COLORADO EXOTIC INSECT DETECTION AND IDENTIFICATION FACT SHEET SERIES

European Woodwasp/Sirex Woodwasp in Colorado - Identification of Insects and Damage of Similar Appearance

Matt Camper and Whitney Cranshaw

Figure 1. European woodwasp larva tunneling in heartwood. *Photo courtesy of Dennis Haugen*

Figure 2. European woodwasp adult (female). *Photo courtesy of David Lance*

The European woodwasp (*Sirex noctilio*) (Figure 2) is a wood boring horntail wasp (Family Siricidae) of European origin that recently was identified as being established in the midAtlantic region of the US. This insect is primarily attracted to trees that are stressed or in decline but healthy trees can also be attacked. Damage that the insect produces is partly related to wood tunneling by the larvae but more importantly the European wood wasp spreads a fungus (*Amylostereum areolatum*) that produce a white rot which can seriously weaken the wood.

Through accidental introduction the European woodwasp has extended its native range of Europe, North Africa and western Asia. Presently it is now established in parts of New Zealand, Australia, Uruguay, Argentina, Brazil, Chile and South Africa. Cultivated pine plantations in these areas where the insect was introduce often consider the European wood wasp to be a key pest and have seen significant tree mortality (c.a. 80%) due to infestations.

European wood wasp has frequently been detected at United States ports-of-entry within solid-wood packing materials, but its recent (2004) detection in upstate New York pine trees is the first evidence of North American establishment. Subsequent detection surveys have confirmed its presence in 25 New York counties and 2 counties in Pennsylvania. In 2005, the European wood wasp was detected in 6 locations of southeastern Ontario

Currently, there have been no detections of the European woodwasp in Colorado but this insect has the potential to spread and ultimately become a pest of North American pines over widespread areas of North America. Its spread into Colorado could occur through introduction of packing material originating from Europe, or by movement of infested pine logs or firewood that originate from European woodwasp infested areas of the US. All North America pines are considered vulnerable including jack (*Pinus banksiana*), loblolly (*P. taeda*), lodgepole (*P. contorta*), Monterey (*P. radiata*), ponderosa (*P. ponderosa*), shortleaf (*P. echinata*) and slash (*P. elliottii*). There are European reports of this insect found associated with spruce, larch, fir and Douglas fir.

Methods to Monitor European Woodwasp in Colorado

Figure 3. Lindgren funnel similar to those used to monitor for European woodwasp. *Photo courtesy of Kenneth Gibson USDA-FS*

Currently there is no specific attractant or pheromone lure available for the European wood wasp and early detections were found in sites monitoring for exotic bark beetles. Current monitoring projects directed at the European woodwasp use Lindgren funnels with a lure (Figure 3). Lures for monitoring have involved alpha:beta pinene (70:30), alpha pinene alone, or a three component lure containing cis-verbenol, ipsdienol and methyl butenol. One disadvantage of all these lures is that the effective attraction range is only about 50 yards. Also, these lures are not specific to the European woodwasp and are attractive to several native *Sirex* species as well as many other wood boring insects.

Identification of captured insects is also a problem as the species require very detailed examination by experts. However suspect *Sirex* species of woodwasps associated with pines should be immediately brought to the attention of a Colorado State Extension office or sent directly to Colorado State University.

Identification of the European Woodwasp

Adult European woodwasps are cylindrical-bodied stingless wasps approximately 1-1.5 inches long. They can be easily separated from other wasps as they lack the constricted "waist" behind their wings. Adults of the European wood wasp are generally metallic blue to black; males have a conspicuous orange band around the middle segments of the abdomen (Figure 4). Most have reddish-yellow legs, black feet (tarsi), and entirely black antennae. However, there is some variation in these features.


Figure 4. European woodwasp adult (male). *Photo courtesy of David Lance*

As with all woodwasps, there are differences in size and appearance between the sexes. Females tend to be slightly larger than males but are best distinguished by a long, stout spine at the end of the body (Figure 2 and 5). This is the ovipositor, used to insert eggs under the bark of trees. Males have only a short blunt spine at the end of the body.


Figure 5. European woodwasp adult (female). *Photo courtesy of David Lance*

Larvae of the European woodwasp are a creamy white and reach a length of around one inch when full-grown (final instar). All larvae are legless and have a distinctive dark spine at the rear of the abdomen. However, these features are shared by all the other native species of horntail larvae that presently occur in Colorado. Currently no keys to identify woodwasp larvae to the species level have been developed nor is this likely because of physical similarities. Methods based on genetic markers may ultimately be useful for separating larvae.

Diagnosis of European Woodwasp Injury

Trees with European woodwasp infestation show a range of symptoms. Green needles will wilt and change color (from the initial dark green to a yellow and finally to red) within six months of infestation in a pine. Trees may have resin "pitch-outs" (thin beads or dribbles of resin) at points where the adult female drills into the tree to lay eggs (Figure 6). However, such symptoms may be produced by several native species and should not be considered evidence of European woodwasp infestation without adult specimens. As they emerge from a tree adults produce a round exit hole, but this is a shared feature of all woodwasps.

Figure 6. "Pitch-outs" produced by European woodwasp females during oviposition. *Photo courtesy of Dennis Haugen*

Regional Woodwasps of Similar Appearance to the European Woodwasp

At least eleven species of siricid woodwasps are present in Colorado. The most commonly encountered species is the pigeon tremex (*Tremex columba*) that develops within declining maples and other hardwood shade trees. All other species in the state are associated with conifers, as is the European woodwasp.

Siricid woodwasps also show great variation in size. Size variations ranging from 1/4 to 1 inch in body length excluding the ovipositor have been recorded within some species. As such size is not a very useful tool to discriminate between the different siricid species.

While there can be substantial variation in color within some species, colors and patterns on certain areas of the body (antennal markings, leg markings) are useful in helping to differentiate some of the woodwasp species.

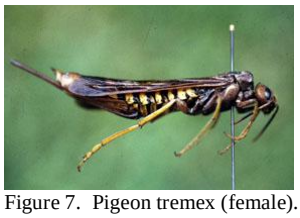
Figure 7. Pigeon tremex (female).

The most easily identifiable of the woodwasps is the pigeon tremex. In addition to differences in host (hardwoods vs. conifers) it is a generally brown color, a feature that allows it to be distinguished easily from the European woodwasp. Colorado State Extension Fact Sheet 5.604 provides additional images of this insect along with its most prominent natural enemy, the giant ichneumon wasp. The link to this sheet is http://www.ext.colostate.edu/PUBS/INSECT/05604.html.

Seven of the woodwasps found in Colorado that are associated with conifers (pines, Douglas-fir, etc.) should be fairly easy to distinguish from the European woodwasp:

Urocerus albicornis. *Urocerus albicornis* resembles the European woodwasp in body shape and length. They can be separated from the European woodwasp by checking antennae color. Females of *U. Albicornis* have antennae that are white except at the base and tips while the antennae of the European woodwasp are entirely black.

Urocerus californicus. *Urocerus californicus* may be separated from the European woodwasp by checking antennae color. Females of *U. californicus* have antennae that are entirely yellow in contrast to the entirely black antennae of the European woodwasp.


Figure 8. *Urocerus californicus* (female). *Photo courtesy of the Ken Gray collection*

Urocerus cressoni. *Urocerus cressoni* looks similar to European woodwasp in general body shape and size. However, unlike the entirely metallic blue/black bodies of the European woodwasp, *U. cressoni* females have black head and thorax and a red or yellow-red abdomen. Another difference can be found in the antennal color. *U. cressoni* females have white tipped antennae while the antennae of the European woodwasp are entirely black.

Figure 9. *Urocerus cressoni* (female). *Photo courtesy of Kenneth Law*

Urocerus gigas flavicornis. *Urocerus gigas flavicornis* can also be separated from the European woodwasp by examining body and antennae color. The body of *U. gigas flavicornis* females is generally black in color, but in many cases the abdomen will have yellow bands. This contrasts the entirely blue/black body of female European woodwasps. A second feature that will help separate the two wasps is the color of the antennae. *U. gigas flavicornis* females have yellow antennae while the antennae of the European woodwasp are black.

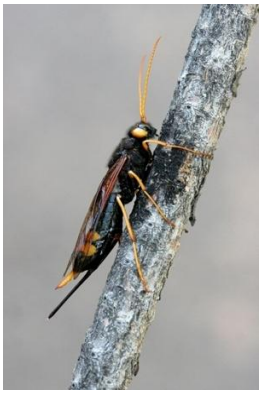

Figure 10. *Urocerus gigas flavicornis* (female). *Photo courtesy of David Leatherman*

Xeris morrisoni indecisus. *Xeris morrisoni indecisus* closely resembles the European wood wasp in body size and color. However they can be easily separated by taking a look at the ovipositor. The ovipositor of *X. morrisoni indecisus* females is nearly ¾ the length of the body while the ovipositor of the European woodwasp is generally very short (c.a. ¼ the length of the body).

Xeris morrisoni Morrisoni. *Xeris morrisoni morrisoni* can be distinguished from the European woodwasp by taking a look at the ovipositor. The ovipositor of *X. morrisoni morrisoni* females is nearly ¾ the length of the body while the ovipositor of the European woodwasp is generally very short (c.a. ¼ the length of the body). Another characteristic that may separate *X. morrisoni morrisoni* from the European woodwasp is the color of the abdomen. *X. morrisoni morrisoni* females generally have red abdomens while the abdomen of female European woodwasps is generally metallic blue/black entirely.

Xeris spectrum spectrum. *Xeris spectrum spectrum* closely resembles the European wood wasp in body shape and color. Much like the other Xeris species discussed *X. spectrum spectrum* can be distinguished from the European woodwasp by taking a look at the ovipositor. The ovipositor of *X. spectrum spectrum* females is nearly ¾ the length of the body while the ovipositor of the European woodwasp is generally very short (c.a. ¼ the length of the body).

There remain three *Sirex* species already present in Colorado that so closely resemble the European woodwasp that species determination must be done by an expert:

Sirex areolatus. *Sirex areolatus* resembles the European wood wasp in body, shape and length. *S. areolatus* may be separated from the European wood wasp by checking leg color as it has blue-black legs; European wood wasp has orange-yellow legs. The ovipositor is also longer than that of a European wood wasp. Common hosts include various pines, Douglas-fir, and juniper.

Sirex juvencus californicus. *Sirex juvencus californicus* closely resembles the European wood wasp. Females are metallic blue black with blue-black legs and a short ovipositor.

For males, the latter ¾ of the abdomen is usually an orange to yellow. Common hosts include various pine and Douglas-fir.

Sirex longicauda. *Sirex longicauda* also resembles the European wood wasp in general body shape and color. A key difference is that *Sirex longicauda* has a very long ovipositor in contrast to the European woodwasp's relatively short ovipositor.

If any *Sirex* species is detected it should be immediately forwarded to Colorado State University extension, through a local office. Determination will be made there whether it is a native *Sirex* species or *Sirex noctilio*, the European woodwasp.