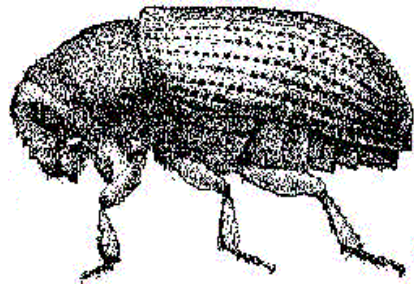
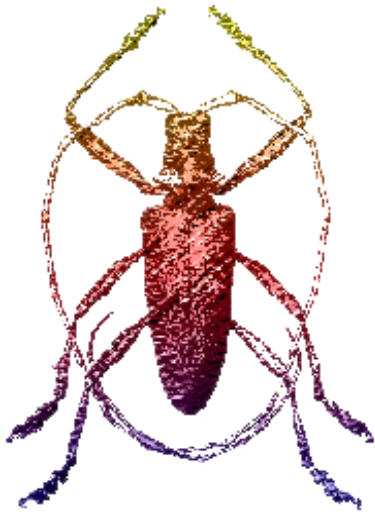


Exotic Wood Borer Bark Beetle National Survey Field Manual



3/10/2006
Prepared by PPQ/EDP/EP Staff

Borer Bark Beetle National Survey Field Manual 2006

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SURVEY GUIDELINES, NATIONAL AND LOCAL COORDINATION

This document provides standardized guidelines for conducting woodborer and bark beetle surveys in the U.S. The elements of the survey were selected by consensus of the National Cooperative Agricultural Pest Survey (CAPS) committee in cooperation with the USDA Forest Service (FS). Surveys are planned and coordinated through each Plant Protection and Quarantine State Plant Health Director's office. The goals of the national survey are to obtain information about:

- The presence, distribution, or absence of the target species,
- The advent of new exotic species,
- Patterns of distribution throughout the U.S. and possible pathways for introduction,
- The phenology of target exotic species in the U.S. and their selection of hosts,
- The characteristics of high risk habitats or sites,
- The survey methods, themselves.

INTRODUCTION

The Animal and Plant Health Inspection Service (APHIS) continues to expand its survey activities to detect non-indigenous woodborer and bark beetle species. The following elements are pivotal to the success of the National Survey:

- Interviews, inspection and trapping activities in and around:
 - Warehouses near major air and sea ports of entry
 - Dunnage storage and disposal areas,
 - Firewood storage areas and dealers,
 - Mulch operators
 - Nurseries and dealers in live woody plants (including nursery and dealer facilities receiving shipments of bonsai)
 - Pallet manufacturers
 - Sawmills
- Timely and accurate data reporting,
- Public outreach programs that create an awareness of wood pests, and encourage reporting from warehouse personnel and the public.

TARGET INSECTS FOR SURVEY

Scientific Name	Common Name (s)
<i>Agrilus planipennis</i> (Fairmaire)	Emerald ash borer (EAB)
<i>Anoplophora chinensis</i> (Forster) (= <i>Anoplophora malasiaca</i> Thompson)	Rough shouldered longhorned beetle, Citrus longhorned beetle (CLB)
<i>Anoplophora glabripennis</i> (Motchulsky)	Asian longhorned beetle (ALB)
<i>Callidiellum rufipenne</i> (Motchulsky)	Lesser Japanese cedar longhorned beetle
<i>Chlorophorous annularis</i> (Fabricius)	Bamboo longhorned beetle/tiger bamboo longhorned beetle
<i>Hesperophanes (Trichoferus) campestris</i> (Faldermann)	Chinese longhorned beetle
<i>Hylurgops (Hylurgus) palliatus</i> (Gyllenhal)	No common English name; (German common name, "Bastkaefer")
<i>Hylurgus ligniperda</i> (Fabricius)	Red-haired bark beetle, golden-haired beetle
<i>Ips sexdentatus</i> (Boerner)	Six-toothed bark beetle
<i>Ips typographus</i> (Linnaeus)	European spruce bark beetle
<i>Monochamus alternatus</i> (Hope)	Japanese pine sawyer
<i>Orthotomicus erosus</i> (Wollaston)	Mediterranean pine engraver beetle
<i>Pityogenes chalcographus</i> (Linnaeus)	Spruce engraver
<i>Sirex noctilio</i>	Sirex woodwasp
<i>Tetropium castaneum</i> (Linnaeus)	No common English name
<i>Tetropium fuscum</i> (Fabricius)	Brown spruce longhorned beetle (BSLB)
<i>Tomicus minor</i> (Hartig)	Lesser pine shoot beetle
<i>Tomicus piniperda</i> (Linnaeus)	Pine shoot beetle, Japanese pine engraver (PSB)
<i>Trypodendron domesticus</i> (Linnaeus)	No common English name, (German common name, "Borkenkaefer")
<i>Xyloborus</i> spp.	
<i>Xylotrechus</i> spp.	

OPERATIONAL INFORMATION

Trapping Parts and Supplies

Known Commercial Suppliers	Phone	Fax	Types of Supplies Available
PheroTech, Inc. Attn: Bruce Thomson 7572 Progress Way Delta, British Columbia CN V4G 1E9 <i>www.pherotech.com</i>	(888) 665-0076	(604) 940-9433	Lindgren Funnel Traps Alpha-pinene lure IPS lure (l. typographus) IPS lure holders Ethanol lure, UHR
El Tech Technology Attn: David Stein 7 Woodland Avenue Larchmont, NY 10534	(914) 834-8865	(914) 834-8903	Chaloprax lure Pheroprax lure Theysohn bark beetle traps (PSB traps)
Hercon Environmental Attn: Andrea Martinez Aberdeen Road Emigsville, PA 17318 <i>www.herconenviron.com</i>	(717) 764-1192 x2261	(717) 764-5211	Pheromone lures (various)
Advanced Pheromone Technologies P. O. Box 417 Marylhurst, OR 97036-0417 Attn: Philip Kirsch <i>aptsales@comcast.net</i>	(315) 299-2598	(971) 327-8407	Pheromone lures (various) Traps (bark beetles, wood wasps, cerambycids)
ISCA Technologies, Inc. P. O. Box 5266 Riverside, CA 92517 Attn: Annlok Yap <i>info@iscatech.com</i>	(951) 686-5008	(815) 346-1722	Pheromone lures (various) Traps (forest and agric pests including Sirex)
Bioquip 2321 E. Gladwick Street Rancho Dominguez, CA 90220 <i>www.bioquip.com</i>	(310) 667-8800	(310) 667-8808	Universal black light

Send your request with your approving official's signature to the address below, and then fax your request and it will be entered into the system; or, you can e-mail your order through the approving official.

Contact: Martha Garza, PPQ National Trap Coordinator, (956) 580-7222, 22675 N. Moorfield Road, Moore AFB 6407, Edinburg, TX 78539. Request PPQ Trap Supplies Database icon for availability and ordering database.

Order Forms

If ordering from the PPQ Trap Supplies Database, you can simply fill in the form (select quantities of lures under column in "Miscellaneous Pest") and submit it online. This is the format for ordering from the database:

Trapping Supplies Ordering Form						
Contact						
Name:	<i>Approving Official's Name</i>					
Phone:						
Fax:						
Inside Delivery Required?						
Comments:						
Status:						
Location:						
Product Description:						
Name	Pic	Abbreviation	Price	Quantity	Date Needed	Date Shipped

Reorders and Schedules

Lure trap maintenance typically follows a 2-3 month rotation, depending on environmental conditions. With insecticidal strips, you can just add a new strip.

TRAP SITES

General Site Considerations for Trap Placement

- Establishments and environs around sites:
 - Where exotic woodborers/bark beetles were discovered in previous surveys or inspections.
 - In the Emergency Action Notification (PPQ 523) database that received cargo treated for pests or bark at ports of entry. All PPQ personnel can gain access to this database to search existing EAN through Lotus Notes Workplace EANS Database.
 - Handling high risk cargo and SWPM, identified from contacts and leads during previous surveys.
 - Where dunnage is removed from ships, stored, and disposed of.
 - Where large amounts of urban tree and branch debris are collected, stored, and eventually disposed of (e.g. green wood waste recyclers, landfills, firewood dealers and repositories, sawmills, and incinerators) (New York handlers are specifically listed, because these handles waste in a particular manner that causes concern for the spread of ALB).
 - Near major seaports or airports of entry, especially those in close proximity to sites handling dunnage, wooden cable spools, wooden crating, and having arrivals of bulk cargo of steel, stone, heavy machinery, and other wood packed items.
 - Container de-vanning areas, etc. should be visited and evaluated as possible survey sites.

- Nurseries and dealers :
 - Receiving shipments of foreign bonsai or other living woody plants.
 - That have received ash trees from areas near Detroit and around the Great Lakes.
 - Urban forests, urban parks and arboretums.
 - Native production and non-production forested areas outside the immediate port environs, and within a given mile radius that is determined at the outset of the survey by availability of personnel and resources.

TRAPS



Lindgren 12-funnel trap.
Photo: Phero-Tech

Lindgren® Funnel Traps

Trapping Period

The trapping period will be throughout the approximate adult activity period from mid-March through mid-October, depending on local climate. Traps should be placed in the field as soon as adult activity periods begins, and remain through approximately mid-October or later. Actual trapping periods could vary by location. The following checklist contains examples of bulk items that can be ordered ahead.

√	Bulk Supplies
	Traps, trap hangers, lures
	70-75% ethanol
	Preservative: 50:50 water to propylene glycol (Sierra brand or other lower toxicity propylene glycol based antifreeze) with a few of drops of liquid detergent added to break up surface tension
	Disposable latex gloves
	“Locking zipper” type plastic bags
	Labels and data sheets
	Mailing tubes or boxes

Number and Types of Traps

Typically, three, eight or 12 -funnel Lindgren traps are placed at each site. Each trap is baited with one of the lures listed below, or with a combination of the listed lures that is appropriate for the habitat.

Lure Handling, Changing, and Other Information

- Store lures in a freezer until used.
- Replace lures (typically) every 6 to 12 weeks.
 - UHR alpha-pinene and ethanol lures have a field-life of approximately 90days at 70-75° F.
 - Direct sunlight reduces lure lifespan and may make traps less attractive to target species.
 - Exotic *Ips* EBB lures have a field-life of approximately 60 days at 70-75° F. These lures should be changed approximately every 8 weeks, or as lures become depleted.
 - Lures may become depleted more rapidly at higher temperatures. The amount of attractant remaining in the lures should be monitored biweekly when the traps are checked.
- Record the change date for each lure on the trap card. This will provide information on the longevity of the attractants.
- Add kill strips every 2 months.
- Transport and store lures separately in a large sealable plastic container to prevent breakage and contain leaks.

Trap Placement

The criteria are listed in approximate order of importance.

1. Place traps within 100m of potential host trees.
2. Set traps at least 25m apart when possible—but never closer than 10m apart.
3. Place traps out of direct sunlight, or in partial shade. E.g., at the margin of a stand of host trees.
4. Place traps with EBB lures 25-50m from possible host conifer trees.
5. Avoid placing traps near obviously injured or fallen potential hosts, which could compete for target species.
6. Place traps upwind (based upon prevailing winds) of potential sources of target species.
7. Place traps in line-of-sight from potential sources of target species (e.g. piles of SWPM, possible host trees etc.).
8. Make sure traps are not obscured by vegetation. Clip or remove any such vegetation.

Trap Setup

Traps can be set up on stands, hung from rope, or suspended from a branch or other object. In all cases, traps should be hung so that the collecting container is at least 12" above the ground and any ground cover or other vegetation. Then:

1. Attach lures using nylon cable ties or the hangers provided.

2. Use disposable latex gloves and change them between lure types to prevent cross-contamination.
3. Ensure that the rubber stopper is secure inside the bottom of the collecting cup with the large end of the stopper on the inside of the cup to prevent it from falling out.
4. Fill the collecting cup 1/3 to 1/2 full with preservative BEFORE attaching it to the trap.
5. Be sure that all the flanges on the bottom funnel and collecting cup engage properly.
6. Record the trap site data on the trap card.

√	Supplies for Placing Traps
	8- or 12- funnel Lindgren trap with "wet" style collecting cup
	Lures: UHR alpha-pinene (blue pouch), UHR ethanol (black pouch), 3-component exotic Ips EBB lures (2 bubble caps, 1 pouch).
	Sealable plastic container with tight-fitting lids to store and transport lures (one container per lure type).
	Lure holders (nylon cable ties or lure holders provided)
	Disposable latex gloves
	Hammer (for pounding in rebar)
	2-3' length of rebar (for pilot hole for trap hanger)
	Small twine, rope or twist ties to secure trap to hanger
	Gallon jug of preservative (see below)
	Trap tags
	Trap cards or data sheets
	Water or other hand cleaner for washing up
	Paper towels

Checking Traps

1. Check traps every two weeks.
2. Examine trap for damage.
3. Remove any debris blocking funnels, including leaves, twigs, spider webs etc.
4. Ensure that all lures are still in place and still have fluid in them.
 - The fluid levels in the transparent bubble caps are visible.
 - Vapor pressure may make empty UHR ethanol and UHR alpha-pinene pouches appear full. These UHR lures are particularly prone to leaking.
5. Remove the cup from the bottom of the trap and remove all debris with a pair of long forceps (leaves, twigs etc.).
6. Flush cup contents with water through a paint filter to collect any entangled specimens.
7. Strain filtrate into a wide mouth container (e.g., a quart-size yogurt or cottage cheese container).
8. Check thoroughly for insects.
9. Rinse filter contents with a small amount of alcohol to rinse off antifreeze (ethanol)
10. Again, remove any large debris, rinsing it off into the filter first to ensure no insects are adhering to it.

√	Supplies for Checking Traps - tote box containing the following supplies
	Paint filter for straining trap contents
	Wide mouth container to strain fluid into (e.g., quart-size cottage cheese or yogurt container)
	Small empty can (e.g. tuna fish can) to place collecting cup on to avoid tipping over
	Quart and gallon size "locking zipper" type plastic freezer bags
	Plastic squeeze bottle with 70-75% alcohol
	Small paint brush for manipulating small specimens
	Forceps
	Empty gallon container (e.g. milk jugs) for used antifreeze
	Wire cutters
	Small funnel
	Lubricant (bar soap or wax for collecting cup rims)
	Adhesive labels for specimen cups
	Permanent marker
	Water or other hand cleaner for washing up
	Paper towels

Processing and Submitting Specimens

1. Place the filter and its insect contents into a quart-size “locking zipper” plastic freezer bag.
2. Saturate the sample with ethanol, but not to the extent that ethanol floats throughout the bag.
3. Place one or two paper towels in the bag and saturate them with ethanol.
4. Complete and place one of the paper labels in the bag. The label should contain the following information:
 - a. Date sample was collected.
 - b. City where sample was collected.
 - c. Type of site (urban forest, SWPM importer or recycler).
 - d. Lure type (i.e., Ips EBB, UHR a-pinene/ethanol, UHR ethanol).
 - e. Collector’s name.
5. Remove all air inside possible, and zip the bag shut.
6. Complete and place an adhesive sample label on the outside of the bag.
7. Place the bag inside a one-gallon “locking zipper” plastic freezer bag.
8. Place the rest of the sample bags for a sample period in the gallon bag, following the preceding directions. When all the samples for a period are in the gallon bag, remove the air, and zip it shut.
9. Place that bag inside another gallon bag, remove the air, and zip it shut.
10. Place the packet of “locking zipper” bags inside an inexpensive small, flat, rectangular (dimensions of around 6-8 inches long, 4-5 inches wide, and 2-3 inches high) plastic opaque airtight.
11. Send the package via overnight mail or Federal Express to the person(s) designated by the SPHD to sort trap contents.
12. Pour preservative back into the collection cup and top up to 1/3 or 1/2 full with fresh preservative if necessary.
13. Record on the trap card the date the traps were set, checked or serviced, and removed.
14. Record on the provided data sheet whether a trap yielded specimens. Use indelible ink to complete the data sheet.

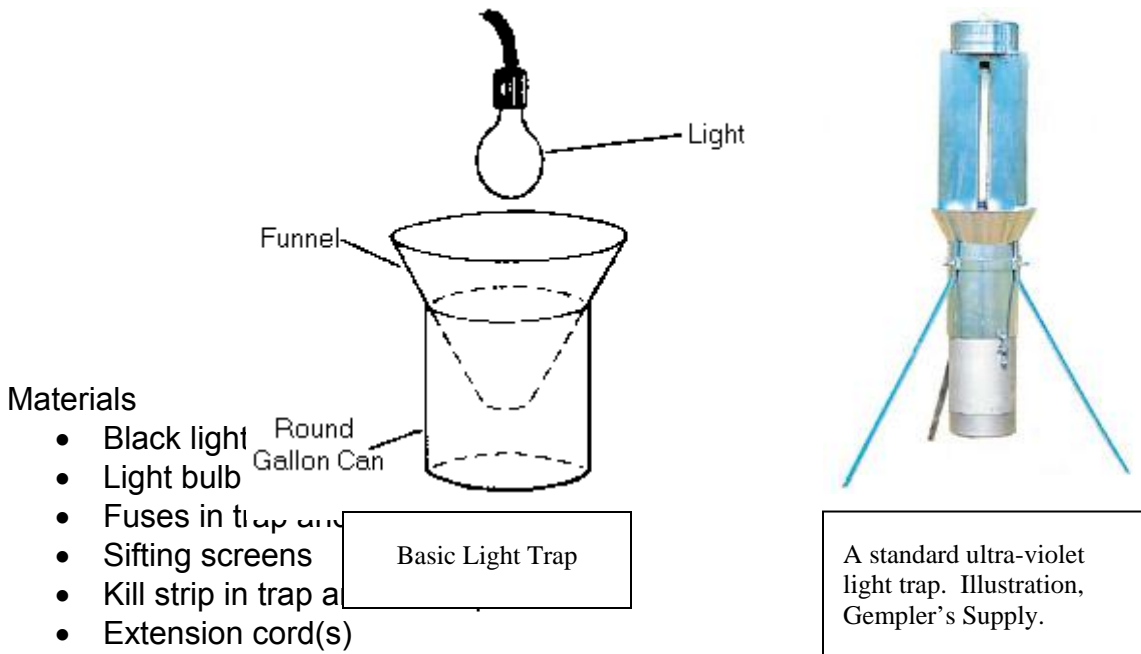
√	Supplies for Submitting and Processing Specimens
	70-75% ethanol
	Forceps
	Sample data labels and data sheets
	Indelible ink pens
	“Locking zipper” type plastic bags
	Mailing tubes or boxes

Light Trapping

Description

The attractant is a 22-watt black light tube mounted on clear acrylic vanes. The collection container is a 5-gallon polypropylene bucket with an aluminum funnel that fits the lip of the bucket. Commercial traps come equipped with ballast, photo switch, aluminum lid, and attaching cords. Some are equipped with a power cord with alligator clips for 12-volt DC operation, or the light setup may be purchased to operate on 110/115 V AC household type current.

Attracted insects are stunned when they strike the acrylic vanes. They fall through the funnel, and drop into a collection container. Some include another small funnel and two screens that sift the insects by size and minimize specimen damage. The size of the lamp is less of a consideration in trap efficiency than the intensity of the lamp. Ultra-violet (“black light”) lamps are of higher intensity than incandescent lamps; mercury quartz lamps combine ultra-violet and visible light to provide a broader light spectrum than either type alone. Light traps using a 125 W mercury-vapor bulb have been used to indiscriminately capture multiple moth spp. (and other insects). An ultra violet light trap fitted with a transparent trap may catch a number of moths, but seem to capture fewer Coleoptera.



Assembly

1. Assemble the trap according to manufacturer's instructions.
2. Hang a kill strip on the inside of the collection container. Be sure to avoid direct contact with the chemical and avoid breathing the vapors.
3. Replace the strip every 2 months or sooner if insects are not dead in a reasonable time. An additional kill strip in the trap may increase

effectiveness. Always handle kill strips with gloves or with the foil pouch in which it is delivered.

4. Place the small screen (1/4 inch mesh) in the bottom part of the collection container, allowing at least an inch between the screen and the bottom for the smallest insects to fall. Place the large screen (1/2 inch mesh) above the bottom screen, separated by at least an inch to allow sifting out of larger insects.
5. Secure the collection container to the black light trap.

Trap placement

Most insects are attracted to black light traps that are no more than 200 feet away. The best results occur when traps are placed with a 180 degree arch of visibility within 200 feet of a host.

Outdoor Placement

1. Place the trap in an area with minimal interference from other light sources. If possible, place it 500 feet away from other light sources.
2. When possible, place near a light reflective surface to increase its visibility.
3. Place close to the potential host trees adjacent to areas where foreign host materials have been stored or handled.
4. Try to place the trap in an unobscured area. Placing the trap in the center of a clump of trees or in an area that is closely surrounded by buildings may drastically reduce its effective range.
5. Place the trap some distance from the edge of a clump of trees and raise the light off the ground to at least eye level for increased effectiveness. An example of a good location is a flat roof top of a poorly lighted warehouse.

Indoor Placement

1. Place one black light trap per building.
2. Place in an area where there is minimal interference from other light sources. When possible have the warehouse lights turned off at night.
3. The black light trap should be placed at least at eye level height. If possible, place the black light trap on the flat roof of an indoor office, restroom, or similar structure.
4. When possible, place near a light reflective surface to increase the visibility of the light.
5. Do not block the trap's range by screening it with interfering structures or other materials. Locate the trap so that it does not interfere with the facility's daily operations.

Service

1. Service the trap at least weekly.
2. Battery operated traps may require daily servicing to keep the battery charged.
3. Replace the collection container by unhooking the attaching.

4. Routinely check for leaves, insects, and other debris in the rain catch pan. If the drains in the catch pan become blocked, water can flood the collection container.
5. Empty the collection container using the following steps:
 - Remove the funnel
 - Remove the top screen, then the bottom screen
 - Remove any remaining insects and debris from the bottom of the container.
 - Put back the insecticidal strip that may fall out of the container.

If you are unable to empty the collection container and search for suspect specimens at the trap site, you must replace the collection container. If you remove a collection container from the trap site, be sure to label the specimen container with site, time and date information.

NATIONAL EXOTIC WOOD BORER AND BARK BEETLE SURVEY TRAP CARD

Change lures at least every 2-3 months, tri-lure may need to be changed more frequently; add additional insect kill strip every 2 months

GPS (if available):

Name, Address and Phone Number

Your Name and contact point

Contact Name and Phone Number

Best contact for trapping information

Trap Type Set

Date

Black Light (B) DATE

Lindgren #_Funnel Trap
(L#_)

Lure Set

Date

UHR ethanol (E)

alpha-pinene (A)

Triple Lure (3)

Other (specify)

SITE DIAGRAM

Sketch main features, indicate habitat type, hosts in vicinity; provide height from ground, orientation, times of operation if these are timed, any other information deemed relevant.

Date	Initials	Trap	E	A	3	Other	Date	Initials	Trap	E	A	3	Other	TOTAL DAYS
<i>Service, catch numbers, lure change, maintenance.</i>							<i>Service, catch numbers, lure change, maintenance.</i>							

When completed, this card should be forwarded to the SPHD and to the local US Forest Service RapDet coordinator.

Maintenance

If the black light trap stops operating for no apparent reason:

√	Black Light Troubleshooting Checklist
	The power cord on the trap is connected and tight.
	Both power connections at the bulb are secure.
	The power source end of the power cord is connected properly to the battery.
	The trap fuse beneath the electrical box is intact.
	The bulb is not burnt out.
	For traps with reset buttons, press this button to restart the light
	Replace the starter in the electrical box.
	Replace light with a functional black light trap.

REPORTING INFORMATION FLOW

Information flow is fundamental to the value of the survey. Use the following forms:

1. Interview Form
2. Inspection Form
3. Trap Card
4. NAPIS Form

All forms except the NAPIS online data entry forms are attached in a format that may be reproduced (at the end of the Manual). You must have a NAPIS-generated user ID and password to access the NAPIS entry database. Request these from Jim Pheasant at: pheasant@ceris.purdue.edu

The survey person designated by the SPHD should:

- Record results of surveys using the NAPIS Data Entry Sheets and enter into the NAPIS database on a continuous basis.
 - Enter negative summaries annually, at the conclusion of the survey.
 - Enter positive detections within 48 hours after the confirmed identification has been reported to the SPRO.
- Maintain records of establishment interviews using the Interview Form or any form that includes the same information.
- Report results to the SPHD.

The report results are collated by region, and then are reported to the PPQ National Survey Coordinator, Rapid Detection Coordinator for the US Forest Service; the State CAPS Survey Coordinator and the State Forestry Official in charge of the “Forest Health Program.”

Contact your CAPS coordinator if you have difficulty entering NAPIS data. A list of national and regional CAPS Committee members is included in the contacts section.

Survey Forms

A checklist on how to process survey forms

√	What information is transmitted	From	To	When
	Positive trap data	SPHD Designated	NAPIS	Continually
	Negative trap data	SPHD Designated	NAPIS	End of season
	Trap Card	Survey personnel	SPHD	When card is completed
	Trap Card	SPHD	USFS RapDet*	End of season
	<ul style="list-style-type: none"> • Interview Forms • ALB Survey Forms 	SPHD Designated	SPHD	Weekly or at regular intervals
	<ul style="list-style-type: none"> • Interview Forms • Survey Forms • Summaries 	SPHD	PPQ Regional Office Forest Health Program State Official	End of season
	Trap Data Summaries	SPHD	PPQ Regional Office	End of season
	Interview Form, Survey Form and Trap Data Summary Report	PPQ Regional Office	<ul style="list-style-type: none"> • CAPS National Survey Coordinator* • USFS RapDet Coordinator* 	End of Season

Interview Form

Example of fields for content, only (reproducible forms at end of manual)

Asian Longhorned Beetle/Woodborer/Bark Beetle Multiple Purpose Reporting Form Establishment Interview Recording Form	
Inspector: Name and contact	Date:
Establishment Name and Address:	Initial Contact Person: Person at establishment most familiar with activities
	Phone Number:
Type of Business:	
Please include brief description of the types of items:	
<ul style="list-style-type: none"> ◇ Wood Products ◇ Landfill, ◇ Wood Mulching ◇ Pallet, crate recycle ◇ Tools/Machinery ◇ Raw Materials ◇ Construction ◇ Electronics ◇ Imports, Miscellaneous ◇ Consumer Goods ◇ Manufactured ◇ Other 	<p><i>Check one of the categories and list materials more specifically if possible</i></p>
Cargo Inspected (list):	Country or Countries of Origin:

NATIONAL EXOTIC WOODBORER/BARK BEETLE SURVEY 2006

Updated : November 5, 2003

Inspection Form

Example of fields for content, only (reproducible forms at end of manual)

IF INSPECTION OR PEST SURVEY IS CONDUCTED, PLEASE COMPLETE THE FOLLOWING SECTION				
Asian Longhorned Beetle/Woodborer/Bark Beetle Premises/Solid Wood Packing and Other Material Inspection Form				
If inspection was conducted, what materials on site were inspected? Please provide any details of condition of wood, note of any signs of insect damage. What type of SWPM do you receive?				
<ul style="list-style-type: none"> ◇ Crates ◇ Pallets ◇ Spools ◇ Dunnage ◇ Spacers ◇ Stickers ◇ Skidders ◇ Chips/Shavings ◇ Wood Waste ◇ Utility /Landscaper Wood Waste ◇ Other 				
Were specimens found?				Y N
Were specimens forwarded?				Y N
If yes, to whom?				
On what date?				
Are windows or any other light sources that may attract insects present?				Y N
Are host trees, or potential host trees, on or near property:				Y N
If yes, complete table, below:				
Host Tree/Shrub Potential host	Size of Host	Approximate Number	Distance	Sign of Insect Damage

Be as specific as possible when describing materials and damage. What drew your attention to the item inspected? Were there any obvious signs of insect damage?

NAPIS Forms

New pest detections should be entered in the National Agricultural Pest Information System (NAPIS) database within forty-eight hours of confirmed identification, and survey results should be entered into the NAPIS database on a continuous basis (but in any case, not more than six months after the annual survey has ended). Worksheets used for the Exotic Wood Borer/Bark Beetle National Survey are listed on the site as “Asian Longhorned Beetle Survey Forms.” The data entry worksheets for this survey are available at the web site: <http://ceris.purdue.edu/caps/dentry.html> Request NAPIS user ID and password from: [_pheasant@ceris.purdue.edu](mailto:pheasant@ceris.purdue.edu)

NOTE: Use forms for EITHER the Lindgren funnel trap OR the black light trap. Do not combine trap types on the same data sheet. Note the different trap type in the NOTES field.

Descriptor Units	Total Units Checked	Positive Units	Observation Duration	Diagnostic Lab
318 = plants infected (trees)	Total number of trees	Number of trees at/in which beetles were found	Number of days between beginning & end of survey	Refer to lab reference file for code if positives were identified
312 = Pests in/on trees				

Confirmation Method	Diagnostic Lab Date (YYYYMMDD)	Biocontrol Target
90011 - visual ID positive	no microscope	
90010 - visual survey,	negative	

Notes

Comments in English or prearranged code about optional information
Field now can contain up to 40 characters.

Warehouse Survey Form

May, 2001

NAPIS DATA ENTRY WORKSHEET ASIAN LONGHORNED BEETLE WAREHOUSE SURVEY

(Complete 1 record /year /data source /county for negatives.)
(However NEW STATE or COUNTY positives should be reported immediately.)

Observation Number	Observation Date (YEAR)(month)(day)	Data Source
--- --- --- --- --- --- --- --- --- ---	--- --- --- --- --- --- --- --- --- ---	--- --- ---
(Assigned locally)	Date when negative survey was completed in county.	11=USDA-APHIS 13=STATE AG Dept 15=PRIVATE/COMMERCIAL 16=Joint State/Federal 41=General Public
create your own record identifier	or For positive finds enter exact date. [YYYYMMDD]	

State-County	EPA Site Code	Crop Life Stage	Crop Situation
--- --- --- --- --- ---	--- --- --- --- --- ---	--- --- --- ---	--- --- --- ---
, 9 9 9 9 9 ,	,	,	,
State & county FIPS codes	Unknown	LEAVE BLANK	70000 = shipping point 77004 = commercial storage 77000 = industrial property see reference file for more options

Location Coordinates	EPA Pest Code
LEAVE BLANK , LEAVE BLANK ,	I N A L Q C A ,
Latitude	Longitude Asian Longhorned Beetle

Pest Life Stage	Pest Status	Survey Method	Quantification
I 5 ,	,	0 0 0 5 8 ,	,
Adult	-=no beetles +B=beetles found NOT established	General Pest Observation	# of positive properties
	2=new state record (if first positive for state) 3=new cnty record (if first positive in a county other than the new state record)		

Descriptor Units	Total Units Checked	Positive Units	Observation Duration	Diagnostic Lab
3 7 1 ,	,	,	,	,

Identification of Specimens

Field sorting should only be performed by trained personnel. Immediately forward trap catches to the local identifier (i.e., local cooperators, APHIS, FS). Identifiers submit any significant detections to a national specialist for confirmation.

Reporting a New Detection

√	What information is transmitted	From whom	To Whom	When
	<ul style="list-style-type: none"> Detection of suspected new exotic Specimen, properly preserved 	Survey personnel	Local Identifier	Immediately
	Preliminary ID	Local Identifier	USDA-recognized taxonomist	When specimen is preliminarily determined to be suspect
	Confirmed ID	USDA-recognized taxonomist	Local Identifier	ID is confirmed
	New Pest Detection	Local Identifier	<ul style="list-style-type: none"> SPRO SPHD State Forest Health Program Official 	Immediately after ID is confirmed
	New Pest Detection	Local Identifier	NAPIS	Within 48 hours after SPHD/SPRO notification
	New Pest Detection	Local Identifier	<ul style="list-style-type: none"> CAPS National Survey Coordinator FS RapDet Coordinator PPQ Emergency Programs PPQ Taxonomic Group 	Within 48 hours after confirmation
	New Pest Detection	PPQ SPHD	PPQ Regional Office	Immediately after confirmation

TARGET PEST INFORMATION

Scientific Name	Common Name (s)
<i>Agrilus planipennis</i> (Fairmaire)	Emerald ash borer (EAB)
<i>Anoplophora chinensis</i> (Forster) (= <i>Anoplophora malasiaca</i> Thompson)	Rough shouldered longhorned beetle, Citrus longhorned beetle (CLB)
<i>Anoplophora glabripennis</i> (Motchulsky)	Asian longhorned beetle (ALB)
<i>Callidiellum rufipenne</i> (Motchulsky)	Lesser Japanese cedar longhorned beetle
<i>Chlorophorous annularis</i> (Fabricius)	Bamboo longhorned beetle/tiger bamboo longhorned beetle
<i>Hesperophanes (Trichoferus) campestris</i> (Faldermann)	Chinese longhorned beetle
<i>Hylurgops (Hylurgus) palliatus</i> (Gyllenhal)	No common English name; (German common name, "Bastkaefer")
<i>Hylurgus ligniperda</i> (Fabricius)	Red-haired bark beetle, golden-haired beetle
<i>Ips sexdentatus</i> (Boerner)	Six-toothed bark beetle
<i>Ips typographus</i> (Linnaeus)	European spruce bark beetle
<i>Monochamus alternatus</i> (Hope)	Japanese pine sawyer
<i>Orthotomicus erosus</i> (Wollaston)	Mediterranean pine engraver beetle
<i>Pityogenes chalcographus</i> (Linnaeus)	Spruce engraver
<i>Sirex noctilio</i> (Fabricius)	Sirex woodwasp
<i>Tetropium castaneum</i> (Linnaeus)	No common English name
<i>Tetropium fuscum</i> (Fabricius)	Brown spruce longhorned beetle
<i>Tomicus minor</i> (Hartig)	Lesser pine shoot beetle
<i>Tomicus piniperda</i> (Linnaeus)	Pine shoot beetle, Japanese pine engraver (PSB)
<i>Trypodendron domesticus</i> (Linnaeus)	No common English name, (German common name, "Borkenkaefer")
<i>Xyloborus</i> spp.	
<i>Xylotrechus</i> spp.	
<i>Trypodendron domesticus</i> (Linnaeus)	No common English name, (German common name, "Borkenkaefer")

Agrilus planipennis (Fairmair)
Emerald Ash Borer (EAB)

Insect	Host(s)	Host(s)	Survey Method(s)	Lure(s)
<i>Agrilus planipennis</i>	<i>Fraxinus</i>	Ash	Visual Purple sticky panel	UHR Ethanol?

At a Glance:

EAB Life Cycle

(pictures courtesy of PPQ Officer Brian Sullivan and PPQ Identifier James Zablotny, Ph.D)

EAB breeding pair



EAB laying egg



Egg EAB



EAB larva



EAB pupae



Newly-eclosed adult
preparing to exit from pupal
cell



Emerging adult



Adult



EAB Adult dorsal and ventral perspectives, Photos by James Zablotny, Ph.D



Cappaert, Michigan State University



Canadian Food Inspection
Agency

Photos of EAB damage to ash trees by David McKay, SPHD, Michigan and Gerald Wheeler, Domestic Programs Coordinator, Michigan

Thinning crowns



D-shaped exit hole



Symptoms of EAB: yellowing leaves, galleries (often in areas where branches arise), split bark, sometimes with sprouted branchlets (epicormic shoots or “witches’ brooms”).



Survey Considerations for Emerald Ash Borer (EAB)

Ash appears to be the exclusive host for EAB, regardless of ash species. Visual assessment of ash tree stands, and closer inspections of unhealthy ash trees, allows personnel to survey a sizeable area throughout the season. Girdled detection trees have proven to be more effective than visual surveys.

When possible, collect information on the ultimate destination(s) of imported possible host material and follow up by contacting those destinations for possible surveys. If the final destination is in another state, contact the SPHD in the destination state and provide information on the host or commodity transported.

Sites

Designated sites

Sawmills

Pallet manufacturers

Nurseries (check on reshipped imported bonsai and other live woody material; determine destination)

Firewood vendors/dealers (may have been sold to individuals or wholesalers; check on destinations, if possible)

Additional sites

Any site with ash trees exhibiting symptoms of decline.

Seek out and examine ash trees in and around survey sites for symptoms of ash borer infestation. Compared with some woodborers, EAB attacks progress quickly and outward symptoms may appear within one to two years unless the founder population was extremely small (e.g., a few "hitchhikers" transported from a distance).

Examine symptomatic trees at close range to determine if EAB, or damage characteristic of EAB, is present.

For areas where the beetle is not known to occur, identification of specimens of the insects, themselves, by an identifier with discard authority will usually be necessary.

Landfills

If SWPM was disposed of at a landfill, survey according to guidelines, below
Visit and evaluate any recycling companies that receive host material as possible survey sites.

General Survey Procedure

Conduct ground based visual surveys of 75 to 100 ash trees (i.e., any species) surrounding the site for EAB.

Include trees that are within 1.25 miles of the site.

Conduct close visual inspection if symptoms of decline are noted in ash trees.

Symptoms of EAB infestation include:

thinning foliage and crowns

branch dieback

yellowing foliage

cracks in the bark

callused sapwood tissue at sites of larval galleries

longitudinal bark splits (5-10 cm long)

epicormic branches (i.e., branches that grow out of the main stem of a tree from buds produced under the bark) which turn brown prematurely.

D-shaped exit holes

By the third year after an infestation, the ash tree may have few viable branches, little foliage, and many bark splits and epicormic branches (esp. at lower trunk and ground line).

Remove tree bark. Damage typical of EAB includes D-shaped exit holes and frass-packed, serpentine galleries beneath the bark.

Look for typical EAB damage or active adults on standing, live, dying or dead trees.

Obtain wood samples from suspect, damaged trees to extract larvae or other EAB life stages.

Look for D-shaped exit holes on the lower trunk, especially in late stage infestations

Submit larval or adult insect specimens for identification to the appropriate PPQ Area Identifier or State diagnostic lab, depending on local arrangements.

Submit any insect survey samples identified by the state or PPQ taxonomists as EAB (or any other suspect exotic pest) to the ARS Systematic Entomology Laboratory (SEL) for final determination.

For additional images of Emerald Ash Borer and its damage, please visit:

<http://www.invasive.org/browse/subject.cfm?sub=7171>

<http://www.news.uiuc.edu/news/03/08ashborerphotos.html>

<http://www.inspection.gc.ca/english/plaveq/protect/pestrava/ashfre/agrplaphotoe.shtml>



Figure 5. Ash tree showing epicormic branches. Photo: Dave Roberts, Michigan State Extension Service.



Figure 6. Symptoms of ash decline include thinning foliage. Photo: Michigan Department of Agriculture.

Special Trapping Considerations for Emerald Ash Borer (High Risk areas):

Constructing "traps" by girdling ash trees (which can enhance their attractiveness to EAB) is more effective than visual survey. These "detection trees" should have an application of a sticky substance onto an impermeable membrane wrapped as a band around the tree trunk. Girdling, however, may result in injury or death of the tree. A less intrusive alternative is placement of a purple panel coated with an "insect glue." In initial studies, these traps were demonstrably attractive to some populations of EAB when placed at approximately 1.5 meters off the ground. (Francese, et al., 2004). They may be hung from branches of ash trees or on poles in the immediate vicinity of ash trees.

The Michigan EAB populations have spawned a number of "outlier" populations or isolated infestations in other states, all of which are associated with movement of nursery stock, firewood, or ash logs from the main infested area. Regardless of state or location, each survey planner may wish to consider risk from interstate introduction when identifying routine survey activities.



**Figure . Newly-emerged emerald ash borer adult .
Photo: US Forest Service**

**Figure . Serpentine gallery of emerald ash borer larvae.
Photo: US Forest Service**

Anoplophora chinensis (Forster) (= A. malasiaca Thompson)
 Rough shouldered longhorned beetle, Citrus longhorned beetle (CLB)

At a Glance:

Insect	Host(s)	Survey Method
<p><i>Anoplophora chinensis</i></p>	<p><i>Aceraceae,</i> <i>Anacardiaceae,</i> <i>Araliaceae,</i> <i>Betulaceae,</i> <i>Eleagnaceae,</i> <i>Fagaceae,</i> <i>Lauraceae,</i> <i>Oleaceae,</i> <i>Polygonaceae,</i> <i>Styracaceae,</i> <i>Rutaceae,</i> <i>Rosaceae,</i> <i>Salicaceae,</i> <i>Ulmaceae,</i> <i>Moraceae,</i> <i>Meliaceae,</i> <i>Leguminosae,</i> <i>Juglandaceae,</i> <i>Aquifoliaceae,</i> <i>Platanaceae,</i> <i>Euphorbiaceae,</i> <i>Casuarinaceae,</i> <i>Verbenaceae,</i> <i>Sapindaceae,</i> <i>Theaceae,</i> <i>Taxodiaceae.</i></p> <p>These families include commercially important genera as: <i>Citrus</i> <i>Acer</i> <i>Alnus</i> <i>Populus</i> <i>Salix</i> <i>Prunus</i> <i>Quercus</i></p>	<p>Visual</p>

General Appearance: The beetle is large, stout, and approximately 21 to 37 mm (~1 - 1.5 inch) long with shiny black elytra marked with 10 to 12 white round spots (Lingafelter and Hoebeke 2002). Males are generally smaller than females, and have their abdomen tip entirely covered by the elytra, in contrast to the partially exposed abdomen of females (Lieu 1945). Also, the male elytra are narrowed distally compared to the rounded female elytra. Another difference between males and females is antennal size. The male's antennae are approximately twice as long as the body when compared to the female's antennae which are only slightly longer than the body. Each segment of the long, 11-segmented antennae is basally marked with white or light blue bands. The anteriorly and posteriorly narrowed pronotum has a pair of stout spines extending from its sides.



Citrus longhorned beetle (left) is also called the rough-shouldered longhorned beetle, and this character separates the two species to visual inspection, as illustrated by two photos at right (*A. chinensis*, near right and *A. glabripennis*, far right). Photos above by Jeff Lotz and M.C. Thomas



Washington State Department of Agriculture

Archives;



Adult emergence hole in maple
Photo by Washington State
Department of Agriculture



Trident maple bonsai with exit hole.
Photo by PPQ's L. Cruse

For additional information and images of this insect see:
<http://agr.wa.gov/PlantsInsects/InsectPests/CLHB/default.htm>
<http://edis.ifas.ufl.edu/IN633>
<http://www.forestryimages.org>

Anoplophora glabripennis (Motchulsky)
Asian longhorned beetle (ALB)



1. Egg Niche



2. Larva



3. Pupa



4. Emergence Hole



5. Adult



ALB Life Cycle

Photos by USDA/APHIS



At a Glance:

Insect	Host(s)	Host(s)	Survey Method
Anoplophora glabripennis	Acer, Aesculus, Salix, Betula, Populus, Ulmus, Albizia, Celtis, Fraxinus, Platanus, Sorbus	Maple, boxelder; Horse chestnut, buckeye; Willow Birch; Poplar (apparently excluding cottonwood); Elm Mimosa, silk tree; Hackberry Ash (especially green ash, F. pennsylvanica); Plane tree, sycamore Mountain-ash	Visual



Figure 2. Asian longhorned beetle with egg pits. Photo: Ken Law, USDA/APHIS



Figure 3. Asian Longhorned beetle with galleries. Photo: Charles Harrington, USDA

Survey Considerations for Asian Longhorned Beetle (ALB)

General Procedure:

- Conduct ground based visual surveys of 50 to 100 potential host trees surrounding the site for ALB. Managers may choose to use bucket trucks and tree climbers based on the availability of resources. Include trees that are within 1.25 miles of the site. Concentrate on preferred hardwood hosts, e.g. maple, horse chestnut, poplar, elm, willow.
- Look for typical ALB damage or active adults on standing, live or dying (but not dead) trees. Surveyors should use binoculars at the very least. If available, “bucket trucks”, “cherry pickers” and other mechanisms for putting surveyors into the upper parts of trees increase the chances of detecting an infestation. Consider contracting with tree care businesses to do this work.
- Obtain wood samples from suspect, damaged trees to extract larvae or other ALB life stages.
- Submit larval or adult insect specimens for identification to the appropriate PPQ Area Identifier or State diagnostic lab depending on local arrangements.
- Submit any suspect insect survey samples identified by the state or PPQ taxonomists as ALB (or any other suspect exotic pest) to the ARS Systematic Entomology Laboratory (SEL) for final determination.

Survey Sites:

- Importing establishments
 - If significant amounts of the SWPM were shipped to a consignee with the commodity, contact the second establishment, collect essential information, and conduct a survey, as above.
 - For **FY 06**, it is recommended that survey is performed at high risk establishments/entities, such as pallet makers, green industry businesses, bonsai nurseries, or other companies for which documentation is available that demonstrates a higher risk of infestation.
- Landfills, if the importing establishment disposed of SWPM at a landfill
- Recycling companies should be visited and evaluated as possible survey sites.
- Nurseries and individuals that have, or have reshipped imported bonsai and other live woody material.
 - Gather trace forward information during the initial interview with establishment personnel.
 - When possible, collect information on the ultimate destination(s) of imported bonsai and other woody plants
 - Contact those destinations for possible follow up surveys.
 - If the final destination is in another state, contact the SPHD in the destination state and provide the host material information for follow-up.

**pest
Alert**



United States
Department of Agriculture

Forest Service

Animal and Plant
Health Inspection Service

NA-PR-01-99GEN
Revised September 2002

Asian Longhorned Beetle (*Anoplophora glabripennis*): A New Introduction

The Asian longhorned beetle (ALB) has been discovered attacking trees in the United States. Tunneling by beetle larvae girdles tree stems and branches. Repeated attacks lead to dieback of the tree crown and, eventually, death of the tree. ALB probably travelled to the United States inside solid wood packing material from China. The beetle has been intercepted at ports and found in warehouses throughout the United States.

This beetle is a serious pest in China where it kills hardwood trees in roadside plantings, shelterbelts, and plantations. In the United States the beetle prefers maple species (*Acer* spp.), including boxelder, Norway, red, silver, and sugar maples. Other known hosts are alders, birches, elms, horsechestnut, poplars, and willows. A complete list of host trees in the United States has not been determined. Currently, the only effective means to eliminate ALB is to remove infested trees and destroy them by chipping or burning. To prevent further spread of the insect, quarantines are established to avoid transporting infested trees and branches from the area. Early detection of infestations and rapid treatment response are crucial to successful eradication of the beetle.

General Information

The ALB has one generation per year. Adult beetles are usually present from July to October, but can be found later in the fall if temperatures are warm. Adults usually stay on the trees from which they emerged or they may disperse short distances to a new host to feed and reproduce. Each female is capable of laying up to 160 eggs. The eggs hatch in 10-15 days and the larvae tunnel under the bark and into the wood where they eventually pupate. The adults emerge from pupation sites by boring a tunnel in the wood and creating a round exit hole in the tree. For more information about Asian longhorned beetle in the United States, visit these U.S. Department of Agriculture web sites:

<http://www.na.fs.fed.us/spfo/alb>, <http://www.aphis.usda.gov/lpa/issues/alb/alb.html>

If you suspect an Asian longhorned beetle infestation, please collect an adult beetle in a jar, place the jar in the freezer, and immediately notify any of these officials or offices in your State:

State Department of Agriculture:
State Plant Regulatory Official

State Entomologist
U.S. Department of Agriculture:
Animal and Plant Health Inspection Service, Plant Protection and Quarantine
Forest Service
County Extension Office
State Forester or Department of Natural Resources

WHAT TO LOOK FOR:



1. Adult beetles. Individuals are $\frac{3}{4}$ to $1\frac{1}{4}$ inches long, with jet black body and mottled white spots on the back. The long antennae are $1\frac{1}{2}$ to $2\frac{1}{2}$ times the body length with distinctive black and white bands on each segment. The feet have a bluish tinge.



2. Oval to round pits in the bark. These egg-laying sites or niches are chewed out by the female beetle, and a single egg is deposited in each niche.



3. Oozing sap. Sap may flow from egg niches, especially on maple trees, as the larvae feed inside the tree.



4. Accumulation of coarse sawdust around the base of infested trees, where branches meet the main stem, and where branches meet other branches. This sawdust is created by the beetle larvae as they bore



5. Round holes, 3/8 inch in diameter or larger, on the trunk and on branches larger than 1½ inches in diameter. These exit holes are made by adult beetles

into the tree.

Photo Sources:

- ◇ USDA Forest Service
- ◇ USDA Animal and Plant Health Inspection Service

USDA is an equal opportunity provider and employer.



Prepared by: USDA
Forest Service
Northeastern Area
State and Private
Forestry,
Radnor, PA

Callidiellum rufipenne (Motchulsky)
 Lesser Japanese Cedar Longhorned Beetle

At a Glance:

Insect	Host(s)	Host(s)	Survey Method
Callidiellum rufipenne	Cupressaceae Taxodiaceae	Cypress species Yew species	Baited log traps Visual

Body length: 9 - 15 mm.

Life cycle: 2 - 3 years.

Adults in: June - August.

Host plant: polyphagous in coniferous trees (*Cryptomeria*, *Pinus*, *Abies*, *Chamaecyparis*).

Distribution: introduced from North-East Asia (Japan or China) to South Europe (Italy, Spain)

Visual Inspection

These inspection procedures have been suggested by USDA APHIS PPQ and the Connecticut Agricultural Experiment Station:

All stages can be found in stems as small as 1" diameter, or as large as basal multi-trunks near the root ball.

Adult beetles are typically found at the base of the crotch where two branches join.

Look for any small puckering, 1" or larger incisions, or mined corkscrews or sinuses (bark may have healed over these tunnels).

Frass can often be seen in these openings.

With a sharp knife, gently scrape the upper bark to expose tunneling below the surface.

The opening of one of these tunnels and/or pupal chambers often has a frass/sawdust plug.

Examine all sides of each branch; some may have damage on one side of the arborvitae that cannot be seen from the other side.

Listen for snapping of the branches as arborvitae are spread open for examination. They are very brittle and the branches often break readily when there are multiple beetles in a stem. As many as 10 beetles have been found in one branch.

For additional images or information on this insect see:

<http://www.uochb.cas.cz/~natur/cerambyx/calidruf.htm>

<http://www.invasive.org/browse/subimages.cfm?sub=2255>

<http://www.in.gov/dnr/entomolo/pestinfo/callid.htm>

All images by J.M. Fengler, CT Agr. Exp. Sta.

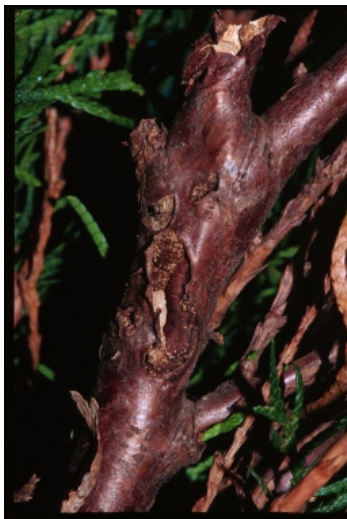
Larva in cell



Pupa in cell



Moderate feeding damage



Adult in pupal cell prior to emergence



Adult beetles



Adult female



Chlorophorus annularis (Fabricius)
 Bamboo longhorned beetle/tiger bamboo longhorned beetle

At a Glance:

Insect	Host(s)	Host(s)	Survey Method
Chlorophorus annularis	Bambusa spp. Shorea sp. Tectona sp. Spondias sp. Gossypium sp. Liquidambar sp. Citrus sp. Pyrus sp. Vitis sp. Dipterocarpus sp.	Bamboo	Visual



Photo and Illustration, USDA/APHIS

Trapping Considerations for the Bamboo longhorned tiger beetle

The beetle infests bamboo, especially dried bamboo that are often warehoused, or stocked in garden stores as poles, stakes or lumber.

Visually inspect the exterior of bamboo poles for exit holes.

Exit holes are 2-3 mm, circular to oval

General Description

Head: pitchy with dense, very much narrower than prothorax; labrum and clypeus combined triangular- shaped; antennae shorter than broad, extended to half of elytra; scape cylindrical; 3 as long as scape; 4 - 11 gradually shorter.

Prothorax as long as wide; base acutely constricted; apex narrower than base.

Scutellum large; wider at base; apex semicircular.

Elytron 5 X as long as broad; parallel-sided, gradually curved from 1/4 of apex; truncate at apex, yellowish marking denser compared to fuscous stripes

Measurement : Length 10.0 - 15.0 mm; breadth 2.2 - 4.0 mm

Exerpted from: ASEAN Review of Biodiversity and Environmental Conservation

For additional images or information on this insect see:

<http://www.inbar.int/publication/txt/tr13/Long-horned%20Beetles136.htm#Tiger%20longicorn>

<http://www.arbec.com.my/cerambycinae/Clytini/n4.htm>

Hesperophanes (Trichoferus) campestris (Faldermann)
 Chinese longhorned beetle

At a Glance:

Insect	Host(s)	Host(s)	Survey Method
Hesperophanes (Trichoferus) campestris	Salix Ulmus	Willow Elm Poplar Honey locust Mulberry	Visual Blacklight



Photo © M.Hoskovec

Hesperophanes sericeus (Fabricius) is pictured as an example of general type. Photo, <http://www.uochb.cas.cz/~natur/cerambyx/hespser.jpg>

For additional information on this insect see: <http://ceris.purdue.edu/napis/pests/barkb/hespcfs.html>

Survey Considerations for the Chinese longhorned beetle
 U.S. detections have been at warehouses in imported wood products.
 Some literature suggest that black lights attract adults.
 Ethanol and triple lure were used in traps that caught these beetles.
 These beetles are very tolerant of dry conditions and often infest dead wood as well as live.

Hylurgus ligniperda (Fabricius)
 Red-haired pine bark beetle, golden-haired beetle

At a Glance:

Insect	Host(s)	Host(s)	Survey Method
Hylurgus ligniperda	Pinus spp.	Pine species	Lindgren with UHR alpha-pinene and UHR ethanol

Survey Considerations for Hylurgus ligniperda

A recent study by the USDA Forest Service found Lindgren funnel traps with high release alpha-pinene (625 mg/day = 5 standard lures) + high release ethanol (1000 mg/day) to be the most effective of the trap-lure combinations they tested. Other lures tested in this study also proved effective, but to a lesser degree. Intercept panel traps and Theysohn traps may be used in conjunction with high release alpha pinene + high release ethanol. Lindgren funnel traps should be hung from a trap rod with top of trap approximately 6 feet from the ground, with the ethanol attract and hung from the top funnel down through the inside of the funnels below. The alpha pinene should be attached below the ethanol, and these attractants should not touch each other.

For additional images or information on this insect see:

http://www.ento.csiro.au/aicn/system/c_799.htm

<http://www.barkbeetles.org/exotic/hlignprd.html> (screening aid)



Adult, larva, and pupae in pine log
 William M. Ciesla, Forest Health Management International



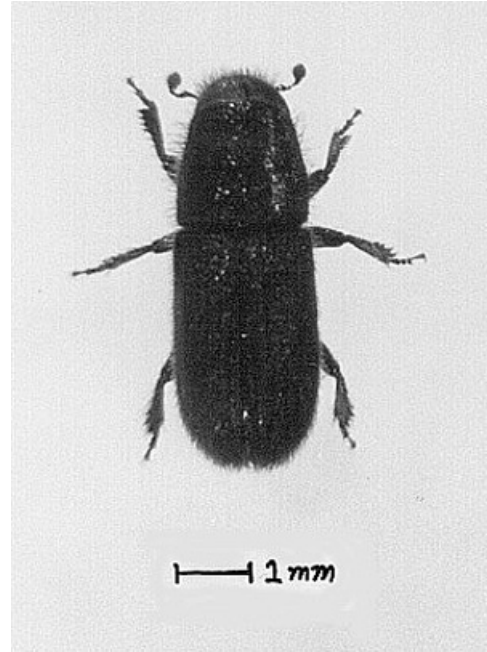
A Theysohn trap (left) combines a lure with an interception frame. Lindgren traps provide visual and olfactory attraction.

Photo, Auburn University "Something to Grow On" ornamental newsletter.

Adult beetle, Photo by Steve Passoa

Hylurgus ligniperda magnified

approximately 7.5X
Courtesy of David Mausel, University
of WA



Hylurgops palliatus (Gyllenhal)

At a Glance:

Insect	Host(s)	Host(s)	Survey Method
Hylurgops palliatus	Pinus spp.	Pine Species	Window traps Ethanol Spruce blend

General Appearance in a Sample. Hylurgops palliatus superficially resembles other scolytids in the subfamily Hylesininae. Some of the more obvious characters are:

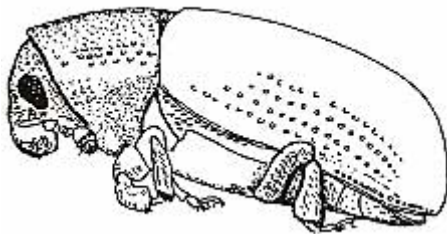
elytral apex rounded, not excavated, and without marginal teeth.

elytral basal margin raised with series of marginal flattened granules (crenulations) (Fig. 1).

pronotum usually unarmed and with an anterior constriction (Fig. 6: Anderson 1989).

head usually visible from above.

In addition, H. palliatus has red-brown elytra, pronotum and legs; and a black underside.



From: Cavey, J., Passoa, S. and Kucera D. 1994, Screening Aids for Exotic Bark Beetles in the Northeastern United States. NA-TP-11-94. Northeastern Area: U.S. Department of Agriculture, Forest Service.

For additional images and information on this insect see:

<http://barkbeetles.org/exotic/hplltus.html> (screening aid)

<http://www.forestryimages.org/browse/detail.cfm?imgnum=2130080>

Ips sexdentatus (Boerner)
Six-toothed Ips

At a Glance:

Insect	Host(s)	Host(s)	Survey Method
Ips sexdentatus	<i>Pinus spp.</i> <i>P. sylvestris</i> , <i>P. nigra</i> , <i>P. pinaster</i> , <i>P. brutia</i> and <i>P. heldrichii</i> (= <i>P. leucodermis</i>). In Thailand, <i>P. merkusii</i> and <i>P. caribaea</i> (exotic) are hosts. Other conifer hosts in Europe and Asia include: <i>Abies alba</i> , <i>A. normanniana</i> , <i>Larix decidua</i> , <i>L. sibirica</i> , <i>Picea abies</i> , <i>P. orientalis</i> and Douglas-fir, <i>Pseudotsuga menzeisii</i> .		Ips lure

General Appearance in a Survey Sample.

At 5.5-8.2 mm in length, *I. sexdentatus* would be one of the largest scolytids found in a survey sample from the northeastern U.S. This brown species has an excavated elytral declivity armed laterally with spines. Viewed from above, erect yellow hairs protrude from the body perimeter.

Recognizing the Genus. In general, *Ips* differs from other North American scolytids in having the following combination of characters (from Wood 1982, 1986):

Elytral declivity widely excavated and armed laterally with 3 or more teeth, the teeth arising from the summit (ridge) of the lateral margins.

Pronotum asperate on the anterior half.

Antennal funicle 5-segmented.

Antennal club strongly flattened, with two sutures on the anterior face bisinuate or procurved (curved forward).

Members of the most similar genera, *Orthotomicus* and *Acanthotomicus*, are much smaller in size than *I. sexdentatus*.

Recognizing *I. sexdentatus*: This species is named for the six spines or teeth found on each lateral margin of the elytral declivity (Fig. 3).

From: Cavey, J., Passoa, S. and Kucera D. 1994, Screening Aids for Exotic Bark Beetles in the Northeastern United States. NA-TP-11-94. Northeastern Area: U.S. Department of Agriculture, Forest Service.

For additional images or information on this insect see:

<http://www.forestpests.org/hungary/weevilsis.html>

<http://barkbeetles.org/exotic/ipsxdnts.html> (screening aid)

http://www.eppo.org/QUARANTINE/insects/lps_sexdentatus/IPSXSE_images.htm



W. Billen - Pflanzenbeschaustelle, Weil am Rhein (DE)

Ips typographus L.
European Spruce Bark Beetle

At a Glance:

Insect	Host(s)	Host(s)	Survey Method
Ips typographus	<i>Picea spp.</i> , including <i>Picea abies</i> , <i>Picea jezoensis</i> , <i>Picea orientalis</i> and <i>Picea obovata</i> . Other members of the <i>Pinaceae</i> <i>Abies spp.</i> , <i>Pinus spp.</i> <i>Larix spp.</i>	Spruce Firs Pines Larches	Ips lure in Lindgren Funnel Trap

General Appearance in a Sample.

This moderate to large (4.2-5.5 mm), cylindrical, brown bark beetle has an excavated elytral declivity armed laterally with 4 spines on each side. From above, erect yellow hairs protrude from the body perimeter and margins of the declivity.

Recognizing the Genus. In general, Ips differs from other North American scolytids in having the following combination of characters (from Wood 1982): Elytral declivity widely excavated, armed laterally with 3 or more teeth, the teeth arising from the summit (ridge) of the lateral margins.

Pronotum asperate on the anterior half.

Antennal funicle 5-segmented.

Antennal club strongly flattened, with two sutures on the anterior face bisinuate or procurved (curved forward).

Recognizing *I. typographus*. Whittle and Anderson (1985) gives adult characters and illustrates this species. Color and SEM photographs of *I. typographus* are available in the Forest Service Pest Alert (Cavey and Passoa 1993).

Superficially, this species might be confused with other *Ips* having 4 teeth on the elytral declivity. It is most like the *I. plastographus* group (Whittle and Anderson 1985), but none in that group are known to occur in the NER (Wood 1982).

From: Cavey, J., Passoa, S. and Kucera D. 1994, Screening Aids for Exotic Bark Beetles in the Northeastern United States. NA-TP-11-94. Northeastern Area: U.S. Department of Agriculture, Forest Service.

Adult beetle . Photo:
[http://www.entom.slu.se/images/
barkb4.jpg](http://www.entom.slu.se/images/barkb4.jpg)



Egg galleries,
<http://www.bio.ic.ac.uk/bawbilt/annila.htm>



Adult beetle
Photo, Steve
Passoa



For additional images or information on this insect see:
<http://www.barkbeetles.org/exotic/htypgrph.html> (screening aid)
<http://www.wcrl.ars.usda.gov/cec/insects/ipst.htm>
<http://www.inspection.qc.ca/english/sci/surv/data/ipstype.shtml>

Monochamus alternatus (Hope)
Japanese Pine Sawyer

At a Glance:

Insect	Host(s)	Host(s)	Survey Method
Monochamus alternatus	Pinus spp., Pinus elliottii Pinus densiflora;, Pinus thunbergiana, , Pinus luchensis (Japan), Pinus massoniana (China), Picea spp. Abies sp. Cedrus sp. Larix sp. Under laboratory conditions, adults preferred to feed on pines, <i>Cedrus deodara</i> and <i>Larix leptolepis</i> . <i>Metasequoia</i> , <i>Cryptomeria</i> , <i>Gingko biloba</i> and <i>Fagus</i> were accepted but not attractive.	Pine species (17) slash pine Japanese red pine Japanese black pine luchu pine Mason pine Spruce species Fir species (1) True cedar larch	Commercial lures are available for the Japanese pine sawyer

General appearance:

Adult. Length: 15-28 mm, width: 4.5-9.5 mm. Orange to brown, antenna dark brown. The base part of the 1st, 2nd and 3rd segment of male antenna has grayish hairs. Male antenna is about 2 times of body length, while female antenna is about one third longer than its body. There are two longitudinal orange stripes on the protergum. The two orange stripes are interlaced with three narrower black strips. Each elytra has 5 longitudinal bands consists of black and gray rectangular spots

Egg. 4 mm long, milk-white, sickle shaped

Larva. Opaque, Narrow cylindrical. Mature larva can reach 43 mm. Head, dark brown. Protergum is brown with wavy strips.

Pupa. Opaque, cylindrical. 20-26 mm long.



Photo,
http://www.news.cornell.edu/photos/Jamestown_beetle.300.JPG



Photo,
http://www.wrass.co.jp/log/2002/2002_pict3/020805_matuM1.jpg

For additional images or information on this insect see:

<http://www.people.umass.edu/baodew/monochamusA.htm>
<http://www.invasive.org/browse/subject.cfm?sub=4532>

Orthotomicus erosus (Wollaston)
Mediterranean pine engraver

At a Glance:

Insect	Host(s)	Host(s)	Survey Method
<i>Orthotomicus erosus</i>	<p><i>Pinus</i> spp., i.e., <i>Pinus canariensis</i>; <i>Pinus brutia</i>; <i>Pinus nigra</i> and <i>Pinus nigra</i> ssp. <i>pallasiana</i>; <i>Pinus pinaster</i>; <i>Pinus pinea</i>; <i>Pinus sylvestris</i>, <i>Pinus mugo</i> subsp. <i>uncinata</i>. <i>Pinus radiata</i> <i>Pinus coulteri</i> <i>Pinus caribaea</i> <i>Pinus echinata</i> <i>Pinus patula</i> <i>Pinus strobus</i> and others Occasionally, maturing beetles feed in <i>Pseudotsuga menziesii</i>, <i>Picea</i> spp.; <i>Abies</i> spp.; and <i>Cedrus</i> spp.</p> <p>However <i>Orthotomicus erosus</i> does not breed in hosts other than pines.</p>	<p>Pine Species Calabrian pine Austrian pine, Black pine maritime pine Italian stone pine, Scotch pine, a form of mugo pine Monterey pine Coulter pine Caribbean pine shortleaf pine Mexican weeping pine Eastern white pine</p> <p>Douglas-fir, Spruce, Fir, Cedar</p>	<p>Alpha-pinene and UHR ethanol n Lindgren Funnel Trap</p>

This Eurasian bark beetle, commonly called the Mediterranean pine engraver, is native to the pine (*Pinus*) growing areas of Europe, northern Africa, and Asia. It has also been introduced to Chile, Fiji, South Africa, and Swaziland.

Cavey *et al.* (2004) reports that the length of *O. erosus* is generally between 2.7 and 3.5 mm. It is reddish brown in color. The anterior portion of the pronotum (the region of an insect's body immediately behind the head) on this species is asperate (rough with points or projections). The elytral declivity (downward slope of the modified forewings of beetles serving as protective coverings for the hindwings) is also moderately concave with lateral spines or teeth on it.

See screening aid at: <http://barkbeetles.org/exotic/oreross.html>

For additional information or images for this insect see:

<http://issg.appfa.auckland.ac.nz/database/species/ecology.asp?si=787&fr=&sts=tss>

<http://www.forestryimages.org/browse/imagesthumb.cfm?sub=4071&area=5&start=1>



Louis-Michel Nageleisen



Detail of elytron
Louis-Michel Nageleisen



Galleries
William M. Ciesla

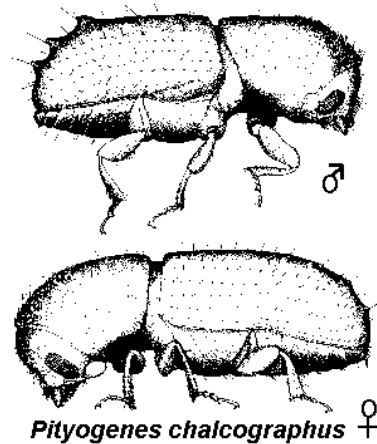
Pityogenes chalcographus (Linneaus)
Spruce Engraver

At a Glance:

Insect	Host(s)	Host(s)	Survey Method
Pityogenes chalcographus	Picea abies	Norway Spruce	Chalcogran or Chalaprax in Lindrgren Funnel TRap

General Appearance in a Sample. A small species, 1.6-2.9 mm, with a moderately excavated elytral declivity bearing 3 conical teeth (males) or 3 smaller teeth (females). Color either black or often bicolored, black in front and red-brown on the latter half.

From: Cavey, J., Passoa, S. and Kucera D. 1994, Screening Aids for Exotic Bark Beetles in the Northeastern United States. NA-TP-11-94. Northeastern Area: U.S. Department of Agriculture, Forest Service.



Pityogenes chalcographis, Photo from USDA/APHIS John Beyers, PhD.
[www.wcrl.ars.usda.gov/ cec/bbec.jpg](http://www.wcrl.ars.usda.gov/cec/bbec.jpg)

The scanned drawing is from <http://www.wcrl.ars.usda.gov/cec/insects/pitychal.htm>, who credits S.L. Wood (1982) who got it from Blackman (1915).

For additional images and information on this insect see:

- <http://www.bugwood.org/hungary/weevilspec.html>
- <http://www.wcrl.ars.usda.gov/cec/insects/pc-lit.htm>

Sirex noctilio (Fabricius)
Sirex woodwasp

At a Glance:

Insect	Host(s)	Host(s)	Survey Method
<i>Sirex noctilio</i>	Pinus spp.	Pine species	Lindgren funnel or panel trap with a ratio of 70% alpha- and 30% beta-pinene in the high (ultra) release formulation

General Appearance: 25-40 mm metallic blue-black “horntail” wasp with orange legs.

Female: Head and body completely metallic blue; legs orange. Typically over 20 mm long, some females reach 45 mm in length, including the ovipositors. Females bear a long, non-retractable ovipositor that is adapted for piercing wood .

Male: Head and thorax metallic blue; abdomen orange at center, black at base and apex; legs with femora orange, hind tibia black.

Sirex noctilio hind tibiae are characterized by two apical spurs. Apical two tarsal segments are blackish. Antennae always black.

The sirex woodwasp is considered a secondary pest of trees in its native range. However, it is a major pest in exotic pine plantations in the Southern Hemisphere. Females carry a fungus, *Amylostereum areolatum*, that they deposit in trees when laying their eggs. This fungus and the mucus injected by the wasp rapidly weaken and kill host trees, and the developing larvae feed on the fungus. This pest is attracted to stressed trees that are often used to make solid wood packing material (SWPM). Since the life cycle can take a year or more, the insect is transported easily in pallets or other SWPM and not readily detected at a port.

Visual Survey Guide

Surveying for *Sirex noctilio* is primarily visual inspection of hosts (e.g., any pine species).

There are three types of inspection:

1. Forest--this survey requires observant persons on the ground to search for damage.

2. Ground-check--a fine-grained inspection of trees that have been identified as potentially infested by aerial or forest surveillance. Ground checks may require stripping the tree to inspect for galleries and fungus.
3. Aerial--a coarse-grained survey, using observers in an aircraft to plot evidence of damage.

General symptoms of *Sirex noctilio* infestation (best observed by survey type) include:

1. Beads of resin are visible on the bark. These arise from oviposition drills. (forest, ground-check)
2. Exit holes (3-8 mm diameter). (forest, ground-check)
3. The fungus arising from drills eventually creates a stain in the cambial layer. Stains are long, narrow brown bands along the grain. In later infestations, the fungal staining indicates that it has invaded all tree tissue. (ground-check)
4. Larvae in cambial tissue, or deep in drills. (ground-check)
5. Frass-filled serpentine galleries in cambium. Galleries may turn inward towards heartwood and then turn back toward the bark, as the time for pupation draws near. Pupae are typically found within 5 cm of the bark. (ground-check)
6. Tree crowns turning light green to yellow to reddish brown in the spring. (aerial, forest)

Auxilliary forest surveillance: Train persons with intimate knowledge of the forest or working in the forest (e.g., naturalists, foresters, loggers, sawmill personnel) to be alert for signs of *Sirex noctilio* activity (e.g., adult insects, oviposition drills, exit holes, larval galleries, cambial staining). Use handouts that describe *Sirex noctilio* and provide contact information.

Aerial surveys can assist planning by locating habitats that have large areas of pine trees. For a detection survey in areas that are not known to be infested with *Sirex noctilio*, a sampling frame will not have been determined, and quadrant sampling will allow surveyors to work within a structure and quantify results.

Quadrant Sampling: Follow a similar sampling pattern for each area surveyed. Local terrain will dictate the shape of the quadrant sample unit (e.g., square, rectangle, circle).

Forest surveys supplement observations of persons working in forested areas. These consist of individuals walking units of forest that contain hosts and checking hosts for signs of *Sirex noctilio* infestation. Determine unit size and sampling frequency based on the level of risk presented by the area. As a reference point, for mature forest trees over 4m, use one hundred square meter plots (i.e. 10m x 10m or 7.07m x 14.14m). Inspect at least 10 host trees from each quadrant. Since injured, dead or fallen trees are those most likely to be infested by *Sirex noctilio*, these should be inspected preferentially. Preferentially inspect pines that appear diseased or stressed and have resin flow or beads of resin on the bark.

Look for the following life stages:

Eggs: Look for drills. Drills are grouped in five or six sites with one site being empty of eggs but containing a cache of fungus.

Larvae: Check cambial tissue beneath the bark for larvae or serpentine larval galleries. Tissue may be stained and dry from activities of the fungus. Collect eggs and larvae with sufficient host material (i.e., wood and fungus) for rearing purposes.

Delimiting Survey Decision Table

If you find:	In an area that is:	Take this action:	And supplement with
One or more adults	Apparently in the original infestation*	Initiate delimiting survey in a 25-hectare area	Aerial survey; 1, 10-tree plot
One or more (any stage)	Within a 25-hectare area	Extend delimiting survey to 225 hectares by adding a 25-hectare blocks around original area	Visual survey 100 hosts per hectare in each 25-hectare area. Aerial survey; 9, 10-tree plots
One or more (any stage)	Within a 225-hectare area	Extend delimiting survey to 625 hectares by adding 25-hectare blocks around previously surveyed area	Visual survey 100 hosts per hectare in the 25-hectare block. Aerial survey; 25, 10-tree plots

*Conservatively determined by the presence of larvae, detections of number of sufficiently dispersed adults, backtracking, or other means

Trapping Guide

Trapping period

Traps should be deployed by early June and removed at the end of September. *Sirex noctilio* flight period may vary from one region to another. In New York activity occurs from June through September.

Trap type

Until trap efficacy studies are conducted, it is difficult to recommend one trap type over another. Several trap types have been deployed in New York for the *S. noctilio* detection/delimitation effort including cross-vane, IPM Tech intercept

panel, log traps, and Lindgren funnel traps. *Sirex noctilio* was captured with all these trap types.

Because of their widespread availability, Lindgren funnel traps have made up the majority of the trapping effort. Traps should be fitted with the “wet option” for collecting insects. Preservative used in the traps should be low toxicity anti-freeze (i.e., propylene glycol).

Recommendation: 12-unit Lindgren funnel traps (Figure 1), or IPM Tech intercept panel trap (Figure 2); see below.

Trap lure

Research is currently being conducted on an optimal lure for *S. noctilio*. Until further research is completed, a lure consisting of alpha-pinene (70%) and beta-pinene (30%) is suggested.

Trap placement

Stand selection: Priority should be placed on locating declining pine stands that contain potential host trees (i.e., hard pines). Overstocked pine plantations or smaller patches of declining pines should be the focus of trapping efforts. State or federal lands often provide the easiest access for trap placement.

Trap placement: Traps should be hung from a host tree or placed adjacent to the nearest host tree. An attempt should be made to get the bottom of traps (i.e., collecting cups) at least 6 feet off the ground (Figure 1). A rope with a light weight tied to one end can be tossed over a low hanging branch and then tied to the trap hanger. The trap can then be hoisted to the desired height and securely fastened. While hanging traps is optimal, traps placed at or near ground level have successfully captured *S. noctilio* and native Siricidae. Depending on the effort required to hang traps and the total number of traps deployed, surveyors should use their discretion for placement.

Collections

Trap collections should be made once every two weeks. After two weeks in preservative, insects begin to break down and are more difficult to sort/identify. Also, large numbers of carrion beetles are often attracted to traps that have been left out for extended periods of time.

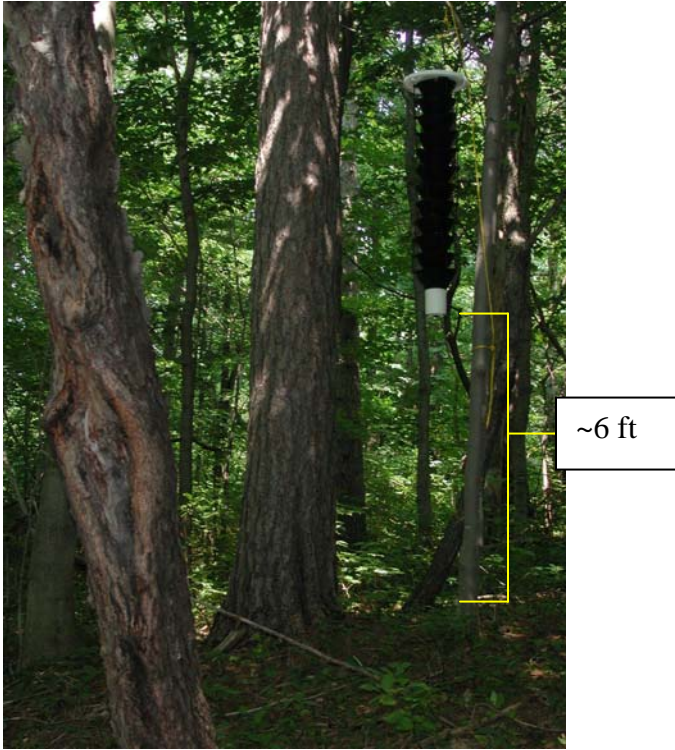


Figure 1. A 12-unit Lindgren funnel trap intercept deployed for *Sirex noctilio* detection.

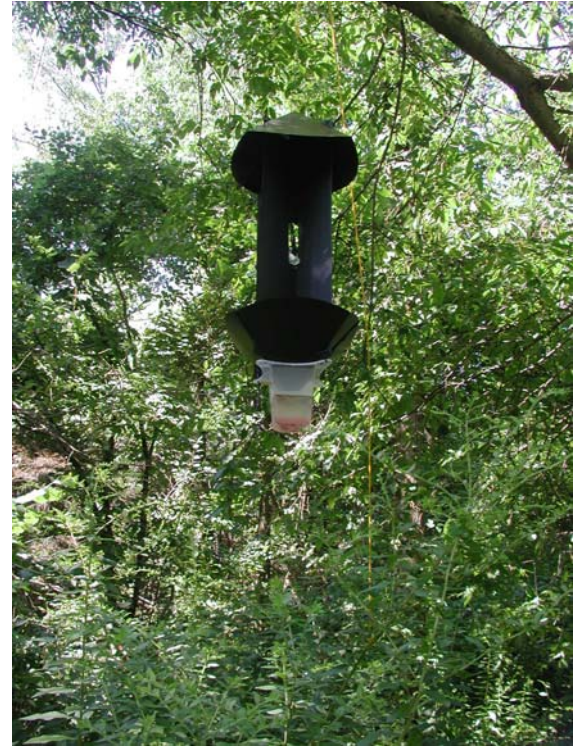
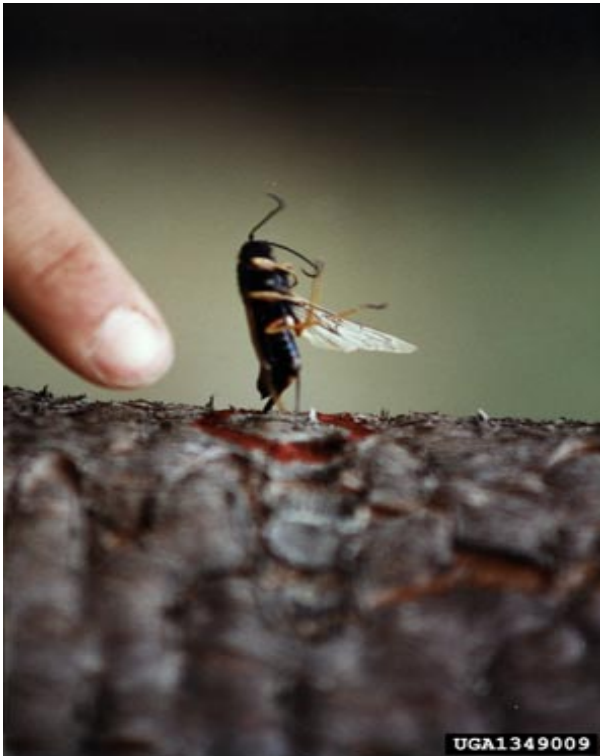


Figure 2. IPM Tech panel trap

Sirex noctilio female oviposition photo, Paula Klasmer, Instituto Nacional de Tecnología Agropecuaria





Sirex noctilio larva and galleries

William M. Ciesla, Forest Health Management International,
www.forestryimages.org

For additional images or information on this insect see :

http://www.aphis.usda.gov/ppq/ep/emerging_pests/sirexnoctilio.html

<http://www.forestryimages.org/images/384x256/...>

Sirex larvae bear characteristic posterior “spike” of horntail
William M. Ciesta, Forest Health Management Int'l





Tree damage showing typical symptoms of wilting and discoloration; photo by Paula Klasmer, Instituto Nacional de Tecnologia Agropecuaria

Tetropium castaneum (Linnaeus)
Black Spruce Beetle

At a Glance:

Insect	Host(s)	Host(s)	Survey Methods
<i>Tetropium castaneum</i>	<i>Picea</i> , <i>Pinus</i> , <i>Abies</i>	Spruce Pine Fir	Alpha-pinene and UHR ethanol in Lindgren Funnel Traps



Photo M.Hoskovec, <http://www.uochb.cas.cz/~natur/cerambyx/tetcas3.jpg>



Photo M.Hoskovec,
<http://www.uochb.cas.cz/~natur/cerambyx/tetcas3.jpg>



Larval feeding tunnel, Photo, Michael Henn,
www.faunistik.net/.../IMAGES/tetropium.castaneum_da01s.jpg

Body length: 10-18 mm
Life cycle: 1-2 years
Adults in: May-June
Distribution: Europe, Crimea, Russia

For additional images or information on this insect see:
<http://www.forestpests.org/hungary/longhorntc.html>
<http://www.zin.ru/Animalia/Coleoptera/eng/tetrob.htm>
<http://www.uochb.cas.cz/~natur/cerambyx/tetcas.htm>

Tetropium fuscum (Fabricius)
Brown spruce longhorned beetle

At a Glance

Insect	Host(s)	Host(s)	Survey Method
<i>Tetropium fuscum</i>	<i>Picea</i> , <i>Pinus</i>	Spruce Pine	Visual

Body length: 8 - 17 mm.
Life cycle: 1 year.
Adults in: June - July.
Distribution: Europe, Russia



Photo © M.Hoskovec

Photo, http://www.chebucto.ns.ca/.../FPPP/Images/Tetropium_fuscum.jpg



Photo,
<http://biotype.biology.dal.ca/biotype/2001/jun01/cmajka.html>

Survey Considerations for brown spruce longhorned beetle (BSLB)

Designated sites

Sawmills

Nurseries

When possible, collect information on the destination(s) of imported bonsai and other woody plants and follow up by contacting those destinations for possible surveys. If the final destination is in another state, contact the SPHD in the destination state and provide the host material information.

Firewood dealers

Additional Sites

Landfills

If the SWPM was disposed of at a landfill, conduct survey as below.

If significant amounts of the SWPM were shipped to another consignee with the commodity, contact the second establishment, collect essential information and survey, as above.

Visit and evaluate any recycling companies that receive host material as possible survey sites.

Damage caused by BSLB may be similar to that caused by native species; therefore, it is essential to investigate more closely if suspected damage is observed. The primary symptom of an infestation is abnormally heavy sap flow, scattered streams of resin the length of the trunk from (usually) lower areas on the trunk. The needles turn progressively yellow to brown and are lost from portions of the crown. When the tree dies, the remaining foliage turns reddish brown. Exit holes are round to oval in the bark (approx. 4 mm diameter), and L-shaped feeding tunnels wind through the wood under the bark (up to 6 mm diameter).



**Abnormally heavy resin flow may indicate the presence of the brown spruce longhorned beetle.
Photo: Canadian Food Inspection Service.**

Conduct ground based visual surveys of a maximum sample of 50 to 100 potential host trees (i.e., any species of spruce, with special attention to red, black and Norway spruce, and to white pine in the vicinity) surrounding the site for BSLB.

Include trees that are within 1.25 miles of the site. If symptoms of infestation are noted, conduct closer visual inspections.

Remove bark to inspect for winding feeding galleries.

Obtain wood samples from suspect, damaged trees to extract larvae or other BSLB life stages.

Submit larval or adult insect specimens for identification to the appropriate PPQ Area Identifier or State diagnostic lab, depending on local arrangements.

Submit any suspect insect survey samples identified by the state or PPQ taxonomists as BSLB (or any other suspect exotic pest) to the ARS Systematic Entomology Laboratory (SEL) for final determination.

For additional images or information on this insect see:

<http://www.inspection.gc.ca/english/sci/surv/data/tetfuse.shtml>

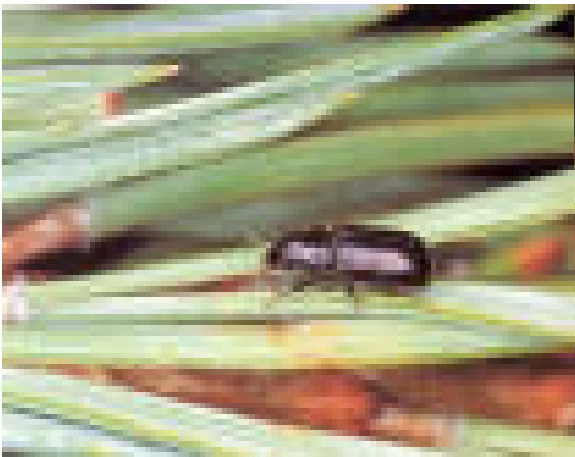
<http://www.uochb.cas.cz/~natur/cerambyx/tefus.htm>

<http://www.invasive.org/browse/subject.cfm?sub=4117>

Tomicus minor (Hartig)
Lesser pine shoot beetle

At a Glance:

Insect	Host(s)	Host(s)	Survey Methods
Tomicus minor	Pinus spp.	Pine species	Trap logs inoculated with blue stain fungus (s)- and (R)-trans verbenol and 3-carene-10-ol Alpha-pinene in Lindgren funnel trap



Adult beetle on host,

Photo:http://www.aragob.es/ambiente/05mednat/08sf/mn_80_9904.htm



Galleries, Photo:

http://www.faunistik.net/.../IMAGES/blastophagus.minor_da01m.jpg

For additional images or information on this insect:

<http://www.forestpests.org/hungary/weevilstmh.html>

<http://www.invasive.org/browse/subject.cfm?sub=4160>

<http://www.forestryimages.org/browse/subimages.cfm?SUB=4160>

Tomicus piniperda (Linnaeus)

Common pine shoot beetle, Japanese pine engraver

At a Glance

Insect	Host(s)	Host(s)	Survey Methods
<i>Tomicus piniperda</i>	Pinus spp. Pseudotsuga spp. Picea spp.	Pine species Fir species Spruce species	Alpha-pinene in Lindgren funnel trap

Survey Considerations:

Non-target information which may help future survey efforts.

Other scolytids found in pine shoots in the northeastern USA with *T. piniperda* include:

Pityophthorus spp. (3 species)

Orthotomicus caelatus

Other insects found in pine shoots during the *T. piniperda* survey in the Northeastern USA;

Dioryctria spp. (Lepidoptera: Pyralidae)

Pissodes spp. (Coleoptera: Curculionidae)

Native scolytids that resemble *T. piniperda* include:

Hylastes salebrosus

Hylurgopsspp. (various)

Scolytids which do not yet occur in the USA that resemble *T. piniperda* are:

Tomicus spp., for example *T. minor*

Hylurgus ligniperda

From: Cavey, J., Passoa, S. and Kucera D. 1994, Screening Aids for Exotic Bark Beetles in the Northeastern United States. NA-TP-11-94. Northeastern Area:

U.S. Department of Agriculture, Forest Service.

From Bugwood, <http://www.barkbeetles.org/other/fspsb.html>

The common (or larger) pine shoot beetle, *Tomicus (Blastophagus) piniperda* (L.), was discovered near Cleveland, Ohio in July 1992. As of this writing, it is now in six states: Illinois, Indiana, Michigan, New York, Ohio, and Pennsylvania. Adults of the common pine shoot beetle are cylindrical and range from 3 to 5 mm in length (about the size of a match head). Their head and thorax are shiny black while the wing covers are reddish-brown to black. Eggs are 1 mm long, oval, smooth, and shiny white. Larvae are legless, slightly curved, have a white body and brown head, and can reach 1/4 inch (5 mm) in length when fully grown.

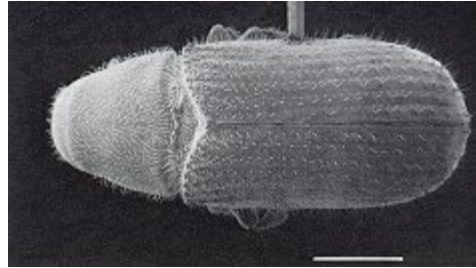


Figure 1. Adult Beetle (Scale line=1mm)

Figure 2. Mined shoots on Scotch Pine.
(Arrow indicates entrance gallery)



Life History



Damaged shoots on Scotch Pine

Tomicus piniperda completes one generation per year throughout its native range of Europe and Asia. Overwintering adults initiate flight on the first warm (50-54° F) days of spring which probably occurs in February or March in the Lake States in the northeastern United States. Adults quickly colonize either recently cut pine stumps, logs, or, at times, infest the trunks of severely weakened trees. If necessary, adults can fly 1/2 mile (1 km) or more in search of host material. Pine is the principal host tree. When populations are high, adults may breed in spruce, fir, and larch logs that occur in stands mixed with pine. Various species of blue stain fungi are associated with this bark beetle.

Adults use host volatiles such as alpha-pinene to locate suitable host material for breeding. *T. piniperda* does not appear to produce an aggregation pheromone (sex attractant). Females initiate gallery systems and soon one male joins each

female. After mating, females construct individual vertical egg galleries within the inner bark and outer sapwood. Egg galleries extend 4 to 10 inches (10 - 25 cm) in length. Females lay eggs singly in niches that are cut into both sides of the egg gallery. After hatching, larvae construct horizontal feeding galleries that are 1.5 to 3.5 inches (4 - 9 cm) long. Most larvae complete development, pupate, and transform to adults in May and June.

The newly formed adults tunnel through the outer bark, creating circular exit holes about 2mm in diameter. They then fly to the crowns of living, healthy pine trees of all ages, but prefer the taller trees in any particular area. Adults feed primarily inside lateral shoots, mostly in the upper half of the crown from May through October. During this period of maturation-feeding, each adult may destroy 1 to 6 shoots. Scotch pine is preferred, but other pine species have been infested in the Lake States including Austrian pine, eastern white pine, red pine, and jack pine.

Adults usually enter shoots in the one-year old or current year's growth. Normally, one beetle infests each shoot. They tunnel into the center and bore outwards, hollowing out 1 to 4 inches of the shoot. After several weeks, adults often emerge and enter other shoots. Infested shoots generally bend near the point where the beetles entered, turn yellow to red, eventually break off, and fall to the ground.

In the Lake States, adults exit twigs soon after the first frosts in October and November and enter the thick bark at the base of pine trees to spend the winter. Adults typically overwinter at the base of the same pine tree that supported their maturation feeding. A few beetles may pass the winter inside twigs in the crown.

Damage

The most severe damage caused by *T. piniperda* is the destruction of shoots during maturation feeding. When shoot feeding is severe, tree height and diameter growth are reduced.

Generally, the reproduction phase of this beetle in pine stumps and slash causes little economic damage. However, in China and Poland, *T. piniperda* has attacked and killed apparently healthy pine trees.

Prepared by Bob Haack USDA FS NCFES, Dan Kucera USDA FS NA,
Technical Advisor Steven Passoa USDA/APHIS/PPQ

For additional images or information on this insect see:

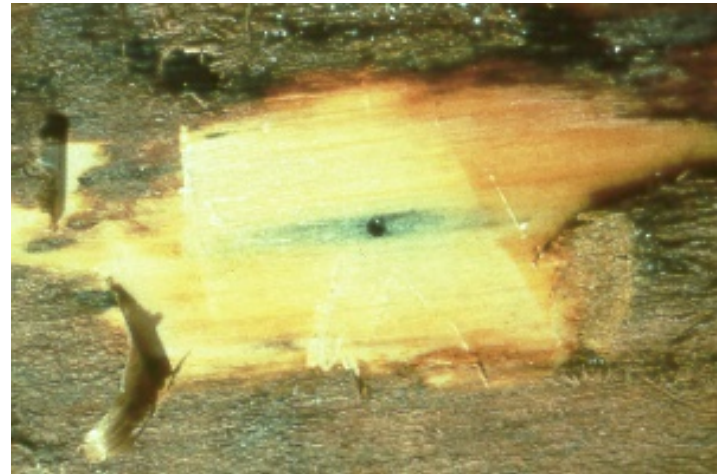
<http://www.forestpests.org/hungary/weevilstp.html>

<http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=124&langdisplay=english>

Trypodendron domesticus (Linnaeus)

At a Glance:

Insect	Host(s)	Host(s)	Survey Methods
Trypodendron domesticus	Pinus spp.	Pine species	UHR ethanol in Lindgren funnel trap UHR ethanol in Theysohn trap placed in Scots pine trees



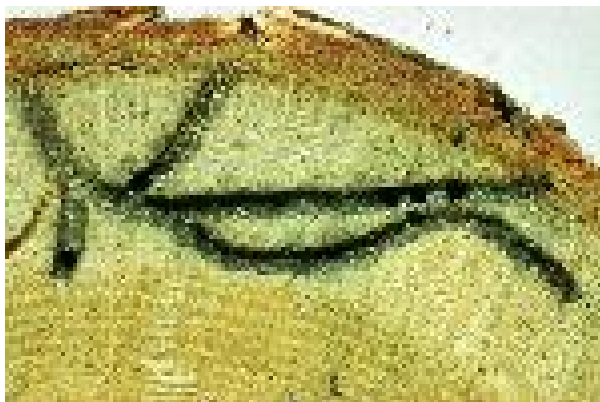
Trypodendron sp. As example of type.

Photo:

<http://www.ulb.ac.be/.../images/coleopteres/trypodendron.jpg>

Staining around bore hole, Photo:

<http://www.fs.fed.us/r6/nr/fid/ento/fg1-1-1.jpg>



Galleries and staining caused by

Trypodendron, Photo:

http://www.faunistik.net/.../trypodendron.domesticum_da01s.jpg

Xyloborus spp.
Ambrosia beetles

At a Glance:

Insect	Host(s)	Survey Methods
Xyloborus spp.	Conifers and hardwoods	Alpha-pinene and UHR ethanol in Lindrgren funnel trap



Xyleborus dispar ♂ (Fabricus), Photo, Coutin R. / OPIE),
<http://www.inra.fr/Internet/Produits/HYPPZ/RAVAGEUR/6xyldis.htm>

Xyleborus dispar (Fabricus) forming a gallery.
Photo, Coutin R./ PIE).
<http://www.inra.fr/Internet/Produits/HYPPZ/RAVAGEUR/6xyldis.htm>



Maternal galleries, Photo, Coutin R. / OPIE), <http://www.inra.fr/Internet/Produits/HYPPZ/RAVAGEUR/6xyldis.htm>

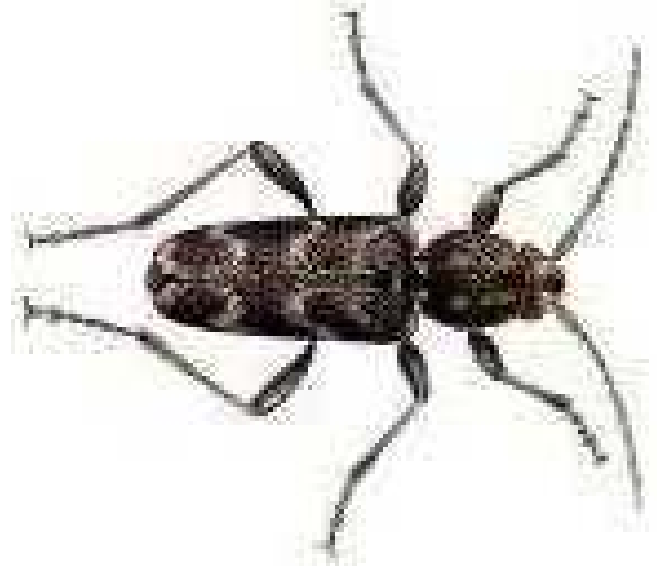
Xylotrechus spp.

At a Glance:

Insect	Host(s)	Survey Methods
Xylotrechus spp.	Both conifers and hardwoods	UHR ethanol, Ips lure, UHR Alpha-pinene in Lindgren funnel trap



Nautical borer, *Xylotrechus nauticus*; adult and larva, as example of type. Photo, <http://www.entomology.ucr.edu/ebling/figures/fig124.jpg>



Xylotrechus, Photo: <http://www.probertencyclopaedia.com/j/Xylotrechus.jpg>

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Scolytus schevyrewi (Semenov)
Banded elm bark beetle

Insect	Host(s)	Host(s)	Survey Methods
Scolytus schevyrewi	<i>Ulmus</i> spp. <i>Elaeagnus</i> spp. <i>Salix</i> spp. <i>Caragana</i> spp. <i>Prunus</i> spp.	Elm Russian olive Willow Peashrub	UHR ethanol? Visual

This is a newly introduced species in the western US. It has been found on elm, caragana, and Russian olive. Identification key, developed by Jim LaBonte:

Scolytus schevyrewi Identification Aid

1. Bark beetles with elytra not extending beyond abdominal apex and/or elytral apex strongly declivous.....Not *S. schevyrewi*.



Bark beetle with elytra extending beyond abdominal apex. Elytral apex not or faintly declivous.....2

2. 2nd abdominal sternite without a spine or with multiple spines on abdominal sternites.....Not *S. schevyrewi*.



2nd abdominal sternite with a single spine.....3

3. Spine at or contacting posterior of 2nd abdominal sternite.....Not *S. schevyrewi*.



Spine not at or contacting posterior of 2nd abdominal sternite.....4

4. Spine at anterior of 2nd abdominal sternite. Teeth on posteriolateral margins of abdominal sternites 2 through 4.....Not *S. schevyrewi*.



Spine not at anterior of 2nd abdominal sternite. No teeth on posteriolateral margins of abdominal sternites 2 through 4.....5

5. Spine narrowly conical and pointed at apex. Last abdominal sternite with transverse carinae distant from apex. Elytra unicolorous brown.....Not *S. scheyrewi*.



Spine variable, from almost absent to strong, but most often broadly conical and blunt at apex. Last abdominal sternite with transverse carinae at apex. Elytra almost always with dark median band and pale bases and apices.....*Scolytus scheyrewi*.



HOST IDENTIFICATION
Known Hosts

Insect	Host(s)	
	Genus	Common Name
<i>Agrilus planipennis</i>	Fraxinus	Ash
<i>Anoplophora chinensis</i>		
<i>Anoplophora glabripennis</i>	Acer, Aesculus, Salix, Betula, Populus, Ulmus, Albizia, Celtis, Fraxinus, Platanus, Sorbus	Maple, boxelder; Horse chestnut, buckeye; Willow Birch; Poplar (apparently excluding cottonwood); Elm Mimosa, silk tree; Hackberry Ash (especially green ash, <i>F.</i> <i>pennsylvanica</i>); Plane tree, sycamore Mountain-ash
<i>Callidiellum rufipenne</i>		
<i>Chlorophorus annularis</i>	Bambusa spp.; Shorea sp; Tectona sp.; Spondias sp.; Gossypium sp.; Liquidambar sp.; Citrus sp.; Pyrus sp.; Vitis sp.; Dipterocarpus sp.	
<i>Hesperophanes (Trichoferus) campestris</i>		Willow Elm Poplar Honey locust Mulberry
<i>Hygurolops (Hylurgus) palliates</i>		
<i>Hylurgus ligniperda</i>		

Ips sexdentatus		
Ips typographus		
Monochamus alternatus	<p>Pinus spp., Pinus elliotii Pinus densiflora;, Pinus thunbergiana, , Pinus luchensis (Japan), Pinus massoniana (China), Picea spp. Abies sp. Cedrus sp. Larix sp.</p> <p>Under laboratory conditions, adults preferred to feed on pines, Cedrus deodara and Larix leptolepis. Metasequoia, Cryptomeria, Gingko biloba and Fagus were accepted but not attractive.</p>	<p>Pine species (17) slash pine Japanese red pine Japanese black pine luchu pine Mason pine Spruce species Fir species (1) True cedar larch</p>
Orthotomicus erosus	<p>Pinus spp., i.e., Pinus canariensis;, Pinus brutia; Pinus nigra and Pinus nigra ssp. pallasiana;, Pinus pinaster; Pinus pinea; Pinus sylvestris, Pinus mugo subsp. uncinata. Pinus radiate Pinus coulteri Pinus caribaea Pinus echinata Pinus patula Pinus strobus and others Occasionally, maturing beetles feed in Pseudotsuga menziesii, Picea spp.; Abies spp.; and Cedrus spp.</p> <p>However Orthotomicus erosus does not breed in hosts other than pines.</p>	<p>Pine Species Calabrian pine Austrian pine, Black pine maritime pine Italian stone pine, Scotch pine, a form of mugo pine Monterey pine Coulter pine Caribbean pine shortleaf pine Mexican weeping pin Eastern white pine</p> <p>Douglas-fir, Spruce, Fir, Cedar,</p>

Pityogenes chalcographus		
Sirex noctilio	Pinus spp.	Pine species
Tetropium castaneum	Picea, Pinus, Abies	
Tetropium fuscum	Picea, Pinus	Pine species
Tomicus minor		
Tomicus piniperda		
Tryptodendron domesticus		
Xyloborus spp.		Apple , pear , apricot ; but also develops on peach , cherry , sweet chestnut , plum
Xylotrechus spp.	Quercus, Carpinus, Fagus, Malus, Ulmus, Crataegus, Juglans, Populus, Tilia, Morus, Sorbus, Prunus, (Larvae feed in dead wood of the hosts)	Oak Apple Elm Walnut Poplar Mountain Ash

INTERNET KEYS, PHOTOGRAPHIC MATERIALS AND OTHER IDENTIFICATION RESOURCES FOR TREES

Providing an identification key for host trees is beyond the scope of this job aid. Field guides are available, and the internet has many useful sites that provide keys, information and photographs for identifying trees. Listed is a sampling of sites:

Leaf Keys:

Virginia Tech: <http://www.fw.vt.edu/dendro/dendrology/ident.htm>

Ohio Historical Society/Public Library: <http://www.oplin.lib.oh.us/products/tree/>

Twig Keys:

Virginia Tech: <http://www.fw.vt.edu/dendro/dendrology/ident.htm>

Ohio Historical Society/Public Library: <http://www.oplin.lib.oh.us/products/tree/>

Fruit Keys:

Ohio Historical Society/Public Library: <http://www.oplin.lib.oh.us/products/tree/>

Name Keys:

Virginia Tech: <http://www.fw.vt.edu/dendro/dendrology/ident.htm>

Ohio Historical Society/Public Library: <http://www.oplin.lib.oh.us/products/tree/>

Online Interactive Keys:

Virginia Tech: <http://www.fw.vt.edu/dendro/dendrology/ident.htm>

Ohio Historical Society/Public Library: <http://www.oplin.lib.oh.us/products/tree/>

Oregon State: <http://oregonstate.edu/trees/dk/index.html>

Iowa State Extension: <http://www.exnet.iastate.edu/pages/tree/>

Photos:

National Wildlife Federation Online Field Guide: search can be limited by location: <http://www.enature.com/>

University of Wisconsin Dendrology:

<http://botit.botany.wisc.edu:16080/courses/dendrology/>

US Geological Survey Southern Wetlands:

<http://www.npwrc.usgs.gov/resource/1999/soutflor/species.htm#group5>

OUTREACH

PUBLIC INFORMATION FOR DISTRIBUTION

All relevant publications are available over the APHIS Legislative and Public Affairs (LPA) website: <http://www.aphis.usda.gov/lpa/pubs/pubs.html> and may be requested from PPQ Public Affairs in Riverdale or from the Regions.

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APHIS Fact Sheets of Possible Interest

Selected APHIS Publications, reviewed and updated, March 2006:

[Amended Solid Wood Packing Material Interim Rule, Q&A's](#)

[Asian Longhorned Beetle](#)

[Asian Longhorned Beetle Q&A's](#)

[Asian Longhorned Beetle Control Treatments, Q&A's About](#)

[Preguntas y respuestas sobre los tratamietos para el control del escarabajo asiatico de cuernos largos](#)

[Civil Penalties Increased for Violations of Agricultural Regulations](#)

[Information for Commercial and Non-Commercial Importers of Nursery Stock,](#)

[Plants, Roots, Bulbs, Seeds, and Other Propagative Plant Products](#)

[Interim Rule on Solid Wood Packing Material from China Q&A's](#)

[Invasive Species](#)

[Especies invasoras](#)

[Pine Shoot Beetle](#)

[Plant Protection Act, The](#)

[Plant Protection Act, The: Q & A's](#)

[Plant Protection and Quarantine Permits, Q & A's](#)

[Protecting America's Plant Resources and Ecosystems](#)

[Surveillance to Safeguarding America's Agricultural Plant Health, The Significance of](#)

Other APHIS Publications, Pictures, Posters and Identity Cards available through respective agency public affairs or on the Internet

The following are available at <http://www.aphis.usda.gov/oa/pubs/bproglist.html>

Asian Longhorned Beetle, Be on the Alert for the (doorhanger) [PDF](#)

Asian Longhorned Beetle, Identifying the (id card) [PDF](#)

Asian Longhorned Beetle, Wanted: The [PDF](#)

(ALB) Have You Seen This Beetle? [PDF](#)

(ALB) Save Trees! [PDF](#)

Detecting Plant Pests and Weeds Through a National Survey Program [PDF](#)

Inland Inspection Program: Safeguarding American Agriculture Against Invasive Species [PDF](#)

Emerald Ash Borer, *The Green Menace*, Program Aid No. 1769

Japanese Cedar Longhorned Beetle in the Eastern United States [PDF](#)
[National Smuggling Interdiction and Trade Compliance Program](#)
[Not All Alien Invaders are from Outer Space](#) (poster and individual cards)
Plant Protection & Quarantine: Safeguarding American Agriculture, Fighting
Invasive Species, & Facilitating Trade

USDA Forest Service Publications
National Headquarters
USDA Forest Service
PO Box 96090
Washington, DC 20090-6090
(202) 205-8333

Or you can locate the appropriate regional contact by consulting the webpage:
<http://svinet2.fs.fed.us/contactus/regions.shtml>

[America's Forests: 2003 Health Update](#) (pdf, 1.67mb)
Available: <http://svinet2.fs.fed.us/publications/>

Selected Forest Service Pest Alerts:

<http://www.fs.fed.us/na/morgantown/fhp/palerts/palerts.htm>

[Asian Longhorned Beetle \(Anoplophora glabripennis\): A New Introduction](#)

[Spanish version](#)

[Common Pine Shoot Beetle](#)

[Emerald Ash Borer](#) [pdf version](#)

[Hemlock Borer](#) [pdf version](#)

[Nun Moth--Potential New Pest](#)

[Red-Haired Bark Beetle](#)






[Scarlet Oak Sawfly](#) [pdf version](#)



[Sudden Oak Death - Eastern](#) [pdf version](#)

[Sudden Oak Death - Western](#) [pdf version](#)

Selected Forest Service Forest Insect and Disease Leaflets:

<http://www.na.fs.fed.us/spfo/pubs/fidl.htm>

<u>FIDL #</u>	<u>Title</u>
170	Ambrosia Beetles of Western Conifers
116	Arizona Five-Spined Ips
12	Black Turpentine Beetle 
111	Bronze Birch Borer (revised: 2000) (250 KB) NEW!
4	California Five-Spined Engraver Beetle *** superseded by FIDL #102 ***
102	California Five-Spined Ips
24	California Flatheaded Borer
132	The Columbian Timber Beetle
5	Douglas-fir Beetle 
175	Eastern Larch Beetle 
134	Eastern Pineshoot Borer (68.7 KB) NEW!
142	Elm Sawfly
98	European Pine Sawfly
13	Fir Engraver 
115	Fir Tree Borer
109	The Hemlock Borer
31	Hemlock Sawfly 
99	Introduced Pine Sawfly (36 KB)
129	Ips Bark Beetles in the South (356KB) NEW!
11	Jeffrey Pine Beetle
8	Larch Sawfly
71	The Locust Borer (117 KB)
56	Monterey Pine Ips
2	Mountain Pine Beetle (280 KB)
104	Pales Weevil (172 KB) NEW!
122	Pine Engraver, Ips pini, in the Western United States
15	Pine Reproduction Weevil

- 39 Pine Root Collar Weevil
- 105 Pine Sawfly
- 121 Poplar-and-Willow Borer
- 14 [Redheaded Pine Sawfly](#) (131 KB)
- 14 [Redheaded Pine Sawfly](#)
- 163 [Red Oak Borer](#)
- 55 Red Turpentine Beetle 
- 155 Roundheaded Pine Beetle 
- 3 [Saratoga Spittlebug](#) (69 KB)
- 60 Silver Fir Beetle
- 47 Sitka Spruce Weevil
- 141 Six-Spined Engraver Beetle
- 49 [Southern Pine Beetle](#) (178 KB)
- 127 [The Spruce Beetle](#)
- 160 [Spruce Budworm](#)
- 160 [Spruce Budworm in the Eastern United States](#)
- 108 Sugar Maple Borer
- 112 The Sugar Pine Cone Beetle
- 168 [Twolined Chestnut Borer](#)
- 1 [Western Pine Beetle](#) (174 KB)
- 83 White-Pine Cone Beetle
- 21 [White Pine Weevil](#) (226 KB)
- 74 [White-Spotted Sawyer](#) (62 KB)
- 69 Yellow-Headed Spruce Sawfly
- 125 Yellow-Poplar Weevil

Other USDA/FS Publications: The following are available at:

<http://www.na.fs.fed.us/spfo/alb/pubs/pubs.htm>

[Pest Alert - Asian Longhorned Beetle — \(In Spanish/Español\)](#)

[Wanted Poster - Be On The Lookout for The ALB Attacking Trees](#)

[Asian Longhorned Beetle vs. Whitespotted Sawyer](#)

[Asian Longhorned Beetle vs. Cottonwood Borer](#)

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Please see <http://www.ceris.purdue.edu/napis/names/natcaps.html> for a complete list of addresses, phone numbers, and email contact information.

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Please see <http://www.ceris.purdue.edu/napis/names/wr-comm.html> for a complete list of address, fax, and email information.

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Please see <http://www.ceris.purdue.edu/napis/names/er-comm.html> for a complete list of addresses, fax numbers, and email contact information.

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(E) = Entomology, (P) = Plant Pathology, (B) = Botany

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USDA-APHIS-PPQ Francis Krim Memorial Insp. Station 2500 Brunswick Ave., Bldg. G Linden, NJ 07036 (908) 862-2012 FAX: (908) 862-2095		
KEITH CLANCY (B) USDA, APHIS, PPQ 230-59 International Airport Centers Blvd. Bldg. C, Suite 100-Room 109 Jamaica, NY (718) 553-1413 FAX (718) 553-0060	Covers: NJ, Port of Brooklyn, DE, OH, MI, PA, WI, IL, MN, IN, KY, VA, MD	
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LEON PRAETORIUS (E)	JFKIA, NY (ex. Brooklyn)	Middle East
DAN LEE (E)	JFKIA, NY (ex. Brooklyn)	Middle East
ALAN J. TOWSON (P)	JFKIA, CT, MA, ME, NH, NY (ex. Brooklyn) RI, VT	Europe, Africa, Middle East
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REFERENCE MATERIALS

Forest Pest Control

Douce, G.K., Moorhead, D.J., and Bargerion, C.T.. Forest Pest Control. The University of Georgia, College of Agricultural and Environmental Sciences, Special Bulletin 16, Revised January 2002.

The Bugwood Network:

<http://www.bugwood.org/pestcontrol/pat.pdf>

<http://www.forestpests.org/>

Insect Images:

<http://www.forestryimages.org/>

FORMS FOR REPRODUCTION

Interview Form

Inspection Form

Trap Card

Asian Longhorned Beetle/Woodborer/Bark Beetle Multiple Purpose Reporting Form Establishment Interview Recording Form	
Inspector:	Date:
Establishment Name and Address:	Initial Contact Person:
	Phone Number:
Type of Business:	
Please include brief description of the types of items:	
Wood Products Landfill, Wood Mulching Pallet, crate recycle Tools/Machinery Raw Materials Construction Electronics Imports, Miscellaneous Consumer Goods Manufactured Other	
Cargo Inspected (list):	Country(ies) of Origin:

NATIONAL EXOTIC WOORDBORER/BARK BEETLE SURVEY 2004, Updated :
November 5, 2003

IF INSPECTION OR PEST SURVEY IS CONDUCTED, PLEASE COMPLETE THE FOLLOWING SECTION					
Asian Longhorned Beetle/Woodborer/Bark Beetle Premises/Solid Wood Packing and Other Material Inspection Recording Form					
If inspection was conducted, what materials on site were inspected? Please provide any details of condition of wood, note of any signs of insect damage. What type of SWPM do you receive?					
Crates					
Pallets					
Spools					
Dunnage					
Spacers					
Stickers					
Skidders					
Chips/Shavings					
Wood Waste					
Utility /Landscaper Wood Waste					
Other					
Were specimens found?				Y	N
Were specimens forwarded?				Y	N
If yes, to whom?					
On what date?					
Are windows or any other light sources that may attract insects present?				Y	N
Are host trees, or potential host trees, on or near property:				Y	N
If yes, complete table, below:					
Host Tree/Shrub Potential host	Size of Host	Approximate Number	Distance	Sign of Insect Damage	

NATIONAL EXOTIC WOOD BORER AND BARK BEETLE SURVEY TRAP CARD
 Change lures at least every 2-3 months, tri-lure may need to be changed more frequently; add additional insect kill strip every 2 months

GPS (if available):		SITE DIAGRAM												
Name, Address and Phone Number														
Contact Name and Phone														
Trap Type														
Set Date														
Black Light (B)														
Lindgren #_ Funnel Trap (L#_)														
Lure Set Date														
UHR ethanol (E)														
alpha-pinene (A)														
Triple Lure (3)														
Other (specify)														

Date	Initials	Trap	E	A	3	Other	Date	Initials	Trap	E	A	3	Other	TOTAL DAYS

When completed, this card should be forwarded to the SPHD and to the local US Forest Service RapDet coordinator.

SELECTED REFERENCES

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