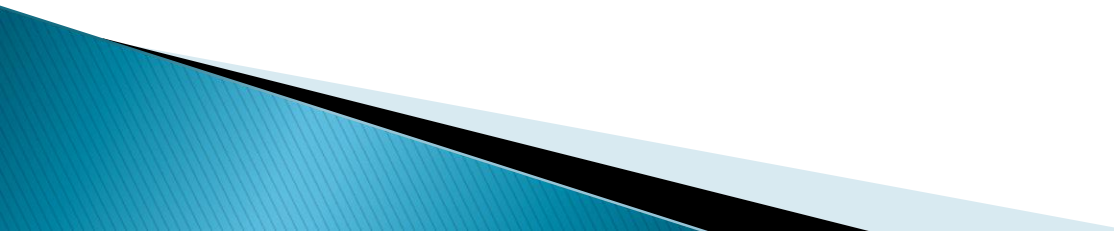




Exotic Insects of Concern

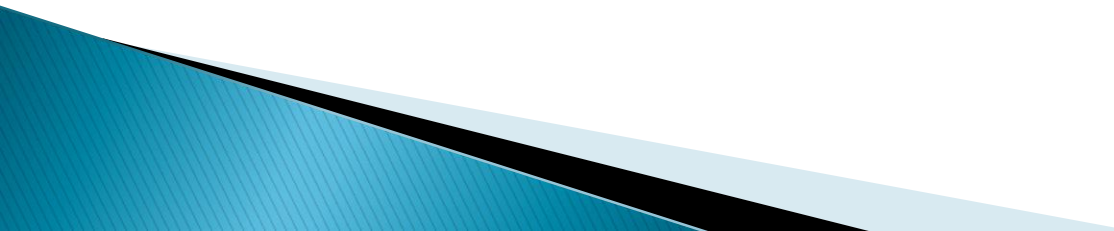
Elizabeth Graham, Ph.D.
USDA Forest Service, State and Private Forestry, Forest Health Protection

Introduction

- ▶ Non-native species introduced into urban and forest settings represent one of the greatest threats to forest ecosystems
 - ▶ Early Detection Rapid Response (EDRR) is the second line of defense
 - ▶ Greatest chance for eradication or control is immediately after introduction
 - ▶ 2001 – an agreement between the Forest Service and APHIS was formalized through a Memorandum of Understanding to establish an EDRR program
- 



Invasive Species in Boreal Forests

- ▶ Originally proposed that the extreme climate and low biodiversity of boreal forests would not be conducive to invasive species
 - ▶ Estimated species are moving north at an average of 16.9 km per decade
 - ▶ Most invasive insects originate from Eurasia, because of the similar plant genera
 - ▶ Exotic species tend to be better competitors and more adaptable
- 



Target Species

- ▶ Woodborers and bark beetles are among the most frequently intercepted insects at U.S. ports-of-entry
- ▶ Easily transported in solid wood packing materials

Pest Family	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Grand Total
Buprestidae	33	35	68	40	41	46	70	78	91	116	113	103	107	30	971
Cerambycidae	190	318	299	321	381	310	364	493	584	472	489	508	630	149	5508
Curculionidae	324	468	890	766	703	539	463	552	634	636	722	489	532	134	7852
Grand Total	547	821	1257	1127	1125	895	897	1123	1309	1224	1324	1100	1269	313	14331

> 50 exotic species of bark beetles are established in the U.S.

Information provided by:
Emilie Bess, PhD
Entomologist – USDA, APHIS, PPQ

Ips typographus

European spruce beetle



- ▶ Native to Europe and Asia
- ▶ Between 1985 and 2000, *I. typographus* was intercepted 286 times in association with packing material entering the United States
- ▶ Hosts: many species of *Picea*, can also infest *Pinus*, *Abies*, and *Larix*
- ▶ \$201 million and \$1.5 billion in losses in Washington and Oregon alone should this insect be introduced
- ▶ 65,060,800 hectares in Alaska are susceptible

Alaska
Ips typographus
European Spruce Bark Beetle
Susceptibility
3/21/2007

Legend



Susceptibility potential relates to:

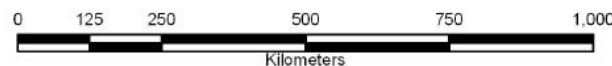
1. Establishment
2. Introduction

Establishment potential relates to:

1. Host species for *Ips typographus*.
2. Disturbance factors (Fires, Forest Damage, Flooding)

Introduction potential relates to:

1. Ports that handle commodities and solid wood packing materials shipped from countries where *Ips typographus* exists
2. Distribution Centers
3. Potential Markets



Map produced on 3-21-2007 by MFT
 file: suscept3.mxd
 Model: Model1a



Hylurgops palliatus

Lesser spruce shoot beetle



- ▶ Native to Europe
- ▶ Polyphagous with *Picea* as preferred host and has adapted to U.S. conifers
- ▶ Intercepted in ports and found in Pennsylvania
- ▶ Generally a secondary pest in its native range
- ▶ Vector of staining fungi and nematodes



Orthotomicus erosus

Mediterranean pine engraver



- ▶ Native to Europe and Asia
- ▶ Intercepted in wood packing material
- ▶ Associated with many fungi including, *Sphaeropsis sapinea* which has caused extensive mortality of *Pinus* spp.
- ▶ Broad host range includes many *Pinus* spp. as well as *Picea* and *Thuja*
- ▶ Causes the most damage in low elevation pine on dry sites

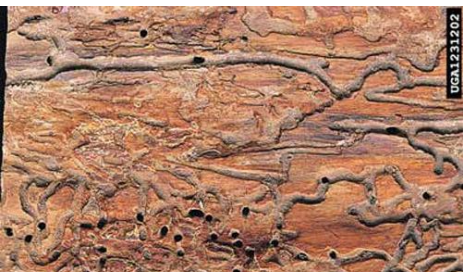


Tomicus piniperda

Pine shoot beetle



- ▶ Native to Europe, where it is one of the most destructive forest pests
- ▶ Attacks new shoots on pine trees, stunting growth and leaving them susceptible to other stressors
- ▶ First discovered in a Christmas tree farm in Ohio in 1992, now found in 19 states
- ▶ Damaged shoots flag (droop), turn yellow, and eventually turn brown & fall off the tree



Trypodendron domesticum

European hardwood ambrosia beetle



- ▶ Native to Europe
- ▶ Attacks broadleaf hardwoods but has demonstrated the ability to colonize new hosts
- ▶ Creates infection courts for decay fungi, decreasing quality of veneer
- ▶ Identified in British Columbia



Trypodendron lineatum

Pronotum with postero-lateral
light brown
patches

Longitudinal
Light brown
stripes



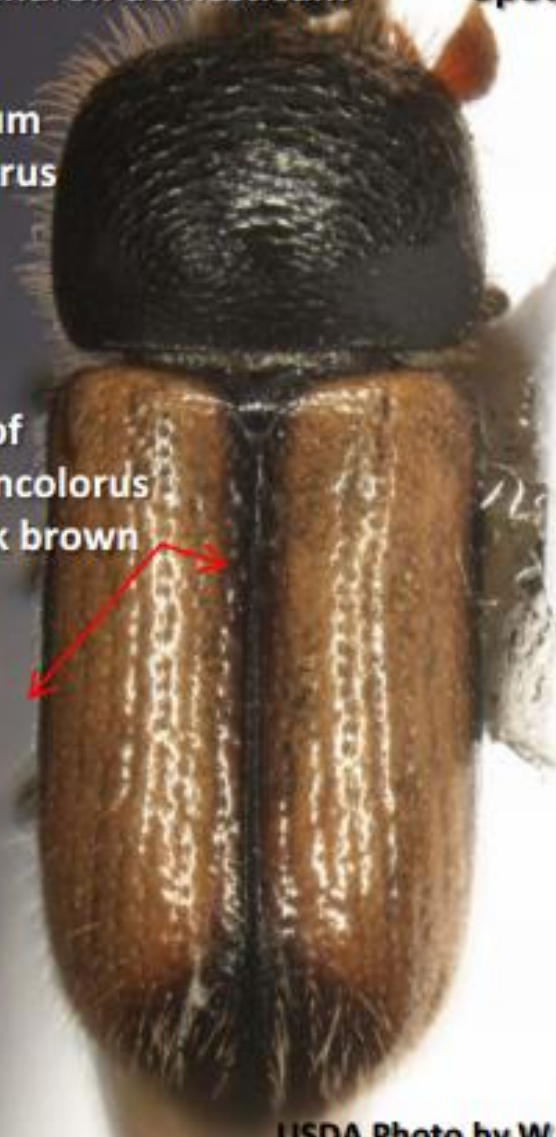
USDA photo by W. Carlson

Trypodendron domesticum

"Spock ear"

Pronotum
concolorous

Median of
Elytra concolorous
with dark brown
edges



USDA Photo by W. Carlson

Pissodes strobi

Sitka spruce weevil



- ▶ Currently found between B.C. and northern California
- ▶ Sitka spruce main host along Pacific coast, but infests many spp. of *Picea* and *Pinus*
- ▶ Heavy attack on previous year's leader can result in the loss of 3 or 4 years of height growth.
- ▶ Laterals then compete for dominance and this can result in forking or heavy branching.

Very important pest of Sitka spruce in B.C.



Tetropium fuscum

Brown spruce longhorned beetle



- ▶ Native to Europe and Asia
- ▶ Introduced in Nova Scotia and has become a serious pest of red spruce
- ▶ Eradication efforts have failed
- ▶ Multiple hosts: *Picea* spp., *Pinus* spp., *Abies* spp., *Larix* spp. Attacks Sitka spruce in Europe





Anoplophora glabripennis

Asian longhorned beetle



- ▶ First discovered in New York in 1996, Chicago in 1998, New Jersey in 2002, Ontario CA in 2003
- ▶ Native to Asia
- ▶ Hosts: *Acer*, *Populus*, *Salix*, *Ulmus*
- ▶ Declared eradicated from Chicago and Hudson County, New Jersey in 2008, Islip, New York in 2011, Canada 2013
 - 1550 trees cut down in Chicago
 - 23,000 trees cut down in New Jersey
 - 18,000 trees cut down in New York
 - 30,000 trees cut down in Canada
 - =72,550

Anoplophora glabripennis

Asian longhorned beetle



- ▶ 2008– a large infestation was found in Worcester, Massachusetts
- ▶ 28,000 trees were removed
- ▶ Inspection of 98 sq mi quarantine area revealed >19,000 infested trees
- ▶ Infestation dates back to 1997 (at least)
- ▶ 2010– six trees were identified as infested in Boston, across the street from the Arnold Arboretum (the oldest arboretum in the U.S.)
- ▶ Also discovered in Bethel, OH



Sirex noctilio

Woodwasp



- ▶ Native to Europe, Asia, and northern Africa
- ▶ The most common species of exotic woodwasp detected at United States ports-of-entry associated with solid wood packing materials.
- ▶ Attack living pine trees, caused extensive damage in pine plantation in New Zealand
- ▶ Vector decay fungi





Lymantria dispar

Gypsy moth



▶ European

- Likely introduction pathway from U.S. or Canada
- Flightless females are sedentary
- About 250 known food plant hosts
- At least seven detections since 1987

▶ Asian

- Likely introduction pathway from Asia
- Female can fly and disperse before egg laying
- About 600 known food plant host
- Two very recent detections



Tongass Deputy Forest Supervisor
Becky Nourse congratulates Customs
Officer John Whittaker.



Invasive species in Alaska



Western tent caterpillar



Sitka spruce weevil



Amber-marked birch leaf miner



Green alder sawfly



Spruce aphid



Questions?