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MBP Publishes Book

The MSU Medicinal Botanicals Program (MBP) is proud to announce the publication of the book *Medicinal Botanicals I*.

The book, edited by Dr. Mario R. Morales, director of the Medicinal Botanicals Program, compiles presentations given at the MSU/WVHA 2008 Spring Conference, which was held in Beckley, WV, on March 8, 2008.

The book provides detailed information on plant utilization, cultivation, value-adding and marketing (see contents below) and will be valuable to anyone interested in medicinal plants. It also discusses aspects of farmer's market formation and economic development in Appalachia.

If you value and appreciate medicinal plants, this book is for you or for someone you care about such as a friend or relative. The book will also be valuable for anyone interested in starting/improving a small business dealing with medicinal plants.

The book has a softcover, a 5.5" x 8.5" size and is 250 pages long.

The book price is **\$15.00** and is available at the MSU bookstore (410 Neville St., Beckley, WV), through mail (see order form on page 6) and at Dr. Morales' office (John W. Eye Bldg., 502 S. Kanawha St., Beckley, WV).

Chapter Quotes

"Naturopathy is the study and practice of medicine that uses the whole body, mind, and soul approach to discover the causes of disease". *Chapter 5*

"Most herbs require the same growing conditions as agricultural crops but need some tweaking to maximize yield of therapeutic compounds". *Chapter 10*

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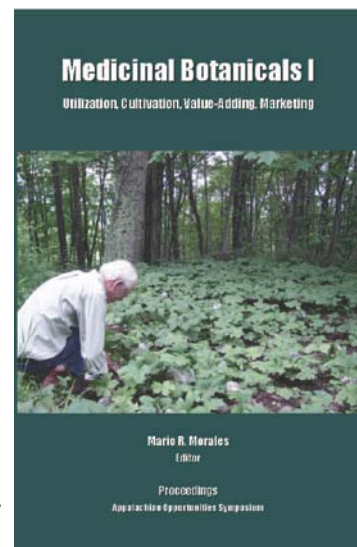
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The Herbal Dispatch

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 V

By Elaine R. Ingham
Oregon State University

CHAPTER 2: THE FOOD WEB & SOIL HEALTH

WHAT IS COMPLEXITY?

Food web complexity is a factor of both the number of species and the number of different kinds of species in the soil. For example, a soil with ten species of bacterial-feeding nematodes is less complex than a soil with ten nematode species that includes bacterial-feeders, fungal-feeders, and predatory nematodes.

Complexity can be determined, in part, from a food web diagram such as Figure 4 (see diagram), which represents the soil in an old-growth Douglas fir forest. Each box of the food web diagram represents a functional group of organisms that perform similar roles in the soil system. Transfers of energy are represented by the arrows on the diagram and occur when one organism eats another. Complex ecosystems have more functional groups and more energy transfers than simple ecosystems.

The number of functional groups that turn over energy before the energy leaves the soil system is different (and characteristic) for each ecosystem (Figure 5). In the Douglas fir system (Figure 4), energy may undergo more than twenty transfers from organism to organism, or between functional groups. In contrast, a cave or low-residue cultivated system is not likely to include a large variety of higher predators on the right-hand side of a soil food web

diagram. Energy and nutrients will be cycled through fewer types of organisms.

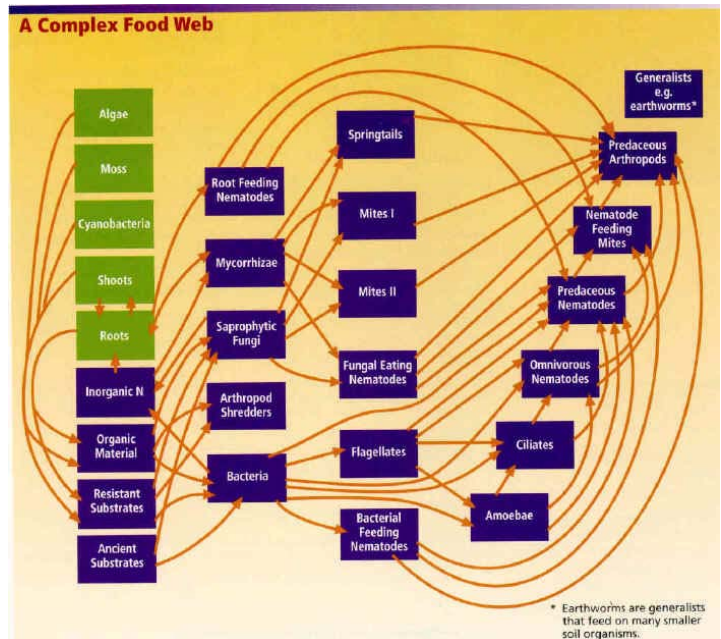
Land management practices can alter the number of functional groups – or complexity – in the soil. Intensively managed systems, such as cropland, have varied numbers of functional groups. Crop selections, tillage practices, residue management, pesticide use, and irrigation alter the habitat for soil organisms, and thus alter the structure and complexity of the food web.

BENEFITS OF COMPLEXITY

Biological complexity of a soil system can affect processes such as nutrient cycling, the formation of soil structure, pest cycles, and decomposition rates. Researchers have yet to define how much and what kind of food web complexity in managed ecosystems is optimal for these soil processes.

Nutrient cycling. When organisms consume food, they create more of their own biomass and they release wastes. The most important waste for crop growth is ammonium (NH_4^+). Ammonium and other readily utilized nutrients are quickly taken up by other organisms, including plant roots. When a large variety of organisms are present, nutrients may cycle more rapidly and frequently among forms that plants can and cannot use.

Nutrient retention. In addition to mineralizing or releasing nitrogen to plants, the soil food web can immobilize or retain



nitrogen when plants are not rapidly growing. Nitrogen in the form of soil organic matter and organism biomass is less mobile and less likely to be lost from the rooting zone than inorganic nitrate (NO_3^-) and ammonium (NH_4^+).

Improved structure, infiltration, and water-holding capacity. Many soil organisms are involved in the formation and stability of soil aggregates. Bacterial activity, organic matter, and the chemical properties of clay particles are responsible for creating microaggregates from individual soil particles. Earthworms and arthropods consume small aggregates of mineral particles and organic matter, and generate larger fecal pellets coated with compounds from the gut. These fecal pellets become part of the soil structure. Fungal hyphae and root hairs bind together and help stabilize larger aggregates. Improved aggregate stability, along with the burrows of earthworms and

arthropods, increases porosity, water infiltration, and water-holding capacity.

Disease suppression. A complex soil food web contains numerous organisms that can compete with disease-causing organisms. These competitors may prevent soil pathogens from establishing on plant surfaces, prevent pathogens from getting food, feed on pathogens, or generate metabolites that are toxic to or inhibit pathogens.

Degradation of pollutants. An important role of soil is to purify water. A complex food web includes organisms that consume (degrade) a wide range of pollutants under a wide range of environmental conditions.

Biodiversity. Greater food web complexity means greater biodiversity. Biodiversity is measured by the total number of species, as well as the relative abundance of these species, and the number of functional groups of organisms.

Yellow Lady's Slipper (*Cypripedium parviflorum* Salisbury), Orchid Family (Orchidaceae)

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

Our native perennial, commonly known as Yellow Lady's Slipper, is recognized to have a "large" and a "small" varieties. Their physical differences are minor and are primarily defined by size and habitat (north/south), "large" dominates in southern Appalachia habitats and "small" in northern habitats.

This beautiful native orchid is highly variable in detail traits between populations;

however, at first glance and to the untrained eye, they all look the same.

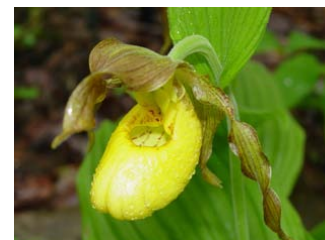
Yellow lady's slippers may be found locally in full bloom at this time of the year. Their niche is fertile, moist, shaded woodland with soils containing the micro organisms necessary for the symbiotic relationship they must have for their very existence. For this reason, and because of their rarity, these plants should never be removed from their natural location.

If you wish to enjoy this wild

treasure, pick up your camera and take a hike. The sight of them is well worth the effort required to locate and photograph this natural wonder.

Lady's slippers were extensively harvested in bygone years for medicinal purposes, but are no longer included in herb buyers' lists for ethical reasons. To protect native populations some jurisdictions have imposed strict measures to prevent the collection of this orchid.

Roots have been used



medicinally as a sedative, for nervous headaches, depression, PMS, insomnia, and hysteria.

For those interested in learning about our wild native orchids, I highly recommend the book "Native Orchids of the Southern Appalachian Mountains" by Stanley L. Bentley.

MSU/WVHA Hold Successful Conference

The Seventh Annual Appalachian Opportunities Symposium, organized by the Mountain State University Medicinal Botanicals Program and the West Virginia Herb Association, was an overwhelming success. On Saturday May 2, 2009 old friends and new acquaintances gathered on the Beckley, WV, Mountain State University campus to learn the time honored traditions of herbal medicine. Participants from as far away as Wheelersburg, OH, Mountain Lake Park, MD, and all regions of West Virginia intensely listened to the fact-filled presentations from herbal professionals.

The morning sessions began with classes on aromatherapy; planting, harvesting and processing by the moon; the first part of the energy medicine discussion; and a lecture from Dr. Jorge Ferreira on the latest research of *Artemisia annua* for breast cancer.

After the morning break, attendees enjoyed the second component of Dr. Linda Geronilla's lecture on energy medicine, a lecture on the use of flower essences by Dr. Bonnie Buchman, and an exceptional lecture from master herbalist David Hawkins on ways to combat pain and inflammation the natural way.

During lunch, the group enjoyed discussing the morning sessions with the presenters and visiting the vendor tables. Everything from medicinal plants, tinctures, teas, books, herbal scrubs, soaps, salves, and many other items were for sale.

The afternoon session began with a lecture from Dr. Hassan Amjad, MD, on everything you wanted to know but were afraid to ask about aphrodisiacs and the use of purslane as food and medicine by the Director of the Medicinal Botanicals

Program, Dr. Mario Morales. Dr. Amjad also presented what an herbalist can do for diabetes, menopause, cancer, and obesity followed by Arnie Vaughn, a certified diabetes educator, who examined how to manage blood sugar with healthy eating and exercise.

After the afternoon break participants enjoyed the following lectures/workshops: making natural cosmetics with Dr. Amjad, easy to grow herbs for culinary vinegars and oils with Melissa Dennison, cooking with herbs with Chef Galal from Mountain State University School of Culinary Arts, and making herbal teas, tinctures and other medicines with herbalist Janice Sumpter.

One participant wrote:

"Thanks very much for sponsoring the Saturday event. It was a nice time to connect with some old friends and make some new friends while increasing my knowledge base on herbs and

such. My goal to become a naturopathic physician is strengthened each time I can dunk myself in activities like those afforded by seminars like Saturday's conference. Thanks!

-Craig Wilger

The Medicinal Botanicals Program and the West Virginia Herb Association would like to extend our gratitude to the speakers and participants for their continued support throughout the years. If you missed this conference and would like to learn more about using herbs safely plan to attend the 2009 Fall Celebration of Herbs Conference "Go Green and Healthy with Herbs" on October 10th 2009, at Jackson's Mill, Weston, WV.

For more information, contact:

Susan Patterson
160 Jackson's Mill Rd.
Weston, WV 26452
304-269-5100 ext. 127
susanb@inbox.com

Appalachian Plant Profile: Jacob's Ladder

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

Polemonium reptans L. is a native perennial herbaceous species commonly known as Jacob's ladder or Greek valerian. Jacob's ladder is 1 to 1½ feet in height [1]. The angular stems are glabrous with a dull reddish green color [5]. The alternate pinnately compound leaves have 5 to 15 leaflets and are up to 1 foot in length [1]. The sessile leaflets are glabrous and oval to narrowly ovate with an entire margin. The flower stalks develop from the upper axils of the compound leaves and are several inches in length. The flowers are arranged in a small corymb of floppy or nodding flowers. The small bell-shaped flowers have 5 rounded petals that are light-blue and 5 stamens with white anthers. The stamens do not project past the flower [2]. The flowering period for *P. reptans* is from April to June. *P. vanbruntia* also known as Jacob's ladder is less common, grows larger, has 15 to 19 leaflets, the stamens extend beyond the flower, and blooms in late May through July [3]. The fruit is of *P. reptans* a rounded capsule containing 3 cells with several seeds. The root is small and wiry with a

fragrance similar to pine [2].

Traditionally, the American Indians used *P. reptans* roots in formulas for piles, to induce vomiting, for eczema and to enhance the action of mayapple [2]. Native American tribes used a root tea for diaphoretic for fevers, as an astringent for treating scrofula and snakebites, and for bronchial ailments such as pleurisy. *P. reptans* roots are used internally in the treatment of coughs, colds, bronchitis, laryngitis, tuberculosis, feverish and inflammatory diseases, including skin conditions and poisonous bites [4]. The Fox and Meskwaki tribes used *P. reptans* as a cathartic and diuretic [6, 7]. *P. reptans* is seldom used in modern herbalism. *P. vanbruntia* has no documented use by the native tribes.

P. reptans can be found growing in moist humus soils in deciduous forest and near stream banks with a pH of 6.8 to 7.2. [5]. Jacob's ladder prefers light shade but can survive in full sun in areas with reduced temperatures [4]. Propagation can be from seed or root divisions. Seeds are sown in the fall or early spring. Seedlings can be started in cold frames or in pots in the green house. Seeds are covered with soil and kept

moist until germination. Once the danger of frost has passed, seedlings can be planted in permanent locations. Propagation from root divisions is quite simple. In early spring or late fall, divide the root and replant.

P. reptans can be found in most counties in West Virginia, however *P. vanbruntia* which is much rarer is reported growing only in the highest elevations of four West Virginia counties: Pocahontas, Preston, Mineral and Tucker [1]. *P. reptans* is considered to be secure within its range with the exception in Michigan where it is listed as "threatened" and New Jersey where it is listed as "endangered" [6]. Remember to contact your local native plant program or the National Plants Database at <http://plants.usda.gov/> for species status in your area.

1. Strausbaugh, P. D., Core E., (1978) **Flora of West Virginia**, Seneca Books, Inc Morgantown, WV
2. Foster, S., Duke, J., (2000) **Medicinal Plants and Herbs Eastern/Central Ed.** Houghton Mifflin Co. NY
3. Peterson R. T., McKenny, M. 1996 *Wildflowers of North Eastern North America*, Houghton Mifflin Co. NY
4. Plants for the Future



Database *Polemonium reptans* Accessed 5/7/09 at <http://www.pfaf.org>

5. Lady Bird Johnson Wild Flower Center Accessed on 5/7/09 at http://www.wildflower.org/plants/result.php?id_plant=P_OVA5
6. USDA Plants Database *Polemonium reptans* Accessed 5/7/09 at <http://plants.usda.gov>
7. Native American Ethnobotanical Database *Polemonium reptans* University of Michigan-Dearborn Accessed on 5/7/09 at <http://herb.umd.umich.edu/>
8. UK Crop-net Ethnobotanical Database *Polemonium reptans* Accessed on 5/8/09 at <http://ukcrop.net/perl/ace/gr/ep/MPNADB>

Photography courtesy of © 2002-2003 - The Mary T. and Frank L. Hoffman Family Foundation at www.all-creatures.org

Simple Supplement Reverses the Most Common Cause of Blindness

Healthy News Service
May 9, 2009

A simple supplement could prevent – and even reverse – one of the leading causes of blindness, responsible for 15 per cent of all cases,

scientists have discovered.

A vitamin B1 supplement called benfotiamine is effective against uveitis, an inflammatory disease of the eyeball tissue.

Uveitis is usually treated with

antibiotics or steroid eye drops, but researchers from the University of Texas Medical Branch at Galveston have found that benfotiamine, a fat soluble form of vitamin B1, could be more effective.

When they tested the

supplement on rats, they found it successfully suppresses the condition. It also appears to come with no side effects.

Source: *Investigative Ophthalmology and Visual Science*, 2009; 50: 2276-82.

In Fight against Pathogens, Calcium Helps Plants Make Their Own Aspirin

ScienceDaily, Jan. 11, 2009

Calcium builds strong bones, good teeth—and healthy plants, according to a new study from Washington State University.

Experiments show that calcium, when bound to a protein called calmodulin, prompts plants to make salicylic acid (SA) when threatened by infection or other danger. SA is a close chemical relative of aspirin. In plants, SA acts as a signal molecule that kicks off a series of reactions that help defend against external threats.

That plants make salicylic acid has been known for more than 100 years, said B.W. Poovaiah, Regents Professor and director of the study, but the role of calcium in signaling a plant to make SA has not been known before.

“We are now beginning to understand the molecular mechanism connecting the calcium/calmodulin signaling to plant immunity,” said Poovaiah.

Poovaiah said that in controlling salicylic acid level,

calcium acts like a gatekeeper within the cells of a plant, directing incoming information and helping the plant respond to such dangers as pathogen attacks. Normal, healthy plants have a low level of SA in their cells. That level rises when the plant is threatened by infection or environmental stress.

“When we expect danger, we try to take precautions,” said Poovaiah. “Plants cannot run away. Plants have to turn on their built-in system to protect themselves. The plant has to produce different signal molecules. One of them is salicylic acid.”

According to lead author, assistant research professor Liqun Du, SA sets off defensive measures within the plant, such as the “hypersensitive reaction” in which cells around an infection site die, forming a barrier that keeps the pathogen from invading deeper into the plant. That provides protection against the immediate threat. SA also activates the plant’s systemic acquired resistance, a form of immunity that protects the plant from further pathogen

attacks.

But a rise in SA levels also causes the plant to slow its growth, perhaps saving its strength for the battle against the pathogen. That sets up a challenging situation for both the plant—grow faster or protect myself better?—and farmers, who might view SA as a tool to protect their plants from disease. A plant that makes high levels of SA all the time will be safe from infection but will grow slowly. A plant that makes little or no SA will grow like gangbusters but be very susceptible to infection.

“It’s a fine balance,” said Du. “Too much is bad; too little is bad.”

Working with the small mustard plant *Arabidopsis thaliana*, Poovaiah’s research team showed that the key step in this balancing act is the interaction between calcium/calmodulin and a protein called AtSR1, which suppresses the production of salicylic acid. Stress or infection causes a spike in calcium within the plant cells, which, in combination with calmodulin, acts as a specific

signal controlling the activity of AtSR1 and the formation of SA.

In an environment with few pathogens, a plant will have low levels of SA. The plant lets its guard down and devotes more resources to growth. If it becomes infected, SA production goes up, and the plant dials back its growth and puts more resources into defense.

The importance of AtSR1 was especially clear in experiments in which plants were engineered to have more or less AtSR1 than normal. Plants that have extra AtSR1 make almost no SA. They grow larger and faster than a normal plant, but easily succumb to infection. Plants that lack the gene for AtSR1 develop high levels of SA and deploy their immune responses all the time. They are nearly impervious to infection, but small in size. The same is true of plants whose AtSR1 has been changed so it cannot bind to calcium/calmodulin, demonstrating the crucial role played in this system by calcium and calmodulin.

Five Things to Change in Your Life to Avert Diabetes

Healthy News Service, 5-01-2009

There are five simple lifestyle changes you can make that will dramatically lower your risk of diabetes – and may even mean you’ll never develop it.

Researchers have discovered there are five major risk factors for type II diabetes, often referred to as the ‘lifestyle disease’, and each

one on its own can cause the disease. Eliminating, or making improvements, in all five areas could bring your risk level to zero.

The five risk areas are:

- Eat dietary fiber and polyunsaturated fats;
- Eat less trans fat, starchy and sugary foods.
- Smoking: if you smoke, stop
- Alcohol: drink no more than two glasses of alcohol a day

- Weight: get your weight down to a body mass index of less than 25, or a waist measurement of less than 88 cm (34.6 inches) if you’re a woman, and 92 cm (36.2 inches) for men.

Researchers from Harvard School of Public Health discovered that the five lifestyle factors accounted for nine out of 10 of all cases of diabetes when they tracked

4,883 men and women aged 65 and older for 10 years. During the study period, more than 300 of the participants developed diabetes.

The Harvard research team reckons that by improving each of the five lifestyle factors reduces the diabetes risk by 35 per cent.

Source: *Archives of Internal Medicine*, 2009; 169: 798.

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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 aimed at the identification and development of native plants as specialty vegetable/forage crops. Educational offerings include symposia, workshops and farm visits.

Subscriptions

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Mountain State University
Medicinal Botanicals Program
P.O. Box 9003
Beckley, WV 25801-9003

Omega-3 Supplements Cut Heart Failure Risk

by Healthy News Service
May 01, 2009

Eat a fatty fish dish – such as salmon – once a week, and take omega-3 supplements every day, and you will reduce your risk of heart failure.

Taking omega-3 supplements had the most dramatic protective effect, but eating fatty fish every week also helps. Interestingly, eating more than one portion of fatty fish every week didn't seem to lower the risk any further.

Researchers made the discovery after tracking the health of 39,367 men aged between 45 and 79 for six years. During the study period, 597 men without a previous history of heart problems or diabetes suffered heart failure, and 34 died.

Those who ate fatty fish such as mackerel, herring and salmon once a week were 12 per cent less likely to suffer heart failure compared with those who never ate fatty fish.

But the risk was lowered even more dramatically among men



who supplemented every day with omega-3 fish oil capsules. Their risk fell by 33 per cent.

Source: *European Heart Journal*, 2009; April 22, 2009. doi: 10.1093/eurheartj/ehp111.

Book Order Form

Book Order Form

Title: **Medicinal Botanicals I**

Price: \$15.00

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To purchase, make check or money order to **Mountain State University** and mail it with form to:

Mario R. Morales
MSU Medicinal Botanicals Program
410 Neville Street
Beckley, WV 25801-4511

Contributions

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.

MBP in Pictures



Dr. Linda Geronilla explaining participants important principles of Energy Medicine during the 7th Appalachian Opportunities Symposium: Medicinal Plant Applications. The event, held at the O'Dell Hall, Mountain State University, Beckley, West Virginia, on 2 May 2009, had good attendance.