ISPM No. 15 and the incidence of wood pests: recent findings, policy changes, and current knowledge gaps

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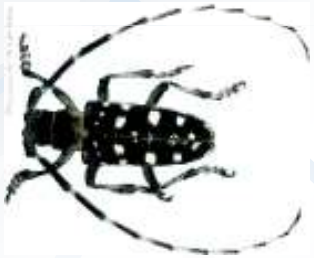
International Research Group on Wood Protection, IRG 42, Queenstown, NZ, 11 May 2011

Every Country Worldwide is Dealing with Exotic Pests

For example, in the USA: more than 500 exotic insects that feed on woody plants, including …

59 Scolytidae (bark and ambrosia beetles)

10 Buprestidae (metallic wood borers)



12 Cerambycidae (longhorned beetles)

3 Siricidae (woodwasps)

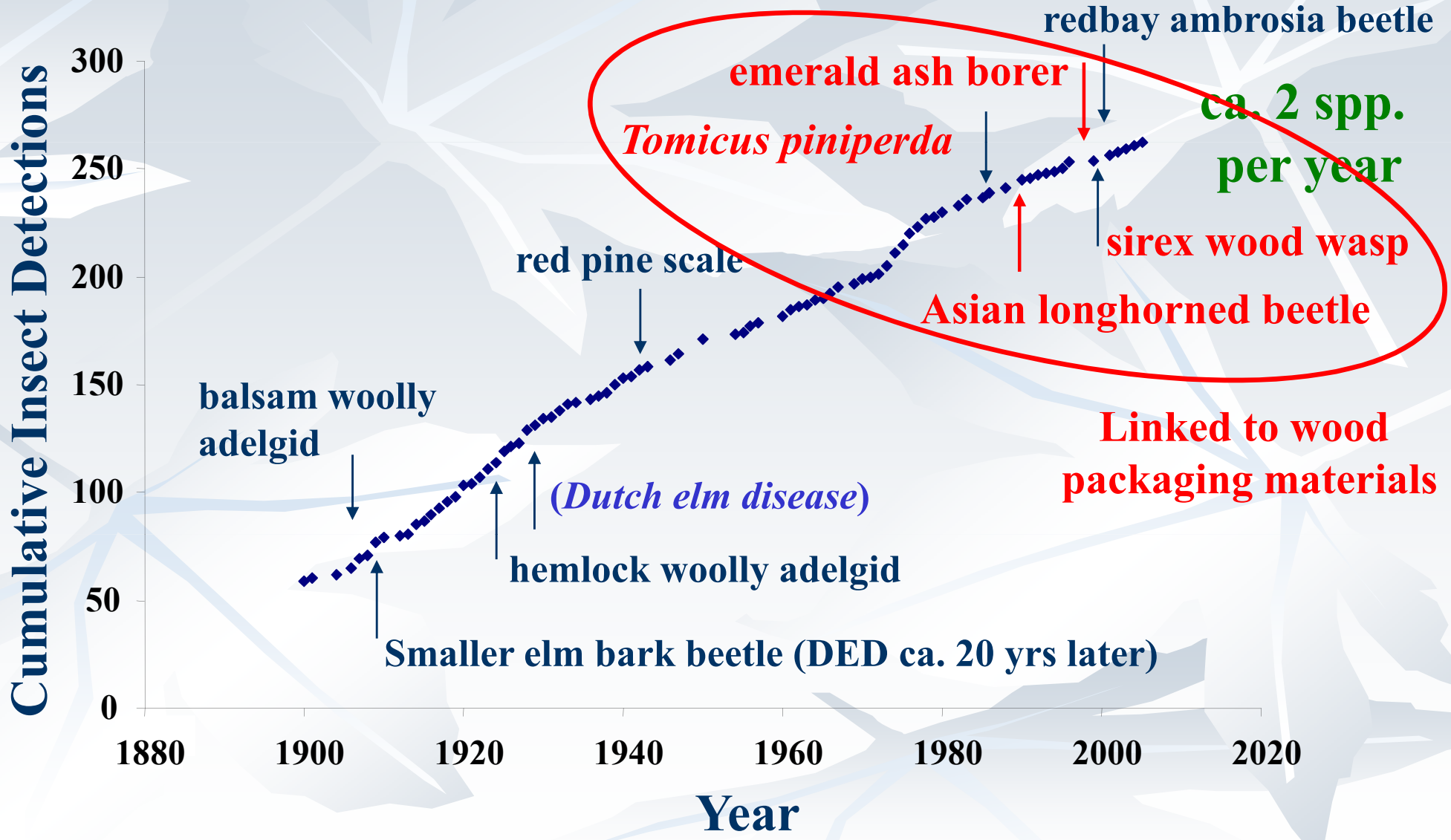
Emerald ash borer, USA/Canada (2002 -)

Agrilus planipennis
(Buprestidae)

Photos: www.forestryimages.org; www.emeraldashborer.info

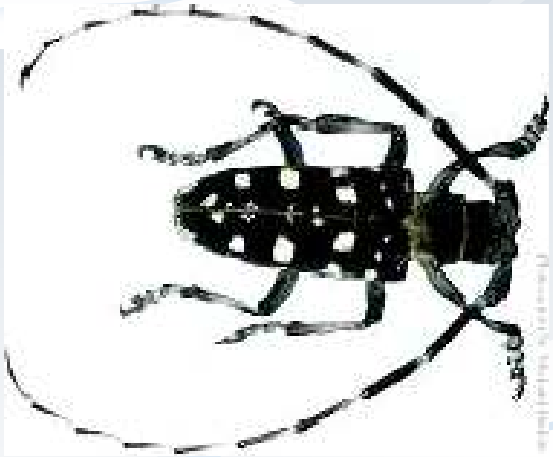
- As of 2010, > 50 million ash trees killed
- Ash is expected to be virtually eradicated in N. Am.

Forest insect establishments (USA) 1900 - 2010



Examples of Insects Found in WPM

Emerald ash borer (*Agrilus planipennis*)
Buprestidae (15,000 species)
EAB native to Asia
Now in: Canada, USA, Russia



Asian longhorned beetle (*A. glabripennis*)
Cerambycidae (20,000 species)
ALB native to Asia
Now in: Austria, France, Germany, Italy, Netherlands, Canada, USA

Sirex woodwasp (*Sirex noctilio*)
Siricidae (100 species)
Sirex noctilio native to Eurasia
Now in: Argentina, Brazil, Chile, Uruguay, Australia, New Zealand, Canada, USA, South Africa

Common types of Wood Packaging Material (WPM)

Pallets

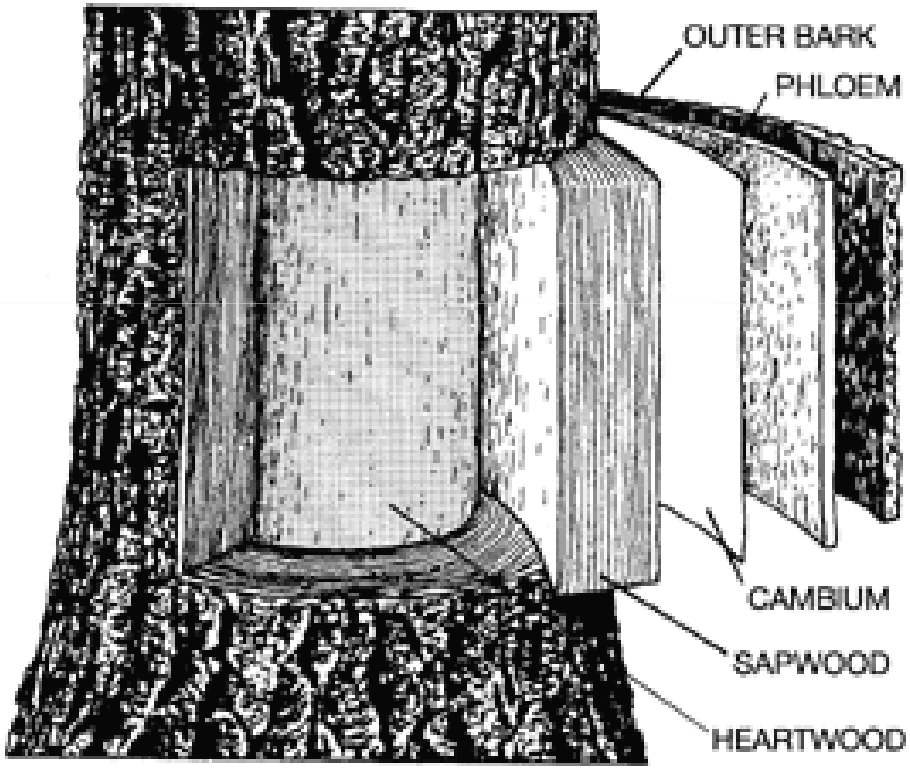
Dunnage

Spools

Crating

Life Cycles of Bark- and Wood-feeding Insects

- Most feed in the inner bark (phloem) and sapwood.
- Most infest stressed, dying, and recently dead/cut trees.
- Nutrient content affects insect developmental rates:
  cambium & inner bark - high, sapwood - much lower,
  outer bark & heartwood - very low.



Typical length of borer life cycle

Inner bark	<1 - 1 year
Sapwood	1 - 2 years
Hardwood	2 - 3 years

Borers concealed in wood, bark
Difficult to detect
Long risk period

A general rule of thumb…

If you trade with a country,
you are at risk of receiving pests
from that country

USA: Bark- & wood-infesting insects were interceped on WPM from 119 countries during 1985-2000

Top 10

Italy
Germany
China
Spain
Belgium
Russia
India
Mexico
France
UK

Source: USDA APHIS PEST ID

New Zealand: Scolytidae interceptions on WPM from 59 countries during 1950-2000

Top 10

Japan
USA
Fiji
Australia
Germany
UK
Papua N. Guinea
China
Sweden
Italy

Source: Scion / NZ Forest Research Inst., New Zealand

Container Ships are Getting Bigger and Can Cross Oceans in 1-2 Weeks

Largest from 2003-2006

OOCL Shenzhen (323 m)
Launched in 2003
Carries 8000 containers

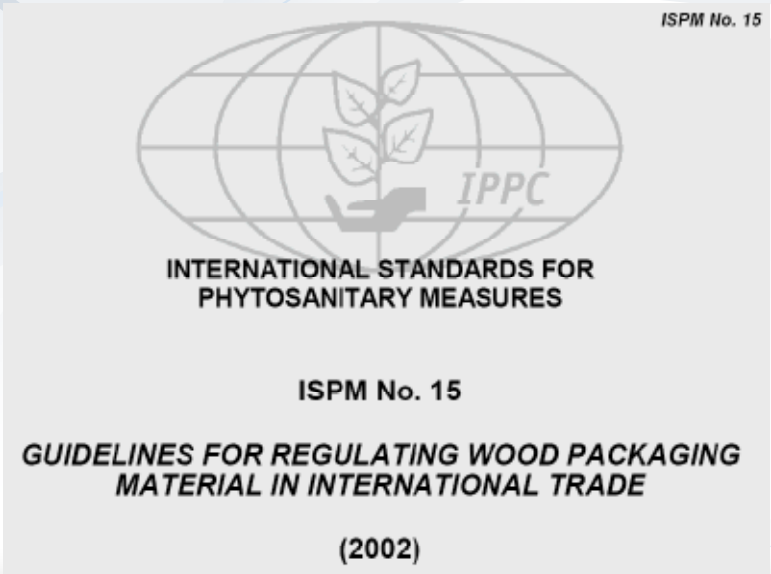
World's Largest since 2006

Emma Mærsk (397 m)
Launched in 2006
Carries 14,500 containers

ISPM 15: An International Standard to Reduce the Risk of Introducing Pests Associated with WPM

Codes:
Country
Producer
Treatment

(ISPM = International Standards for Phytosanitary Measures)



ISPM No. 15:
"Guidelines for Regulating Wood Packaging Material in International Trade"
(Approved in 2002)

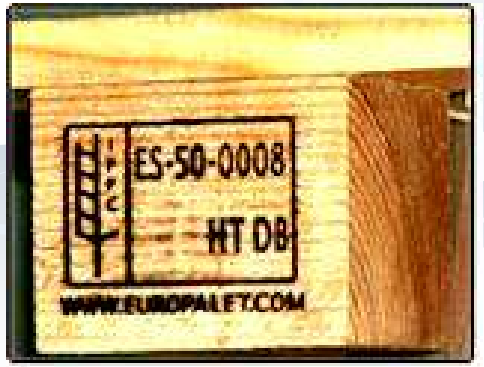
ISPM 15: Background Information

First approved in 2002.

First implemented in NZ in 2003
Australia in 2004
European Union in 2005
North America in 2006

Over 70 countries have now implemented ISPM 15

177 countries are signatories to IPPC



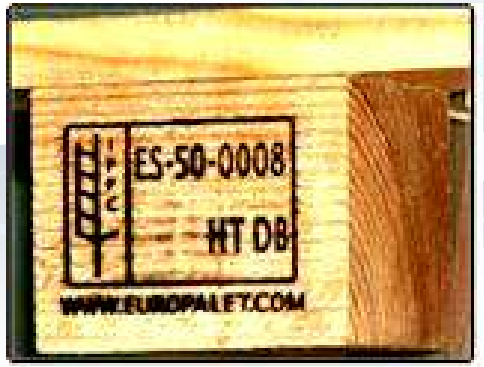
ISPM 15 Approved Treatments

HT: Heat treatment (56°C at the core for 30 min)

MB: Methyl Bromide fumigation (various concentration x time schedules)

HT and MB were first approved in 2002, and are still the only two approved treatments.

Other treatments are in development.



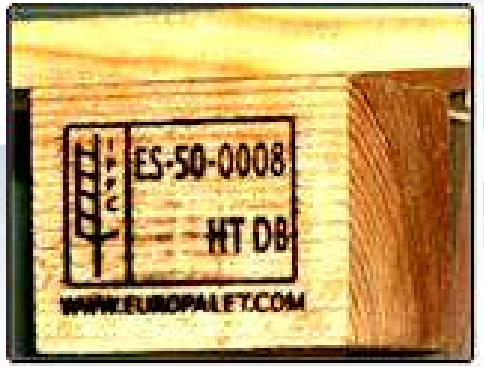
Major Changes to ISPM 15

Revised in 2006 and 2009 to improve efficacy

MB – time lengthened, 16 to 24 hr (2006)

Heat treatment – change from 56°C at the core to 56°C throughout the profile of the wood to allow for microwave heating (2009)

Many additional changes in 2009



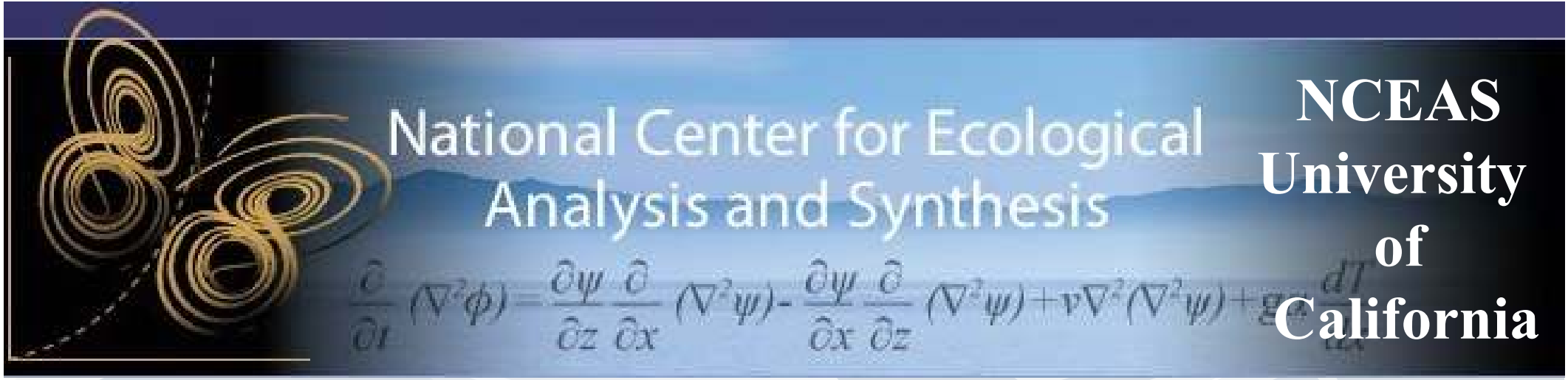
Bark Size Issue Addressed in 2009 Revision

Tolerance limits on the maximum size of individual pieces of residual bark allowed on WPM.

If <3 cm wide, then any length was OK.

If >3 cm wide, then had to be < 50 sq. cm (slightly larger than a credit card).

This change was supported by research conducted in Canada, Germany, UK and USA under auspices of IFQRG (International Forestry Quarantine Research Group)



Has ISPM 15 Made a Difference?

Change of incidence of live insects, before to after implementation of ISPM 15?

The available data are not actually comparable…

Pre-ISPM 15: Data presented on a *consignment* basis

Post-ISPM 15: Australia: 0.5% of WPM items had live insects
USA: 0.1%

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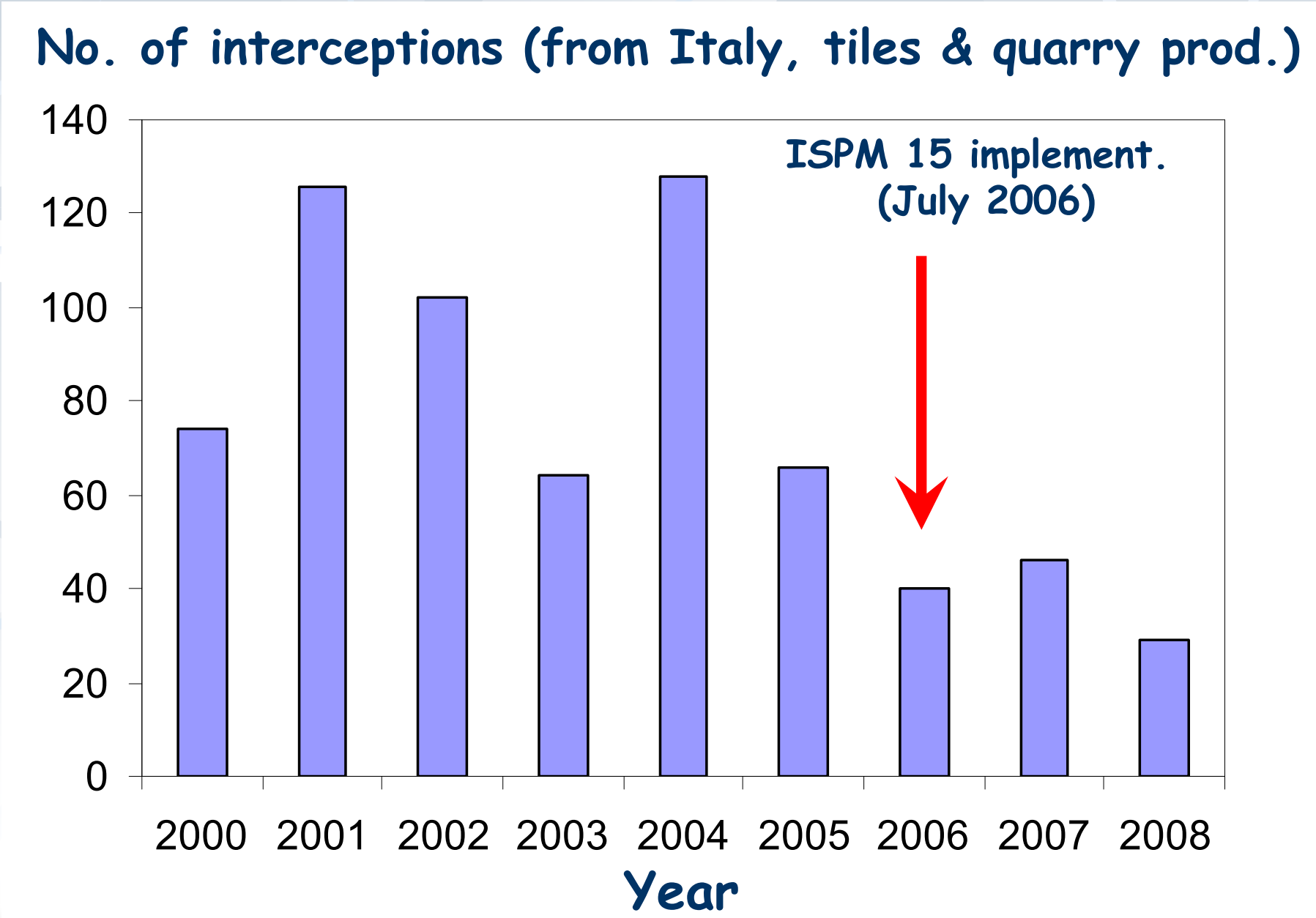
Protecting nature. Preserving life.™

USDA

SCION
Next generation biomaterials

B3 · BETTER BORDER BIOSECURITY

Change in interception rate post IPSM 15?



Source: Pest ID (USDA)

Does the Presence of Life Insects in Treated WPM Mean ISPM 15 Failed?

Not really, considering …

1. **Some insects can colonize after treatment** (especially when bark is present; but bark has now been addressed)
2. **Some spp. may be able to tolerate the treatments (?)**
3. **Equipment may be faulty or not calibrated**
4. **Fraud**

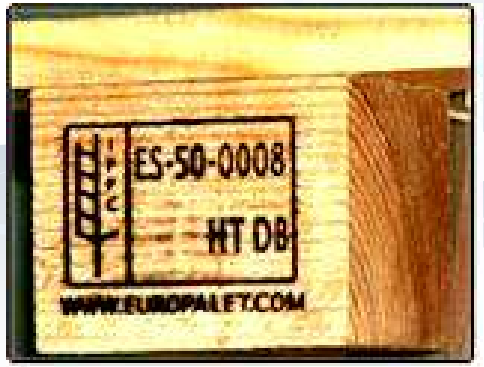
Future Research Needs

New treatments are still needed to sanitize wood.

Replacements / alternatives for Methyl Bromide

Is 56/30 adequate? Original HT research was based on Pinewood Nematode, and later adopted for insects. Would 60/30 or 60/60 be more effective?

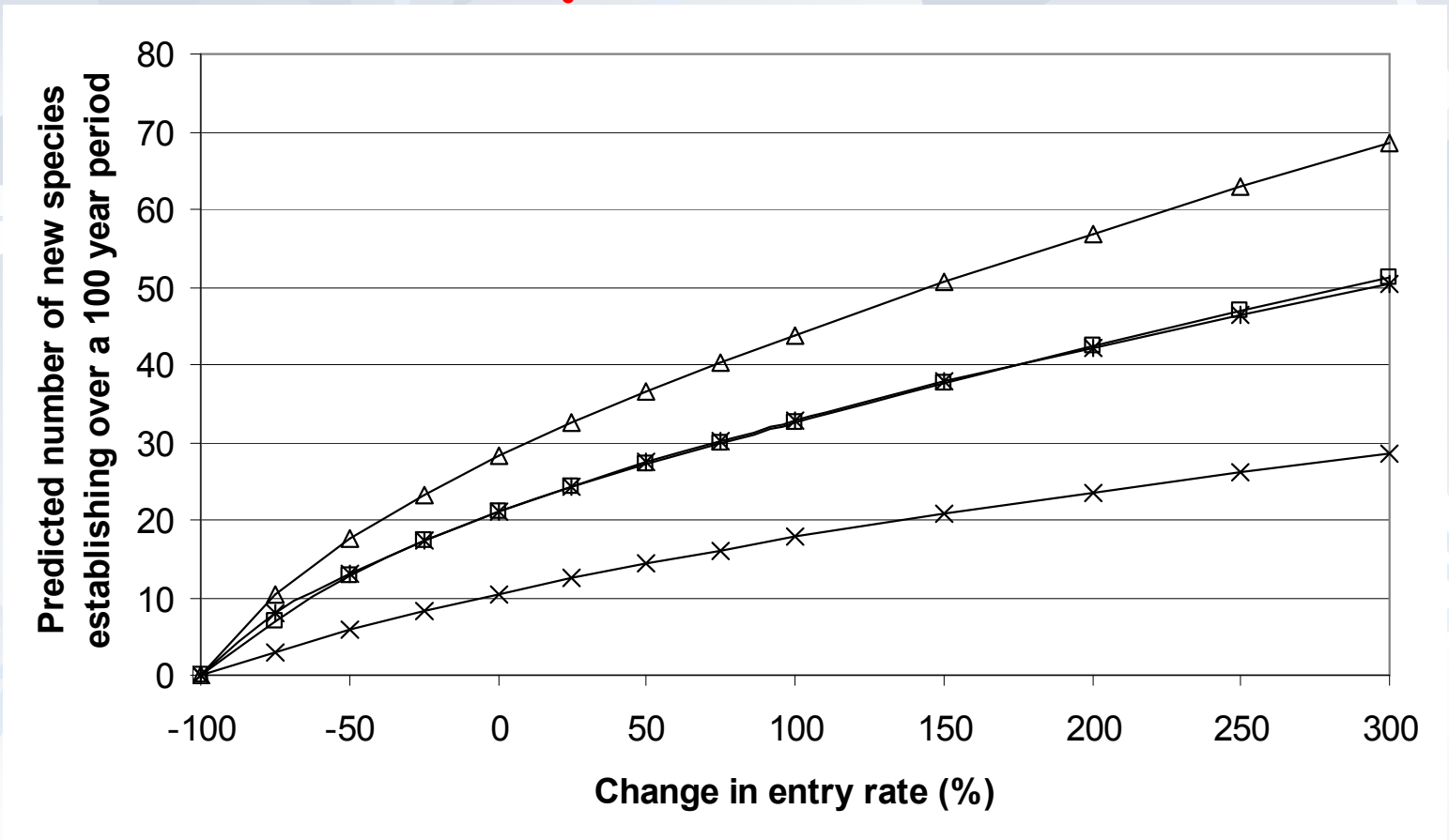
Are there methods to verify treatment?



Thanks!

Questions?

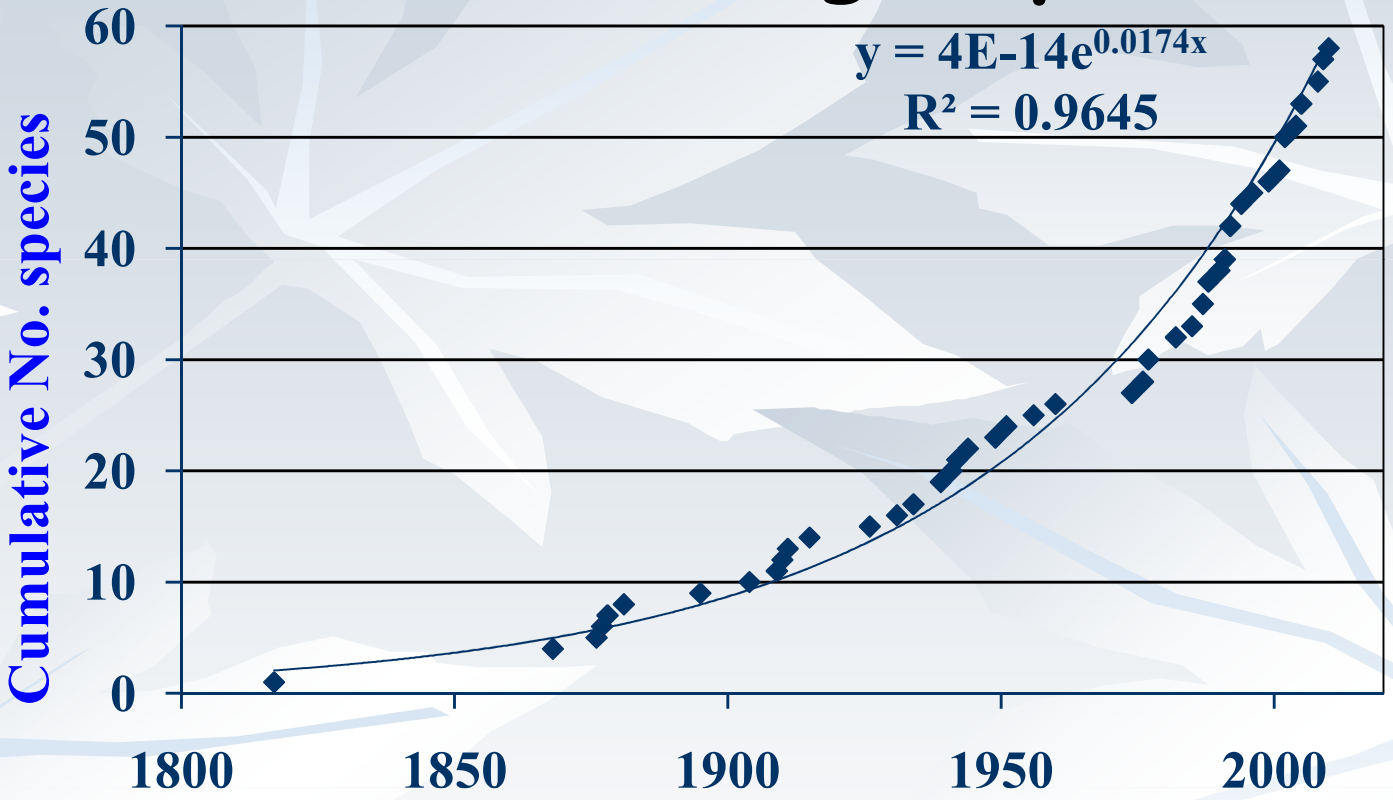
How Would Reducing the Pest Arrival Rate Affect the Establishment Rate of New Pests?



NCEAS work

(Want to include a slide on the Ecki function?)

The Number of Exotic Pests Becoming Established is Rising Exponentially



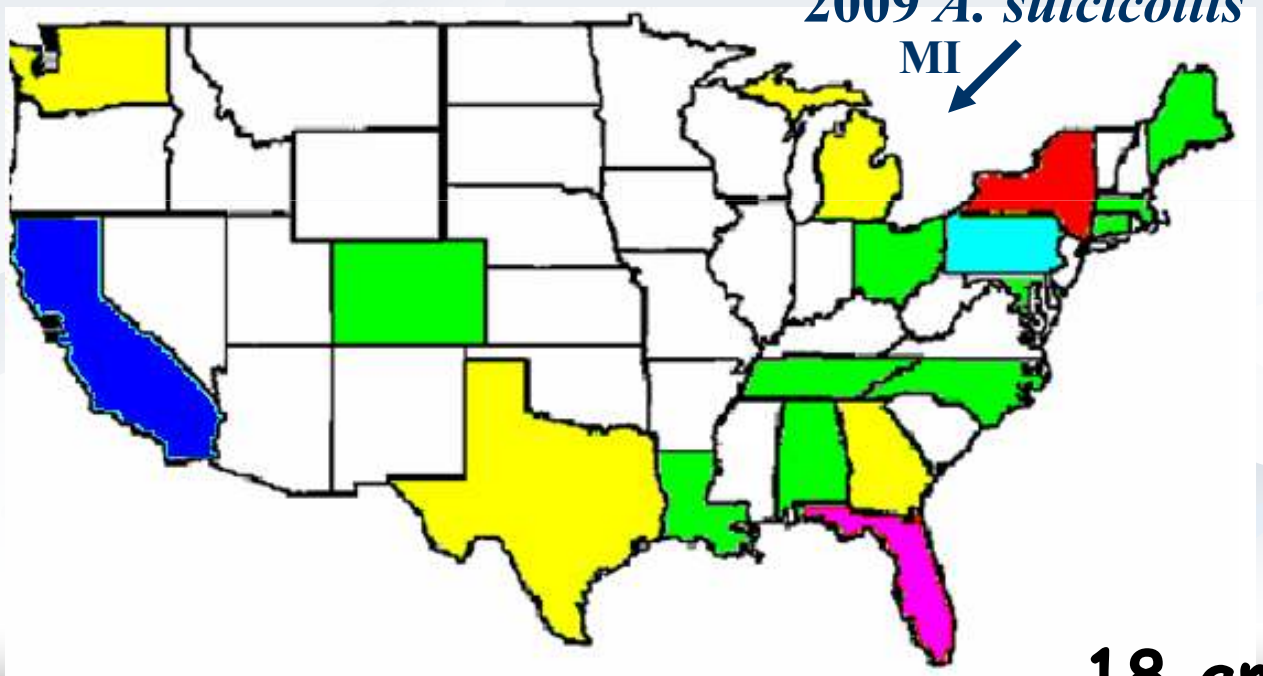
Cumulative number of exotic bark and ambrosia beetles (Scolytidae) established in the continental USA over time (N = 59 species through 2010).

(Haack and Rabaglia 2011)

39 Exotic Borers discovered in 1985-2010

First found in 18 states

- 1 Exotic
- 2 Exotics
- 3 Exotics
- 4 Exotics
- 5 Exotics
- 6 Exotics
- 7 Exotics



6 Cerambycids

2002 *A. planipennis*

2009 *A. sulcicollis*

MI

1 Siricid

18 ambrosia, 9 bark beetles