

The Herbal Dispatch

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The Medicinal Botanicals Program
Mountain State University (304) 929-1630

ISSN 1548-6052 (Print)
ISSN 1548-6044 (Electronic)

Milkweed: From Floss to Fun in the Sun

By Jan Suszkiw, USDA ARS
Information Staff, February, 2009

Milkweed is popularly known as a favorite food of the monarch butterfly caterpillar. Historically, though, farmers considered milkweed a noxious weed. Today, some farmers actually cultivate milkweed for its soft, silky floss, which is used commercially as a hypoallergenic filler in high-end pillows, comforters, and jacket linings.

But floss isn't the only useable portion of this native American plant, which grows throughout the country. In studies at ARS's New Crops and Processing Technology Research Unit in Peoria, Illinois, chemist Rogers E. Harry-O'kuru is experimenting with new, value-added uses derived from unsaturated oil in the seed of common milkweed, *Asclepias syriaca*.

Harry-O'kuru's analysis of the waxes and different fatty acids in the oil shows it has potential use as a base material in sunscreen, cosmetics, and skin- and hair-care products, including moisturizers and conditioners.

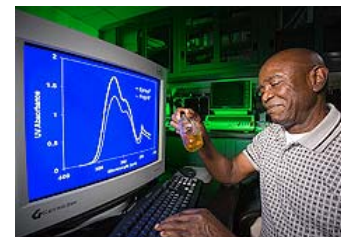


Many of today's sunscreens use chemical filters or blocks to protect skin from two types of ultraviolet radiation, UV-A and UV-B, at wavelengths of 290 to 400 nanometers (nm). The effects of UV-B exposure are usually temporary—an example being the sunburn a careless beachgoer must endure for a few days. Repeated or prolonged exposure to UV-A radiation—such as that experienced by lifeguards or road crews—can cause premature aging and skin cancer. The filters and blocks work by absorbing or scattering such radiation before it penetrates and damages skin.

Recently, interest has grown in sunscreen and cosmetic products that not only protect skin, but nourish it. Harry-O'kuru's milkweed-oil-based sunscreen aims to fill the bill on both counts. It contains natural antioxidants, such as tocopherols, and cinnamic acid derivatives like ferulic acid, which occurs naturally in many plants and is highly absorbent of UV rays.

A key step in the process, which ARS has patented, is using zinc chloride to catalyze the conversion of milkweed oil's triglycerides into the UV-absorbing cinnamic acid derivatives.

In laboratory tests, the derivatives strongly absorbed



UV rays in the range of 260 to 360 nm, wavelengths that can damage skin. The milkweed-oil product accomplished this at very low concentrations (1 to 5 percent by weight)—a range far below that approved for today's topical skin formulations, says Harry-O'kuru.

Harry-O'kuru says his current sunscreen compounds are clear liquids, but gels, creams, sticks, and aerosol sprays are also possible. The sunscreen's unique combination of fats and waxes may qualify it as biodegradable and may keep it from washing off during a swim.

Besides skin- and hair-care products, the UV-absorbent formulation could also be tailored for use in epoxies, paints, or other industrial applications.

Says Harry-O'kuru, "We're hoping a stakeholder will become interested in developing the technology further."

Milkweed photo courtesy of Theodore Webster, ARS

The Herbal Dispatch

A monthly publication of the Medicinal Botanical Program

The goal of this newsletter is to inform readers of the Program's educational, research and outreach activities and events; and of results of the latest research on the chemistry, cultivation, processing and preventive and therapeutic use of botanicals.

The views expressed in The Herbal Dispatch are those of the authors and do not necessarily reflect those of MSU or the Medicinal Botanical Program staff.

Authors are solely responsible for their articles.

Mario R. Morales
Editor/Publisher

The Soil Biology Primer-Part II

By Dr. Elaine R. Ingham
Oregon State University

Organic Matter Fuels the Food Web

Soil organic matter is the storehouse for the energy and nutrients used by plants and other organisms. Bacteria, fungi, and other soil dwellers transform and release nutrients from organic matter (see photo).

Organic matter is many different kinds of compounds – some more useful to organisms than others. In general, soil organic matter is made of roughly equal parts humus and active organic matter. Active organic matter is the portion available to soil organisms. Bacteria tend to use simpler organic compounds, such as root exudates or fresh plant residue. Fungi tend to use more complex compounds, such as fibrous plant residues, wood and soil humus.

Intensive tillage triggers spurts of activity among bacteria and other organisms that consume organic matter (convert it to CO₂), depleting the active fraction first. Practices that build soil organic matter (reduced tillage and regular additions of organic material) will raise the proportion of active organic matter long before increases in total organic matter can be measured. As soil organic matter levels rise, soil organisms play a role in its conversion to humus—a relatively stable form of carbon sequestered in soils for decades or even centuries.



These microshredders, immature oribatid mites, skeletonize plant leaves. This starts the nutrient cycling of carbon, nitrogen, and other elements. *Collohmanna* sp. **Credit:** Roy A. Norton, College of Environmental Science & Forestry, State University of New York

Food Sources for Soil Organisms

“Soil organic matter” includes all the organic substances in or on the soil. Here are terms used to describe different types of organic matter.

Living organisms: Bacteria, fungi, nematodes, protozoa, earthworms, arthropods, and living roots.

Dead plant material; organic material; detritus; surface residue: All these terms refer to plant, animal, or other organic substances that have recently been added to the soil and have only begun to show signs of decay. Detritivores are organisms that feed on such material.

Active fraction organic matter: Organic compounds that can be used as food by

microorganisms. The active fraction changes more quickly than total organic matter in response to management changes.

Labile organic matter: Organic matter that is easily decomposed.

Root exudates: Soluble sugars, amino acids and other compounds secreted by roots.

Particulate organic matter (POM) or Light fraction (LF) organic matter: POM and LF have precise size and weight definitions. They are thought to represent the active fraction of organic matter which is more difficult to define. Because POM or LF is larger and lighter than other types of soil organic matter, they can be separated from soil by size (using a

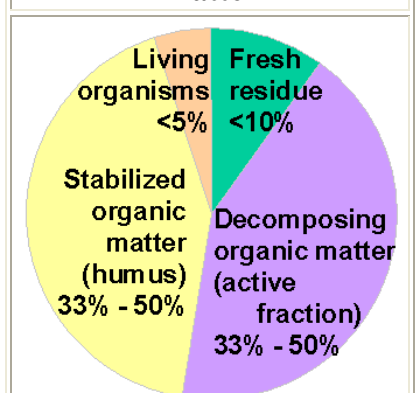
sieve) or by weight (using a centrifuge).

Lignin: A hard-to-degrade compound that is part of the fibers of older plants. Fungi can use the carbon ring structures in lignin as food.

Recalcitrant organic matter: Organic matter such as humus or lignin-containing material that few soil organisms can decompose.

Humus or humified organic matter: Complex organic compounds that remain after many organisms have used and transformed the original material. Humus is not readily decomposed because it is either physically protected inside of aggregates or chemically too complex to be used by most organisms. Humus is important in binding tiny soil aggregates, and improves water and nutrient holding capacity.

Components of Soil Organic Matter



Dutchman's Breeches – *Dicentra cucullaria* (L.) Berhn.

**By David C. Carman
Grower and Collector
Princeton, West Virginia**

As a member of the bleeding heart family of native perennial plants, Dutchman's breeches is an attractive wild flower, in addition to having a history as a medicinal herb.

The April blooming 3/4" white flowers on leafless stalks have the appearance of a pair of miniature pantaloons hanging upside down, which attract attention for their unusual shape and presentation.

Compound three-part leaves appear individually on their own stems along with the taller 5- to 12-inch flower stalks.

This plant may be found locally growing in moist, humus-rich mountain woodlands and is an excellent choice for your shaded rock garden of wild flowers. A close relative called squirrel corn (*D. canadensis*) can often be found growing in the same location with Dutchman's breeches.

Other common names are breeches flower, colic weed, little boy's breeches, little stagger weed, turkey corn, and white hearts.

The plant is potentially poisonous and may cause a skin rash on some people. It contains an alkaloid with CNS-depressant activity. Leaves are poisonous to grazing animals. The plant has been used to increase urine flow, to treat skin diseases (poulticed), to treat venereal diseases, and as a



tonic. It has had veterinarian applications as pre-anesthetic for larger animals.

The Common Cold

**By Dean Myles, Coordinator
Medicinal Botanicals Program
Mountain State University**

The common cold may have as many symptoms as it does treatments. The common cold is characterized by runny nose, nasal congestion and sneezing [1]. Depending on the strain of rhinovirus other symptoms may include dry cough, itchy or sore throat, watery eyes, mild body aches, low grade fever (99-100°F) and fatigue [2].

The Mayo Clinic estimates most adults are likely to catch the common cold virus two to four times a year. Children, especially preschoolers, may contract a cold virus as many as 6 to 10 times over the course of the year. Most people recover from a common cold in about a week or two. There is no evidence that you can get a cold virus from exposure to cold weather

or from getting chilled or overheated [3]. There is also no evidence that your chances of getting a cold are related to factors such as exercise, diet, or enlarged tonsils or adenoids.

There are more than 200 viruses that can cause a common cold [3]. The most common is the rhinovirus and is highly contagious. The rhinovirus enters the body through the mouth or nose. The virus is spread through droplets in the air when an infected individual coughs, sneezes or while talking. The virus can also be spread by hand-to-hand contact with someone who has a cold or by using shared objects, such as doorknobs, utensils, towels, toys or telephones. Failing to wash one's hands after such contact is a sure way to catch a cold. The first symptoms appear after an

incubation period of 24 to 72 hours [4]. The duration of the cold is between 4 - 14 days in general.

The general attitude in the medical communities is there is no cure for the common cold. The Mayo Clinic reports antibiotics, antihistamines, and over the counter (OTC) cough syrups are of no value when fighting the common cold and may worsen the symptoms. When combating cold symptoms, it is suggested to get plenty of rest; drink plenty of fluids, and to avoid the use OTC medications if possible. To combat cold symptoms the physicians at the Mayo Clinic suggest water, juice, clear broth or warm lemon water with honey can help loosen congestion and prevent dehydration. To temporarily relieve a sore or scratchy throat gargle 1/2 teaspoon salt

dissolved in an 8-ounce glass of warm water. The Mayo Clinic also suggests consuming plenty of chicken soup, and taking vitamin C, Echinacea, and/or zinc may help reduce the duration of symptoms if taking during the onset of the cold.

Chicken soup, according to the Mayo Clinic, acts as an anti-inflammatory by inhibiting the movement of neutrophils, immune system cells, which participate in the body's inflammatory response. Second, it temporarily speeds up the movement of mucus through the nose, helping relieve congestion and limiting the amount of time viruses are in contact with the nose lining. Echinacea is a dietary herbal supplement that is use to boost the immune system and for treating cold and flu symptoms [2]. Researchers, however, have found that

Appalachian Plant Profile: Persimmon

By Dean Myles, Coordinator
Medicinal Botanicals Program
Mountain State University

Diospyros virginiana L. is a small to medium tree native to the southeastern US commonly known as persimmon or possumwood [1]. Persimmon reaches heights of 40 to 80 feet. Persimmon has an alternating leaf and twig arrangement. The lance to elliptical shaped leaves are 2 ½ to 5 inches long with an entire margin. The stiff leaves are a shiny dark-green above and slight pubescent below. The slender zig-zag twigs are brown with the terminal bud absent. The triangle shaped lateral buds are reddish brown to black with 2 overlapping scales. The bark is thick, hard, and a very dark grayish-black with distinctive square scaly blocks resembling alligator skin [1, 2, 3]. The greenish-yellow flowers appear clustered in cymes of 2-3 flowers after the leaves, with male and female flowers on different trees [1]. The fruit is a persistent spherical berry 1 to 1 ½ inches in diameter [4]. The fruit ripens in the fall into an orange to purplish color.

Persimmon is a slow-growing shade-tolerant species [4]. The optimum fruit-bearing age is 25 to 50 years, but 10-year-old trees sometimes bear fruit. Good seed crops are borne every 2 years, with light crops in intervening years. The largest persimmon reported in WV is located in Kanawha County near Charleston [1]. The tree has a dbh of 22.7 inches and is 76 feet in height. The US champion tree is located in Yell, Arkansas with a dbh of 48.3 inches and is 93 feet in height [5].

The wood of common

persimmon is hard, smooth, and even textured. It is used for turnery, plane stocks, veneer, golf club heads, and low-grade lumber [4]. The fruit is an important food for squirrel, fox, coyote, raccoons, opossum, and quail. The leaves and twigs of persimmon are an important fall and winter food for white-tailed deer. Persimmon fruit is also edible by humans after the first frost. The Cherokee Indians used the inner bark and unripe fruit as an anti-diarrheal, sore throat, gastrointestinal aid, liver aid, toothaches, and venereal diseases [6]. The Rappahannock Indians used the inner bark for sore throats and thrush. The Cherokee, Comanche, Rappahannock, and the Seminole tribes used the ripe fruit as food. In folk medicine, the inner bark of persimmon is used for sore throats, thrush, stomachaches, heartburn, diarrhea, and uterine hemorrhages [7]. A bark tea was used as a wash for warts and cancers. Scientific research suggests persimmons contain a "high percentage of polyphenols, especially tannins, which are very good antioxidants and a persimmon a day, does more to reduce the risk of heart disease - the leading cause of death in the United States - than an apple [8]. Research also confirms young persimmon fruit may reduce total cholesterol, triglycerides, and LDL cholesterol and suggest young fruits are beneficial as preventive and therapeutic agents for dyslipidemia [10].

Persimmon grows on a wide variety of sites but grows best on terraces of large streams and river bottoms [4]. Persimmon reproduces vegetatively and by seed. Propagation is easy from

stratified seeds. Seeds are stratified in moist peat for 30-60 days at 36-41 degrees. Germination is about 80 percent. Root cuttings 6 to 8 inches (15-20 cm) long and 1/3 inch in diameter can also be used provided the ends are sealed with pitch or wax to prevent rot. Persimmon can be found in all counties in WV but is most abundant in the southern and western counties in dry woods, old fields and clearings [1]. Persimmon is considered to be secure within it range with the exception in Connecticut where it is listed as "concerned" and New York where it is listed as "threatened" [9]. Remember to contact your local native plant program or the National Plants Database at <http://plants.usda.gov/> for species status in your area.

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Photograph courtesy of: Mike Hogan at https://fp.auburn.edu/sfws/samuelson/dendrology/ebenaceae_pg/common_persimmon.htm

The Common Cold (Cont'd)

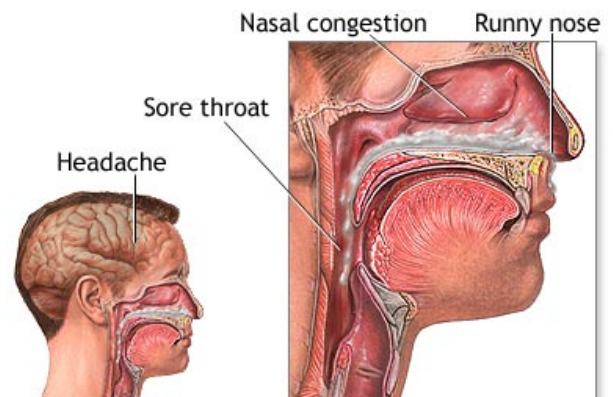
while the herb may help treat cold symptoms if taken in the early stages, it will not help prevent them. To date, no conclusive data has shown that vitamin C prevents colds. Vitamin C may reduce the severity or duration of symptoms, but there is no clear evidence of this effect. Although several studies have shown zinc to be effective for reducing the symptoms of the common cold, an equal number of studies have shown zinc is not effective.

Most practitioners would confirm prevention is the best treatment for the common cold [5]. To prevent the common cold avoid people with colds, wash hands frequently, and disinfect telephones, door knobs, and other household items. In the realm of home remedies, many therapies have been used for treating the common cold. Garlic soup, onion and mustard poultices, unsweetened lemonade, and placing 6 drops of spirits of camphor on a sugar cube, to name a few [5]. Herbs such as angelica, boneset, cayenne, echinacea, elder flower, ginger root, goldenrod, goldenseal, lemon balm, lobelia, mugwort, mullein, peppermint, ramps, yarrow and many more have traditionally been used for treating cold symptoms [6]. If you contract a cold, get plenty of rest, drink plenty of fluids and if the symptoms become unbearable, equal parts of elder flower, boneset,

peppermint and yarrow can be used [6]. Elder flowers (*Sambucus*) are considered to be diaphoretic and anti-catarrhal. Boneset (*Eupatorium perfoliatum*) is considered to be a powerful anti-viral with diaphoretic and immunostimulating properties. Boneset may help to lower fever and combat the cold virus itself. Peppermint (*Mentha piperia*) is considered to be diaphoretic, analgesic, and anti-catarrhal. Peppermint can help lower fever, reduce nasal congestion, ease aches and pains, and ease the bitterness of boneset. Yarrow (*Achillea millefolium*) is considered diaphoretic, anti-catarrhal, and a mild analgesic.

If symptoms persist for more than 7 to 10 days, contact your physician to ensure the virus has not progressed into influenza or pneumonia. The symptoms of influenza are fever over 101 F (38 C) in adults—and often as high as 103 to 105 F (39.5 C to 40.5 C) in children—chills and sweats, headache, dry cough, muscular aches and pains—especially in the back, arms and legs—fatigue and weakness, nasal congestion, loss of appetite, diarrhea and vomiting in children [2]. The symptoms of pneumonia include many of the same symptoms of the flu. However, chest pain, labored breathing, and a cough that produces greenish-yellow phlegm are a sure sign of pneumonia. If you exhibit any

Symptoms of a cold:



of these symptoms do not hesitate to contact a health professional. Influenza and pneumonia can be life threatening if left untreated. According to the Center of Disease Control (CDC), on average, influenza is estimated to cause 36,000 deaths per year in the United States [7]. The CDC also reports another 5,000 deaths per year from complications due to pneumonia. The CDC reports adults over the age of 65 comprise 90% of the influenza and pneumonia deaths per year.

This article is not a substitute for medical advice or treatment recommendation. It was solely written for educational purposes. DM-2009

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About the Medicinal Botanical Program

This Program was created as result of a Specific Cooperative Agreement between Mountain State University and the USDA/ARS-Appalachian Farming Systems Research Center in Beaver, WV. The establishment of this agreement came through the efforts of Senator Robert C. Byrd and a Congressional Appropriation. The mission of the Program is to promote the medicinal plant industry in WV through research, education and outreach. The Program conducts research aim at the identification and development of native plants as specialty vegetable/forage crops. Educational offerings include symposia, workshops and farm visits.

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Dear reader:

Would you like to share your knowledge, skills and experience with us? Do you know how to produce, process, market and/or use herbs and medicinal plants?

Would you like to share this knowledge with our readers? It is quite simple. Just write your ideas on a piece of paper and mail it to us. We will type it and make sure that it gets published in our newsletter.

Please send contributions to the addresses indicated above.

Herbal tea ingredient helps beetle-plagued trees

Yahoo! News, By Jeff Barnard, February, 2009

GRANTS PASS, Ore. – Would a dose of herbal tea slow the march of beetles killing millions of acres of pine trees across the West?

Sort of.

But instead of brewing up a cup, U.S. Forest Service scientists found that sprinkling tiny flakes containing the pheromone verbenone over lodgepole pine forests cut the number of trees attacked by bark beetles by two-thirds.

Verbenone is found in rosemary and walnut husks and is approved for use in herbal teas. It also resembles a pheromone the beetles give off to tell one another that their tree is getting crowded, and it would be better to pick another one.

Forest Service entomologist Nancy Gillette, lead author on the study, said scientists have known for a decade that when bark beetles smell verbenone they tend to disperse.

The problem has been to find a cheap and effective way of distributing it, and Gillette says sprinkling flakes from helicopters is the best way yet.

It costs about \$110 an acre, compared to \$1,000 an acre or more for thinning. Insecticides are also expensive, and kill lots of beneficial insects.

Gillette said she could foresee the technique being used around campgrounds, visitor centers and ski resorts, where it would be desirable to save trees.

Andy Stahl, director of Forest Service Employees for Environmental Ethics, said it would be fruitless to use across large areas, because the beetles infest only mature trees weakened by factors such as drought, and the infestations are part of a natural cycle that replaces lodgepole pine forests every 100 years.

"All you are doing is saving (commercially) worthless trees in order that they burn next year," he said.



The beetles have killed millions of acres of pine forests, touching every state in the West.

Warming temperatures have meant winters no longer get cold enough to routinely kill the insects, so more of them survive to bore into trees, which fight them off by oozing sap.

In Colorado alone, a survey found nearly 2 million acres of forests killed by beetles. The biggest outbreak in North America is in British Columbia, where 23 million acres have been killed.

MBP in Pictures



Beebalm (*Monarda didyma* L.) growing in the medicinal plants garden of the Mountain State University Medicinal Botanicals Program, Beckley, WV