



BUG BIZ

Pest Management and Insect Identification Series



Sirex nigricornis, Native North American Woodwasp (Hymenoptera: Siricidae)

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Description

Adults of *S. nigricornis* are large dark wasps that vary greatly in size, ranging from 1 to 1.6 inches (2.5 to 4 cm) in length. Typically, females are larger than males and possess a three-pronged egg laying apparatus extending from the underside and tip of the abdomen. The head and thorax are dark blue to black with metallic iridescence, and the abdomen (technically metasoma in Hymenoptera) can range from a pale orange to black, often with orange near the rear and black in front. The wings are dark. The body is robust and cylindrical, lacking the characteristic constricted waist of many Hymenoptera. This character is diagnostic for the suborder Symphyta, which includes woodwasps and sawflies. The legs are reddish-brown towards the tips. Adults of this species are characterized by the presence of a dark horntail at the tip of the abdomen, which is also present in larvae. Larvae are creamy white and grub-like in appearance with dark heads. Members of this species can be confused with the nonnative, *S. noctilio* (European woodwasp) but the latter species has light brown to yellowish, translucent wings.

The family Siricidae includes about 100 species worldwide, 23 of which occur in the U.S. Seven species of *Sirex* occur in the U.S. Only *S. nigricornis* is known from Louisiana. Pale specimens of *S. nigricornis* have been placed in another species, *S. edwardsii*, but these are color variations of *S. nigricornis*, and that name is no longer used.

Life Cycle

The native North American woodwasp undergoes one generation annually. Most adult specimens in the Louisiana State Arthropod Museum were collected September through December. Females produce up to 600 eggs each that are deposited in stressed or injured pine trees by drilling through the bark to reach the xylem using the ovipositor. During this process,



Female *Sirex nigricornis* (Erich G. Vallery, U.S. Department of Agriculture Forest Service - SRS-4552) Bugwood.org. Creative Commons 3.0.)

the females also deposit spores of a symbiotic white rot fungus *Amylostereum* that is stored in a special structure in her body called a mycangium. The resulting fungus-infected wood substrate serves as food for the developing larvae, with the fungus providing the biochemical mechanism for cellulose digestion. The larvae hatch after 10-14 days and begin tunneling into the wood, creating long galleries in the xylem tissue. After developing for at least a year, the larvae pupate in the outer layers of wood. Adults wait under the outer bark, emerging only when temperatures begin to decline in the late summer and fall. After emerging, the adults search for mates, the females lay eggs, and the life cycle restarts. Emergence holes produced by the larvae are obvious. Adults are short lived and do not feed. Sometimes females die during the process of egg laying with the ovipositor still embedded in the tree.

Ecological Significance and Pest Status

During recent years the native North American woodwasp, *Sirex nigricornis*, has received much attention due to the introduction to North America of a similar, invasive species, the European woodwasp, *Sirex noctilio*. The native range of the invasive wasp is Europe, Asia and northern Africa. It was first discovered in New York and Canada during 2005. Recent studies have confirmed that it competes directly with its native counterpart in the U.S. for resources and breeding sites. The native woodwasp species are not considered economically important as silvicultural pests. However, the invasive European woodwasp is destructive and is responsible for extensive mortality of pine trees in the Southern Hemisphere. Silviculturists are concerned that it will become a major pest of pine plantations in North America. Both species of woodwasps have a wide host range, but various species of pine trees are their preferred hosts.

In Louisiana, native woodwasps are not considered pests for multiple reasons. They produce only one generation annually and will not infest healthy trees. In addition, there are a variety of native parasitoids, nematodes and predators that prey on and parasitize this species of woodwasp. By contrast, the invasive and destructive European woodwasp lacks native predators and parasitoids, can infest and kill healthy trees, and emerges earlier than *S. nigricornis* during breeding season, enabling them to occupy suitable hosts first.

European woodwasp is not currently recorded in Louisiana. In northeastern states, the European woodwasp causes between \$16 and \$60 million in annual losses per year in forests. Forest biologists with the U.S. Department of Agriculture estimate that these wasps could cost between \$2.8 and \$17 billion if they become established nationwide. Louisiana is an important producer of wood products, and pine trees contribute enormously to this market. Preventing the spread of the European woodwasps into Louisiana is a top priority to avoid future losses in the state's extensive pine plantations.

Control

Monitoring. Monitoring for damaged trees and collecting and identifying adult woodwasps is important to estimate population sizes and distribution patterns. These monitoring activities are largely focused on early warning surveys for European woodwasps. Different combinations of commercially available traps and lures can be utilized to attract and capture the adults (for example: Intercept panel traps, cups, funnel traps, with *Sirex* lure). Female woodwasps are highly attracted to ethanol and different volatiles from pine trees, such as, α - and β -pinene. Freshly cut pine material is also an effective lure for adult wasps.

Cultural control. Avoiding transport of freshly harvested wood products from areas where European



Lateral view, female *Sirex nigricornis* (Natasha Wright, Braman Termite and Pest Elimination, Bugwood.org, Creative Commons 3.0).

woodwasps are known or suspected can help mitigate their spread. In addition, studying the basic biology of woodwasps improves our knowledge of life history details of both native and invasive woodwasps, leading to more effective management strategies for the latter.

Biocontrol. The most effective biocontrol strategy is the use of various species of nematodes that parasitize and kill woodwasp larvae. Larvae of several species of large ichneumon wasps in the genus *Megarhyssa* parasitize the larvae.

Chemical control. The use of chemicals is not recommended for the management of woodwasps. They are largely ineffective and contaminate the environment.

References

Hajek, A. E., L. J. Haavik, and F. M. Stephen (eds.) 2021. Biology and Ecology of *Sirex noctilio* in North America. FHAAS-2019-01. U.S. Department of Agriculture Forest Service, Morgantown, West Virginia. 120 pp.

Hartshorn, J. A., D. M. Fisher, L. D. Galligan, and F. M. Stephen. 2015. Seasonal phenology of *Sirex nigricornis* (Hymenoptera: Siricidae) in Arkansas with implications for management of *Sirex noctilio*. Florida Entomologist 98: 933-938.

Hartshorn, J., L. D. Galligan., and F. M. Stephen. 2020. *Sirex nigricornis* (Hymenoptera: Siricidae) larval development correlated with tree characteristics and ophiostomoid fungal infection. The Great Lakes Entomologist 53: 178-182.

Miller, D. R. 2020. Flight Period of *Sirex nigricornis* (Hymenoptera: Siricidae) in Western North Carolina. Journal of Entomological Science 55: 291-294.

Olatinwo, R., J. Allison, J. Meeker, W. Johnson, D. Streett, C. Aime, C. Carlton. 2013. Detection and identification of *Amylostereum areolatum* (Russulales: Amylostereaceae) in the mycangia of *Sirex nigricornis* (Hymenoptera: Siricidae) in central Louisiana. Environmental Entomology 42: 1246-1256.

Schiff, N. M. 2006. Guide to the siricid woodwasps of North America. U.S. Department of Agriculture Forest Service, Forest Health Technology Enterprise Team. 110 pp.

Schiff, N. M., H. Goulet, D. R. Smith, C. Boudreault, A. D. Wilson, and B. E. Scheffler. 2012. Siricidae (Hymenoptera: Symphyta: Siricoidea) of the western hemisphere. Canadian Journal of Arthropod Identification 21: 1-305.

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