

Neem Oil Research as a Valued Organic Insecticide and Fungicide Alternative

by Dee Hufner

When posed with a bagworm infestation problem in a grouping of arborvitae this past summer, I began researching more natural pest and disease control alternatives with minimal impact to the environment and risk to people. This led me to “Neem Oil”. Neem Oil was highlighted over and over again and is named as an organic control in the Va. Tech Integrated Pest Management manual for several insects and diseases.

So, just what is Neem oil? Is Neem Oil considered a Horticultural Oil?

So many questions! So, let’s back up to first define a Horticultural Oil. Horticultural Oil is defined as “oil used to control a pest on plants”¹.

Traditionally, Horticultural Oils are those oils refined from petroleum products (considered mineral oils) with impurities removed and emulsifiers added.² Most are familiar with the term, dormant oils, which are less refined, and used for insect control on fruit trees. The oils can be further categorized by time of application, weight of the oil, or amount of refinement. Vegetable sources, such as soybean and cottonseed oils, are included in the Horticultural Oil category. These oils have been used for insect control for years.

Horticultural Oils are favored as part of integrated pest management practices as they are effective in their treatment, exhibit low toxicity to mammals, and have minimal impact on beneficial insects.²

Now that there is an understanding of a Horticultural Oil, let’s take a look at Neem Oil. Neem Oil is extracted from the leaves, stems, flowers, and seeds of the Neem Tree, *Azadiracta indica*, which is an evergreen tree native to India, Pakistan, and Bangladesh.² Because the oil is a plant or vegetable extract, Neem Oil is classified as a Horticultural Oil.

What makes Neem Oil so unique?

The use of Neem Oil is not new. Neem extracts have been used for generations in the native regions where it grows for medicinal, and hygiene purposes. In India, it is known as the “Sacred Tree”.³

Neem Oil has been identified as a broad spectrum insecticide for control of a wide variety of insects that cause damage to vegetables and ornamentals. In the extraction process, two components are derived: Azadirachtin and the residual Neem Oil. Azadirachtin is the active ingredient that acts as an insect repellent and disrupts an insect’s hormone system (inhibiting growth and the laying of eggs).⁴ The oil component acts as an insecticide and fungicide. The oil

itself as with other Horticultural Oils effectively suffocates the insects by preventing gas exchange and impacts feeding on plant surfaces covered with the oil product. ²

When looking at the environmental impact, Neem Oil is quickly broken down. Microbes and sunlight play a part in the breakdown of Azadirachtin, the major component of the oil, with low half-life properties.⁴ Half-life is the time taken to biodegrade one half of an insecticide's quantity or concentration. Half Life times for Azadirachtin are listed below.

Soil: 3 – 44 days

Water: 48 minutes - 4 days

Plant leaves: 1 – 2.5 days ⁴

Lastly, Neem Oil is basically non-toxic to mammals, birds, plants, and bees and only slightly toxic to fish and other aquatic species ⁴; thereby, increasing it as a valued control solution.

Examples of Brands and Manufacturers ²

Brand	Manufacturer
Trilogy®	Certis USA
Triact®	OHP, Inc.
70% Neem oil	Monterrey
Neem® Concentrate	Green Light
Rose® Defense	Green Light

¹ Colorado State University Extension: <http://www.ext.colostate.edu/pubs/insect/05569.html>

² Texas A&M University: "Horticultural Oils and Pest Control"; James V. Robinson, Professor and Extension Entomologist

³ Wikipedia: http://en.wikipedia.org/wiki/Neem_oil; <http://en.wikipedia.org/wiki/Neem>

⁴ National Pesticide Information Center (NPIC); March 2012