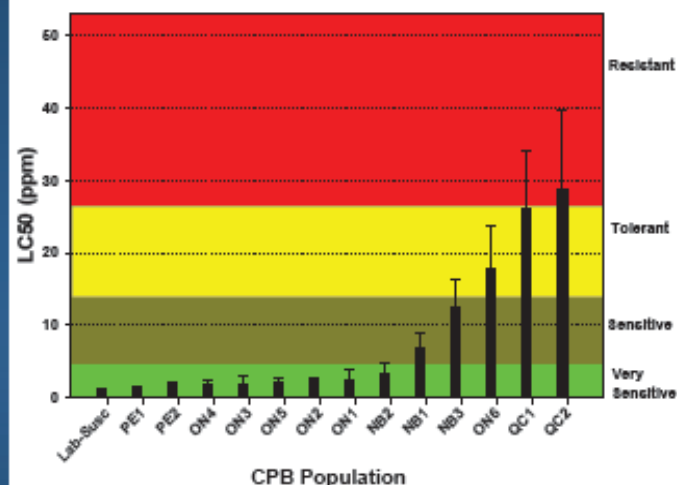


Fig. 4: Colorado potato beetle susceptibility to imidacloprid of populations from Prince Edward Island (PE), New Brunswick (NB), Quebec (QC) and Ontario (ON).

DISCUSSION

- CPB populations highly variable in susceptibility to imidacloprid.
- Most populations from PE and ON susceptible to imidacloprid.
- ON6 and QC1 had elevated tolerance to imidacloprid; QC2 was the only resistant population (Fig. 4).
- LC₅₀ values reached up to 28-fold that of the insecticide susceptible strain (Fig. 4).

CONCLUSION

Our results highlight the potential for future CPB control failures in some regions of Canada with overuse of imidacloprid, but also confirm that imidacloprid continues to provide good control for many growers.



Fig. 5a: Colorado potato beetle eggs and 1st instar larvae.



Fig. 5b: Female adult Colorado potato beetle laying eggs.

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