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# The Herbal Dispatch



***The Medicinal Botanicals Program***
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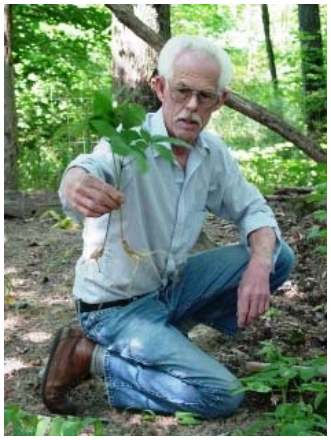
## David C. Carman: A Success Story

David C. Carman, a botanicals grower and collector from Mercer County, WV and collaborator of the Mountain State University Medicinal Botanicals Program, was featured recently in a Success Stories publication prepared by the USDA Office of Small Farms and Beginning Farmers and Ranchers Coordinators.

Small farms have been critical to the American society throughout the Nation's history. Today, as historically, the vast majority of all farms in the United States are small. The viability and sustainability of these farms are important to our Nation's economy, to the wise stewardship of our biological and natural resources, and to the leadership and social fabric of rural communities.

Their economic contribution is important to the Nation and is especially critical to the thousands of rural communities where they pay taxes and to the thousands of businesses they support.

This success story, among others, illustrates that small farms play an important role in the U.S. agricultural sector. The story highlights a success that demonstrates the continuing efforts made by



USDA to assist the Nation's small farmers and ranchers.

### Farmer, Researcher, and Partner on Herb Project

**David C. Carman** has such a small operation that when he speaks of crops, he is speaking of ginseng and other herbs and some wild flowers. Don't talk to him about acres--he speaks in terms of square feet and scattered patches, both at the edges of and inside wooded areas.

Carman works with the Medicinal Botanicals Program, a joint venture of the Agricultural Research Service's Appalachian Farming Systems Research Center in Beaver, West Virginia, and neighboring Mountain State University. Carman has written a manual on how to grow ginseng.

He also recently earned a 2007 Sustainable Agriculture Research and Education (SARE) farmer grant that will enable him to learn how to grow and propagate two herbs extremely rare in the wild, Virginia snakeroot and false unicorn.

Carman fertilizes his herbs with composted wood and leaves from the trees that shade his herb patches. He will grow the herbs side by side in a 5,000-square-foot patch. In 3 years, he will publish a manual on how to grow the two herbs.

SARE is a program of USDA's Cooperative State Research, Education, and Extension Service that funds projects and conducts outreach designed to advance farming systems that are profitable, environmentally sound, and good for communities through a nationwide research and education grants program.

With all his herbs, Carman prides himself on only using plants that are descendants of herbs native to his southern West Virginia area. He collected a few plants years ago and produces seeds to plant. He distributes both plants and seeds to area farmers and other customers, often giving them away.

**The Herbal Dispatch**

A monthly publication of the Medicinal Botanical Program

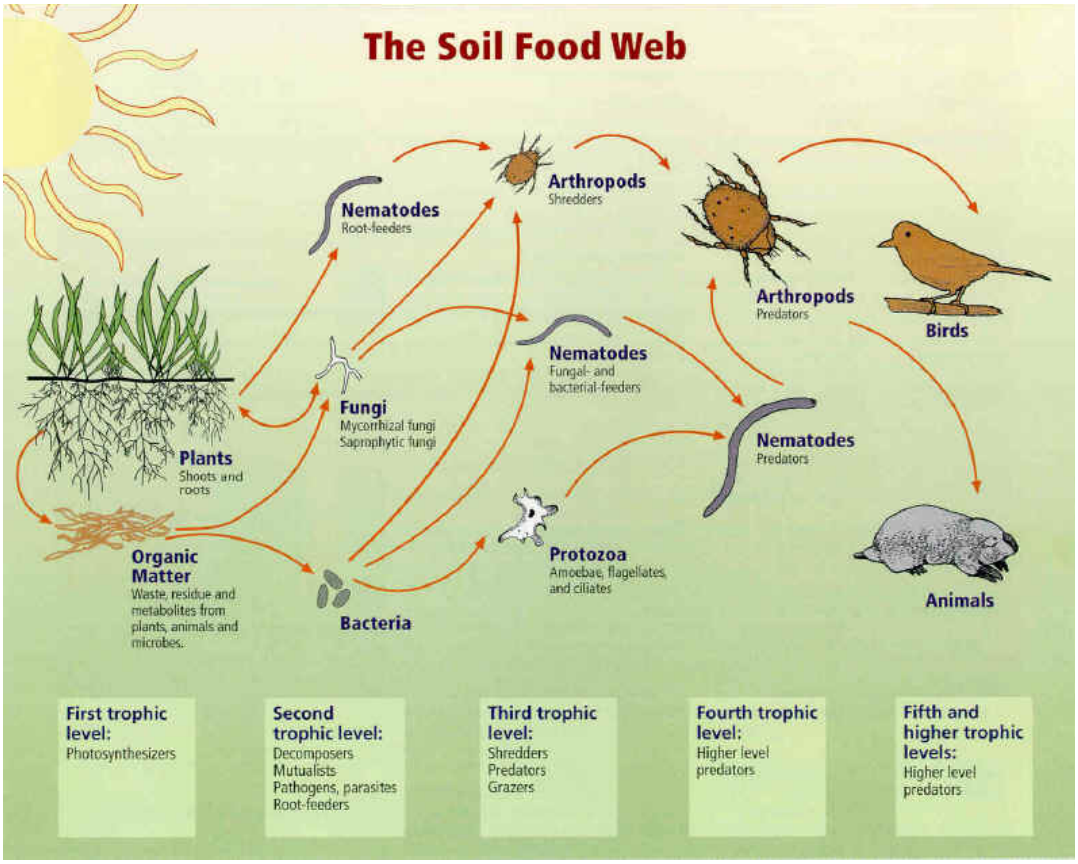
The goal of this newsletter is to inform readers of the Program's educational, research and outreach activities and events; and of results of the latest research on the chemistry, cultivation, processing and preventive and therapeutic use of botanicals.



Mario R. Morales
Editor/Publisher

# The Soil Biology Primer

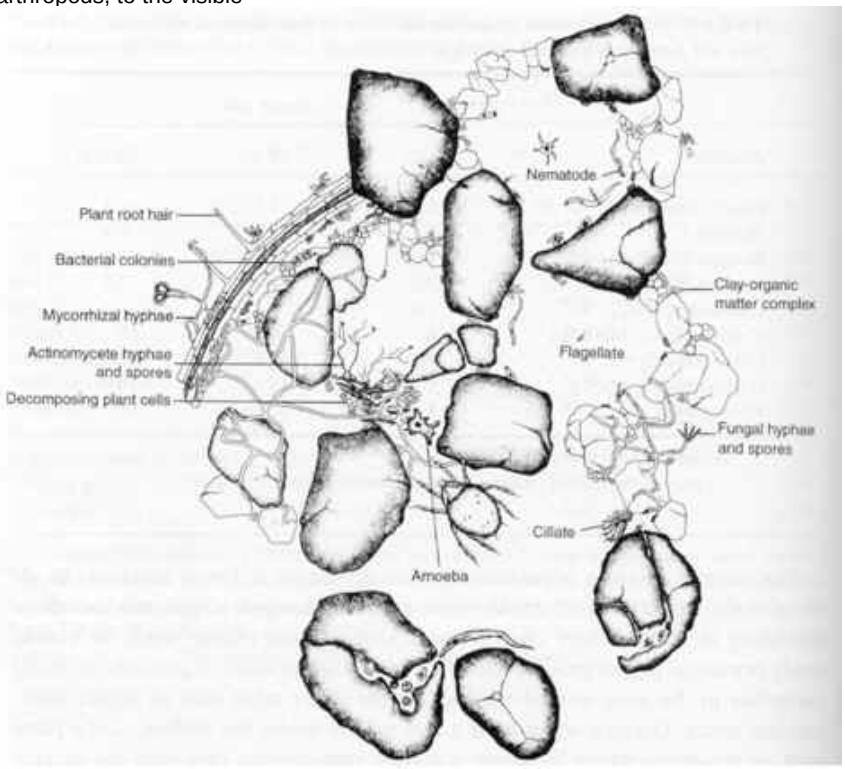
The *Soil Biology Primer*, written by Dr. Elaine Ingham and others for the Soil Quality Institute of the Natural Resource Conservation Service, is an introduction to the living component of soil and how it contributes to agricultural productivity, and air and water quality. The Primer includes units describing the soil food web and its relationship to soil health, and units about bacteria, fungi, protozoa, nematodes, arthropods, and earthworms. Starting January 2009, the Herbal Dispatch will publish this document in sequential parts.




**CHAPTER 1: THE SOIL FOOD WEB,** by Elaine Ingham, OSU

**Soil Biology and the Landscape**

An incredible diversity of organisms makes up the soil food web. They range in size from the tiniest one-celled bacteria, algae, fungi, and protozoa, to the more complex nematodes and micro-arthropods, to the visible earthworms, insects, small vertebrates, and plants.




**The soil environment.** Organisms live in the microscale environments within and between soil particles. Differences over short distances in pH, moisture, pore size, and the types of food available create a broad range of habitats. ***Credit**: S. Rose and E.T. Elliott*

As these organisms eat, grow, and move through the soil, they make it possible to have clean water, clean air, healthy plants, and moderated water flow.

There are many ways that the soil food web is an integral part of landscape processes. Soil organisms decompose organic compounds, including manure, plant residue, and pesticides, preventing them from entering water and becoming pollutants. They sequester nitrogen and other nutrients that might otherwise enter groundwater, and they fix nitrogen from the atmosphere, making it available to plants. Many organisms enhance soil aggregation and porosity, thus increasing infiltration and reducing runoff. Soil organisms prey on crop pests and are food for above-ground animals.

**The Food Web: Organisms and their Interaction**

The soil food web is the community of organisms living all or part of their lives in the soil. A food web diagram shows a series of conversions (represented by arrows) of energy and nutrients as one organism eats another (see food web diagram).

All food webs are fueled by the primary producers: the plants, lichens, moss, photosynthetic bacteria, and algae that use the sun's energy to fix carbon dioxide from the atmosphere. Most other soil organisms get energy and carbon by consuming the organic

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## Seneca Snakeroot (*Polygala senega* L.)

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

As a native perennial medicinal, Seneca snakeroot is also known as Seneca snakeroot polygala, senega root, milkwort, rattlesnake root, Seneca root, mountain flax, seneka snakeroot, and senega snakeroot.

Seneca snakeroot belongs to the milkwort family, *Polygalaceae*.

This medicinal herb is relatively rare in our southern West Virginia area, but has been included on some buyers' lists for years and has been progressively decreasing in price. Currently, some buyers are paying diggers four to six dollars per pound.

Medicinal use of this root has a long history dating back to use by Native Americans. It has been used for poisonous snake bites; swellings; pleurisy, asthma, pneumonia and other pulmonary infections; heart disease; convulsions; spasms; sweating; pain; gout; rheumatism; hives; coughs; colds; croup; inducing vomit; increasing urine flow; and treating uterine disorders; also as a laxative.

Root reportedly contains methyl salicylate (wintergreen). This probably explains the record of such wide usage.

An unassuming little plant, Seneca snakeroot displays its small, dense, clustered spikes of tiny white flowers, May to June atop multiple stems with small alternate lance-shaped leaves. Each seed capsule contains two small black seeds. The plant may grow to 30 inches under ideal conditions. Its favorite habitat is dry rocky or gravely woodland soil at higher elevations within its range in the eastern two thirds of the US and Canada, but may be found in open meadows and prairies.

The root is the plant part used for medicinal purposes and should be collected in the fall, washed clean, and dried out of direct sunlight before it is offered for sale.

Roots vary greatly in size depending on location and varying growing conditions.

A.R. Harding, in 1908, describes the root, quoting the description provided by the United States pharmacopoeia at the time, as follows: "Somewhat cylindrical, tapering, more or less flexuous, three to 15 cm long and two to eight mm thick, bearing several similar horizontal branches and a few


rootlets; crown knotty with numerous buds and short stem remnants; externally yellowish-gray or brownish-yellow, longitudinally wrinkled, usually marked by a keel which is more prominent in perfectly dry roots near the crown; fracture short, wood light-yellow, usually eccentrically developed; odor slight, nauseating; taste sweetish, afterwards acrid".

## Thirty eight Percent Adults Use Alternative Medicine

Rob Stein, Washington Post, December, 2008

More than one-third of adults and nearly 12 percent of children in the United States use alternatives to standard medicine, according to a large federal survey released today that documents how entrenched acupuncture, herbal remedies and other, once exotic, therapies have become.

The 2007 survey of more than 32,000 Americans, which for the first time included children, found that use of yoga, "probiotics," fish oil and other "complementary and alternative" therapies held steady among adults since the last national survey five years earlier, and that such treatments have become part of health care for many youngsters.

"It's clear that millions of Americans every year are turning to complementary and alternative medicine," said Richard L. Nahin of the National Institutes of Health's National Center for Complementary and Alternative Medicine, which released the survey. "The use of complementary and alternative medicine seems to have stabilized in the US."

The most commonly used are dietary supplements and herbal products such as echinacea, flaxseed oil and ginseng, followed by deep-breathing exercises, meditation, chiropractic therapy, massage and yoga. Although fewer Americans were using certain diets and trying herbal remedies such as echinacea to cure colds, the popularity of acupuncture, meditation, yoga and massage grew.

"I think it's fair to say we can conclude that this is part of the steady state of medical care in the United States," said David Eisenberg, director of the Harvard Medical School's division for research and education in complementary and integrative medical therapies. "I think the news is complementary and alternative medicine use by the US public is here to stay."

Others said the findings were disturbing because most alternative treatments have not been scientifically validated and those that have been rigorously tested have overwhelmingly been found to be ineffective.

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## Appalachian Plant Profile: Sugar Maple

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

*Acer saccharum* L., is a large native tree commonly known as sugar maple or rock maple [1]. This northeastern native commonly reaches heights above 100 feet.

Sugar maple has an opposite leaf and twig arrangement. The 5-lobed leaves are simple, entire, and three to five inches long. The twigs are slender with a greenish-brown color with lenticels.

The dark red to brown terminal bud is present. The terminal buds of sugar maple are an easy identification tool. The sugar maple bud is pointed at the apex, the other maple species have blunt apex.

The bark of sugar maple is light gray to brownish-gray. The bark is smooth on young trees and become scaly with age.

The small bell-shaped flowers occur in drooping clusters on slender stalks. These flowers appear with the leaf flush. The fruit is a 1 to 1½ inch long double samara. Sugar maple reaches maturity after 20 to 22 years [2]. Light fruit crops are produced by 40- to 60-year-old trees and moderate crops by 70- to 100-year-old trees.

The largest report sugar maple in WV is located near Circleville in Pendleton County [3]. The tree has a dbh of 59.5 inches and is 98 feet in height. The National Register of Big Trees doesn't list a national champion sugar maple.

Sugar maple is one of the most important hardwood in the eastern forest [2]. Sugar maple wood is tough, durable, hard, heavy, and strong. It is well suited for many uses and is commonly used to make furniture, paneling, flooring, and veneer. It is also used for gunstocks, tool handles, plywood dies, cutting blocks, woodenware, novelty products, sporting goods, bowling pins, and musical instruments.

Medically the inner bark and sap was used by various Native American tribes. The Iroquois tribe used the sap as a blood purifier, for sore eyes and itchy skin [4]. The inner bark was used by the Mohegan and Pottawatomie tribes for coughs, and as an expectorant.

These and many other tribes used the sap as a sweetener for breads, beverages and other foods. Today the sugar maple has no use as a medicine but is still important for the production of maple syrup.

Sugar maple most commonly occurs in rich, mesic woods but also grows in drier upland woods [2]. Sugar maple can grow on a wide variety of soils including sand, loamy sand, sandy loam, silty loam, and loam. However, sugar maple typically grows best on deep, moist, fertile, well-drained soils. The soil pH ranges from 5.5 to 7.3.

Propagation from seed is the best way to cultivate sugar maple. Seeds should be stratified for 3 months at 39°F.

The harvesting of sap for syrup production is conducted in late February until just before tree buds begin to expand in early April [5]. Trees for syrup production should be at least 40 years in age and have a dbh of 10 inches.

Sugar maple is considered to be secure within its natural range [6]. Remember to contact your local native plant program or the National Plants Database at http://plants.usda.gov/ for species status.

**References**


1. Hicks, Ray R. Jr. 2007 **Trees of West Virginia** Bruce Lyndon Cunningham Productions. Nacogdoches, TX
2. Tirmenstein, D. A. 1991. *Acer saccharum*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2008, December 17].
3. Big Trees of WV *Acer saccharum* Accessed on 12/17/08 at http://www.gasp.athens.oh.us/wvbigtrees.shtml
4. Native American Ethnobotanical Database *Acer sacccharum* University of Michigan-Dearborn Accessed on 5/12/08 at http://herb.umd.umich.edu/
5. Heiligmann, R.B. Hobby Maple Syrup Production Ohio State University Fact F-36-06 Columbus, OH. Accessed on 12/18/08 at http://ohioline.osu.edu/for-fact/0036.html
6. USDA Plants Database *Acer sacccharum* Accessed 12/18/08 at http://plants.usda.gov



Photograph courtesy of: J.S. Peterson @ USDA-NRCS PLANTS Database at http://plants.usda.gov

## The Soil Biology Primer *(Cont'd)*

compounds found in plants, other organisms, and waste by-products. A few bacteria, called chemoautotrophs, get energy from nitrogen, sulfur, or iron compounds rather than carbon compounds or the sun.

As organisms decompose complex materials, or consume other organisms, nutrients are converted from one form to another, and are made available to plants and to other soil organisms. All plants – grass, trees, shrubs, agricultural crops – depend on the food web for their nutrition.

**What Do Soil Organisms Do?**

Growing and reproducing are the primary activities of all living organisms. As individual plants and soil organisms work to survive, they depend on interactions with each other. By-products from growing roots and plant residue feed soil organisms. In turn, soil organisms support plant health as they decompose organic matter, cycle nutrients, enhance soil structure, and control the populations of soil organisms including crop pests. (See table of functions of soil organisms below.)

### Functions of Soil Organisms

| Type of Soil Organism | | Major Functions |
|---|---|---|
| **Photosynthesizers** | • Plants<br>• Algae<br>• Bacteria | **Capture energy**<br>• Use solar energy to fix $CO_2$.<br>• Add organic matter to soil (biomass such as dead cells, plant litter, and secondary metabolites). |
| **Decomposers** | • Bacteria<br>• Fungi | **Break down residue**<br>• Immobilize (retain) nutrients in their biomass.<br>• Create new organic compounds (cell constituents, waste products) that are sources of energy and nutrients for other organisms.<br>• Produce compounds that help bind soil into aggregates.<br>• Bind soil aggregates with fungal hyphae.<br>• Nitrifying and denitrifying bacteria convert forms of nitrogen.<br>• Compete with or inhibit disease-causing organisms. |
| **Mutualists** | • Bacteria<br>• Fungi | **Enhance plant growth**<br>• Protect plant roots from disease-causing organisms.<br>• Some bacteria fix $N_2$.<br>• Some fungi form mycorrhizal associations with roots and deliver nutrients (such as P) and water to the plant. |
| **Pathogens**<br>**Parasites** | • Bacteria<br>• Fungi<br>• Nematodes<br>• Microarthropods | **Promote disease**<br>• Consume roots and other plant parts, causing disease.<br>• Parasitize nematodes or insects, including disease-causing organisms. |
| **Root-feeders** | • Nematodes<br>• Macroarthropods (e.g., cutworm, weevil larvae, & symphylans) | **Consume plant roots**<br>• Potentially cause significant crop yield losses. |
| **Bacterial-feeders** | • Protozoa<br>• Nematodes | **Graze**<br>• Release plant available nitrogen ($NH_4^+$) and other nutrients when feeding on bacteria.<br>• Control many root-feeding or disease-causing pests.<br>• Stimulate and control the activity of bacterial populations. |
| **Fungal-feeders** | • Nematodes<br>• Microarthropods | **Graze**<br>• Release plant available nitrogen ($NH_4^+$) and other nutrients when feeding on fungi.<br>• Control many root-feeding or disease-causing pests.<br>• Stimulate and control the activity of fungal populations. |
| **Shredders** | • Earthworms<br>• Macroarthropods | **Break down residue and enhance soil structure**<br>• Shred plant litter as they feed on bacteria and fungi.<br>• Provide habitat for bacteria in their guts and fecal pellets.<br>• Enhance soil structure as they produce fecal pellets and burrow through soil. |
| **Higher-level predators** | • Nematode-feeding nematodes<br>• Larger arthropods, mice, voles, shrews, birds, other above-ground animals | **Control populations**<br>• Control the populations of lower trophic-level predators.<br>• Larger organisms improve soil structure by burrowing and by passing soil through their guts.<br>• Larger organisms carry smaller organisms long distances. |

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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.

## Thirty eight Percent Adults Use Alternative Medicine *(Cont'd)*

"They are either unproven or disproven," said Wallace Sampson, founding editor of the Scientific Review of Alternative Medicine. "Acupuncture is a placebo. Homeopathy is one step above fraud. It goes on and on. The fact that they are so widely used is evidence for how gullible large segments of our society are."

Some critics went further, saying studies have found that some dietary supplements might increase the risk of some serious health problems, including cancer. Parents could be putting their children at risk if they deny them proven mainstream treatments, they said.

"In addition to the fact that these things are unproven and potentially dangerous, they also feed the mentality that you can forgo proven treatments in favor of these magic potions," said Seth Asser, a pediatrician and consultant to Children's Healthcare Is a Legal Duty, a nonprofit group that opposes faith healing and other nontraditional medical practices.

The survey comes soon after a flurry of large studies failed to validate the suspected benefits of many "antioxidants" widely used to try to stave off cancer and other diseases. Just this week, two large studies found no evidence that taking vitamins E and C and selenium reduces the risk of prostate and other cancers.

The new survey of about 23,300 adults and 9,400 children was conducted by the federal Centers for Disease Control and Prevention's National Center for Health Statistics as part of a broader ongoing study.

Adults were most likely to use alternative therapies for pain, including in the back, neck or joints. Women were more likely to use them, as were those who are more educated and more affluent.

Because children presumably use alternative medicine mostly because their parents provide it, use among children closely mirrored that of adults. Children whose parents used alternative treatments were almost five times as likely to have used one, compared with children of parents who did not.

The most common reason children used alternative therapies was also back or neck pain, followed by colds, anxiety or stress, musculoskeletal problems and attention-deficit disorder or attention-deficit hyperactivity disorder. About 16.4 percent of adolescents received such treatments, compared with 10.7 percent of those ages 5 to 11 and 7.6 percent of those too young to go to school.

The findings will help set priorities for studying such therapies, Nahin said.

"There are hundreds, if not thousands, of therapies that the public is using. The National Institutes of Health is slowly going through that cornucopia to study them and provide information to the public," he said.

Critics said the survey was being used to justify continued government spending on research into such treatments.

"There's a tremendous amount of money being wasted on this," said Stephen Barrett, who runs Quackwatch (http://www.quackwatch.org), which monitors false medical claims. "That money could be used to do research on something that has been waiting in line to get money."

Nahin acknowledged that there are legitimate concerns about many alternative therapies. Dietary supplements are not regulated as closely as standard medication, leaving them more likely to be contaminated, for example. And some products can interfere with prescription drugs.

But Nahin said government-funded research into such therapies is useful, citing a federal study that concluded that St. John's wort was ineffective. After the results were released, use of the herbal remedy dropped sharply, he said.

"The research is working," he said. "It's doing what it's supposed to do, which is provide reliable information to the public so they can make decisions."

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