



# J&L Garden Center

*The All Season Gift  
and Garden Center*

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## What's Neem Oil?

For centuries the Neem tree has been noted for its unique insecticidal, fungicidal and miticidal properties. For hundreds of years the local villagers in India have put Neem Tree Leaves in their granaries and cupboards to keep away weevils and other insects. The local villagers often call the Neem tree the "Village Pharmacy". They use parts of the tree to cure skin disorders, relieve pain, reduce fevers, cure infections, and they even clean their teeth with Neem Twigs.



USDA researchers began studying the neem tree in 1972. They have determined that Neem extracts seem to have little or no toxicity to warm blooded animals, including humans. Birds and bats eat the fruits of the neem tree without harm. Today many companies are producing Neem extracts for medical and agricultural uses. There are two different types of Neem products available for use in your gardens.

The first product is called **BioNeem**. The Ringer Company packages this product as **BioNeem Insecticide & Repellent**. This product controls insects in their immature stage. It also repels insects from feeding on the treated leaves for 7 to 10 days after treatment. It can be used on ornamental trees, shrubs, and houseplants safely. This product is not labeled for use on edible plants.



The second product is **Neem Oil**. The Greenlight Company packages this product as **Rose Defense** and **Fruit & Vegetable Spray**. These products coat the leaves with neem oil which prevents insects, diseases, and mites from starting to develop. Neem Oil also coats the insects and mites with oil killing most insects in all stages of life. Neem Oil repels insects for 7 to 14 days after application. In addition to controlling insects, Neem Oil both prevents and controls Powdery mildew, and many common diseases, of flowers, trees, shrubs, and vegetables.



**Rose Defense** controls the major pests and diseases on roses and trees and shrubs. Rose Defense controls diseases such as black-spot, powdery mildew, rusts and anthracnose. In addition, Rose Defense controls many common insect pests such as two-spotted mites, aphids, mealy bugs and scales.



**Fruit, Nut & Vegetable Spray** is an insecticide, fungicide, and miticide labeled for use on fruit trees and in the vegetable garden. The product is an oil that suffocates all life stages of aphids, fruit flies, leafminers, mealybugs, whiteflies, scale, as well as mite adults and eggs. As a fungicide, Fruit, Nut & Vegetable Spray provides both preventative and curative control of powdery mildew, black spot, rust and anthracnose, in addition to other diseases. **Rose Defense** is labeled for use on Ornaments and Flowers. **Fruit & Vegetable Spray** is labeled for use in vegetable gardens.



Neem oil is a hydrophobic extract from the seeds of the Neem tree, specially processed and formulated to retain fungicidal and miticidal activity. In USDA, and university trials, Neem Oil has been found to control such diseases as blackspot, powdery mildew, rusts and anthracnose. In addition, Neem Oil controls common insect pests such as two-spotted mites, aphids, mealy bugs and scales.

Rose Defense should not be confuse with other Neem insecticides containing the compound, azadirachtin, such as BioNeem and Azatin. Rose Defense contains no azadirachtin. Azadirachtin is an insect growth regulator that affects the ability of immature insects to develop. While effective on a variety of insects such as aphids and webworms, azadirachtin has little or no activity on diseases and mites.

As a fungicide, Neem Oil works primarily as a protectant to prevent infection of the plant tissue. Neem Oil acts as a shield to prevent the germination and penetration of fungal spores on the leaf surface. Neem Oil

will also kill fungi by contact if external to the plant surface such as downy or powdery mildews. This protective shield can be maintained for several days.

As a miticide / insecticide, Neem Oil works to smother and repel pests. Unlike Azadirachtin-based neem insecticides that are slow to act, Neem Oil kills pests quickly and repels them for one-to-two weeks.

**Neem Oil** is safe to use, but as always, the product label of all pesticides should be carefully read and followed. **Rose Defense** and **Fruit, Nut & Vegetable Spray**, like other products generated from the neem tree,



have virtually no environmental impact. Being botanically derived, it is biodegradable and nontoxic. It has received a "Caution" label from the E.P.A. (the lowest rating available) and has essentially no mammalian toxicity. It offers low risk to humans, pets, livestock (and other warm blooded animals, including wildlife), but it can be detrimental to fish; applications should not be made near ponds. In fact, in India, toothpaste and soap are made from the same material as Rose Defense.

Neem Oil is easy to use. To use Neem Oil, add one to two tablespoons of the product per gallon of water and mix thoroughly. Neem oil is a thick material that does not work well in a hose-end sprayer, especially a "No Mix" or "Dial Sprayer". Neem Oil also tends to crystallize if it is mixed with cold water. Apply Neem Oil to your plants to the point of run-off. It is important to cover all plant surfaces with Neem oil to protect the plant. Unsprayed areas are sites for possible infection. If the plant already has pests or diseases, repeat application again in one week. If no pests or disease are present, repeat in two or three weeks. After application, you will notice that Rose Defense will make the plant shiny and healthy looking.

The future of the neem tree, and the benefits it yields to mankind, continues to unfold. Pharmaceutical applications may yield new medicines and dental treatments. In India, toothpaste and soap are made from the neem tree.

Pesticidal applications are continuing to be sought. The combination of multiple uses, safety, and ease of use, makes **Rose Defense** and **Fruit, Nut & Vegetable Spray** the ideal choice in garden pest control.

### So, what's Neem Oil?

It may be the solution to your garden pest problems.



## Neem Oil Locks Out Spores

Oil extracted from neem seeds covers plant leaves like a raincoat, stopping fungi that cause diseases such as powdery mildew and rust from infecting plants.

Fungal spores are spread by wind and splashing raindrops. "If the spores can't adhere to a leaf, germinate, and penetrate the leaf cells, they can't cause disease," says Jim Locke, an ARS research plant pathologist.



Neem, or morgania, trees are native to India and Burma. They are related to mahogany, require a frost-free climate, and will grow in West Africa, the Caribbean, Australia, Southern Florida, several southwestern states, and Hawaii.

Almost all parts of the versatile plant contain extractable compounds that have been used for centuries in India in personal hygiene products like soap and toothpaste. Seed extract has been used to treat skin diseases, sores, and rheumatism.

Locke, says that in numerous tests, a spray of 1% neem oil in water "stopped 95 to 100 percent of the powdery mildew on hydrangeas, lilacs, and phlox."



A single spray application was sufficient to protect these ornamentals from infection. Repeated applications at 7 to 14 day intervals as the plants grew provided disease protection without any plant damage.

On plants where mildew had begun to develop, "it was arrested," he says, "providing control comparable to each of three chemical fungicides."

Powdery mildew, which also attacks crepe myrtles and roses, causes leaves to turn white. Preliminary results indicate the oil will arrest and control the fungus that plagues these popular ornamentals, especially in humid areas.

Locke says the oil is the first botanical product to exhibit fungicidal properties. He has been field testing it for the past 4 years on several greenhouse and nursery crops.

"We're working now to discover how the neem oil protects the plant from infection," says Locke. Two of the possibilities are that the spores fail to germinate or are unable to penetrate the leaf.

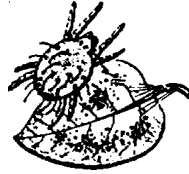
One study involves numerous laboratory test of roses by Locke's group in the Floral and Nursery Plants Research Unit at the agency's U.S. National Arboretum, Washington, D.C. He says the oil "seems to delay infec-

tion by black spot--the number-one disease of roses. As a result, rose bushes lose fewer leaves, compared to untreated, diseased plants.

Locke says this research, begun in cooperation with former ARS entomologist Hiram Larew, also demonstrated that neem oil can reduce damage cause by various pests, including spider mites.

"In preliminary tests, a 2% spray of neem seed oil applied directly to spider mite eggs resulted in an 87% mortality," he says.

Research at USDA on plant-derived natural pesticides, such as nicotine, dates back to the 1920's. Beginning in 1975, extraction products from neem seeds were evaluated for their insect-killing properties.



In 1987, ARS researchers demonstrated the systemic activity of a neem seed extract containing azadirachtin against leafmining flies. Larvae that fed on plants grown in azadirachtintreated soil rarely survived to adulthood. Azadirachtin-based insecticides became the first neem product to be approved by the U.S. Environmental Protection Agency.

Locke says the botanical insecticides, Margosan-O and BioNeem, contain azadirachtin. Unlike neem oil, they have no fungicidal activity.

## The Evolution of Neem

### Putting the Power of Mother Nature into the Hands of Gardeners.

Plants are survivors. Over 300 million years of evolution, plants created their own pesticides to defensively withstand pests and disease. In particular the Neem tree, a native of India and Burma, survived the millennia as a natural pesticide factory. Scientists today use chemicals from the neem tree to produce some of the most effective botanical pesticides in history, including Fruit, Nut & Vegetable spray, available to gardeners for the first time this year.

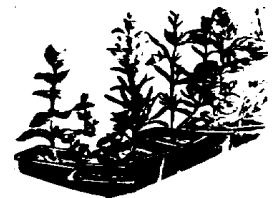
Primordial forests were harsh environments. Plants were forced to evolve multiple defensive strategies in order to survive. Some of these strategies were mechanical; certain plants sprouted thorns to keep animals away. Another strategy was visual. Brightly colored flowers attracted bees and encourage pollination. Yet another strategy is symbiotic. Plant roots formed mutually beneficial relationships with soil microorganisms to extract more nutrients from soil and help the plant ward off soil-borne diseases.

Most exciting to scientists are the plants that developed internal chemical defensive systems, because the chemicals produced by these plants have tremendous potential as pesticides. Sometimes these pesticide-rich plants are found by accident. That was the case in 1959 when Heinrich Schmutterer, a German entomologist traveling in the Sudan, ran right into the middle of a locust storm. Surprisingly, while most plants were decimated, the neem trees in the area remained undamaged. The locusts, Schmutterer saw, swarmed the neem trees, but left without eating the foliage. What were the chemical compounds produced by the neem tree that provided it with protection against the onslaught of a locust plague? That question prompted Schmutterer's future research which helped bring the world's attention to the neem tree.

Schmutterer's locust incident was no surprise to Indians and other Asians. The Asian subcontinent contains some 18 million neem trees (*Azadirachta indica*). The tree, which is in the mahogany family, is cherished for the shade it provides, as well as its pesticidal and medicinal properties.

Commonly known as "the village pharmacy," the neem tree, its seeds, leaves and twigs, have been chewed, brewed, pulped and defoliated by villagers for centuries. Scientific findings now support many of the "folk medicine" beliefs the villagers held. For instance, villagers for years broke twigs off the neem tree to clean their teeth and gums. For rural people who do not have wide access to toothbrushes, their teeth in general are white and healthy. Scientists now find that neem bark is highly antiseptic, and German tests prove that neem extracts prevent tooth decay. Neem is now an active ingredient in some toothpastes sold in Germany and India.

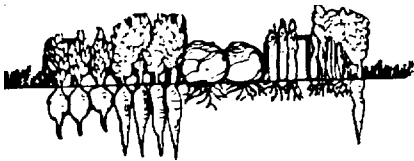
Neem-seed oil is the castor oil of the Asian world. Juice from the leaves is used to cure skin disorders and neem tea to relieve pains, fevers and infections. Indeed, the plant has been found to have compounds with antiseptic, antiviral and antifungal activity. In Ames tests, which are used to detect potential carcinogens, neem extracts show no mutagenicity.



For thousands of years, villagers in India placed neem leaves in their grain bins, beds and cupboards to keep away weevils and other pests. This close proximity of neem to foodstuffs apparently presents no hazards. Neem extracts have little or no toxicity to warmblooded animals, including humans. Birds and bats eat the fruit of the neem tree without harm.

USDA researchers began studies of the neem tree in 1972; the research continues today through Thermo Trilog Corporation. Scientists discovered the neem tree evolved with many chemical compounds to defend itself against more than 300 insect species, mites and diseases. The tree has yielded two powerful active ingredients to date. Researchers believe at least two additional active ingredients and as many as 20 minor active compounds may also produce pest control benefits.

Gardeners have access to a versatile pesticide formulated from the neem tree. Fruit, Nut & Vegetable Spray, available from Green Light Company, contains an organic formulation of clarified hydrophobic extracts of neem oil. This natural "3-in-1" product redefines the term "broad spectrum." It is an insecticide, fungicide, and miticide. The product is a topical oil that suffocates all life stages of aphids, citrus black flies, fruit flies, leafminers, mealybugs, whiteflies and scale, among others, as well as mite adults and eggs. As a fungicide, Fruit, Nut & Vegetable Spray provides preventative and curative control of powdery mildew, black spot,



rust and anthracnose, in addition to other diseases. With a zero-day pre-harvest interval, gardeners can apply the product, harvest and eat the crop all in a single day.

Fruit, Nut & Vegetable Spray is the first of many neem-based products anticipated for the gardener market, which as a group, demands high levels of safety in the products it buys. Fruit, Nut & Vegetable Spray, like other products to be generated from the neem tree, has virtually no environmental impact. The active ingredient degrades and does not bioaccumulate in soil or water. It offers low risk to humans, pets, livestock (and other warm blooded animals, including wildlife), but it can be detrimental to fish; applications should not be made near stocked ponds. Fruit, Nut & Vegetable Spray may kill beneficials that come into contact with its sprays, but populations rebound quickly. As always, the product label of any pesticide used should be carefully read and followed.

The high degree of safety displayed by neem-based active ingredients is a strong incentive for exploiting the tree's pesticidal properties. Unfortunately, the technology

wasn't available in the past to extract neem compounds and formulate them in commercially viable amounts for sale in the U.S. This technology lag held true for many natural pesticides based on plants and microorganisms.

Over the last several decades, however, the increased costs of developing petroleum-based pesticides has risen along with environmental concerns about their use. At the same time, technological developments have been made, allowing companies to identify, extract, test and formulate natural compounds and organisms into products that are easy-to-use by home gardeners today.

Among the most recent developments in pesticide technology is the 'synthesis' of natural compounds in the laboratories. Scientists use the chemical blueprint of a natural pesticide. In the case of the neem tree, however, it is doubtful that scientists will be able to recreate the complexity of neem extracts in the laboratory.

The future of the neem tree, and the benefits it yields to mankind, continues to unfold. Pharmaceutical applications may yield new medicines, dental treatments, even breakthrough compounds for use in birth control. Pesticidal applications, with their inherent environmental and human friendliness, will continue to be eagerly sought, formulated and put into the hands of the home gardener.

### *More resources:*

<http://www.discoverneem.com/>

[http://www.neemuses.com/neem\\_articles.php#3](http://www.neemuses.com/neem_articles.php#3)

<http://www.ipm.ucdavis.edu/PMG/GARDEN/CONTROLS/neemoil.html>



*Neem Tree*

