

Diversity of Non-native Terrestrial Arthropods in Newfoundland & Labrador



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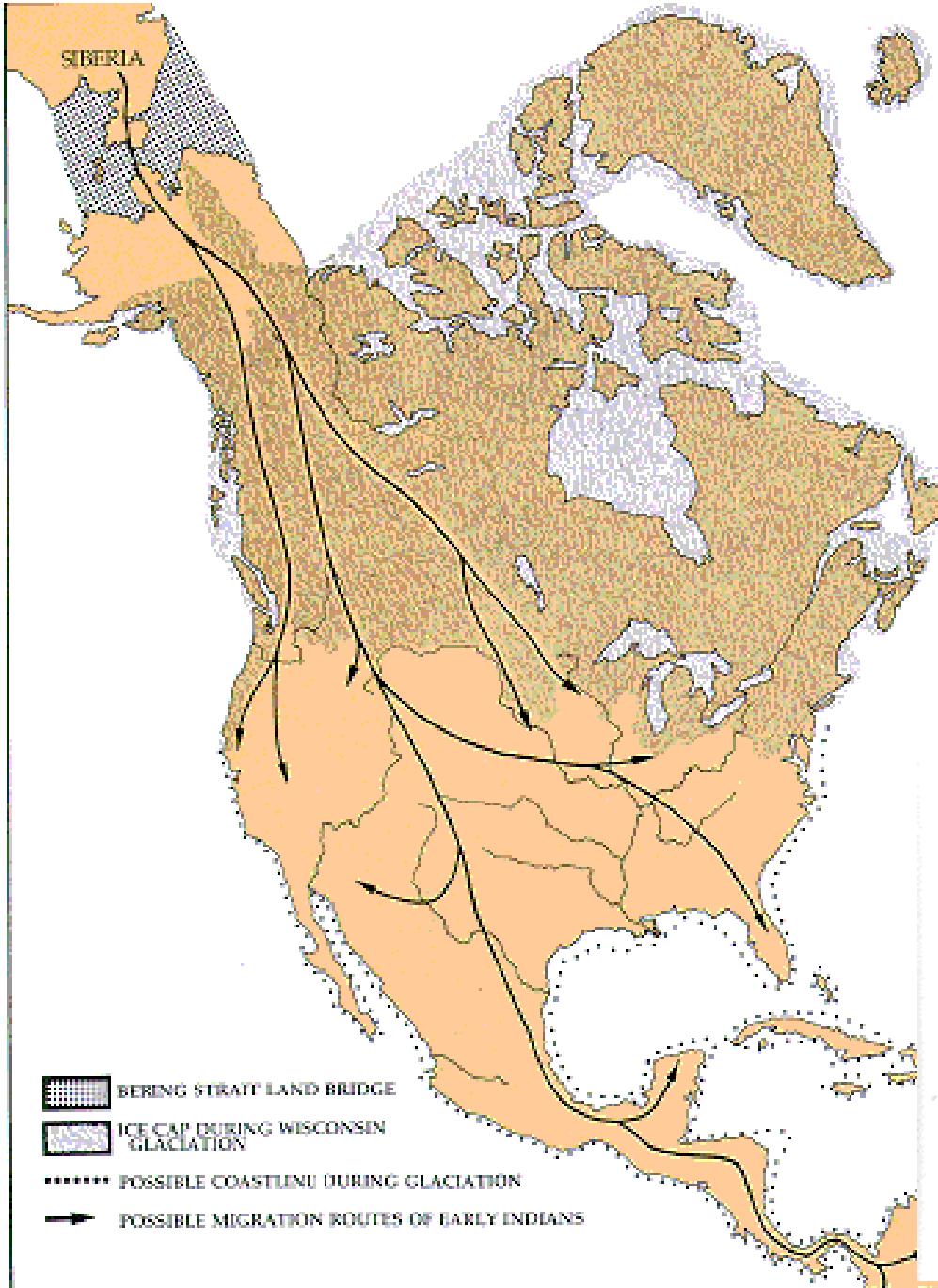
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DEFINITION

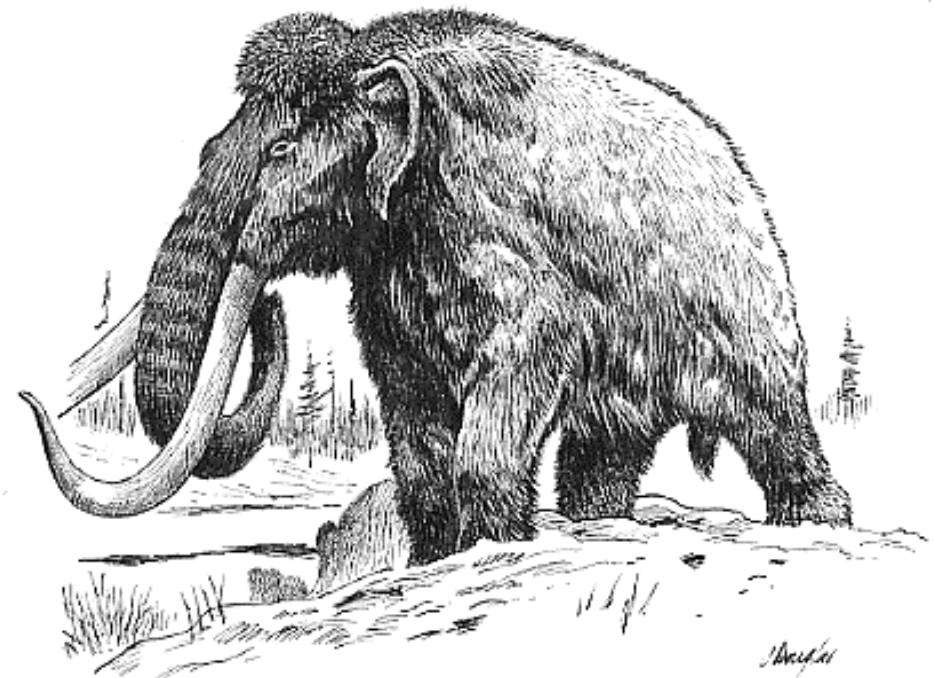
- Invasive Alien Species



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1.1 THE BERING STRAIT LAND BRIDGE AND THE MIGRATION OF EARLY INDIANS



CENTRAL AMERICA AND THE CARIBBEAN





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Asian longhorn beetle



Brown Spruce longhorned beetle



Emerald ash borer



Pine shoot beetle



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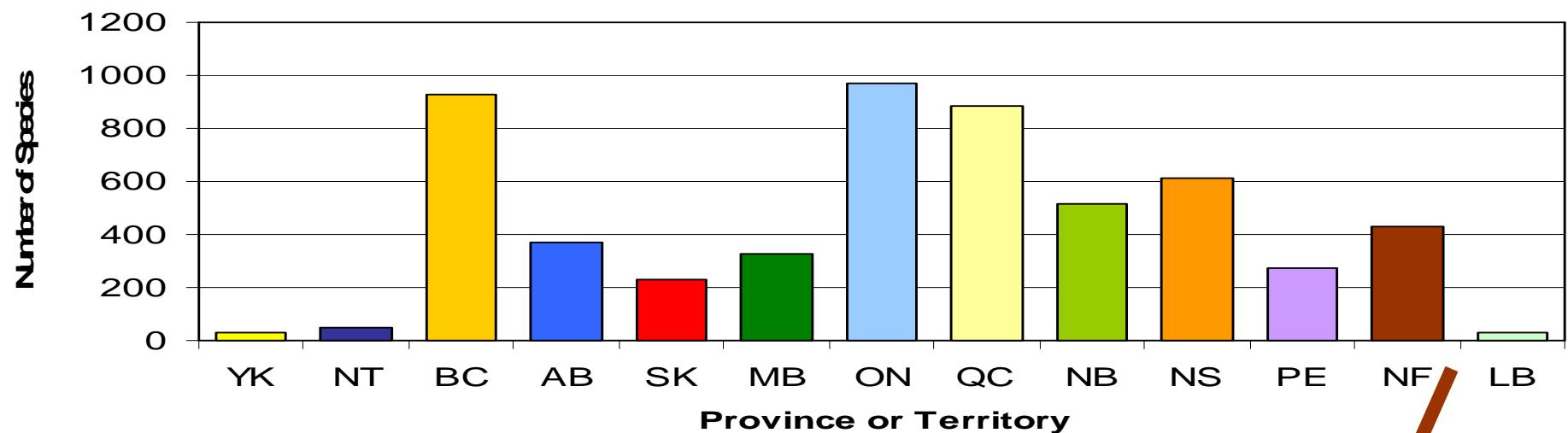
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To date, >1850 non-native terrestrial arthropods have been recorded from Canada. It is expected that this list will grow to > 2000.

Distribution of Exotic Arthropod Species in Canada



Nfld. & Labrador has 456 species,
including 44 species in Labrador

Examples

- European earwigs
- carpenters/ sowbugs
- ‘hard-shells’ carabid beetles
- many common household pests: spider beetles, carpet beetles, strawberry root weevil, cockroaches
- most common lady bugs
- striped flea beetle, clover leaf weevil, imported cabbage worm
- birch leafminers, larch and birch casebearers, balsam woolly adelgid, mountain ash sawfly, larch sawfly
- granary beetles



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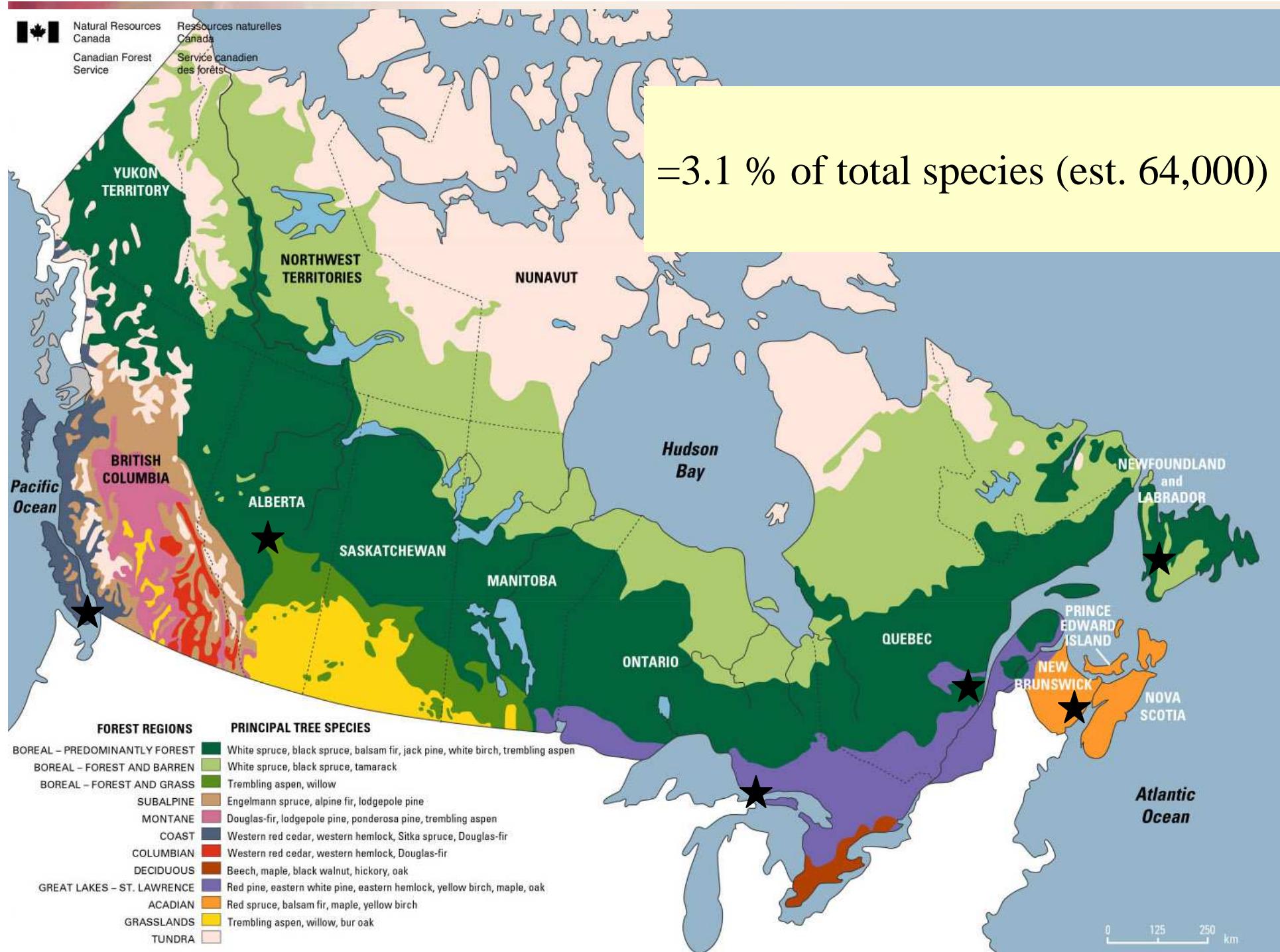
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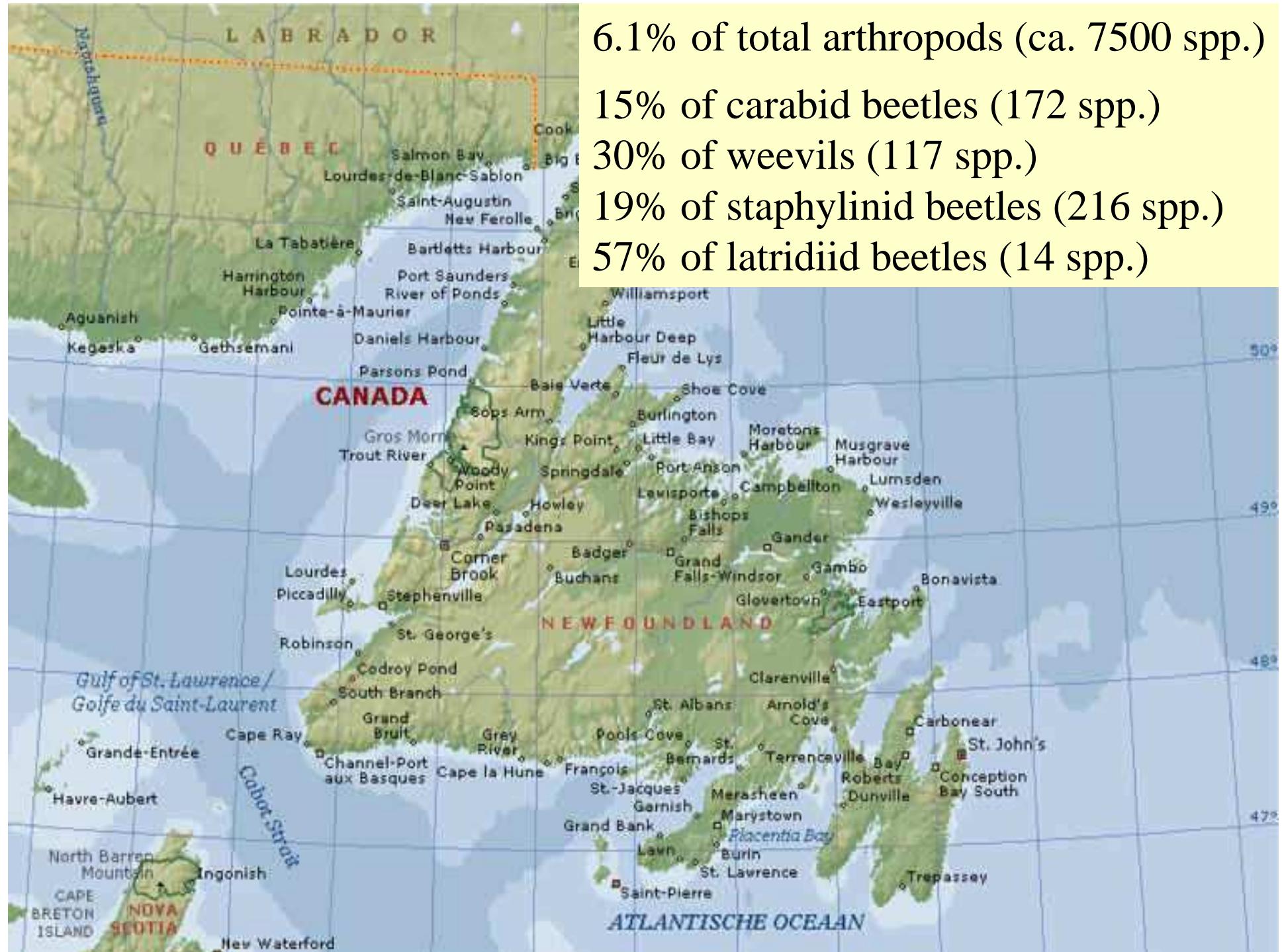
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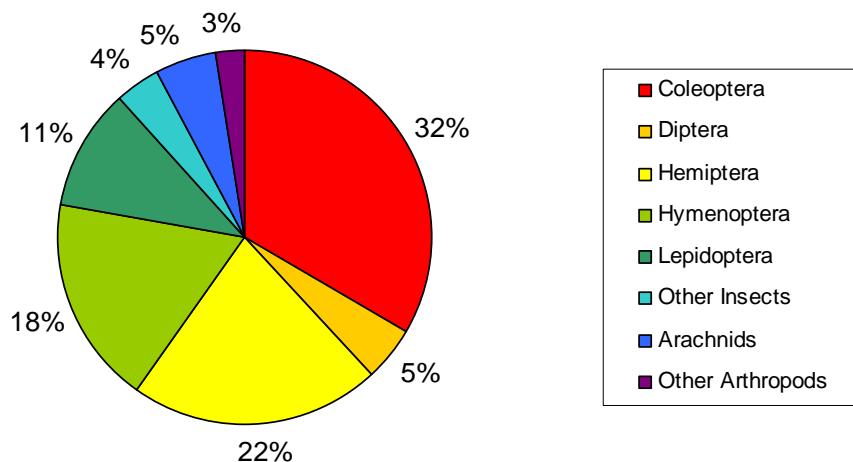
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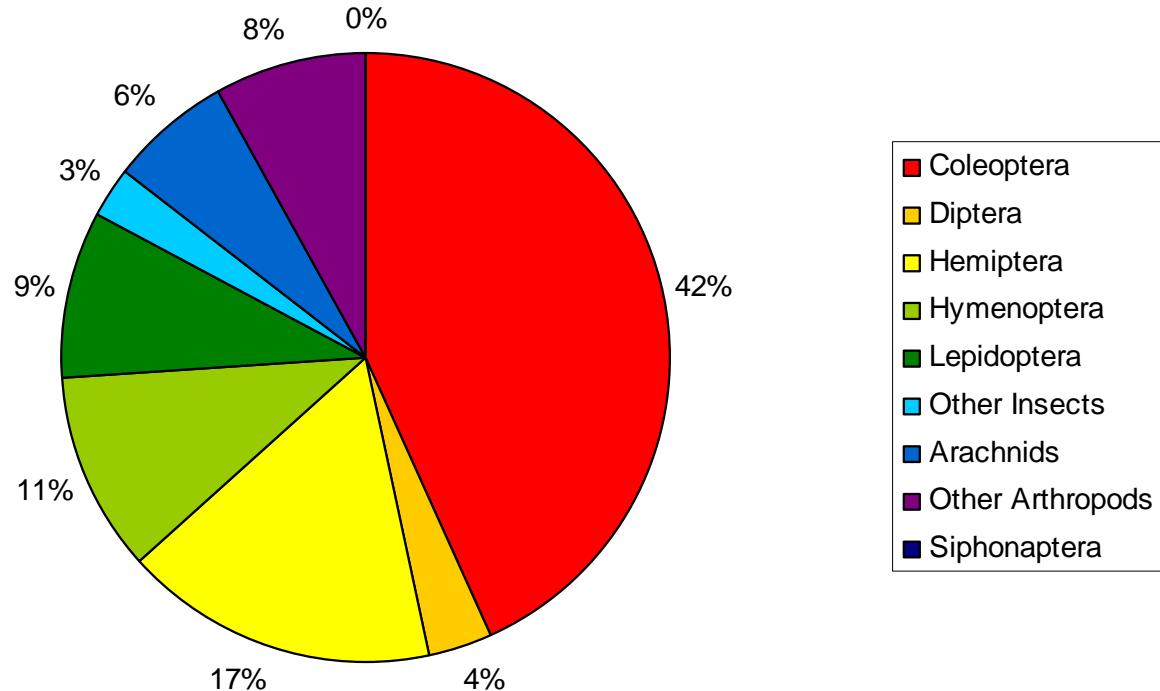




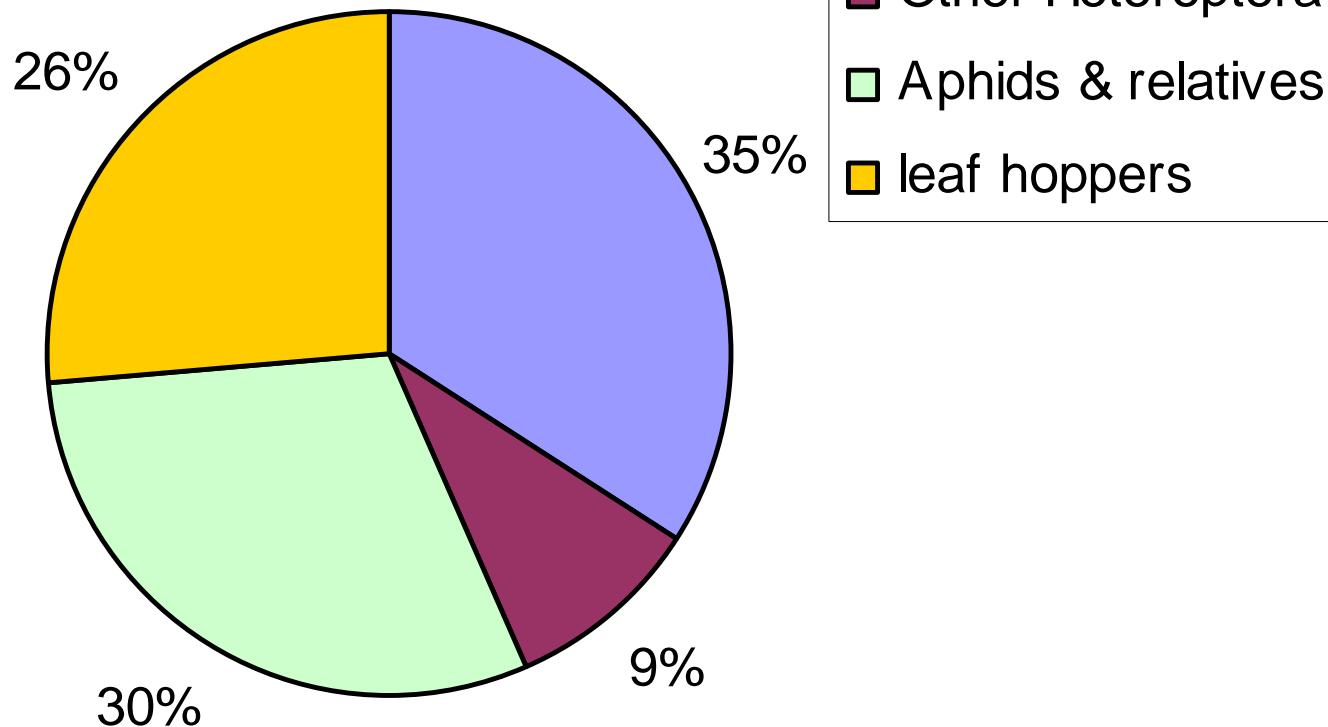
Exotic Arthropod Species in Canada (n = 1833)



Exotic Arthropod Species in Newfoundland (n=456)



Hemiptera (76 spp.)



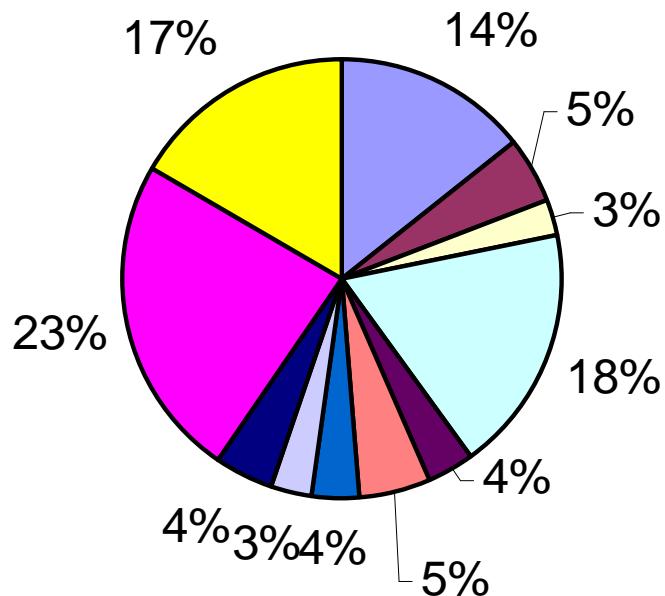
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Coleoptera (197 spp.)



- Carabidae
- Chrysomelidae
- Coccinellidae
- Curculionidae
- Dermestidae
- Hydrophilidae
- Nitidulidae
- Ptinidae
- Scarabaeidae
- Staphylinidae
- Others



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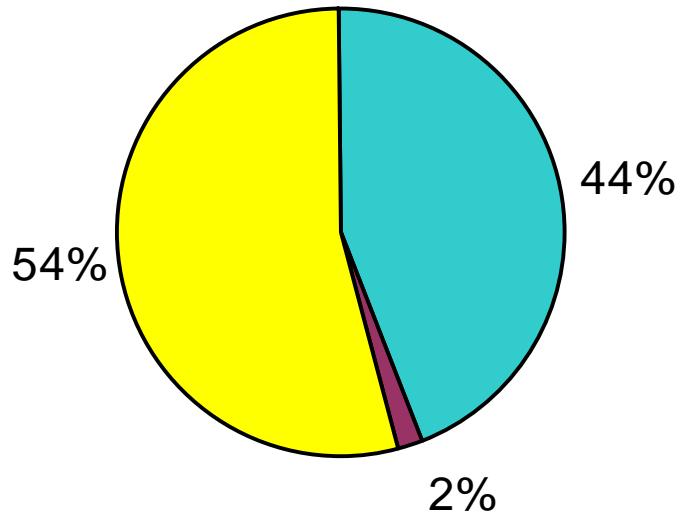
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Hymenoptera (48 spp.)

- sawflies
- bees
- parasitic wasps



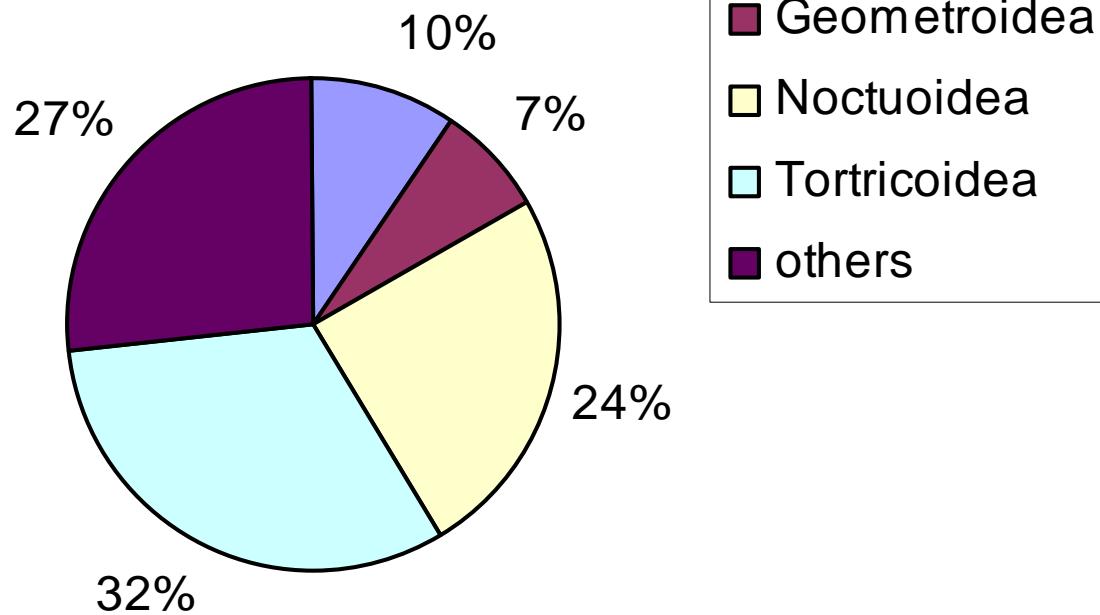
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Lepidoptera (41 spp.)



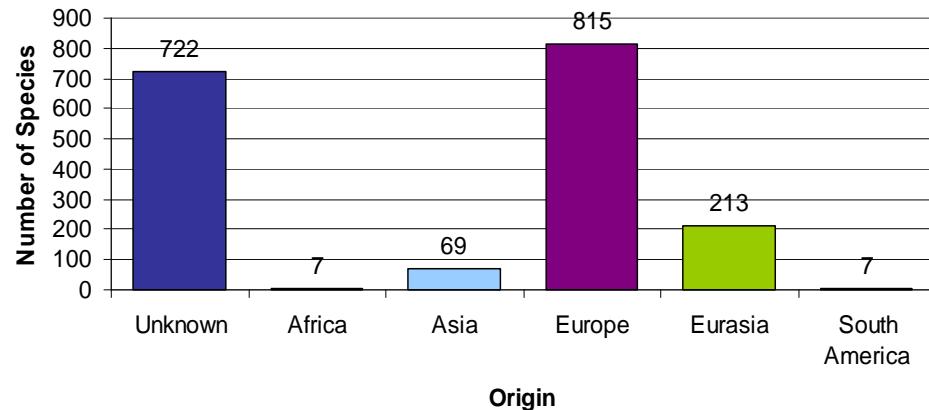
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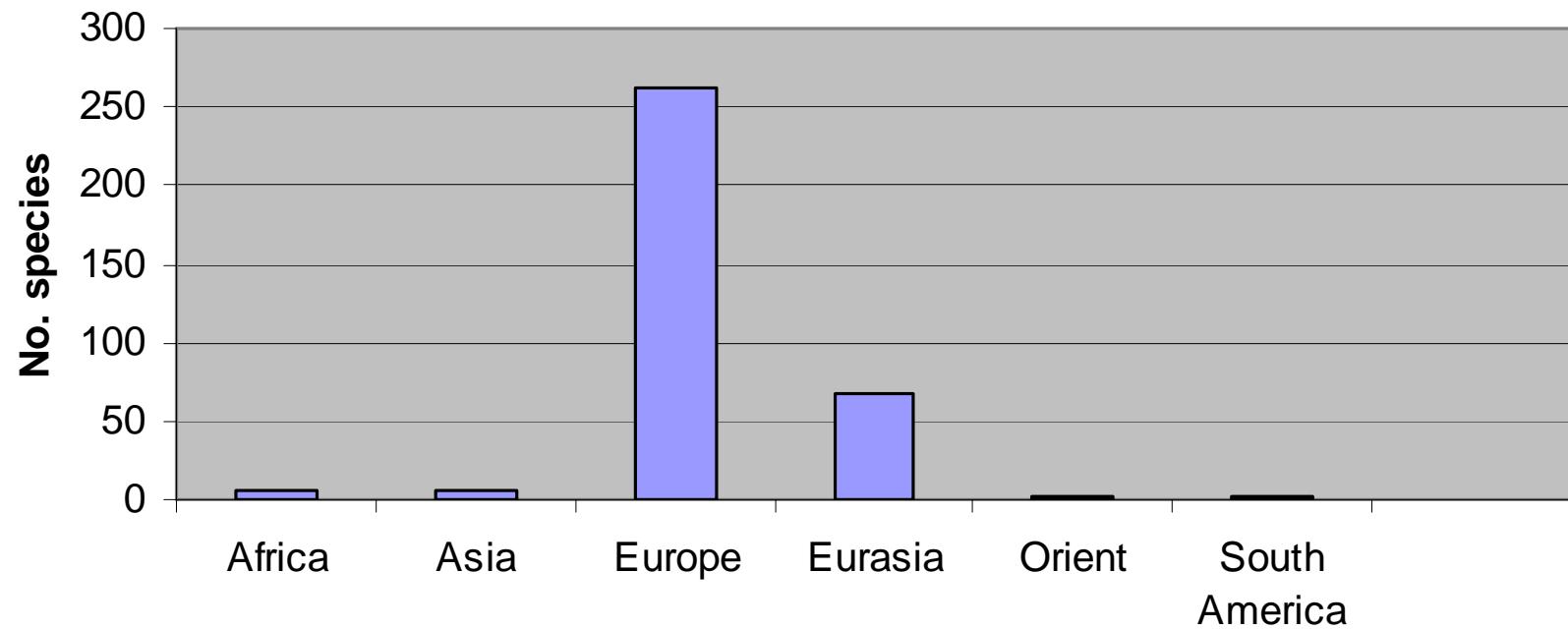
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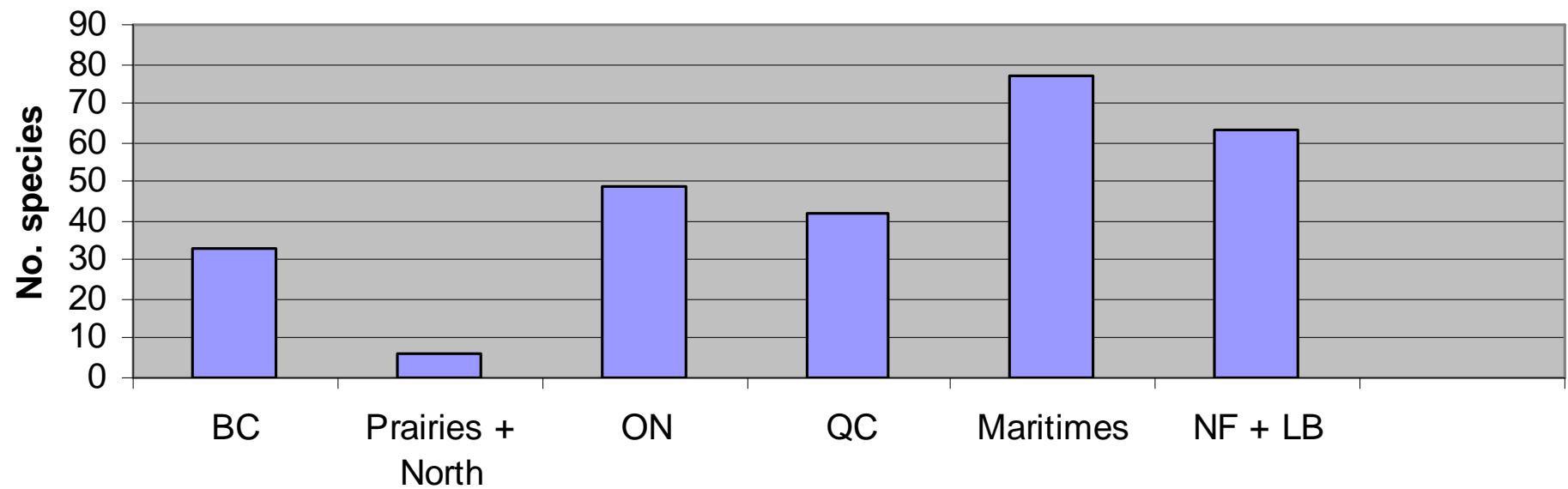
Origin of Exotic Arthropod Species in Canada
(n = 1833)



Origin of non-native species in NL



Points of entry into Canada for non-native species in NL (270 spp.)



St. John's most important port of entry
60 species are currently limited to Nfld.



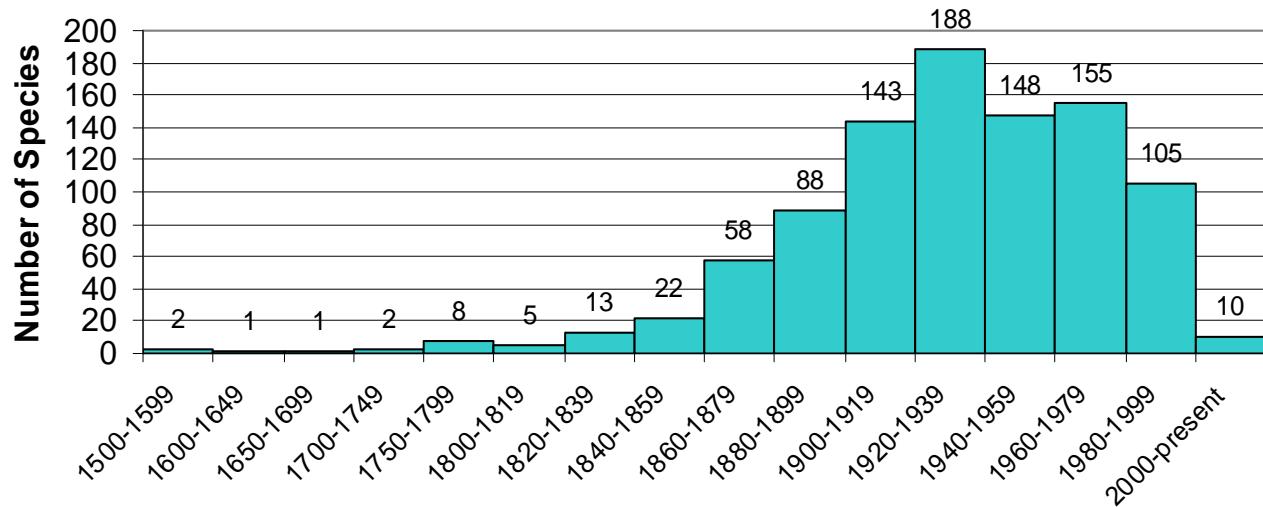
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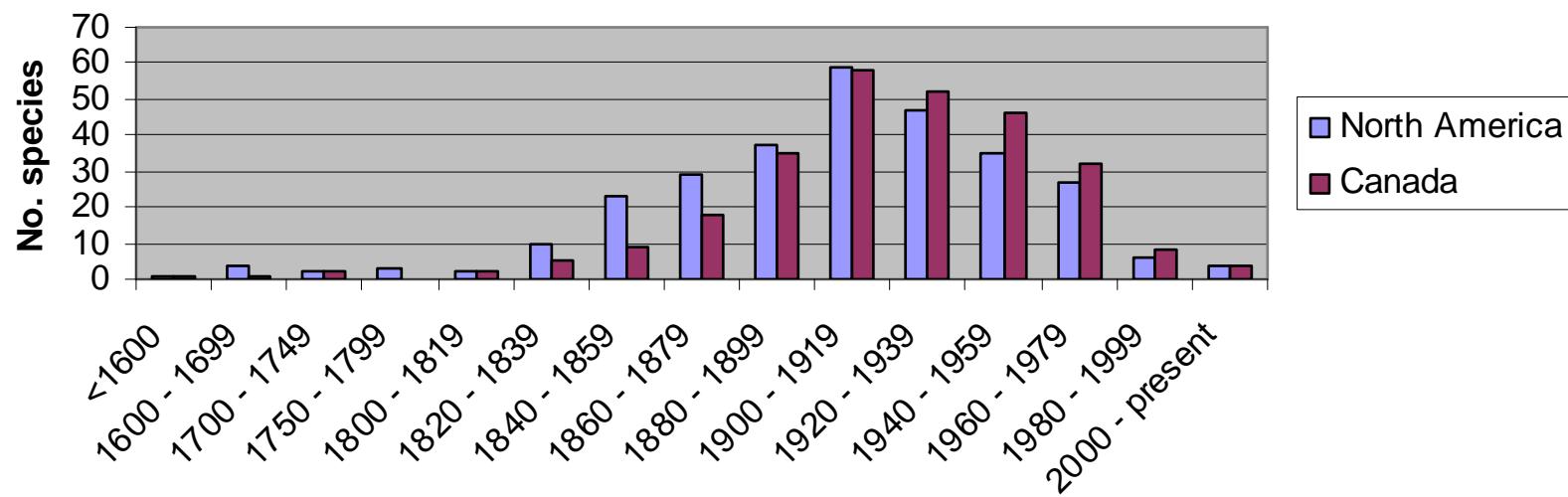
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Introduction of Exotic Arthropod Species into North America (n = 949)



Year of earliest record in North America and Canada for non-native species in NL



1500s – *Apis mellifera* (Hymenoptera: Apidae)

mid 1500s – *Hemisarcoptes malus* (Acari: Hemisarcopidae)

1635 – *Cydia pomonella* (Lepidoptera: Tortricidae) – codding moth

1675-1700 – *Phyllotreta striolata* (Coleoptera: Chrysomelidae) – striped flea beetle

1700s – *Stomoxys calcitrans* (Diptera: Muscidae) – stable fly

1700s – *Philonthus umbratilis* (Coleoptera: Staphylinidae)



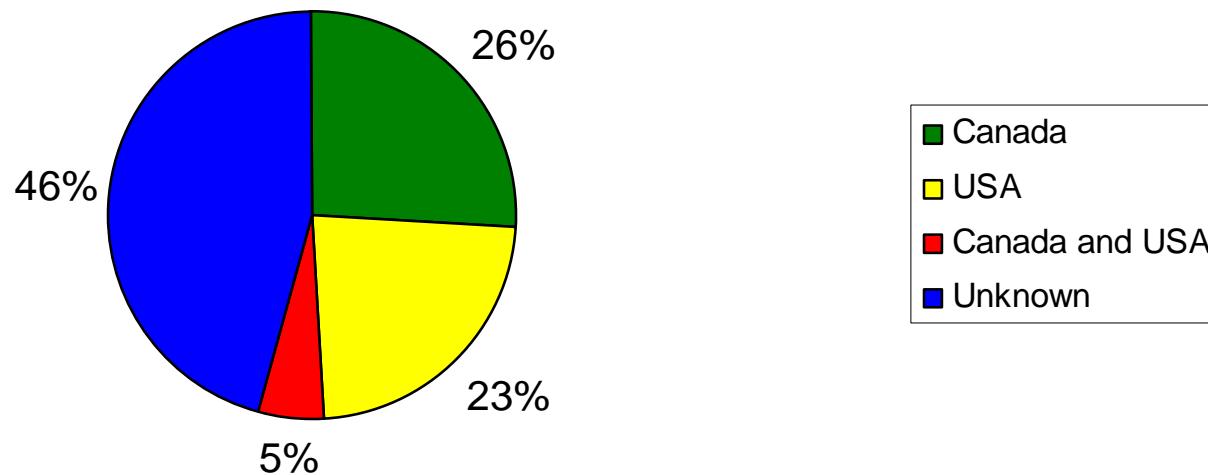
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Exotic Arthropod Species in Canada Introduced Directly into Canada and the USA (n = 1833)



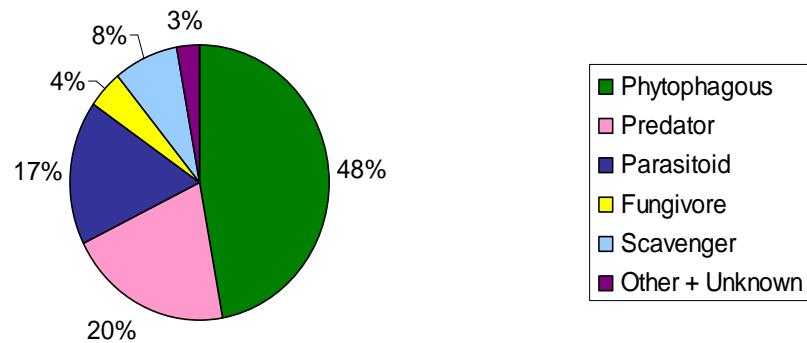
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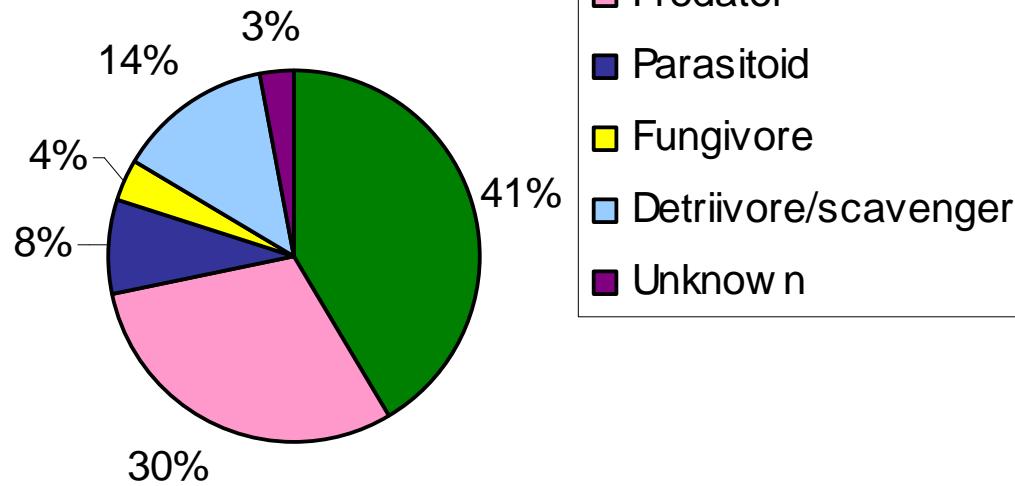
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**Trophic Roles of Exotic Arthropod Species in Canada
(N = 1833)**



Trophic roles of non-native arthropods in NL



Biocontrol agents released against forest insects

*denotes successful biocontrol

*Larch casebearer	2
*Satin moth	1
European pine shoot moth	1
*Birch casebearer	1
*European spruce sawfly	1
*Birch leafminer	1
*Introduced pine sawfly	2
*Mountain ash sawfly	1
Spruce budworm	2
*Larch sawfly	1
Hemlock looper	1 (fly)
Balsam Wooley adelgid	3 (lady bugs)



Biocontrol agents released against other insects

Green peach aphid	1
Delia spp.	1
European Earwig	1



Biocontrol agents released against weeds

Knapweed (*Centaurea*) 1 fly

Nodding thistle (*Carduus*) 1 beetle



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ONGOING WORK

Forest IAS Website

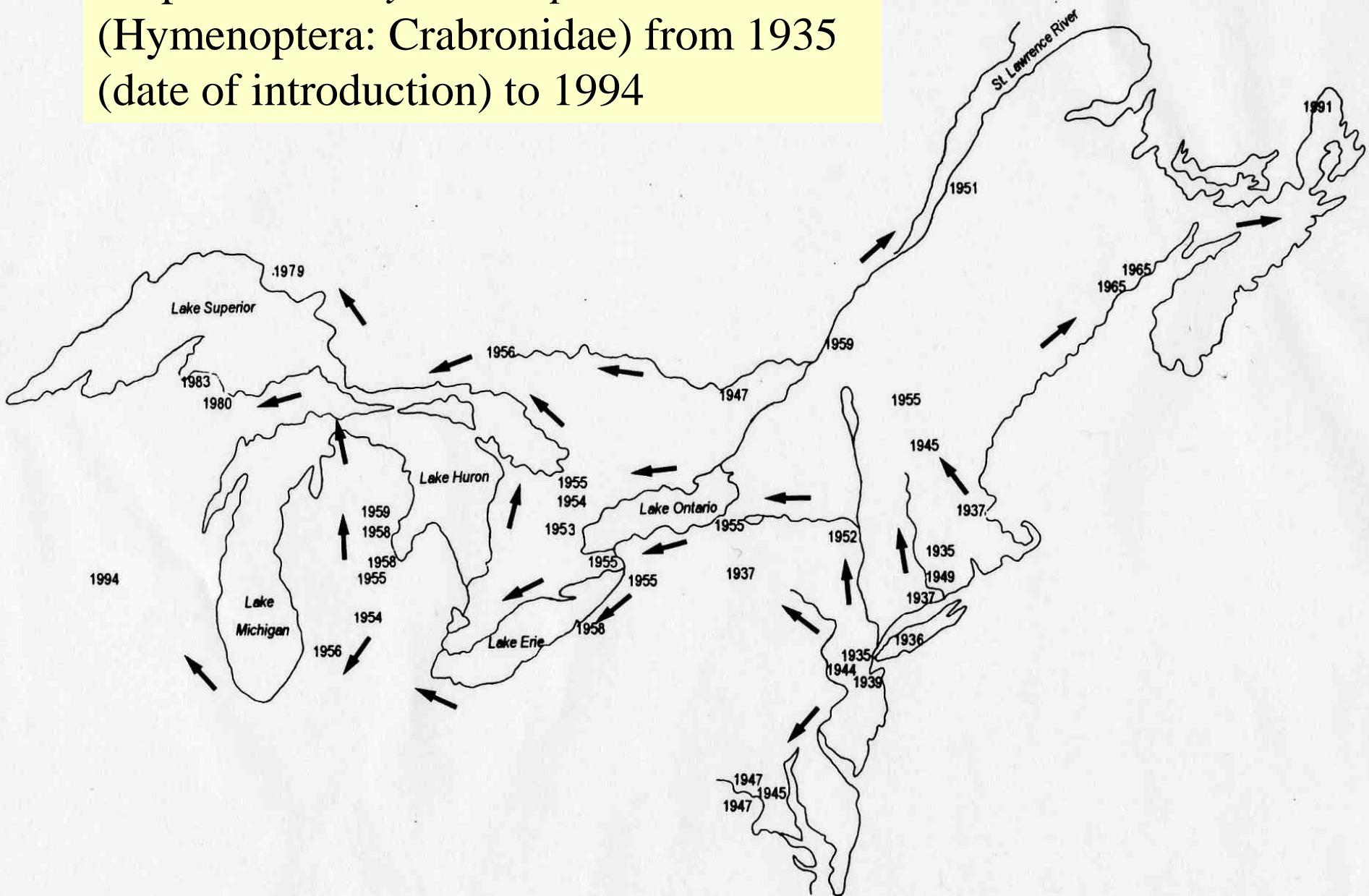
http://www.exoticpests.gc.ca/default_eng.asp

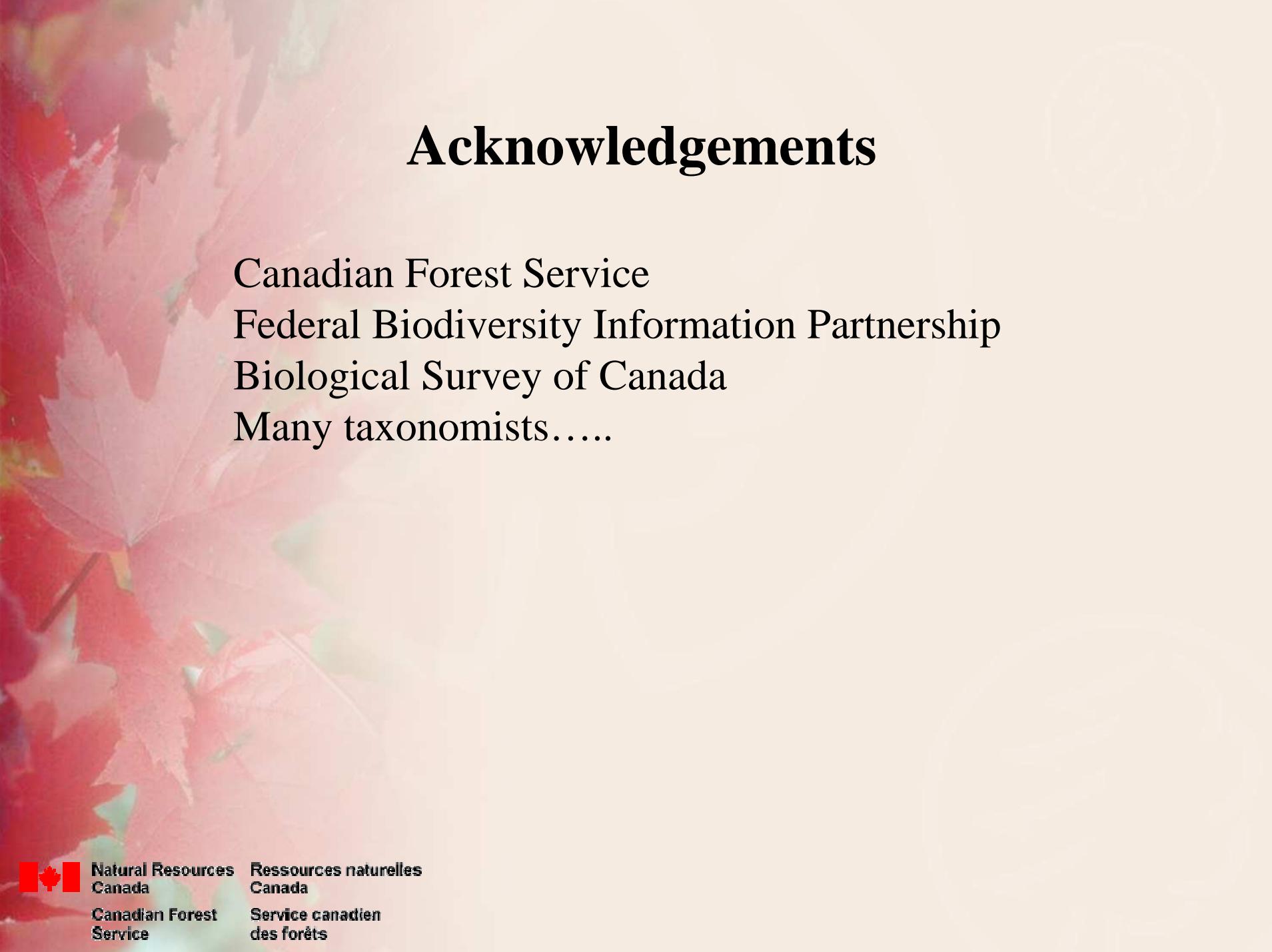
Databasing information from specimen labels
80,000 georeferenced records



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Dispersal of *Oxybelus bipunctatus* (Hymenoptera: Crabronidae) from 1935 (date of introduction) to 1994





Acknowledgements

Canadian Forest Service
Federal Biodiversity Information Partnership
Biological Survey of Canada
Many taxonomists.....



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