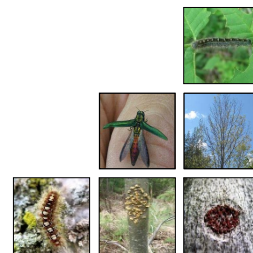


The Importance of Science in Monitoring

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Forest Research and Monitoring Section
Science and Research Branch
Ontario Ministry of Natural Resources and Forestry



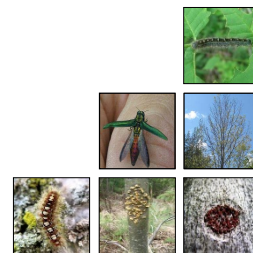
Monitoring

Observe and check the progress or quality of (something) over a period of time; keep under systematic review.



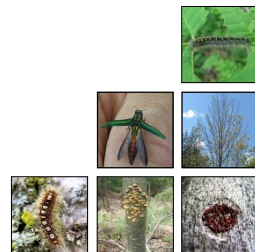
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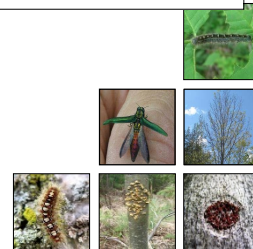
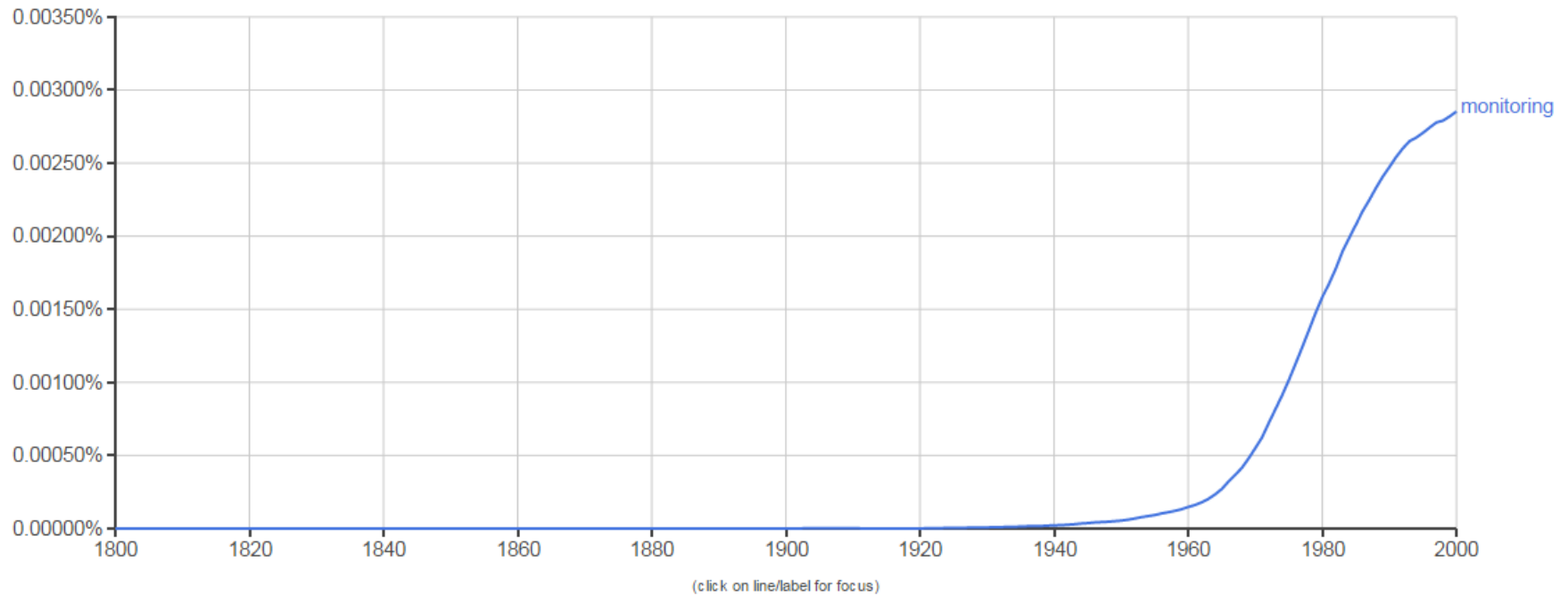
Google Books Ngram Viewer

The Google Ngram Viewer is an online search engine that charts frequencies of any set of comma-delimited search strings using a yearly count of n-grams found in sources printed between 1500 and 2008



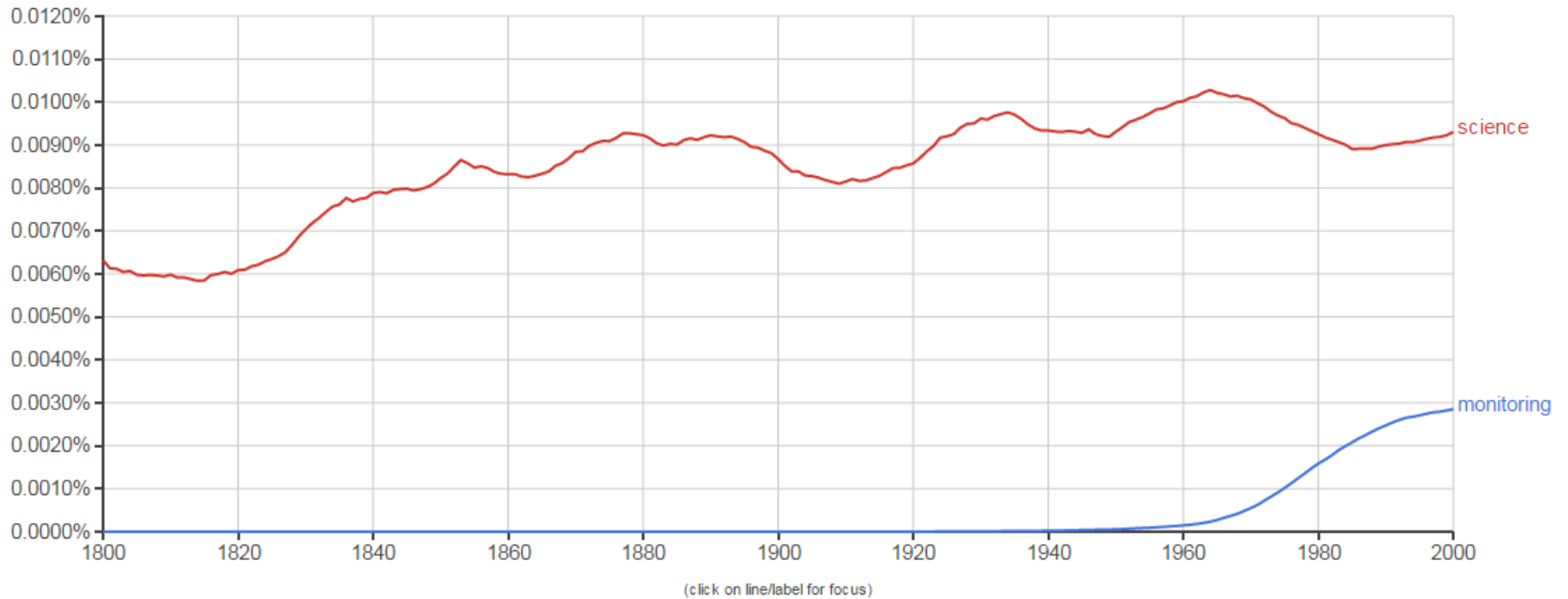
Google Books Ngram Viewer

Graph these comma-separated phrases: case-insensitive
between and from the corpus with smoothing of [Search lots of books](#)

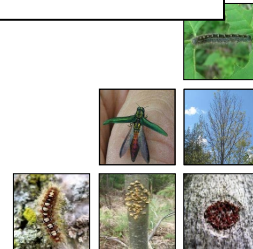


Google Books Ngram Viewer

Graph these comma-separated phrases: case-insensitive
between and from the corpus with smoothing of [Search lots of books](#)

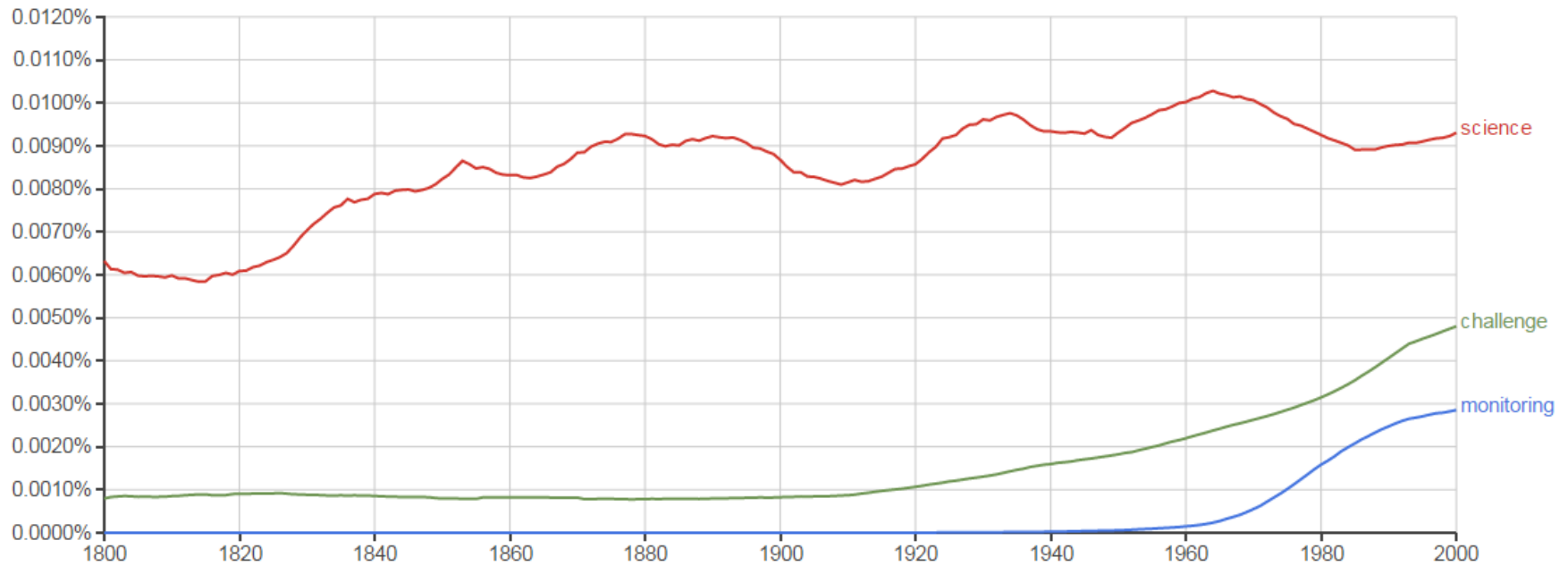


(click on line/label for focus)

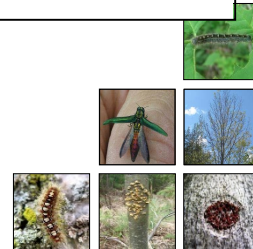


Google Books Ngram Viewer

Graph these comma-separated phrases: case-insensitive
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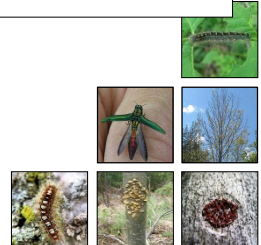
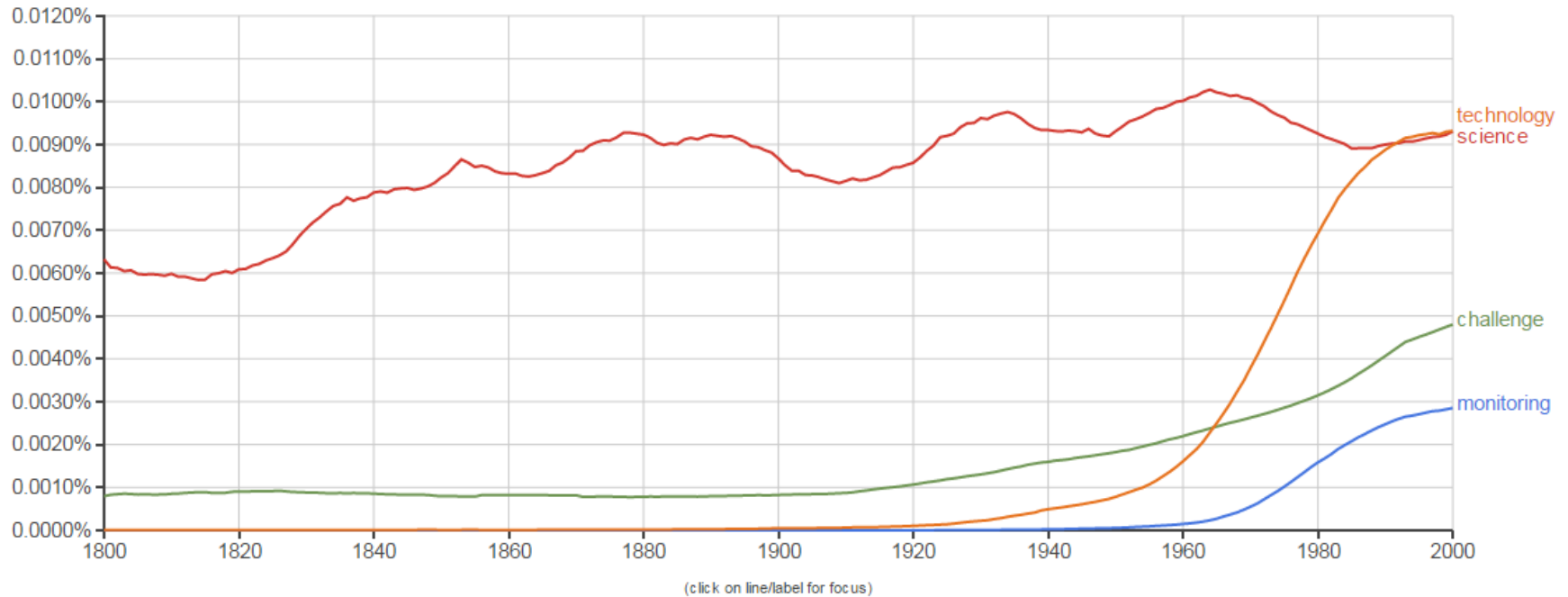


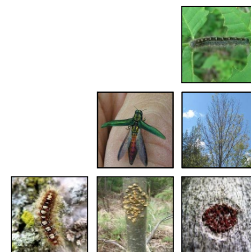
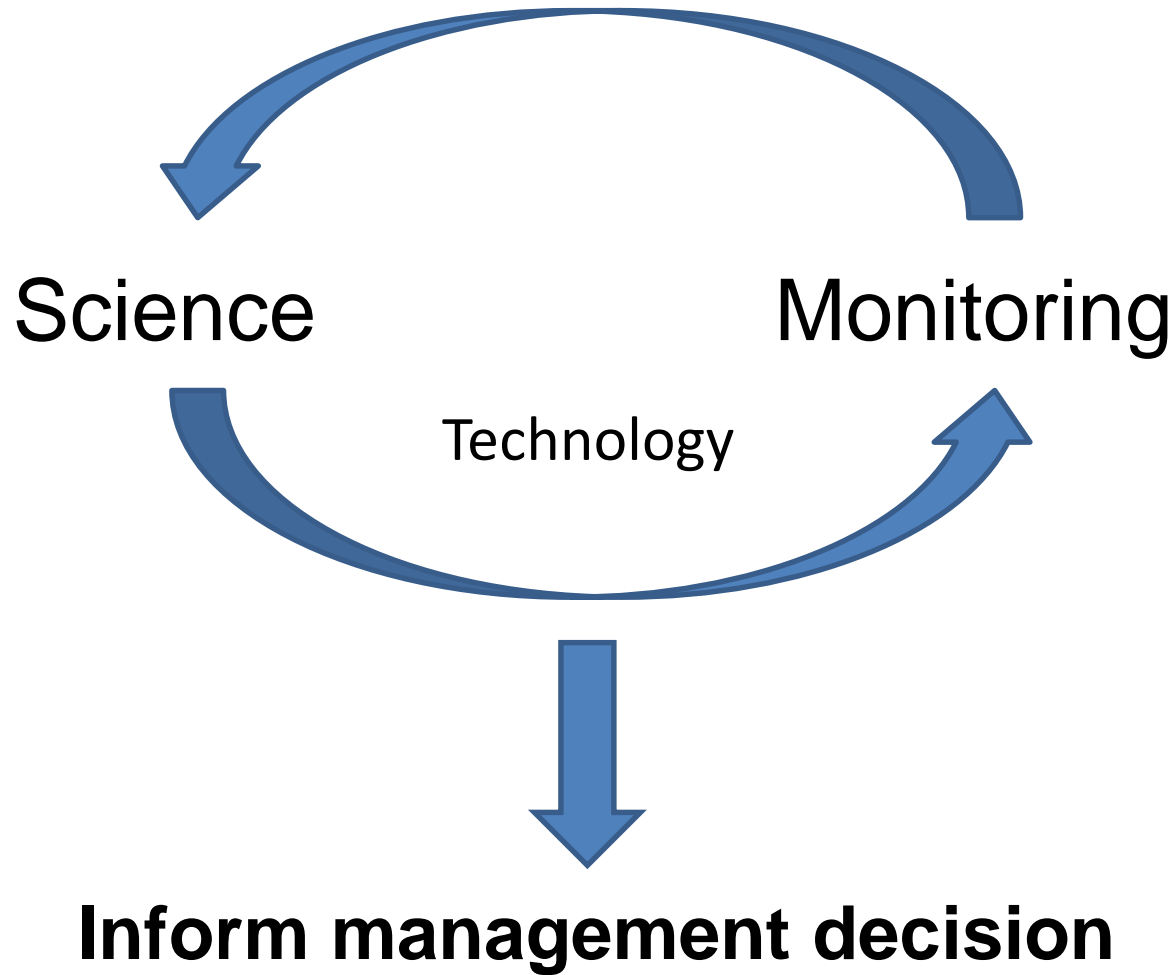
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Google Books Ngram Viewer

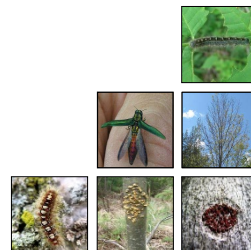
Graph these comma-separated phrases: case-insensitive
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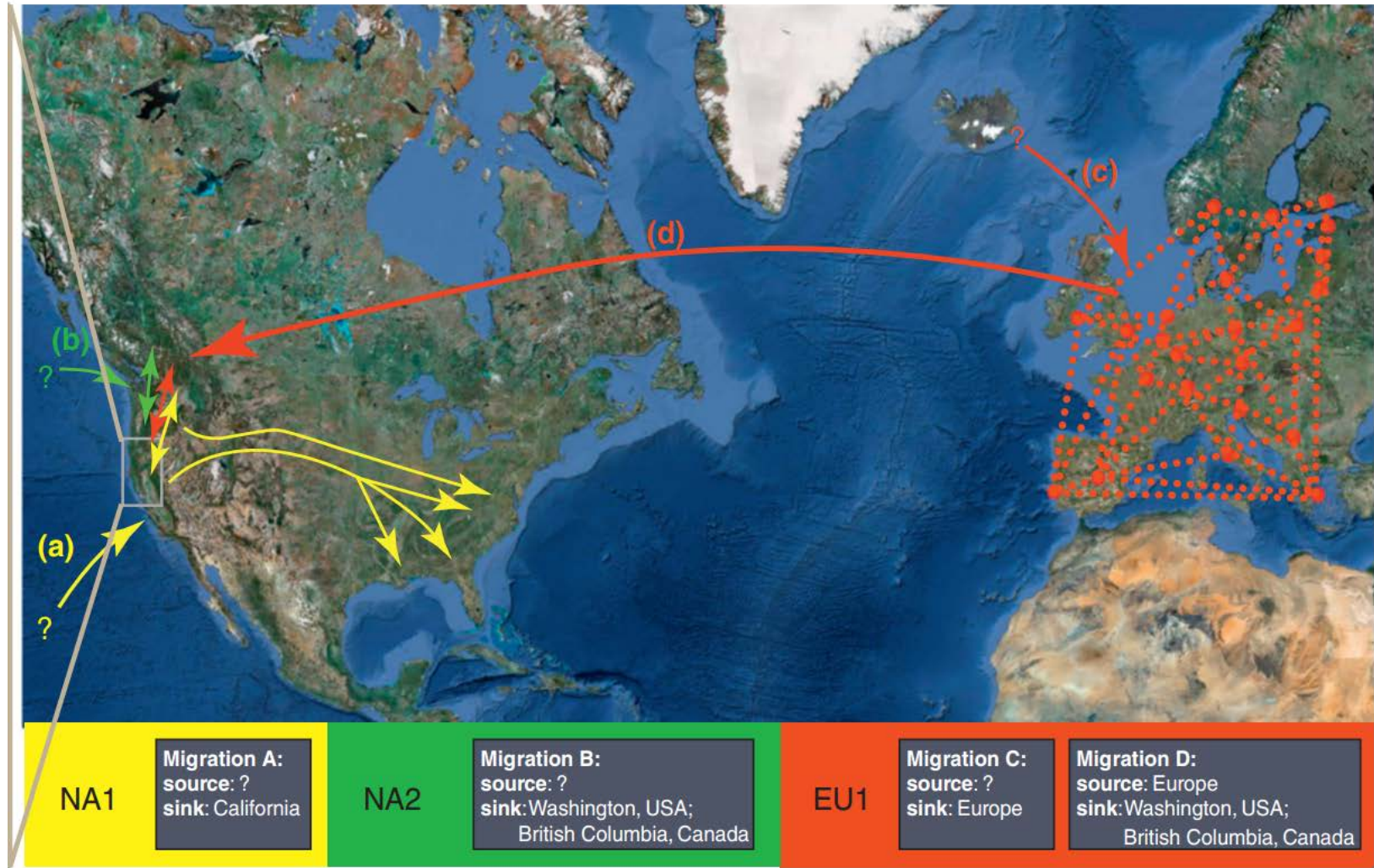
Example 1:

Movement of *Phytophthora ramorum* in USA nurseries



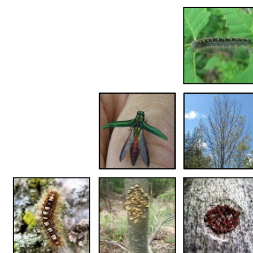
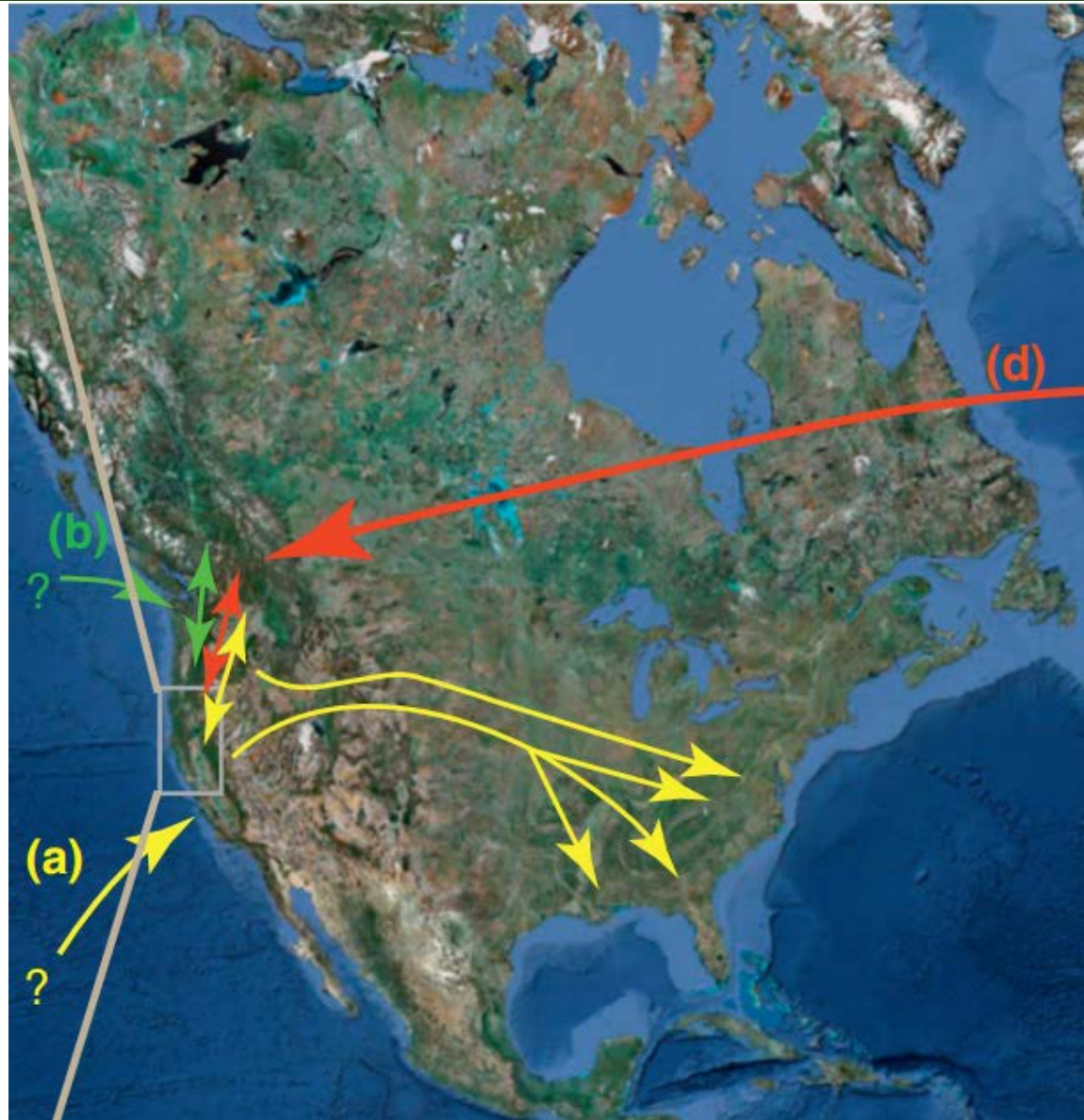
Sudden oak death

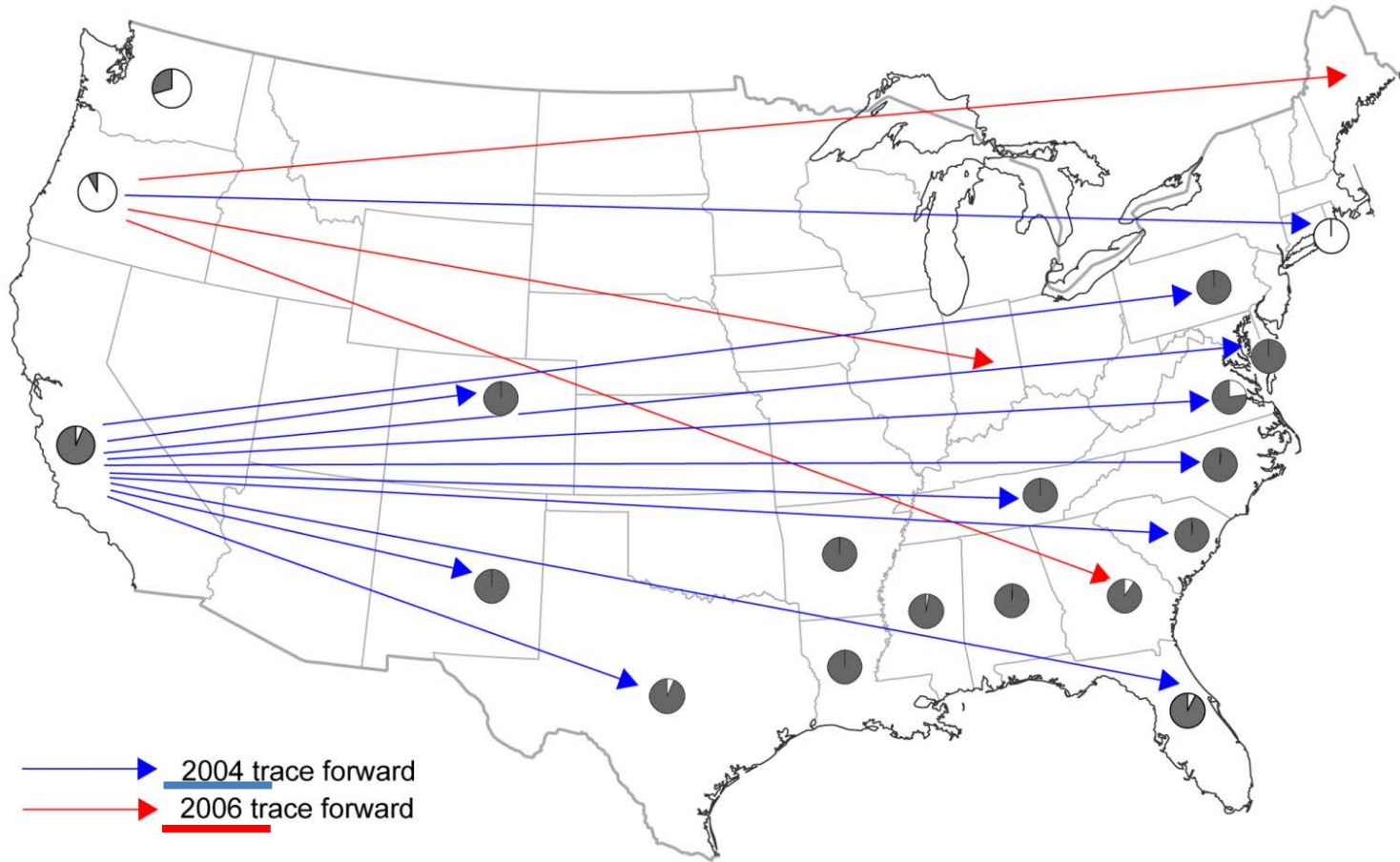




TRENDS in Microbiology

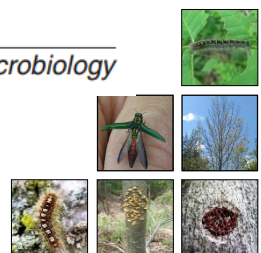




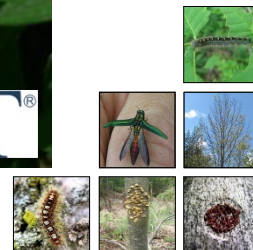
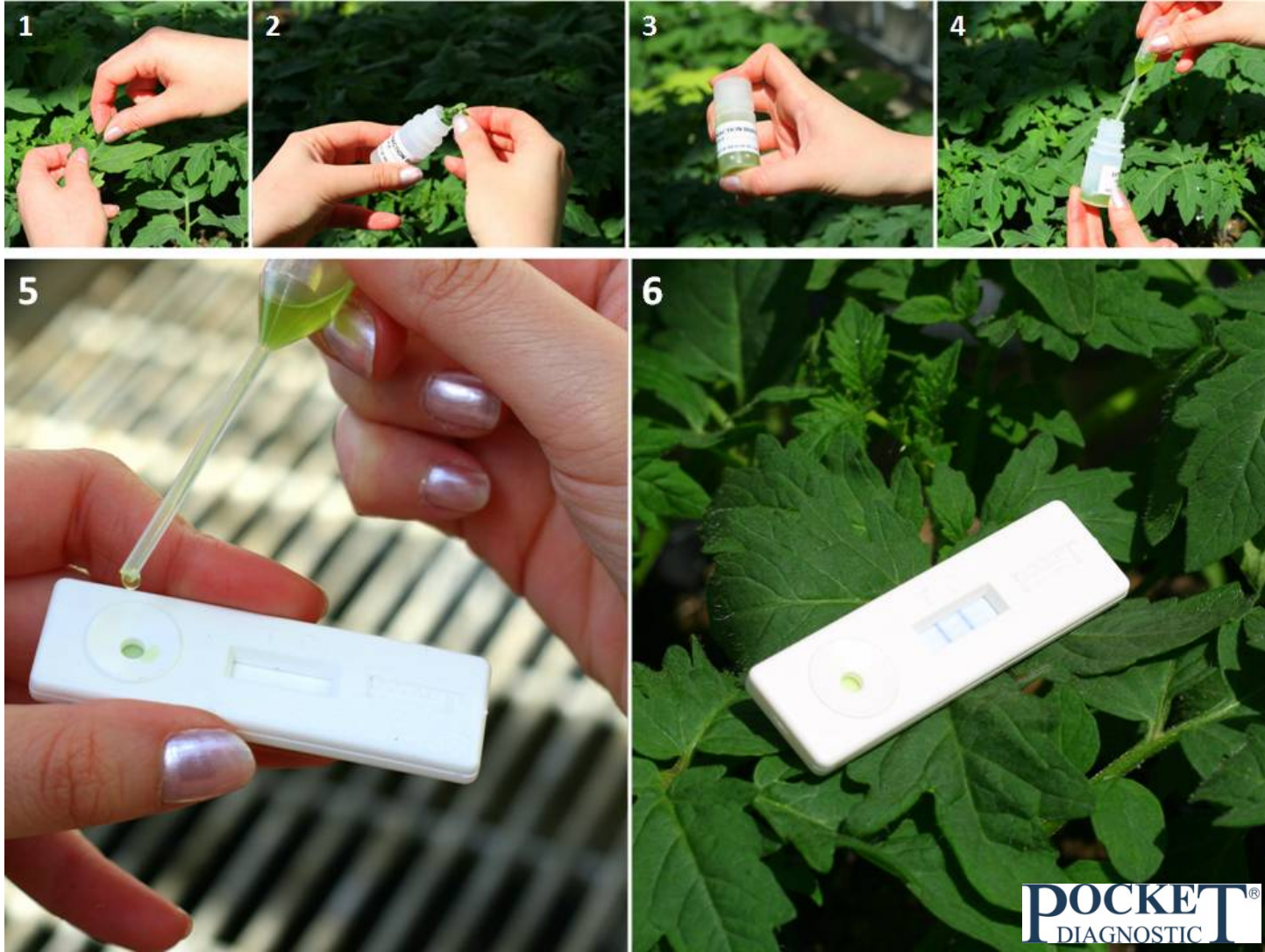


—▶ 2004 trace forward
—▶ 2006 trace forward

TRENDS in Microbiology

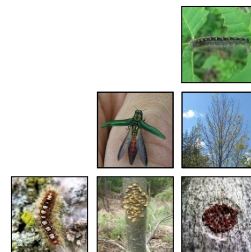


Phytophthora detection using lateral devices



Example 2:

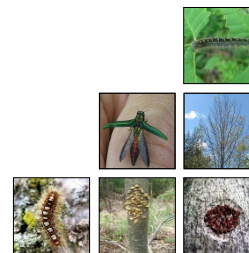
Use of monitoring to determine the pruning prescription based on risk



Neonectria fuckeliana affecting *Pinus radiata*



Canker caused by *Neonectria fuckeliana* on the stem of *Pinus radiata*.

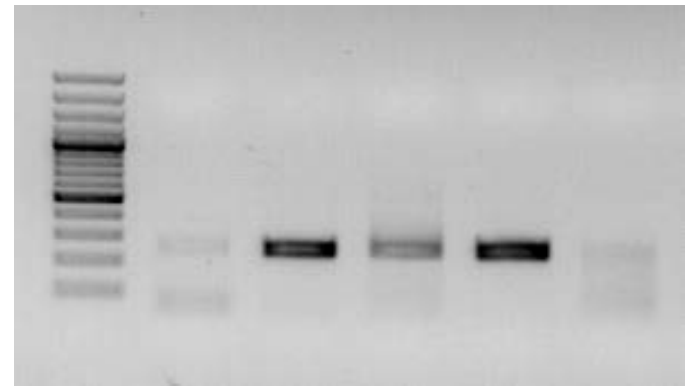




Wood sampling for the detection of *N. fuckeliana*



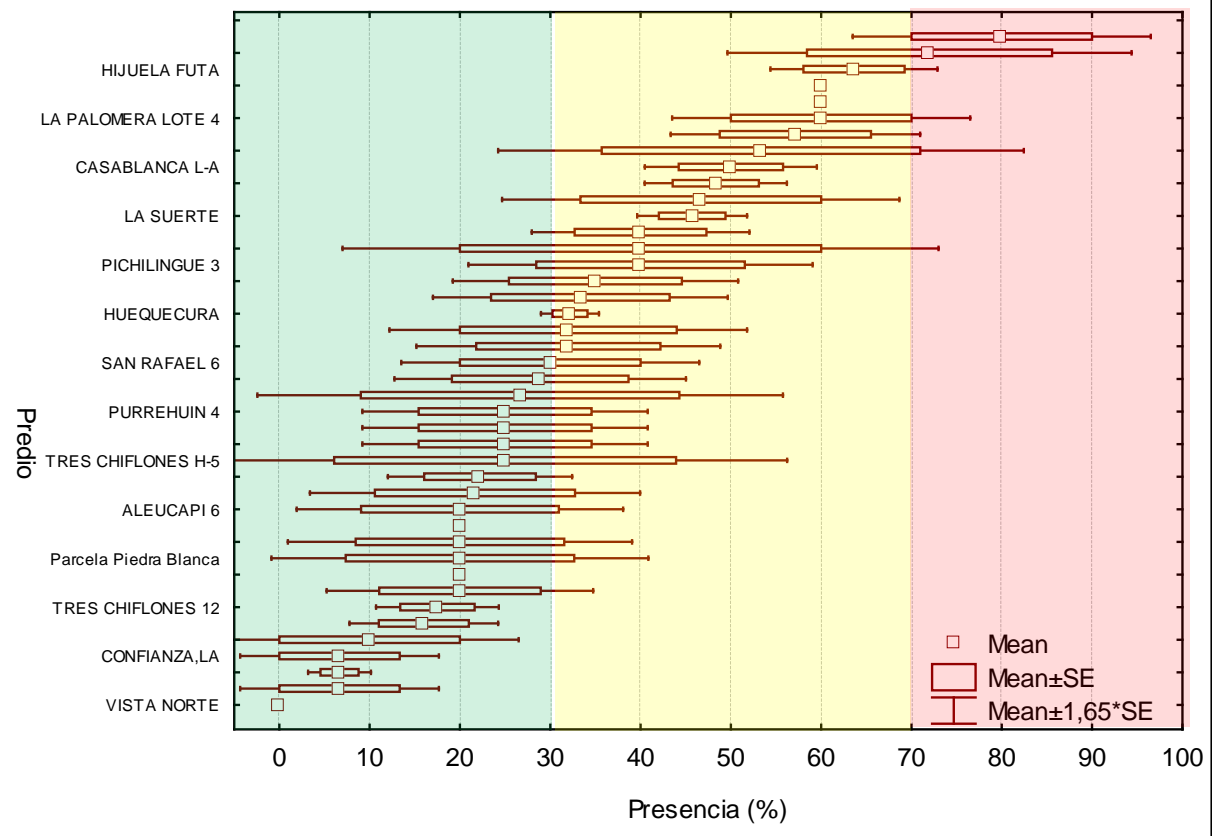
Wood sample



Detection of *N. fuckeliana* using molecular markers

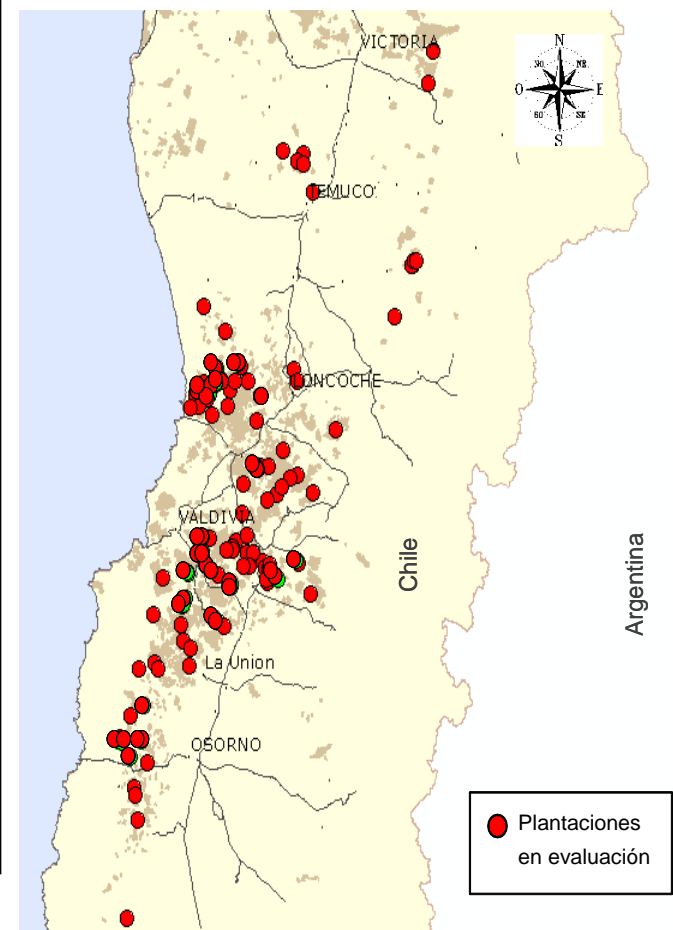


Presencia de *Neonectria fuckeliana* en predios de FVSA
(Evaluación molecular)



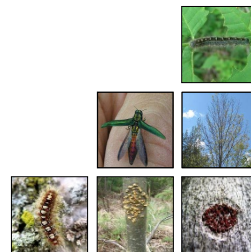
Winter

Summer



Example 3:

Monitoring of Beech Bark Disease



Beech bark disease (BBD)



Canker caused by *Neonectria faginata* on the stem of a beech tree.

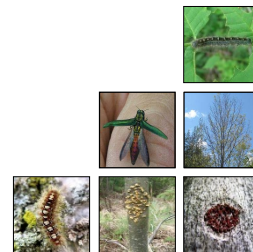


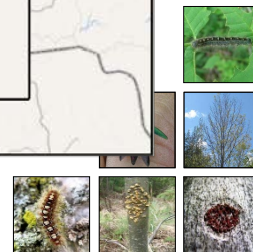
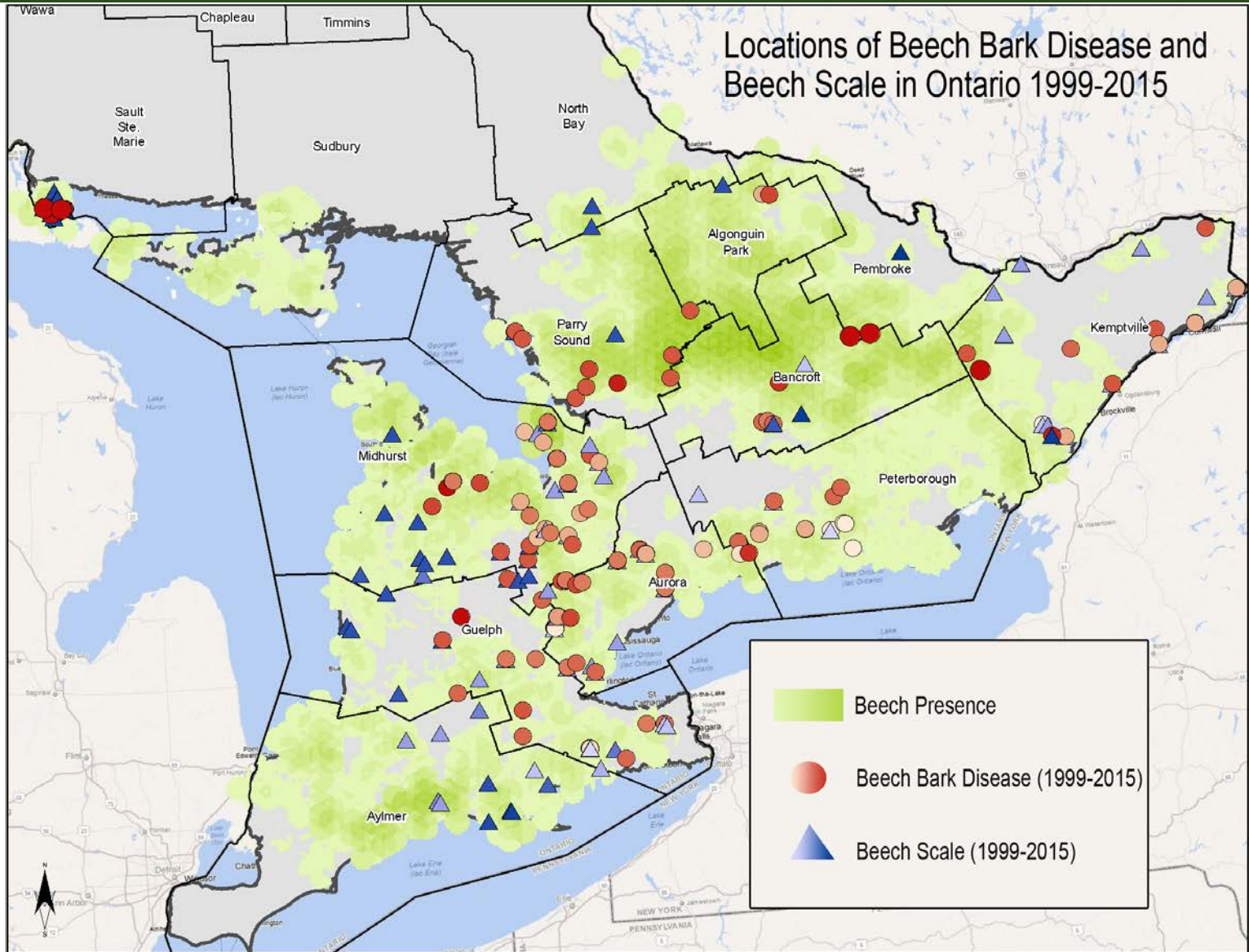
Death beech tree due to BBD.



Broken tree due to the damage caused by BBD.

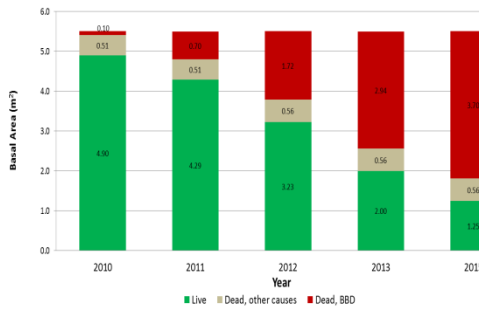
Bugwood.org



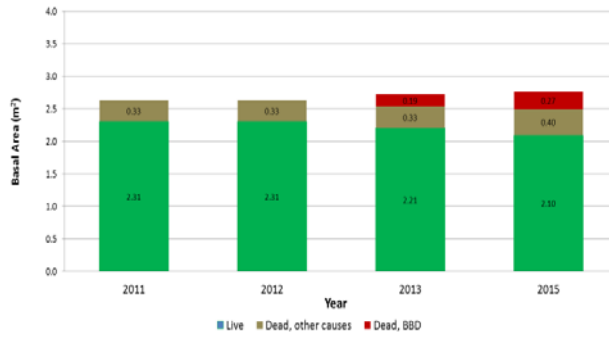




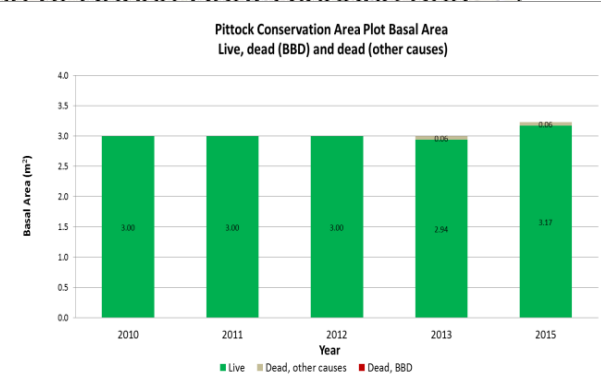
North Ril Lake Road Plot Basal Area
Live, dead (BBD) and dead (other causes)



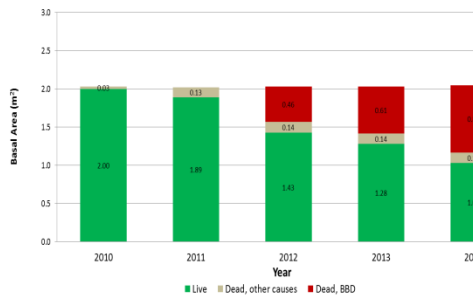
CE6100 Plot Basal Area
Live, dead (BBD), and dead (other causes)



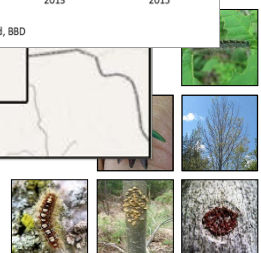
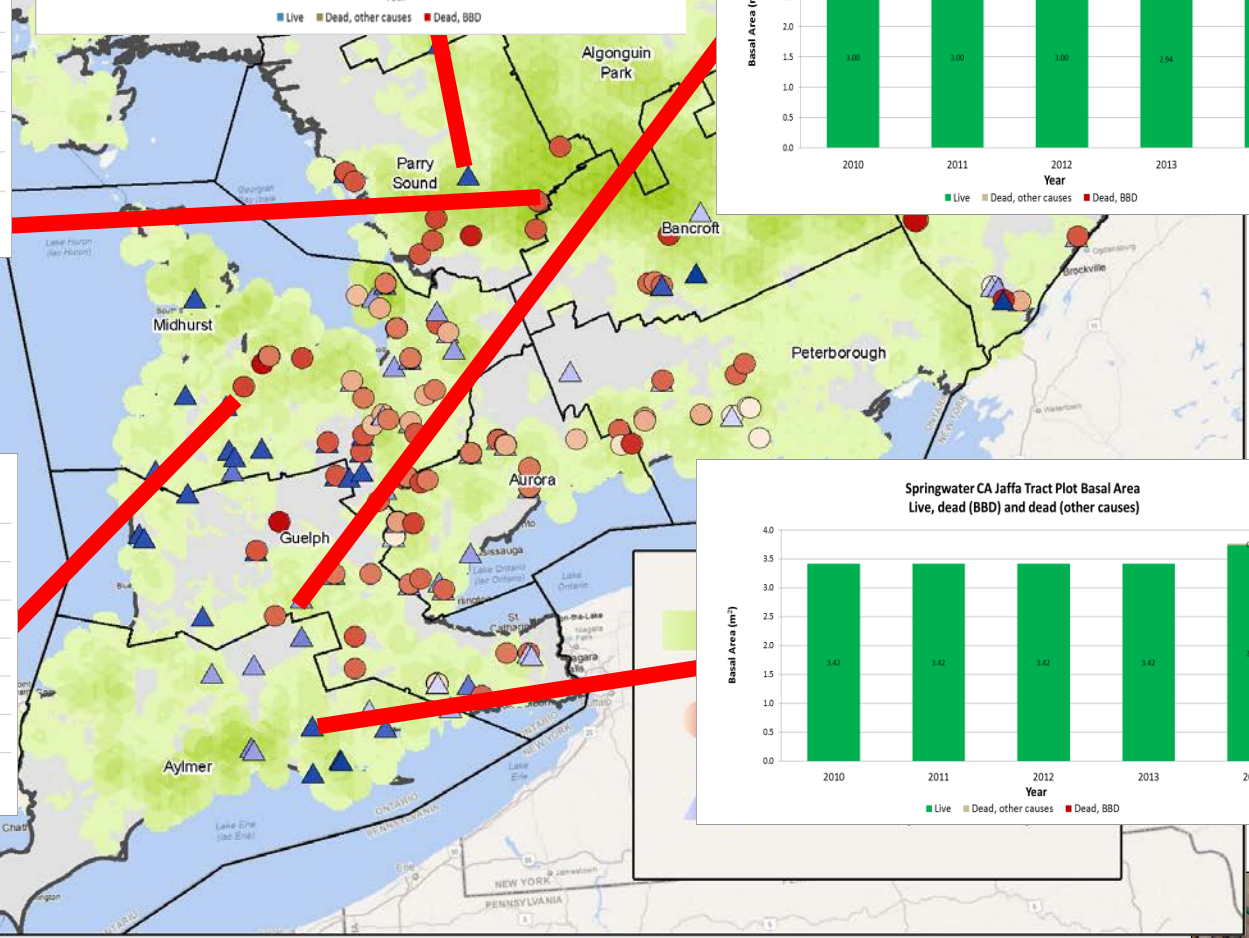
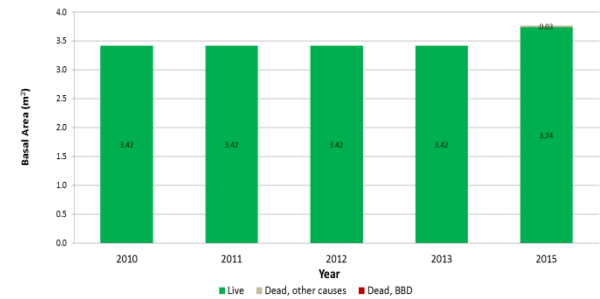
Pittock Conservation Area Plot Basal Area
Live, dead (BBD) and dead (other causes)



Old Baldy Plot Basal Area
Live, dead (BBD) and dead (other causes)

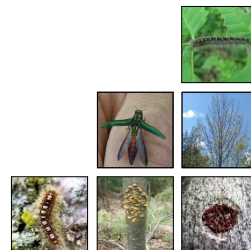


Springwater CA Jaffa Tract Plot Basal Area
Live, dead (BBD) and dead (other causes)



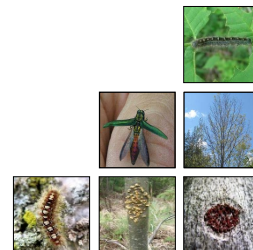
What product is possible to have with the BBD monitoring program?

- Selection of genetic resistance
- Determine areas to modify forest management
- Evaluate presence of biological control agents
- Areas where environmental conditions reduce the impact of the disease



Summary

- Monitoring **feeds** science and science **informs** monitoring
- Advances in **technologies** have changed the way we monitor
- The strengths and quality of the data is **highly correlated** with the strengths and quality of the monitoring effort
- With good quality data, it is possible to make **better decisions**
- The only way to move from “what I think” to “what I know” is **research**



Thank you

Merci

Gracias



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Forest Health Research Program

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