

SIREX NOCTILIO IMPACTS ON NATIVE AND EXOTIC PINE STANDS IN THE NORTHEASTERN UNITED STATES

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ABSTRACT

Sirex noctilio F. (Hymenoptera: Siricidae) was detected in North America during a 2004 exotic species survey conducted in New York. *S. noctilio* has also been detected in Michigan, Pennsylvania, and Vermont, and a large portion of southern Ontario is positive for *S. noctilio*. This large geographical area of positive *S. noctilio* detections represents a region where several important native pine species grow including red pine (*Pinus resinosa* Ait.), white pine (*Pinus strobus* L.), and jack pine (*Pinus banksiana* Lamb.). The non-native Scots pine (*Pinus sylvestris* L.) was also planted throughout this area and is still a component of landscapes today.

While *S. noctilio* has been problematic in Southern Hemisphere countries where pines are planted in even-aged pure stands, it is unknown how this insect will behave in North American pine ecosystems. North American pine ecosystems have well-developed invertebrate and fungal communities that will compete, prey upon, and/or parasitize *S. noctilio*. Understanding *S. noctilio* behavior in northeastern U.S. and southern Ontario forests is important in determining the potential economic and ecological impact this insect will have on regional forests.

Forest stand assessments are currently underway in New York and are planned in southern Ontario by the Canadian Forest Service. The objectives of this study are to (1) describe stands attacked by *S. noctilio*, (2) assess the ecological impact of *S. noctilio* on these stands, and (3) describe the growth history of attacked and un-attacked trees in infested stands. Fixed-radius plots were placed throughout infested stands in the Syracuse, NY, area during 2006 and 2007 to describe vegetation (tree spp., d.b.h., live crown ratio, etc.) and *S. noctilio* activity. To determine the presence of *S. noctilio* in a stand, trees

were checked for characteristic resin beading and round exit holes that are diagnostic for this insect. Resin beading on red and Scots pine can easily be differentiated from damage caused by native insects, but round exit holes are more problematic. Because of a concern for confusing *S. noctilio* exit holes with those of native insects (e.g., Cerambycidae, native Siricidae), we attributed tree mortality to *S. noctilio* for only a 2-year period. Trees that had fresh resin beading were considered attacked during the current year, while trees that had round exit holes, some crown remaining, and signs of older resin beading were considered attacked the previous year. A subsample of attacked and un-attacked trees was selected and increment cores were removed from breast height. On each of these cored trees, the height of the base of live crown and total tree height were measured and live crown ratios determined.

In general, the data collected and analyzed thus far suggest infestation patterns in red and Scots pine were similar. Stands that had *S. noctilio* attacks were overstocked (33-44 m²/ha basal area) and generally in poor condition. In these stands, it appears that *S. noctilio* is preferentially attacking trees under 16 cm d.b.h. However, some larger trees (> 26 cm) have also been successfully colonized but much less frequently than smaller trees. Increment cores from one stand indicated that attacked trees were growing at about half the rate of un-attacked trees over the 10-year period before *S. noctilio* colonization. Increment cores from other infested stands are currently being analyzed. Attacked trees also had approximately one-half the live crown ratio of un-attacked trees.

At this point in the invasion, *S. noctilio* is behaving similarly to endemic population patterns documented

in Southern Hemisphere countries where this species is invasive. Suppressed trees in unthrifty stands seem to be the focus of attacks. However, in other countries, epidemic *S. noctilio* populations are reported to move into more vigorous tree classes as populations build in an area. While we have not yet observed this high level of tree mortality documented in other countries, long-term monitoring of infested forests should be conducted to follow population patterns over time.

While *S. noctilio* in the Northeast is behaving like a secondary species at this point, it is unknown how this insect will respond to forest ecosystems in other parts of North America. Forests and landscapes in the known *S. noctilio* positive area are diverse compared to parts of the world where this insect has been problematic. As *S. noctilio* populations spread south and west in North America, larger blocks of contiguous pine forests will be encountered that are more similar to areas where this species has been economically damaging.