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HERBALGRAM

The Journal of the American Botanical Council

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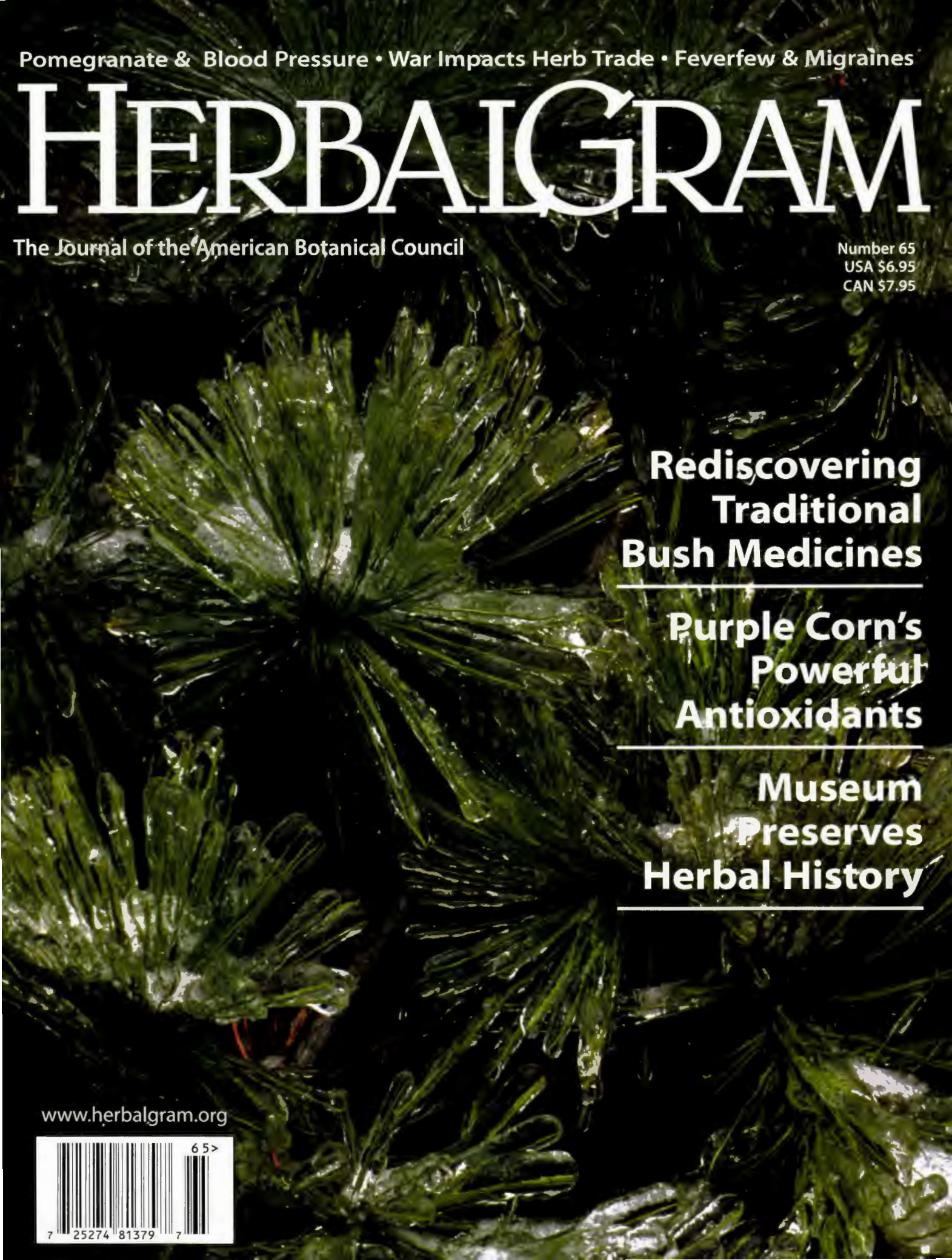

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Pine

Pinus spp. Family: *Pinaceae*

Overview

Pine trees are evergreen conifers (cone-bearing trees) that originate almost exclusively in the temperate regions of the Northern Hemisphere.[1] Pines are the source of many commercial products. Pine medicinal preparations are made from the essential oil of distilled leaves, from the resin and its derivatives produced from the bark, and from the short (3-5 cm) sprouts collected in the spring.

When the trunk of a pine tree is wounded, pine resin, a thick, sticky material, flows to the surface to form a protective coat that seals the wound to pathogenic microorganisms and prevents the loss of sap.[2] To obtain resin commercially, a tapping cut is made in the pine bark and the resin drops are collected into buckets or bags.[2] For many years the production of pine resin was almost exclusively a French industry, but later spread to other European countries, Russia, Brazil, India, and North America.[3,4] In recent years, production has decreased in the former source nations and has shifted to Southeast Asia and China.[4]

Historical and Traditional Uses

Pine needle oil, pine resin-derived turpentine oil, and pine sprouts are approved by the German Commission E for treating coughs, chronic bronchitis, and other irritations or infections of the respiratory tract.[5] They are also approved for external use to relieve muscle soreness and stiffness, arthritis, and neuralgia. The Commission E also recognizes that these pine products have antiseptic properties and can help to break up mucus secretions in the upper and lower respiratory tract and increase local blood flow.[6]

The main products of pine resin are turpentine oil and rosin.[2] The viscous resin from various pine species is distilled to produce oil of turpentine. A by-product of this distillation process is rosin, a brittle, translucent substance. Rosin has been used in the manufacture of soaps, while turpentine vapors have been used to treat congestion of the upper and lower respiratory tract associated with chronic bronchitis.[1,2] When rubbed on the skin, turpentine oil acts as a counter-irritant to relieve mild muscle, joint, or nerve pain.[1] Turpentine oil also has antiseptic properties and stimulates peripheral circulation.[1,5] Pine resin extracts, such as turpentine oil, have traditionally been used internally as a treatment for chronic cough, bladder and kidney complaints, and rheumatism.[3] They are also used externally as plasters and ointments for antiseptic actions in eczema and to stimulate topical circulation. The crude resin has been used topically for various skin conditions.[3]

Modern Research

Pharmacological research on pine-derived materials is being conducted in many countries. The extract of the needles of *Pinus densifolia* was shown to possess strong antioxidant activity.[7] A study examining the effects of an extract of *P. densifolia* bark suggests that it may be useful in the treatment of diabetes.[8] In one study fermented pine seed shell extract protected mice from death associated with *E. coli* infection and also demonstrated anti-tumor and antioxidant activity.[9] The essential oil distilled from the needles of *P. ponderosa* strongly inhibited fungal growth in one study.[10] The essential oil obtained from *P. mugo* has been shown to possess antioxidant activity.[11] An extract from the cones of *P. parviflora* inhibit HIV replication in laboratory studies.[12] A study in mice showed that the extract from pinecones of *P. parviflora* also had antimicrobial and anti-tumor properties.[13] An ointment containing pine resin has shown promise in the treatment of wounds, burns, and other skin diseases involving infection and inflammation.[14,15]

—Gayle Engels and Laura Oeschler

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HG65

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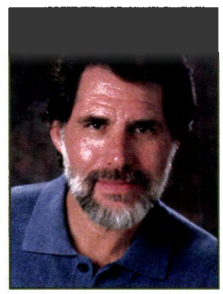
dear reader

The ink had barely dried on our last issue (#64) when one of our unfortunate predictions apparently came true. We received calls from several long-established suppliers of saw palmetto (SP) concerned that the market was being inundated with cheap "SP" oil from Asia. One analysis from a leading supplier suggests that whatever is being offered is palm oil, or some type of fatty oil mixed with palm oil.



In this column we discussed that recent hurricanes had adversely affected the SP crop in Florida and prices had already tripled. Such conditions are ripe grounds for cheap imitations and that seems to be what's happening. What's really weird is that SP does not grow in Asia, so there's no way for Asian extractors to make SP extract unless they had previously purchased large quantities of SP berries from Florida last year or previously, an unlikely scenario. The only place in the world where SP can be harvested is the Southeastern United States. Notice to manufacturers of herbs and dietary supplements: Beware of cheap SP oil being offered from Asia. It's probably not what it claims to be, and if you try to pass it off on the market, the increased vigilance in many sectors of today's market suggests that you're very likely to get caught!

The big news during the past quarter is that in November FDA issued some new guidance documents for the further regulation of dietary supplements—ten years after the passage of DSHEA in October 1994. Such increased regulation is a welcome sign, long overdue, and further evidence that FDA has not fully enforced DSHEA. We have previously stated, as have many others, that what's needed to remedy the ills and abuses in the dietary supplement industry is *full enforcement of existing laws.* FDA's recent publication of new regulatory guidance supports this position. If there are further problems that need to be remedied, then new legislation can be considered.

In December President Bush nominated former Utah governor and EPA Director Mike Leavitt to succeed Tommy Thompson as Secretary of Health and Human Services. Understandably, the herb and dietary supplement manufacturers in Utah are almost dancing in the streets. Leavitt comes from a state with a strong concentration of dietary supplement manufacturers, and he reportedly likes supplements and understands many of the industry's issues. Having already been through the confirmation process for EPA Director, predictably, he'll sail through Senate confirmation hearings, particularly with a strong ally in Senator Orrin Hatch, and will probably be instrumental in choosing a new Commissioner for FDA.

In December JAMA published an article showing that 14 (20 percent) of the 70 Ayurvedic herb products purchased from ethnic Indian stores in the Boston area contained excessively high levels of heavy metals (arsenic, lead, mercury). Although this is not defensible, we pointed out in interviews with media, including a short segment on CNN and in the *Los Angeles Times*, that the offending products were not typical of Ayurvedic herbal preparations sold in natural food stores; they were imported directly from India and circumvented the normal distribution systems for most herbal products. These products were not dietary supplements; they were adulterated and misbranded drugs and are illegal under current federal regulations. Interestingly, another analysis published in November in another journal found no excessive levels of metals in eight different herbs from seven U.S. manufacturers.

There was some good news in the media these past few months. On November 5, ABC News primetime news magazine *20/20* focused on herbs that can improve sexual performance. The segment was part of a larger theme of the show, exposing myths about sex. ABC's resident physician Dr. Timothy Johnson interviewed herbal author Chris Kilham about his new book *Hot Plants* and the

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HERBALGRAM®

The Journal of the American Botanical Council

On the cover: Pine *Pinus* spp.
Photo ©2005 stevenfoster.com

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Traditional Australian Aboriginal Bush Medicines

by Marcello Pennacchio, PhD

38 Australian aborigines were astute botanists. Their ability to find food, water, and medicinal plants in the harsh Australian desert is a testimony to their brilliance. Unfortunately, much of this traditional knowledge is disappearing along with their culture. Scientists are working to rediscover and preserve the rich medicinal knowledge found in aboriginal bush medicine "down under."

The Potential Health Benefits of Purple Corn

by Kenneth Jones

Purple corn is botanically the same species as regular table corn. Yet by a twist of nature, this corn produces kernels with one of the deepest shades of purple found anywhere in the plant world. Research shows that purple corn possesses powerful antioxidants, anti-inflammatory capabilities, and anti-obesity potential

Purple corn pieces Photo ©2005 www.essentiallivingfoods.com

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The Aboca Museum: Displaying the History of Herbal Medicine in Italy and Europe

by Robin DiPasquale, ND, RH

The Aboca Museum, located in central Italy, illustrates and documents the use of medicinal herbs throughout the ages. The museum houses a large number of exquisite artifacts and informative exhibits that show how botanical remedies have been prepared in different historical periods and locations. This photographic essay allows a peek at some of these unique treasures.

An antique herbal book from the "Bibliotheca Antiqua," a collection of over 1,000 printed volumes from the 16th to the 20th century at the Aboca Museum. Courtesy Aboca.

ABC Annual Report—Executive Summary

On a quarterly basis, the staff and management of the American Botanical Council report to the ABC Board of Trustees. Part of this formal reporting is an Executive Summary to the annual or quarterly State of the Organization Report. The executive summary and other detailed materials are submitted in advance of each quarterly board meeting. At the first meeting following the end of the fiscal year (October 31), the Executive Summary provides a snapshot of the activities and condition of ABC during the entire previous year. In an effort to better serve the public, ABC members, and other constituents, and to further the mission of ABC, we have decided to reprint the Executive Summary in *HerbalGram* so that all concerned can have an inside view into the functioning of ABC, including its many educational programs, projects, and publications. ABC welcomes any questions, comments, and/or requests for additional information as a part of this process. We plan to continue publishing these kinds of reports in the future.

—Wayne Silverman, PhD, Chief Administrative Officer

American Botanical Council Executive Summary Fiscal Year 2004

November 1, 2003 through October 31, 2004

The American Botanical Council experienced growth in all of its core activities and created new initiatives that made 2004 the most successful year since the boom of the herb market of the late 90s. In some ways, it may be considered the best year in our history. Programs and services expanded, new programs were initiated, volunteer and governance support became deeper, finances are stable and healthy, and a skilled, experienced, and dedicated staff continues to run ABC to achieve its mission.

Trustees: An expanded Board of Trustees is playing a strong governance role under the able leadership of President, Peggy Brevoort. The Trustees met quarterly during 2004, including a 3-day, on-site meeting in Austin last September. Trustees are taking a more active role in guiding the organization and empowering the staff. This level of Trustee participation is higher than at any other time in ABC history.

Human Resources: The staff of ABC is the glue that holds the organization together. The 1990s saw tremendous growth in ABC's revenues and staffing, followed by a general downturn in revenue and increased staff turnover. In 2003 and 2004 there were a total of only three staff changes out of our 18 employees and contractors. This contributed to a high degree of stability. Stability is further strengthened by longevity among some key staff members. Seven of the current ABC staff who have worked for ABC the longest have contributed a combined total of more than 95 years of service. This continues to provide ABC a depth of organizational history and continuity. The success of ABC and demand for its services continues to place a major stress on the staff who have more tasks to accomplish than time permits. Interns are now more of an integral part of the operation than ever before. Significant contributions in our educational activities were made from 21 interns who worked at ABC in 2004; these interns are university students in the fields of pharmacy, nutrition and dietetics, and journalism. Volunteers have also played a role in enabling ABC to keep the gardens beautiful and in some of our research endeavors.

Membership: ABC continues to serve its members in new and expanded ways. The membership program, created in 2001, is now solid with renewal rates for 2004 of 70% compared to 59% in 2002, and the total number of members is more than 3,000, a 6% increase over 2003. Membership at the Sponsor Level has grown steadily due to the expansion of an increasing number of benefits that bring significant value to the Sponsor Members. The number of Sponsor Members has grown from 152 in 2002 to 219 in 2004.

Financial Status: ABC is in the strongest financial position it has been in its history. Although the total revenue and expenses are not as high as they were in the late 1990s, ABC is far more stable due to conservative budgeting, elimination of most long- and

ABC Garden Tour

ABC was honored to host a garden tour on July 20, 2004 for approximately 30 attendees of the American Society of Horticultural Science 2004 Annual Conference that was held in Austin, Texas July 17-20. This was the first time ABC hosted a group of people who knew so much about the cultivation, taxonomy, and research on the plants in ABC's demonstration gardens, and it was a great learning experience for ABC staff to learn from them while sharing information about the medicinal uses of the plants. A big thank you goes to Corinne Rutzke, Senior Research Associate, Department of Biological and Environmental Engineering at Cornell University for allowing us to use her photographs.

Garden balsam *Impatiens balsamina* in the Musculoskeletal System Garden.

Agrimony *Agrimonia eupatoria* in the Pulmonary System Garden.

short-term debt (except for the mortgage on the Case Mill Homestead property), and through the success of new programs and initiatives. In fiscal year 2004, ABC budgeted total revenues of approximately $1.37 million and expenses of $1.41 million. The fiscal year ended with an unaudited total of $1.53 million in revenue and $1.38 million in expenses for a net operating income of about $150,000. Conservative budgeting and spending, sound financial management at the staff level, and governing oversight at the Board of Trustee level provided this positive result. This has enabled an expanded budget for 2005 to provide better services to the public and more staff resources.

Educational Programs, Publications, and Initiatives

***HerbalGram*:** A new managing editor of *HerbalGram* initiated his duties in March. ABC met its goal of publishing four issues during the fiscal year and efforts are underway to ensure that future issues will ship on schedule. Advertising revenue increased by 29% due, in part, to a commission-based sales representative who is also assisting in the promotion and sales of other ABC services.

HerbClip™: ABC's literature review service was published on time twice a month for the entire year. Two hundred eighty-eight HerbClip reviews were added to the online database, which now contains more than 2,400 HerbClip reviews. Sponsor level members and others receive HerbClip in hard copy form with the original articles included when permission is granted from the publisher. Academic and higher members have access to HerbClip Online. The percent of HerbClip reviews being mailed with the original article increased from 62% in 2003 to 83% in 2004, exceeding the goal of 75% set at the beginning of fiscal year 2004.

Safety Assessment Program (SAP). Formerly known as the Safety Labeling Program, the name was changed to reflect the more comprehensive nature of the scope of this vital new program. In 2004, SAP was expanded to offer companies marketing herbal dietary supplements the use of ABC's peer-reviewed Safety Assessment Reports as a basis for determining what safety information would be included in the companies' marketing materials, advertising, and/or their website. Depending on the extent of the licensing agreement, SAP provides comprehensive safety information for companies to use in the development of expanded information for herbal supplement product labels to help guide consumers and health professionals on the responsible use of popular herbs.

The ABC Board of Trustees and employees, October 2004. Photo © 2004 ABC

ABC Web site (herbalgram.org): The ABC Web site has continued to expand, and access to it directly through ABC's site or via its licensees' sites continues to break records. The educational content on the Web site continues to be updated on a regular basis. The site features five databases and three sets of consumer information, along with latest news, links, two books produced by ABC, educational resources catalog, and other features. The complexity of the site continues to grow as new educational material is added and new methods of access are implemented. Part of the site is open to the general public, while much of the online educational content is available only to members of ABC (via password). Access to different databases and levels of information depends on the level of membership. Because of this complexity and expanded use, we are now faced with the challenge to re-engineer and redesign the system. This will be a long-term project scheduled to begin in 2005.

Herb-Ed-Web™ Content Licensing: ABC's electronic educational content licensing program has now expanded to include more than 20 licensees ranging from small to large companies as well as organizations, including the U.S. Food and Drug Administration, MD Anderson Cancer Center, and some major universities. Herb-Ed-Web is now a solid and far-reaching education program and financial revenue center for ABC. More importantly, it has enabled us to expand our ability to provide high quality, science-based information on herbs and phytomedicines to hundreds of thousands of people. The average number of visitors per month at www.herbalgram.org through direct access and our licensees exceeded 85,000 in 2004, an increase of 59% over 2003.

Herbal Information Course: In January 2004 ABC, in conjunction with the National Training Institute of Virgo Publishing, launched its new online train-

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Rose hips on *Rosa rugosa* in the Rose Garden.

Mentha suaveolans, one of the many mints in the Children's Garden.

Visitors to ABC from the American Society of Horticultural Science Annual Conference in July 2004.

BRIT Hosts Pacific and Neotropical Ethnobotany Lecture Series

by Lan Truong

The Botanical Research Institute of Texas (BRIT) is hosting a Distinguished Lecturer Series on "Medicinal Plant Use by Pacific and Neotropical Peoples." The series features expert speakers with diverse backgrounds lecturing on numerous aspects of ethnobotany. The first three lectures of the series were held in autumn of 2004 at the Lady Bird Johnson Wildflower Center in Austin, Texas, and at the Fort Worth Botanical Garden in Fort Worth, Texas. The four lectures scheduled for spring 2005 will be held at the Fort Worth Botanical Garden.

The first 2004 lecture was titled, "Nature's Pharmacy: Exploration of the World's Rain Forests, Coral Reefs, and Extreme Environments for New Medicines Highlights the Urgent Need to Preserve Our Global Genetic Patrimony." The speaker, Gordon M. Cragg, PhD, Natural Products Branch Chief at the National Cancer Institute (NCI), focused on the importance of preserving global biodiversity. Dr. Cragg expressed a fondness for microorganisms and their roles in sustaining ecosystems and their potential use as sources of novel medicines. NCI has explored the world in search of medicines in virtually every ecosystem, including overlooked areas with potential for biodiversity and medicine discovery. Touching upon the issue of cultural compensation, Dr. Cragg emphasized the need for collaboration and equitable benefit-sharing between the companies that develop the pharmaceuticals and the indigenous communities whose natural environments constitute the source of the raw materials. One possible benefit would be the provision of developed pharmaceuticals to indigenous people at no cost.

Will McClatchey, PhD, ethnobotanist and professor at the University of Hawaii at Manoa, gave the second 2004 lecture, "Roles of Healers, Plants, and Ethnopharmacology in Old Hawaii." With a distinctive anthropological approach, Dr. McClatchey spoke about the defining traditions of indigenous people in the western Pacific oceanic region and their (mostly) plant-based materia medica. He also discussed issues that affect these Pacific cultures and the threat to indigenous ethnobotanical knowledge. Beginning with historical developments, Dr. McClatchey described the Polynesian cultural framework built by the traditional healers who used local plant remedies to treat illnesses.

McClatchey pointed out the loss of traditional knowledge and the need for integrating modern and traditional medicine. Using an image of the sun halfway at the horizon, McClatchey asked the audience to ponder on whether the sun was rising or setting, and whether each representation signifies the end of the traditional healing era or the beginning.

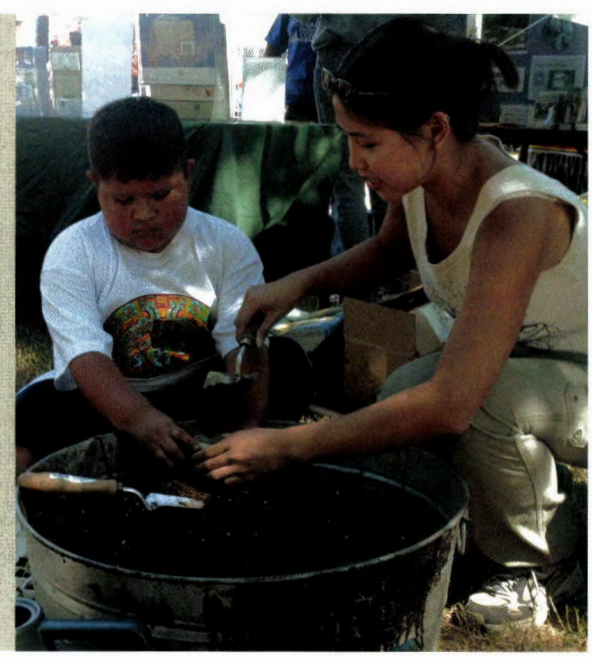
The third 2004 lecture concerned "The Status of our Knowledge of Traditional Plant Use in the Forest Paradise of Papua New Guinea, the Land of the Unexpected." Teatulohi Matainaho, PhD, head of the School of Medicine and Health Sciences at the University of Papua New Guinea, presented an overview of the island's culture and biodiversity, including its economic, ecological, and political struggles, as well as possible solutions. Dr. Matainaho discussed several threats to the ecosystems, including natural gas and mineral extraction, which is partly a result of subsidized economic development by the government. He also stressed the need for additional conservation strategies, an inventory of biodiversity, documentation of traditional medicinal knowledge, and screening plant extracts for potential treatment of HIV, tuberculosis, cancer, and other medical uses. The ultimate goal Matainaho hopes for is national economic development with a conservation-based industry policy.

Slated for 2005 in Fort Worth are four additional lectures: (1) Paul Alan Cox, PhD, Executive Director, National Tropical Botanical Garden, Kauai, Hawaii, speaking on *Ethnobotanical Insights into Neurological Disease*; (2) Glenn Wightman, PhD, Parks and Wildlife Commission of the Northern Territory, Australia, speaking on *The Use of Plants for Medicine in the Dreamtime: Australian Aboriginal Traditional Medicinal Plant Use*; (3) Michael Balick, PhD, Head of the Institute of Economic Botany, The New York Botanical Garden, speaking on *Exploring Ancient Wisdom and Traditional Healing in Micronesia*; and (4) Brent Berlin, PhD, Department of Anthropology, The University of Georgia, speaking on *Use of Medicinal Plants Among the Maya in the Chiapas Highlands.*

For more information on the lecture series, see the BRIT Web site at http://www.brit.org/Education/DistLectSeries.htm. The American Botanical Council and the Academy of Oriental Medicine in Austin, Texas, also provided support for the series.

Festival de las Plantas 2004

Conchero Indians from Mexico and the United States gathered to participate in the Second Annual Festival de las Plantas at the Roy G. Guerrero Colorado River Park in Austin, Texas. Celebrating and preserving Hispanic and American Indian heritage is the main theme of the festival. Displays included plants commonly used in those cultures such as *nopales* (prickly pear cactus pads, from *Opuntia* spp., Cactaceae). The American Botanical Council hosted a calendula planting session for children and provided parents with informational sheets on the care of calendula and its medicinal uses. In the accompanying photo, Lan Truong demonstrates how to construct newspaper pots for calendula seedlings.
Photo © 2005 ABC



Garlic in the Gardens

by Amy Floerke

Since garlic was the International Herb of the Year for 2004, it seemed appropriate to plant as much of it as possible this fall, not just for its culinary uses, but also for its diverse medicinal uses. The American Botanical Council (ABC) is grateful to Gourmet Garlic Gardens for the generous donation of 22 varieties of garlic for planting in ABC's medicinal demonstration gardens. Gourmet Garlic Gardens, located in Bangs, Texas, and owned by the "garlicmeister" Bob Anderson, is a supplier of unusual garlics. Its website (www.gourmetgarlicgardens.com) is packed full of helpful and detailed garlic information for both the sophisticated and inexperienced garlic enthusiast.

From a medicinal perspective, the German Commission E acknowledges garlic as a support to dietary measures for elevated blood lipid (cholesterol) levels (hyperlipidemia) and as a preventative for age-dependent vascular changes, such as atherosclerosis.[1] Other potential medicinal uses include treatment of decreased platelet function, mild hypertension, peripheral arterial occlusive disease, and prevention of stomach and colon cancer.[2]

Part of the internship program at ABC includes working in the many theme gardens on the property, including the human systems gardens and regional cuisine gardens that classify herbs by their medicinal and culinary uses. The 22 different varieties of garlic were planted in late October 2004 and will be harvested in late spring or early summer 2005. The ABC gardens in which the many varieties of garlic were planted include the antioxidant, circulatory, excretory, respiratory and first aid, as well as the Chinese, French, Indian, Mediterranean, Mexican, Middle Eastern, and Southeast Asian gardens.

PharmD intern Amy Floerke (left) and RD intern Melissa Castaño plant garlic in ABC's antioxidant garden. Photo © 2005 ABC

When planting varietal garlic, the issue of which type is better for a specific gardening climate arises. There are two subspecies of garlic. Hard-necked garlics (*Allium ophioscorodon* [Link] Doell, Alliaceae), the original strain, generally have a deeper flavor and store for a shorter amount of time. Soft-necked garlics (*A. sativum*) were hybridized from the hard-necked type and generally have a milder taste but store for longer periods.

Plant garlic in the fall (October or November) to produce the highest yield in spring or early summer. Prepare the top six inches of the soil by loosening and mixing with compost or manure. Mix one gallon of water and one heaping tablespoon of baking soda. Break the cloves of the garlic apart and soak them in the mixture for at least two hours; this helps inhibit fungal growth. Remove the garlic from the mixture and peel the papery skin off the cloves; then soak them in rubbing alcohol for 3 to 5 minutes. This destroys any remaining pathogens to eliminate possible problems before they begin. Once removed from the alcohol, immediately plant the cloves. They should be planted with the pointed end up, six inches apart and two inches deep in the very southern states of the U.S., four inches deep in the very northern states, and three inches deep in the rest of the U.S. The garlic will sprout within 1-2 weeks in the South. In the North, it will lie dormant throughout the winter and sprout when the weather warms in the spring.

Once planted, the garlic should be watered weekly or just enough to keep the soil moist at root depth. Dig to bulb depth occasionally to see how the garlic bulbs are developing. Garlic does not need much fertilizer, but some compost should be added in early spring or if the bulbs are not developing well. Harvesting should be performed in the spring or summer when most of the leaves have died down and only the top five or six leaves remain green. To harvest, dig up the bulbs carefully and place them in a shady, dry location for about a month. Allow the necks of the garlic to completely dry out; when the tops are cut off there should be no lingering garlicky smell. Trim the rootlets and leaves from the bulbs and store the bulbs at room temperature away from direct sunlight. For more information on growing and harvesting garlic, visit the Gourmet Garlic Gardens Web site at www.gourmetgarlicgardens.com.

Amy Floerke is a PharmD candidate at the University of Texas at Austin who interned at ABC in September and October of 2004.

ABC Headquarters

Sharon Timmons talks with Mark Blumenthal about the history of the Case Mill Homestead, which is now the location of ABC headquarters. Timmons is the great-great-granddaughter of Sherman Case, original owner of the homestead which was established in the 1840s. Photo © 2005 ABC

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1. Blumenthal M, Goldberg A, Brinckmann J, editors. *Herbal Medicine: Expanded Commission E Monographs.* Austin, TX: American Botanical Council; Newton (MA): Integrative Medicine Communications; 2000.
2. Blumenthal M, Hall T, Goldberg A, Kunz T, Dinda K, Brinckmann J, et al, editors. *The ABC Clinical Guide to Herbs.* Austin, TX: American Botanical Council; 2003.

Pharmacists and Physicians Visit Peruvian Amazon and Andes on ABC and ACEER Ethnobotany Tour

by Kathleen Coyne

On October 21, 2004, twenty travelers from the United States and Australia journeyed to Peru for a ten-day workshop on *Botanical Medicines from the Amazon and Machu Picchu*. The trip was sponsored by the American Botanical Council, Amazon Center for Environmental Education and Research (ACEER) Foundation, and West Chester University of Pennsylvania. Workshop instructors were James A. Duke, PhD, noted ethnobotanist and author of *Sixty Medicinal Plants from the Peruvian Amazon* (among numerous other books); Mark Blumenthal, founder and executive director of ABC and editor of *HerbalGram*; Sue Mustalish, RN, Coordinator of the University Outreach Program for the ACEER Foundation; and Don Antonio Montero-Pisco, Peruvian shaman and herbalist.

During the first half of the trip the group stayed in Southern Peru at the Reserva Amazonica Ecological Reserve, a 45-minute boat ride on the Madre de Dios river, downriver from the small town of Puerto Maldonado. The Madre de Dios is a major tributary of the Amazon. Don Antonio and Duke led herb walks in the rainforest where students were introduced to native plants, their traditional uses, and the conditions they treat. The group was also the first to use the new Canopy Walkway, which takes visitors to a height of 35 meters (115 feet) into the rainforest canopy and allows them to view plants and animals, including monkeys and many exotic tropical birds. A morning was spent touring the gardens and nature interpretation center at ACEER-Tambopata at Inkaterra, ACEER's new international education and research center. Other activities included an excursion to Sandoval Lake (an ox-bow lake formed by the natural enclosure of a large curve of the river), to a small farm on which visitors were treated to ripe bananas picked directly from the tree, and to a one-room school in a local village.

After flying from Puerto to Maldonado to the ancient Incan capital of Cusco (located in the Andes at an altitude of 11,000 feet), the group spent the second half of the trip visiting the Peruvian highlands. Highlights included a day-and-a-half at the "lost" Incan mountaintop citadel of Machu Picchu and the architectural remains of plazas, palaces, temples, homes, cemeteries, and irrigated mountainside terraces that formed the structure for the Incan agricultural system. The group also visited the market in Machu Picchu village, also known as Aguas Calientes, and hiked the Orchid Trail on the grounds of the Pueblo Hotel, home to the world's largest native orchid species garden, which also contains many species of birds (including hummingbirds), butterflies, plants, and trees.

ABC's Kathleen Coyne and local children at Sacsayhuaman. Photo © 2004 Mark Blumenthal

Heliconia spp. Photo © 2004 Mark Blumenthal

Physicians and pharmacists were able to earn CME or CEU credits, respectively, while learning first-hand about the ecology of the flora and fauna of Peru as well as the history of botanical medicine, the legal and regulatory status of medicinal plants in the United States, biological forms and activities of botanical medicines, clinical research on the efficacy and safety of botanical medicines, herb-drug interactions, and more. The College of Health Sciences at West Chester University of Pennsylvania provided accreditation for continuing education for physicians. The course was accredited for pharmacists by the Texas Pharmacy Association.

The 2005 trip to the Amazon and Machu Picchu is already being planned for October 17-26, 2005. Information will be published in future issues of *HerbalGram*, on ABC's Web site (www.herbalgram.org), and will be available from the ACEER Foundation (www.aceer.org).

Machu Picchu, "The Lost City of the Incas." Photo © 2004 Mark Blumenthal

My Internship at the American Botanical Council: A Pharmacy Student's Reflections

[Editor's note: Each year ABC is fortunate to have numerous candidates for doctorates in pharmacy (PharmD) complete a six-week rotation or internship at ABC. One of our most recent interns, Amy Floerke, has written a reminiscence of her experience at ABC.]

When I showed up at the American Botanical Council on the first day of my Herbs and Phytomedicines Pharmacy Rotation, I did not know what to expect. I had chosen this rotation (internship) in hopes of learning more about herbal uses, safety, efficacy, and interactions with prescription medications. Working in a retail pharmacy setting as a pharmacist intern for the prior two years had brought to my attention that there seemed to be a "hole" in my knowledge concerning herbs. I was approached many times while working at the retail pharmacy by patients in search of advice and information about herbal products. I felt frustrated by not being able to completely answer their questions or refer them to an appropriate reference in order to find the information they needed to safely and effectively make a decision about an herbal product.

During my six weeks at ABC, I learned exactly what I was in search of and more. I was allowed to utilize ABC's vast variety of herbal references that I did not know even existed, references that include documented clinical studies in humans, herbs with approved uses from the German Commission E, *The American Herbal Products Association's Herbs of Commerce*, 2nd edition, regulations on New Dietary Ingredients (NDIs), and *The ABC Clinical Guide to Herbs*. I also learned about the use of herbs as medications in other countries and about the public's desire for more research and information pertaining to herbal products (for example, information about herbs and their interactions with prescription medications, foods, and other herbs). It was also brought to my attention that the general public does not view herbs as medications, and therefore they often do not report their use to doctors or pharmacists, who might be able to warn their patients of potentially harmful interactions.

Garden work (one day per week) is another aspect of the experience at ABC. Working in ABC's medicinal and culinary gardens not only provided a hands-on approach to herbal medicine but also put me in touch with the versatility of herbs, including their culinary and medicinal uses. I was able to harvest herbal seeds for the gardens and plant seeds in trays to be grown in the greenhouse. During my six weeks at ABC, the rotation also included researching herbs for medicinal, cosmetic, and food purposes as well as their safety and effectiveness. My role also included replying to ABC members' inquiries and entering useful articles into ABC's literature database.

I gained a tremendous amount of knowledge about herbs as well as refreshing my "green thumb." My rotation at ABC allowed me to open my eyes to the large amount of references available that touch on all aspects of herbs and to realize the ambiguity of the public and professional knowledge of herbs. From a future pharmacist's perspective, I will be able to apply the knowledge I received from ABC to inform my patients of the available, valid information about herbs. I will be able to refer them to reliable sources and provide them with helpful information so that they will be better able to make their own well-educated and informed decisions about herbs. I will also be able to educate them on the need to inform their doctors/hospitals and pharmacists of the herbs they are taking to further prevent potentially adverse drug interactions.

I really enjoyed my short six weeks at ABC. Members of the staff are knowledgeable and work effectively as a team to serve the public as a reputable source of herbal information. During my rotation, I not only learned a wealth of useful information, but also was provided with a supportive work environment due to the respectful people who work at ABC.

—Amy Floerke
PharmD intern
College of Pharmacy,
University of Texas at Austin

ABC Annual Report

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ing program targeted for retail natural food store employees and network marketing distributors. The program provides basic information about dietary supplements, guidance about how retail employees should communicate with customers, and basic information on many of the most popular herbs. The course has succeeded beyond expectations with more than 1,100 Herbal Information Specialist Certificates awarded in 2004. The year two renewal curriculum will be made available early in 2005 and additional educational modules are currently being contemplated.

New Projects and Initiatives: In addition to the core activities listed above, ABC added 5 new projects during the year, requiring the resources of staff, interns, volunteers, and contractors. Some are complete and some ongoing. These projects included two herbal overview projects for print and electronic use which will become the Herbal Mind and Body Care database; two new herb profiles, the "ABC Clinical Guide to Elder Berry" (*Sambucus nigra* L., Caprifoliaceae) and another on Yerba Maté (*Ilex paraguariensis* A. St.-Hil., Aquifoliaceae), still in progress; and a pharmacy continuing education module on improving immune function and DNA repair in older adults. All of these projects were coordinated by staff. This presents challenges considering the staff's primary priorities in maintaining ABC's ongoing core educational activities. Expansion of human resources is planned for 2005 to address the numerous requests for new projects that have been received. In some cases, ABC has not been able to accept proposed new projects due to a lack of personnel and financial resources.

Summary: The American Botanical Council experienced stability and growth during the 2004 fiscal year. Most core activities, goals, and projects were accomplished. The net operating income for the year was far more positive than previously budgeted. Clearly, many factors have contributed to the success of the organization in 2004. These factors include sound, conservative financial management, effective governance by the Board of Trustees, a dedicated and hard working staff, strong membership support, and the support and confidence of all segments of the constituents served by ABC.

ABC Starts 2005 with Newly Expanded Benefits for Members

Although the New Year has just begun, ABC Members are already deriving great value from the expanded 2005 educational benefits and services. Each year ABC provides new incentives for prospective and renewing members to support ABC's mission to provide education using science-based and traditional information to promote the responsible use of herbal medicine. In addition, ABC continues to offer long-standing educational resources like *HerbalGram*, HerbClip™, herbal research, and its unique suite of online herbal databases.

New Benefits for All ABC Members

This year all ABC Members are receiving access to new online educational content on ABC's Web site (www.herbalgram.org). This new content includes herbal profiles available through ABC's new Herbal Body Care database. These profiles provide information on plants used in phytocosmetics, aromatherapy, and herbal body care. Another new benefit available to all members is access to archives of ABC's e-mail newsletter, HerbalEGram, which keeps members abreast of the latest herbal news between issues of *HerbalGram*.

New Benefits for Academic, Professional, and Organizational Members

Members at these levels now receive a copy of "The ABC Clinical Guide to Elder Berry." This new publication includes a clinical monograph on the growing body of research supporting the immune-enhancing actions of European elder berry. The format for the elder berry profile follows the same format as the 29 monographs in *The ABC Clinical Guide to Herbs*, including use, safety data, dosage, and clinical trial summaries. The profile also contains a Clinical Overview for quick reference and a Patient Information Sheet that healthcare providers can photocopy for patients.

Professional and Organizational Members will also receive a packet of 29 Herbal Information Sheets, ready for duplication and distribution. These information sheets provide an excellent tool for educating patients, customers, or clients about commonly used herbs. The Herbal Information Sheets are concise versions of herb monographs and are written in consumer/patient-friendly language.

Benefits for Corporate and Sponsor Members

The benefits of Corporate and Sponsor Membership also continue to expand with companies' needs for reliable herbal information for staff and customers. The new Herbal Body Care database is one example of how ABC is constantly working with its supporters to find new ways to enhance the quality of herbal medicine resources for consumers, healthcare professionals, the media, government, and industry.

With membership support, ABC continues to be a reliable source of current information on the safe, effective, and responsible use of herbs and phytomedicines. Together, ABC and its members are working to improve the public's knowledge and understanding of herbal medicine.

For more information on ABC membership levels and a detailed list of benefits, see page 3 of this issue, access our Web site at http://www.herbalgram.org/default.asp?c=membership, or call us at 800-373-7105.

— Aileen Truax

[Editor's Note: Truax assumed the position of Development/Marketing Coordinator for ABC in December 2004.]

ABC Employee Profile: Wayne Silverman

Silverman

The business books say there are two kinds of entrepreneurs: visionaries and managers. The start of a business or nonprofit organization often begins with the visionary, but its eventual growth and success depends on a good manager, and the visionary founder must know when to share the reins of management to ensure the organization's success.

Such is the case with the American Botanical Council. ABC is ably managed by Wayne Silverman, PhD, its Chief Administrative Officer. Since he first arrived at ABC, more than nine years ago, Wayne has implemented administrative and development programs that have helped ABC become increasingly professional and transparent in its management and accounting.

I first met Wayne Silverman when he was the Executive Director of the Jewish Federation of Austin. I was impressed with his professionalism and high sense of ethics. Wayne holds a doctorate in college administration, a master's in science education, and has extensive experience in nonprofit management—all perfect skills for a science-based, nonprofit, educational organization like ABC. (He's also an avid organic gardener and a gourmet natural foods chef!)

When Wayne started at ABC, I was spread very thin, trying to cover too many critical areas: editorial, education and public relations, management and personnel, development and fund-raising, etc. ABC needed someone who could focus on management and development. When Wayne started at ABC, he immediately began professionalizing the organization. During his almost ten-year tenure, he has grown from being an able, loyal, and trusted lieutenant to an indispensable and cooperative partner.

Wayne handles all areas of management and development here at ABC, thereby allowing me to focus my time and energies towards the areas I prefer most: research and education, editing and writing, media interviews and public speaking, etc. But I cannot do my work without a well-functioning support platform. This is where Wayne and the rest of the able ABC staff come in.

Wayne covers all the "create the systems and get the work done" stuff. Some of his key areas of contribution include: helping to establish the ABC Web site and the highly successful Herb-Ed-Web program in which ABC licenses its electronic educational content to other organizations and commercial entities; the initiation of the editorial and publication process for our third book, *The ABC Clinical Guide to Herbs* in which he implemented the now common practice at ABC of obtaining continuing professional education credit from multiple disciplines for ABC materials; the move toward a more participatory governing board; the new ABC Herbal Information Course in which ABC produced a Web-based instruction and certification program for retail clerks in natural food stores and for distributors of multi-level marketing companies; and other projects and programs too numerous to list in this limited space. Without Wayne's able and dedicated management, as well as his continuing friendship and partnership, ABC would not be the top-flight organization it is today.

—Mark Blumenthal

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[1] *Journal of Clinical Pharmacy and Therapeutics, 29:75-83, 2004*
[2] *International Immunopharmacology 2002; 2 :381-387*
[3] *Journal of Nutritional Biochemistry 2002; 13 : 487-492*

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— Dr. Richard Barton, Clinical Trial Investigator
Department of Biochemistry and Molecular Biology, Faculty of Medicine, University of British Columbia

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ACEER to Develop Electronic Learning Program on Amazon

The Amazon Center for Environmental Education and Research (ACEER) Foundation is joining with several partners to produce an integrated, inquiry-based learning program—*Living on the Edge!* Program components will include the following: a multipart television series produced at the ACEER-Tambopata research station on the Madre de Dios river, a tributary of the Amazon in Southern Peru; a companion Web-based study program of on-demand video, audio, data, and other learning resources; and local museum exhibits to anchor the learning experiences within local communities.

An initial target audience of 14 million households is expected to participate, and there are plans to eventually distribute nationally. *Living on the Edge* will explore nature's great interfaces: air/water/land/biota. A significant component will be how phytochemistry holds promise for the discovery of new medicines. The ACEER's extensive medicinal plant gardens and trails in the rainforest will be featured, along with depictions of local plant use and ceremonies. Production will begin in 2005 and the program's release is set for 2006-2007.

Key organizations partnering with ACEER include WHYY-TV (PBS Channel 12), Philadelphia, PA; West Chester University of PA; Camden County College, NJ; WebStudy, Inc. of PA; the Delaware Nature Society; the Delaware Museum of Natural History; and Syncreta Associates in Gainesville, FL.

The mission of ACEER, a tax-exempt nonprofit organization, is to promote rainforest conservation by being a catalyst for awareness, understanding, action, and transformation. This is achieved through environmental education and research within Amazonian communities in partnership with industrialized nations. The project's progress can be monitored at http://www.aceer.org/. For more information, contact Dr. Roger W. Mustalish, President, ACEER Foundation, rmustalish@wcupa.edu.

Dr. Low Dog Appointed Director of Botanical Medicine at University of Arizona

The Program in Integrative Medicine at the University of Arizona School of Medicine is proud to announce that Tieraona Low Dog, MD, joined the faculty as Director of Botanical Medicine in August 2004, the first position of its kind at a conventional medical school in the United States. Dr. Low Dog will spearhead the development and instruction of the botanical medicine curriculum for the fellowship program at the University of Arizona.


Low Dog

Dr. Low Dog, who serves on the advisory board for the American Botanical Council, has spent the past 25 years working in the field of herbal medicine. Prior to attending medical school, she had a successful herbal practice in New Mexico and has served as President of the American Herbalists Guild. Her many honors of distinction include *Time* magazine's award of Innovator in Complementary and Alternative Medicine (2001) and a Presidential appointment by Bill Clinton to serve on the White House Commission of Complementary and Alternative Medicine. She is chair of the United States Pharmacopeia Dietary Supplements and Botanicals Expert Committee and was appointed by Secretary of Health and Human Services Tommy Thompson in July 2003 to serve on the Advisory Board for the National Center for Complementary and Alternative Medicine, National Institutes of Health, until 2006.

Rutgers University Receives Grant from USAID for Natural Products Development in Africa

Rutgers University received a new contract award to support natural products research and development in Africa. This new program was awarded in October 2004 by the United States Agency for International Development (USAID), Office of Economic Growth, Agriculture and Trade (EGAT/AG), in support of its global economic development programs, specifically, the Partnership for Food and Industry Development. The programs at Rutgers receiving the grant are New Use Agriculture and Natural Plant Products Program and the Food Policy Institute.

Jim Simon and Dan Acquaye

USAID has three such global programs, one in fruits and vegetables, a second in dairy, livestock and fish, and now a third to focus on natural products. The $2.5 million, 5-year project is designed to support partnerships that contribute to the economic growth of client countries by mobilizing expertise in the private and public sectors to add value, as well as meet safety and quality standards, to the production of food products for the respective client countries' domestic and international markets. The new Rutgers program, "Partnership For Sustainable Economic Growth in Africa Through Natural Products Development (PFID/NP)," builds upon the Agri-Business in Sustainable African Plant Products Program (ASNAPP) and will focus its initial core activities in both Western Africa (Ghana and Senegal) and Southern Africa (South Africa and Zambia), with a satellite program in Rwanda. These agribusiness partnerships will be based on the development of local, regional, and international trade in natural products, based upon the regions' unique ethnic/traditional natural products (which include teas, spices and flavorings, aromatic oils, medicinal plants, and plant-based cosmetic ingredients) that have scientifically verifiable functional properties and are in market demand.

The Rutgers and ASNAPP program uses a scientifically-based and market-driven model that seeks to develop and strengthen successful private and public partnerships in sustainable economic growth of sub-Saharan African natural plant products.

The objectives within the five-year project period include many significant initiatives to improve the economic health and viability of the natural products sectors in each country:

1. Increase the number of natural plant product producers/farmers.
2. Develop botanical products for domestic and international markets.
3. Increase the number of people employed in the natural product sector.
4. Diversify the economy through new/improved natural plant products.
5. Increase economic growth within the natural product sector.
6. Increase and diversify family/farmers/production income.
7. Increase the number of sustainable natural plant products producers/companies.
8. Increase the number of science-based, natural plant products traded regionally and exported from Africa.
9. Increase the use of science-guided marketing of natural plant products as a vehicle to increase sustainable trade.
10. Establish and improve the necessary domestic quality control and quality assurance measures, facilities safety and sanitation, Good Agricultural Practices, and Good Manufacturing Practices by producers and manufacturers of value-added products that are exported and traded in the natural products sector.

The program is being lead by Professor James E. Simon, PhD, Professor and Director of the New Use Agriculture and Natural Plant Products Program at Rutgers. Prof. Simon was formerly a Professor of Horticulture and co-founder of Center for New Crops and Plant Products in the Department of Horticulture at Purdue University. In addition to many of his academic and international activities, Prof. Simon is also a member of the American Botanical Council's Advisory Board.

According to Prof. Simon, "The uniqueness of this new program relative to the herbal products industry is that it provides a contractual mechanism for the USAID to support new programs in natural products in any of the client countries in which USAID operares, thus providing for the first time an efficient vehicle to establish sustainable development programs in natural plant products from the bush to the final product with a focus on quality, science, community development and trade" (written communication to M. Blumenthal, December 6, 2004).

The new project builds directly on the ASNAPP model and has led to the successful introduction of several new African products into regional trade in Africa as well as into the European and American markets. Two of the ASNAPP products, Rooibos tea (*Aspalathus linearis* [Burm. f.] R. Dahlgren, Fabaceae) and the Haarlem Honeybush iced tea (from *Cyclopia intermedia* E. Meyer, Fabaceae) produced by Honest Tea®, have been recognized for their excellence, quality, and/or uniqueness by *Gourmet Retailer* magazine at the 2004 Fancy Food Show in New York City and by *Men's Health* magazine as one of the best new beverages. The project intends to strengthen and expand the project management team's initial work in the natural products sector and extend the team's models of commercialization into West and Southern Africa. It also will create expanded partnerships among American and African universities, African government agencies and, in particular, the private sector and nongovernmental organizations (NGOs, aka nonprofit organizations) in a unique and synergistic manner. These partnerships include Rutgers University (USA) via the New Use Agriculture and Natural Plant Products Program, Food Policy Institute, Food Innovation Center, and the Center for Advanced Food Technology—all at Rutgers; Alcorn State University in Mississippi; and Southern University in Baton Rouge, Louisiana. African partners include ASNAPP programs in West Africa (Accra,

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Seacology Helps Conserve Medicinal Plants in Madagascar

by Karen Peterson

Madagascar, the world's fourth largest island, is sometimes referred to as the "Seventh Continent" because 80 percent of its plant and animal life is found nowhere else on earth. Geographically isolated in the Indian Ocean 250 miles east of the Mozambique coast, the country is home to over 60 lemur species, two thirds of the world's chameleon species, and over 1,000 known species of orchids.

With this biological richness, however, comes vulnerability. Madagascar is one of the world's poorest nations, and until recently, destruction of Madagascar's natural resources went unchecked. Widespread slash-and-burn agriculture, logging, and cutting of trees for charcoal production have led to the disappearance of over three-fourths of the country's forest cover. Soil erosion, groundwater contamination, and desertification have followed in many areas of the country. Fortunately, this devastating habitat loss has not gone unnoticed. Within Madagascar, extraordinary steps are being taken to preserve the country's remaining intact forests. An environmentally aware new national president and increasing involvement on the part of the Malagasy people are helping to stem the tide of destruction. Additionally, Madagascar has become the focus of numerous efforts by international conservation organizations, including the Berkeley, California-based Seacology.

Aloe capitata on Mt. Angavokely. Photo © 2005 Karen Peterson

Seacology is the world's premier nonprofit environmental organization with the sole purpose of preserving the highly endangered biodiversity of islands throughout the world. In the last 400 years, the majority of the world's plant and animal extinctions have taken place on islands. Indigenous people are all too often faced with the dilemma of choosing between protecting their precious natural resources and economic development. Seacology searches for win-win situations where both the local environment is protected and islanders receive some tangible benefit for doing so. In Falealupo, Samoa, Seacology built a critically needed school in exchange for the establishment of a 30,000-acre forest reserve. In Navolau, Fiji, Seacology is constructing a community center in exchange for the establishment of a 370,000-acre marine reserve. Because the organization works closely with islanders right from the beginning, Seacology projects enjoy strong local support and, consequently, lead to long-term benefits.

Orchids in bloom on the flank of Mt. Angavokely. Photo © 2005 Thomas Elmqvist

When Seacology wanted to find an indigenous-led conservation project on the Great Red Island of Madagascar, the organization's management sought the advice of Seacology Scientific Advisory Board Member Thomas Elmqvist of the Swedish Biodiversity Centre in Uppsala, Sweden. Dr. Elmqvist, who has extensively studied the country's flora, introduced Seacology to the work of a Malagasy conservationist and professor at the University of Antananarivo, Elisabeth Rabakonandrianina, PhD.

Dr. Rabakonandrianina ("Bako") has worked passionately to protect Mt. Angavokely, a 1,717-acre oasis of intact high altitude rainforest just 15 miles outside the capital city of Antananarivo. Home to over 120 species of rare and endangered orchids, the forest is an important watershed for three local communities totaling over 20,000 inhabitants. Under Bako's supervision, Seacology is working with the Malagasy environmental organization ARVERT, faculty from the University of Antananarivo and Uppsala University, and the Service des Stations Forestieres to create a new national park at Mt. Angavokely. Singular in its proximity to the capital city of Antananarivo, this park will provide recreational opportunities for local residents as well as research opportunities for scientists and students.

Several medicinal herbs have been found at Mt. Angavokely, including three members of the family Asteraceae: *Helichrysum gymnocephalum* (DC.) H. Humb (uses include aphrodisiac, antiseptic, stimulating, treatment for bronchitis); the endemic *Secneicia faujasiodides* Bak (used for wound healing); and the endemic *Psiadia altissima* (DC.) Benth and Hook (used for toothpaste and to treat eczema, also a good soil indicator). Other endemics include *Bryophyllum proliferum* (Bowie) ex Hook, Crassulaceae, which is used to treat coughing, and *Brachylaena ramiflora* (DC.) Humbert, Asteraceae, used to lower malarial fever. Non-endemics include *Siegesbeckia orientalis* L., Asteraceae, which is used to stop bleeding and heal wounds. According to Bako, the Malagasy name for this plant, Satrikoazamaratra, is translated as, "I am happy to have wounds because it heals real fast."

Work to make Mt. Angavokely safe and accessible for researchers and recreationalists alike has progressed despite obstacles such as an arson-caused fire in 2001, which destroyed the only populations of some of the mountain's orchids. Orchid "poaching" activity has been significant in the area until recently. The Seacology-funded project includes orchid cultivation as an economic alternative. As well, Bako has introduced an alternative charcoal, which uses forest litter

and rice hulls instead of hardwood. For her outstanding dedication in protecting Mt. Angavokely, and her efforts to involve the local communities in the establishment of the new park, Bako was awarded the 2003 Seacology Prize. The Prize, funded by Seacology President Ken Murdock (formerly owner of Nature's Way [one of the leading U.S. herb companies] and one of the founders of Seacology), is awarded annually to an indigenous islander for exceptional achievement in preserving the environment and culture of any of the world's 100,000 plus islands.

Seacology is also working with the United Kingdom-based conservation organization Azafady to protect the Manafiafy Forest in southeastern Madagascar. Since 1997, the Malagasy government has been implementing a policy of Community Forest Management, which consists of devolving control over forest resources to local communities with the help of a mediating non-governmental organization. Azafady has been asked by villagers in the Sainte Luce area to facilitate the transfer of control over the Manafiafy Forest. This

Aloe capitata and other succulent plants atop Mt. Agavokely. Photo © 2005 Karen Peterson

1,730-acre area comprises one of the last remaining stands of littoral forest in Madagascar, and it has been described as being in "pristine" condition. It is home to critically endangered palms, birds, and the rare brown collared lemur.

Members of the community have been trained as part-time forest guardians to patrol the area and act as guides. However, prior to Seacology's involvement, forest guardians, extension agents, and researchers had to spend up to six hours getting to and from the forest each day, and they did not have a base from which they could coordinate their activities. Four forest stations, which are currently being constructed, will allow forest guardians to have a more continuous presence in the area. In situ nurseries will allow for more viable replanting, and volunteers and extension agents will be able to more effectively survey and monitor the forest's flora and fauna.

More information regarding Seacology's projects to protect the environments and cultures of islands throughout the world is available at www.seacology.org or by contacting Seacology at islands@seacology.org (telephone: 510-559-3505).

Karen Peterson is program officer for Seacology, where she has helped to implement almost 100 projects to protect island environments and cultures throughout the world. She previously worked as program associate for the Goldman Environmental Prize, dubbed the "Nobel Prize for the Environment" by international news media.

WHO Releases "Guidelines on Good Agricultural and Collection Practices" of Herbs

by Mathias Schmidt, PhD, Michael Thomsen, and Georges Betti

Quality, efficacy, and safety are parameters that are required for all medicines. These are particularly important to herbal preparations as they gain popularity. The past decade has witnessed significant worldwide growth in the use of medicinal herbs as teas and dietary supplements. Due to the increasing knowledge of both the traditional and scientifically documented benefits of herbs, consumers are now more likely to consider herbal remedies as a viable alternative to conventional medicines. The World Health Organization (WHO) estimates the total world market for medicinal botanicals to be about $60 billion.[1] According to data cited in a report of the Secretariats of the Convention on Biological Diversity (CDB), sales of herbs in the United States increased from $1.6 billion in 1994 to $5.4 billion in 2000.[2] In recent decades, the tremendous growth of the herbal sector has revealed the need for improved quality control in cultivation and collection of herbal raw material. Consistent and reproducible quality of herbal raw materials used for medicinal purposes is paramount for clinical efficacy and for the reproducibility of beneficial effects as observed in clinical studies. Furthermore, numerous safety issues depend on consistent composition of botanical ingredients.

Ideally, raw material for the production of herbal medicines will come from a traceable and reproducible source. In reality, the trading habits co-evolving with the growth of the market frequently obscure the origin of the plant material and facilitate adulterations, which, especially in the case of adverse events, have already damaged the reputation of otherwise relatively safe plants.

In February 2004, the WHO released "WHO guidelines on good agricultural and collection practices (GACP) for medicinal plants,"[1] which addresses quality issues in the production of herbal raw material. It covers recommendations that range from the selection of appropriate seed material and cultivation sites to the avoidance of contaminations in post-harvesting handling, training and working conditions of personnel, and general rules for handling and construction of tools and facilities. Some of the major issues and their practical implications are briefly discussed below.

Selection of appropriate plant/seed material

Though seemingly trivial, the selection of the correct species for cultivation is still of major concern. The replacement of species with seeds from species that are closely or less closely related is a common feature in modern plant trading, even though the required species is frequently defined in pharmacopeias, monographs, or other scientific literature. For example, large tracts of the world market of licorice (*Glycyrrhiza glabra* L., Fabaceae) root do not consist of batches of the species as defined in European Pharmacopoeia (Ph. Eur.) and United States Pharmacopeia (USP). Instead they come from *G. uralensis*, which is permitted by the Japanese pharmacopeia. The mixture of species of various origins, partly from uncontrolled and destructive wild harvesting, is frequently sold as *G. glabra*.

> The tremendous growth of the herbal sector has revealed the need for improved quality control in cultivation and collection of herbal raw material.

Another example is devil's claw (*Harpagophytum procumbens* [Burch.] DC. ex Meisn., Pedaliaceae) secondary tuber from Namibia, where replacements of the root with material collected from *H. zeyheri* from Angola is increasingly observed.

In addition to the replacement of entire species, the question of chemotypes and cultivars must also be addressed. For instance, common thyme (*Thymus vulgaris* L., Lamiaceae) herb can be obtained that is rich in the phytochemicals thymol, geraniol, linalool, α-terpineol, trans-thujanol, and 1,8-cineol or carvacrol. Current trading practices often do not allow for a distinction between the thyme raw materials of various different origins, which very likely will have varying chemical profiles, and therefore, produce variations in the reproducibility of effects in pharmacological and clinical studies.

Finally, commercial orders for raw material of a given plant are often conducted using the local plant name or the English common names. These names are frequently not unique and in some cases are confusing or misleading. For example, the Siberian/Chinese adaptogenic plant eleuthero (*Eleutherococcus senticosus* [Rupr. & Maxim.] Maxim., Araliaceae) is frequently collected using the Chinese plant name, referring to physical attributes of the plant (five-fingered leaves, fleshy root), *ci wu jia*. This description not only may refer to completely unrelated plants, as was observed in a case report of a misplacement or substitution of eleuthero with the potentially toxic roots of Chinese silk vine (*Periploca sepium* Bunge, Asclepiadaceae),[3] but it also obscures the fact that the genus *Eleutherococcus* (also referred to by its formerly accepted genus name *Acanthopanax*) contains dozens of botanical species, e.g., *A. koreanus*. While in the case of *Eleutherococcus* this does not appear to have a significant impact on the safety of the herb, there is nonetheless a question of reproducibility and reliability of clinical effects.

The WHO guidelines address this problem by stating the need for a proper botanical identification not only of the plant material, but also of the seeds used for cultivation. In GACP conform cultivation, the Latin binominal name and the definition of the subspecies/cultivar/chemotype (where applicable) must be laid down in the farmer's documentation. The same documentation applies to plants issued from wild-harvesting, where the botanical identification should be even stricter than for plants grown under the controlled conditions associated with commercial cultivation, which would take the local phytochemical variability into account.

Selection of a suitable cultivation site and appropriate cultivation methods

As trivial as it may sound, the ecological and climatic conditions found on the cultivation site must meet the needs of the cultivated plant. Factors such as local rainfall,

irrigation, water and soil quality, and local climate have an important impact on plant quality. Too often, a decision to cultivate medicinal plants on a given site is made, not based on the specific requirements of the plant, but on the availability of the agricultural surface. In recent years, cultivations of St. John's wort (*Hypericum perforatum* L., Clusiaceae) in Poland were affected with phytosanitary problems (red ring-root), because the genus *Hypericum* naturally thrives in dryer climates. Similarly, the inappropriate plantation of kava (*Piper methysticum* G. Forst., Piperaceae) on former sugar cane fields on Fiji might have contributed to the spreading of the "kava dieback disease." Kava dieback disease is most likely caused by mosaic virus,[4] for which sugar cane is a host. The infection destroyed large parts of some local kava cultivars. Consequently, a poor choice of cultivation site may affect not only the local harvest, but, in extreme cases, can also have a global impact on biodiversity.

The WHO guideline provides recommendations for the choice of an appropriate cultivation site. It also points to the exclusion of sites with possible industrial contaminations with heavy metals, pesticides or herbicides, and radioactive contaminations. In practice this means that soil samples must be collected and analyzed. Wherever possible, suggests WHO, organic growing techniques should be employed, thus avoiding the use of herbicides or pesticides. In addition, the impact that growing herbs has on local biodiversity must be taken into consideration.

Harvesting and processing conditions

Harvesting time and methods are in close relation to phytochemical parameters. For example, St. John's wort (SJW) was traditionally collected in the flowering season with fully developed flowers—a season when the content of hyperforin is relatively low. SJW harvested towards the end of the flowering season, with fruit formation more or less pronounced, leads to batches with considerably higher hyperforin content. Because this compound is now suspected to be a major contributing factor in the much publicized herb-drug interactions documented with the use of SJW,[5-8] techniques that limit the hyperforin content in the SJW raw materials and preparations are currently being discussed. The simplest and most logical approach to achieve this goal is to choose an appropriate harvesting time.

Another practical example is artichoke (*Cynara scolymus* L., Asteraceae) where the leaves are collected in the preparation of choleretic (bile stimulating) and cholesterol-lowering herbal preparations. The harvesting time greatly affects the phytochemical composition and quality of artichoke leaves. The harvest of leaves as a by-product of vegetable production (i.e., the pre-flowering heads) leads to herbal products of lesser quality (albeit cheaper) than the production of dedicated artichoke cultivations for medicinal purposes only.

Conditions associated with processing raw materials, especially drying, frequently have a major impact on drug quality. Inadequate drying and storage leads to microbiological contaminations and changes in the phytochemical composition. Again, artichoke leaves are a practical example: the higher the drying temperature, the lower

the content of caffeoyl quinic acids in the dried leaves; these acids (e.g., cynarine and derivatives) are associated with the leaves' therapeutic effects.

A major part of the WHO guidelines cover the various aspects of harvesting, storage, and shipping. This section of the guidelines is essentially identical for cultivation and collection (wild harvesting or wildcrafting) of medicinal plants. In regard to harvesting times and post-harvesting processing, the guidelines refer to the specifications laid down in pharmacopeias, and/or experience published in the scientific literature. Cross-contamination during storage must be avoided, and organically grown material must be stored separately from conventionally grown herbs (i.e., herbs not grown organically and not certified as organic by an appropriate third party organization, regardless of whether the conventionally grown herbs have been sprayed with pesticides or not, or grown in artificially fertilized soil or not). The documentation of the harvest must contain essential indications that allow the identification and assessment of the key steps. With the measures outlined in the GACP guidelines, the best possible harvest-to-harvest reproducibility and a full traceability of the herbal raw material should be guaranteed.

Sustainability

Many medicinal plants are as yet unavailable from controlled cultivation. TRAFFIC (a division of the World Wildlife Fund) estimates that almost 75 percent of all botanical species in trade continue to be sourced from the wild.[9] One of the major goals of the WHO GACP guidelines is to outline efficient, non-destructive, environmentally sound, and sustainable procedures not only for cultivation, but also for controlled collection. In the case of wildcrafting, the guidelines aim for the avoidance of negative impacts on plant population density and the maintenance of biodiversity. A major obstacle for sustainable collection projects is the over-harvesting of medicinal plants in uncontrolled wildcrafting, as can be observed with many plants such as devil's claw in Southern Africa. However, methods for sustainable cultivation of devil's claw were developed by Mathias Schmidt and Georges Betti (coauthors of this article), with the results being incorporated into large-scale cultivation projects conducted by firms such as the global botanical giant Martin Bauer.

TRAFFIC estimates that almost 75 percent of all botanical species in trade continue to be sourced from the wild.

Intellectual property rights

Almost hidden within the GACP guidelines is the issue of intellectual property rights for plants endemic to a certain region. The brevity of the statement that "All intellectual property rights with regard to source materials must be respected" may seem to understate the importance of this topic for which the practical implications are still under discussion. The guidelines call for a scientific botanical survey to outline the distribution and assess the abundance of the species to be cultivated.

A practical solution for the question of intellectual property rights would be to organize GACP projects in the regions where the plant naturally occurs. With this access, several problems are solved simultaneously:

- The plant grows in its natural habitat under conditions in which it is well adapted.
- There is no problem with intellectual property rights because the region the plant originates from immediately profits from the activities.
- GACP projects have a stabilizing impact on a regional economy, which is an important factor for the long-term sustainability of the cultivation.

Projects that ensure sustainability and quality in wildcrafting are not necessarily difficult to organize if addressed in a systematic manner. The authors are currently organizing projects that conform to GACP with a number of medicinal plants, and with some success thus far.

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Sudan War Impacts Availability of Gum Arabic, A Key Ingredient for Many Commercial Products

by Katherine Purcell

The civil war and protracted violence in the Darfur region of Sudan, Africa, have adversely impacted the collection and exportation of a lucrative natural product, gum arabic, a tree resin used as an emulsifying agent in many commercial products. Both the subsistence farmers who collect the raw material and the trees that produce the valuable resin are fighting for their survival.[1]

Gum Arabic Business

Materials sold as gum arabic are derived from the resin of several species of acacia trees: the true, preferred gum arabic is derived from *Acacia senegal* (L.) Willd., Fabaceae. Other gums of commerce are derived from *A. nilotica* (L.) Willd. ex Delile, Fabaceae (often called gum arabic, but is actually Indian gum arabic) and *A. seyal* Delile, Fabaceae (also called gum arabic, but is actually talha). Gum arabic is also known commercially by the eponymous acacia, *acacia gum,* or Senegal gum due to its generic name.[2]

Gum arabic is one of Sudan's chief export commodities and agriculture products.[3] The Sudanese gum arabic is considered one of the world's largest and most prized crops because of its quality and consistency.[4] The Darfur region where most of the civil strife is occurring produces over two-thirds of the world's supply of gum arabic.[1]

Due to the protracted violence and disruption of supply in the area, "Prices have tripled and quadrupled lately in response to events in the unfortunate Darfur region of the Sudan," according to Peter Landes, President of KHL Flavors, Inc., of Maspeth, NY (Peter Landes [plandes1@aol.com], e-mail, November 24, 2004).

Illustration of *Acacia senegal* (gum arabic) from Köhler's Medizinal-Pflanzen in naturgetreuen Abbildungen mit kurz erläuterndem Texte : Atlas zur Pharmacopoea germanica, by Köhler, F. E. (Franz Eugen) Volume 2 of 3 © 1995-2004 Missouri Botanical Garden (http://ridgwaydb.mobot.org/mobot/rarebooks/)

Sudan

Sudan is a vast and diverse country located in northern Africa between Egypt and Eritrea, next to the Red Sea. Geographically, it is roughly the size of France or a quarter of the United States.

Sudan has had a tumultuous history since it gained independence from Egypt and the United Kingdom in 1956. (It was formerly known as the Anglo-Egyptian Sudan and was administered by both countries.) Since then, Sudan has had a history of military regime changes and Islamic-influenced governments. The country has been engaged in a civil war since 1985, which has had a serious impact on the region.[3]

The current situation in the Darfur region is dire. The African farmers who harvest the gum arabic have either been displaced, murdered, or are unable to continue their work because of the recent violence. Similarly, the gum arabic trees have had to fight for survival with droughts and plagues of locusts. Thus, the people and their business suffer. The violence, however, compounds some of these hazards because the Sudanese refugees, who are more worried about their own survival than the gum business, have begun cutting down the valuable trees for firewood.[1]

In short, the most recent violence in the Sudan civil war has adversely impacted the people, their ability to collect and export gum arabic, and the business interests of several companies that depend upon the gum arabic to help produce their products.

Normally, the government and people of Sudan benefit significantly from the gum arabic business. Agriculture is crucial to the Sudanese economy; it provides jobs for 80 percent of the county's eligible work force. In 1996, the U.S. Central Intelligence Agency estimated that there were 11 million people in the total work force, with agriculture providing jobs for 8.8 million people.[3]

Gum arabic

Gum arabic is one of the most common of all gums. A gum is defined as "an adhesive substance of vegetable origin, mostly obtained as exudate from the bark of trees or shrubs belonging to the pea family"[5] (Fabaceae, formerly Leguminosae). However, gums are also derived from trees in other families, e.g., myrrh gum from various species of *Commiphora,* which is in the Burseraceae family.

Gum arabic is a colorless, tasteless, cold water-soluble, polysaccharide. It is a multi-functional hydrocolloid (a substance that forms a gel with water) with a "highly branched arabino-galactan-protein complex."[6]

Acacia senegal trees, which flourish in the semi-arid areas of sub-Saharan Africa between 10 and 15 degrees north latitude, produce what may be the best quality gum arabic.[1] This region, known as the gum belt, includes the African countries Chad, Eritrea, Kenya, Mali, Mauritania, Niger, Nigeria, Senegal, and Sudan.[3] The gum arabic trees are small trees or spiny shrubs,[7] and they produce gum arabic only if they are in an unhealthy condition. The plant's ability to produce the gum is improved by inclement conditions such as hot weather, lack of water, poor soil, etc. As a result, damaged trees can produce more gum.[8]

There are two stages to the collection of gum arabic. First, harvesters cut and strip pieces of bark from the trunks and branches of unhealthy trees. The trees weep the resin from the scars in the branches and trunk, forming "tears" of hardened amber-colored gum drops when the resin is exposed to the atmosphere. Next, harvesters return to collect the gum arabic drops or "tears" once they've dried.[8,9] The tears are small (.75 to 3 inches in diameter), irregular-shaped, white- and/or yellow-tinged.[7]

A young gum arabic tree can produce 400 to 7,000 grams of gum arabic annually. The gum arabic season lasts from October through June, during which time the gum drops may be collected every 10 days. The gum cannot be harvested during the rainy season, when the trees are in full bloom.[8]

Gum arabic has a long history and has been used for a variety of purposes. The Egyptians used gum arabic in cosmetics, in inks for hieroglyphics,[8] and to help with the mummification process. They also exported gum arabic, calling it *kami,* and they sold, traded, and used the product as a pigment binder and adhesive in painting. Gum arabic's early trade routes inspired its early names, including the current moniker "arabic," which it earned from the Arabian ports. In the Middle Ages, the gum was called "Turkey Gum" because it was shipped through the Turkish Empire, and later it became "Indian Gum" or "East Indian Gum" from its shipments through Bombay, India.[8] In some forms of folk medicine the gum "tears" are also considered highly nutritious and may be valuable for nourishing sick patients.[7]

> Prices have tripled and quadrupled lately in response to events in the unfortunate Darfur region of the Sudan.

In modern times, gum arabic is used in a variety of products and industries, including the pharmaceutical, chemical, and the food and beverage industries, as well as in fine arts, restoration, hobbies, and leather processing.[8]

Gum arabic functions as an emulsifier in certain products. Emulsifiers and stabilizers are products that help improve the consistency of food products. Emulsifiers prevent separation of ingredients and extend storage life.[10] Emulsifiers are useful because they encourage the suspension of one liquid in another, like the mixture of oil and water in products like margarine, shortening, ice cream, and salad dressing.[10] Stabilizers help maintain the emulsified state in prepared products.

Each manufacturer creates a variety of gum arabic products for use in different consumer goods. For example, Tragacanth Importing Company or TIC Gums, of Belcamp, Maryland, manufactures different kinds of gum arabic for use in food and flavor emulsions, in meal replacement products, to coat cereal, snack foods, and confections, and for use in making baked goods like cakes and muffins, as well as in icings and frostings.[6] Gums are used in pill manufacturing for coating and binding, as an emulsifier in processed foods, as a thickener in sauces, in creating various cosmetics, in the lithographic printing processes,[5] in marbling colors, and to make adhesives and ink.[11]

Sudan Civil War

Gum arabic is not the only victim of recent violence in Sudan. Civil unrest and uncertainty plague the Darfur region of Sudan. In 2003, the Sudanese Liberation Army (SLA) and the Justice and Equality Movement (JEM),[12] two African rebel groups, revolted against the Sudanese government.[13] In response, the government hired the Janjaweed, a group of Arab militias, to help restore order and crush the rebellion of black farmers. The Janjaweed have been accused of killing and raping thousands of villagers after various rebel groups started fighting the Sudanese government last year.[12] Reports from the United Nations estimate that at least 1.5 million have been affected by the insecurity and violence in all three states of Darfur. Specifically, there are estimates that at least 1.45 million residents have been displaced from their homes in the Sudan, and at least 200,000 of these refugees have fled to Chad.[14]

According to Naka Nathanial, *New York Times* online producer (oral communication, November 2004), the UN has called the Darfur situation "the greatest humanitarian disaster. The U.S. has been the largest provider of humanitarian aid, and there has been almost no participation from France and Germany. It wouldn't take much effort. The people are suffering." Nathanial accompanied Pulitzer-Prize winning journalist, Nicholas Kristof who reported on the situation in Darfur. Nathanial produced Kristof's multimedia package on Darfur called *A Promise Unkept.*[15]

Emmanuel Akwei Addo, the Independent Expert on the human rights situation in Sudan, told the UN General Assembly, "there were strong indications of such crimes, including murders, rapes, acts of torture and forcible displacement of citizens."[16] Some organizations are calling it genocide and others are calling it ethnic cleansing. It is the latest chapter in Africa's longest war, in Africa's largest country.

Current Status and Possible Terrorism Connection

Problems with gum arabic exportation and business interests began in November 1997 when the United States passed economic sanctions against Sudan because of suspected links between its government and terrorism. A market research report from P. L. Thomas & Co., Inc., an American importer of gum arabic, describes how

this influences the gum arabic business: "Industry leaders have worked tirelessly and successfully to convince the U.S. State Department and Treasury Department that the embargo unfairly punishes a significant number of U.S. companies who process and use gum arabic without having any effect on total Sudan gum arabic exports."[4]

Due to pressure from interested businesses, the United States House of Representatives passed legislation exempting gum arabic from the embargo.[1,4,17] Some companies like Coca-Cola and Pfizer, Inc., reportedly rely heavily on supplies from the Darfur region for the gum arabic used in their products.[1]

On November 9, 2004, United Nations Secretary-General Kofi Annan oversaw the signing of protocols in Abuja, Nigeria. The government of Sudan, the Sudan Liberation Movement/Army, and the Justice and Equality Movement signed the protocols in an effort to improve the humanitarian and security situation in Darfur.[18]

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Clinical Update

by Donald J. Brown, N.D.

Pomegranate Juice Improves Carotid Artery Health and Lowers Blood Pressure in Patients with Carotid Artery Stenosis

Reviewed: Aviram M, Rosenblat M, Gaitini D, et al. Pomegranate juice consumption for 3 years by patients with carotid artery stenosis reduces common carotid intima-media thickness, blood pressure and LDL oxidation. *Clin Nutr.* 2004;23:423–433.

Summary: In an open label, parallel group clinical trial, 19 patients (5 women and 14 men, aged 65-75 years) with severe carotid artery stenosis (CAS) were selected to receive 50 ml concentrated pomegranate juice (PJ) containing 1.5 mmoles of polyphenols per day, the equivalent of 8.3 oz (250 ml) of 100% juice (treatment group; n = 10) or no PJ (control group; n = 9). The CAS was measured at 70-90% occlusion of the internal carotid arteries as confirmed by Doppler ultrasound. The PJ was prepared from the crushed fruit of hand-picked pomegranates and was filtered, pasteurized, concentrated, and stored at –18°C. The concentrated PJ was diluted with water to obtain a single strength juice.

The antioxidant composition of the juice was measured as follows: 1978 mg/l tannins (1561 mg/l punicalagins and 417 mg/l hydrolysable tannins), 384 mg/l anthocyanins (delphinidin 3,5-diglucoside, cyanidin 3,5-diglucoside, delphinidin-3-glucoside, cyanidin 3-glucoside, pelargonidine 3-glucoside), and 121 mg/l ellagic acid derivatives. The juice also contained 3 mg vitamin C per 100 ml juice. The study period lasted for 1 year, and 5 patients consuming PJ continued for another 2 years.

The primary outcome was the change in intima-media thickness (IMT) over time measured at the distal common carotid artery by Doppler ultrasound. IMT refers to the intima plus media layers of the carotid artery. IMT measures the distance between the lumen intima boundary (the space in which blood flows) and the media adventitia boundary (the outermost region of the artery). Additional outcomes included a range of cardiovascular parameters:

- peak systolic velocity (PSV);
- end diastolic velocity (EDV);
- total cholesterol;
- high density lipoprotein (HDL) cholesterol;
- triglycerides;
- apolipoproteins A-1 and B-100;
- serum paraoxonase 1 (PON 1) arylesterase activity, an HDL-associated enzyme that can reduce lipid peroxides, thereby decreasing oxidative stress;
- total antioxidant status;
- serum anti Oxidized low density lipoprotein (Ox-LDL) antibodies;
- LDL oxidation;
- total antioxidant status (TAS); and
- chemical analyses of atherosclerotic plaques obtained by endartherectomy for cholesterol, lipid peroxides, and reduced glutathione (GSH) concentrations.

Compared to pretreatment values, mean IMT decreased significantly in the treatment group after 3, 6, 9, and 12 months (–13%, –22%, –26%, and –35%, respectively; $p < 0.01$). After 12 months of treatment the mean IMT had decreased from 1.5 ± 0.2 mm at baseline to 1.1 ± 0.1 mm ($p < 0.01$) and remained at that approximate mean thickness for the duration of the study. In contrast, from baseline to 12 months, the mean IMT in the placebo group significantly increased from 1.52 ± 0.03 to 1.65 ± 0.04 mm, ($p < 0.01$). Significant decreases after 1 year of treatment were noted for mean PSV (cm/s), which decreased from 135 ± 6 to 103 ± 10 ($p < 0.01$), and for mean EDV, which decreased from 38 ±1 to 30 ± 12 ($p < 0.01$), with no additional significant reductions for the remainder of the trial.

Systolic, but not diastolic, blood pressure (mmHg) was significantly reduced after 1 month of treatment from 174 ± 8 to 162 ± 9 ($p < 0.05$); compared to baseline, blood pressure was significantly reduced even further after 12 months to 153 ± 7 ($p < 0.01$). Blood pressure was not significantly changed in the placebo group at any time period compared to baseline. Compared to baseline, anti-Ox-LDL antibodies (EU/ml) significantly decreased by 24% after 1 month of treatment and by 19% after 3 months ($p < 0.01$). Mean TAS (nmol/L) increased after 12 months of PJ consumption. However, one month after stopping PJ, mean TAS was found to decrease. Mean serum lipid oxidation (nmol lipid peroxides/ml) significantly decreased in the PJ group after 12 months of treatment ($p < 0.01$) and was found to further decrease after 28 months and 36 months compared to baseline ($p < 0.01$). PON 1 (U/ml) significantly increased in the treatment group after 1 year ($p < 0.01$) and continued to significantly increase at 3 years in those patients taking PJ for an additional 2 years ($p < 0.01$); however, one month after stopping PJ, PON 1 activity was found to decrease. LDL cholesterol isolated from patients showed that LDL-associated lipid peroxides were reduced by 90% after 6 months, and the susceptibility of LDL to copper ion induced oxidation was gradually and significantly decreased over the course of 1 year.

Carotid endarterectomy (surgery that removes harmful plaque from major arteries that carry blood to the head) was performed in two patients, one after 3 months and one after 12 months of consuming PJ, due to clinical deterioration during the trial. Compared to 7 controls, their carotid lesions had significantly lower mean concentrations of cholesterol (58% and 20% lower, respectively; $p < 0.01$), lipid peroxides (61% and 44%, respectively; $p < 0.01$), and lesion-induced LDL oxidation (43% and 32%, respectively; $p < 0.01$), and significantly higher reduced glutathione (2.5 times higher in both samples; $p < 0.01$). No adverse events were reported.

Comments/Opinions: The results of this very small study suggest that regular consumption of PJ is beneficial to persons with CAS. In addition to anti-atherosclerotic properties (as seen with the reduced common carotid IMT), the juice also appears to have significant antioxidant activity as noted by the decrease in LDL-oxidation and the significant increase in PON 1 activity. The increase in PON 1 activity was not only seen in the 10 patients consuming PJ at 1 year but was also found to continually increase over an additional 2 years in 5 patients. PON 1 is an interesting measure of lipid oxidation activity and has been found to decrease in persons with hypercholesterolemia, diabetes, and

cardiovascular disease.[1,2] PON 1 is inactivated by oxidized lipids, and PJ appears to act like red wine flavonoids and licorice-derived glabridin to preserve PON 1 activity during lipid peroxidation.[3] Another remarkable finding in this trial is the significant reduction in systolic blood pressure after 1 year of juice consumption.

Pomegranate (*Punica granatum* L., *Punicaceae)* likely originated in Iran and Afghanistan and is currently grown mainly in Iran, India, and the United States, but also in most Near and Far East Countries.[4] Primarily used as a table fruit, it is also commonly used in the beverage and liquor industries. The pericarp, which is high in tannins, is also used for tanning leather.

Pomegranate *Punica granatum*.
Photo ©2005 stevenfoster.com

Historically, the fruit is mentioned by various cultures and religions. The pomegranate tree is said to have flourished in the Garden of Eden (apparently sans a particular snake) and is very likely the "apple" of the Adam and Eve story in Genesis. Greek and Persian mythology mention the fruit as representing life, regeneration, and marriage.[5] The ancient Chinese believed the seeds symbolized longevity and immortality. In Judaism, pomegranate seeds are said to number 613—one for each of the Torah's 613 commandments. The fruit is also a symbol of resurrection and life in Christianity, and it is one of the three "blessed fruits" in Buddhism.

Most of the chemical analysis of pomegranate has focused on the juice, peel/pericarp, and seed oil. The juice/fruit contains high amounts of hydrolyzable tannins, in particular ellagitannins (gallic acid and ellagic acid), anthocyanins (cyanidin, delphinidin, pelargonidin), as well as the phenolic acids: ellagic acid, caffeic acid, and chlorogenic acid.[6,7] The pericarp is also high in hydrolyzable tannins.[8] (Note: The pericarp is the skin surrounding the seed, really the "aril." The seed is only the hard, white internal seed; the red juicy edible sacs, including the seed, are called arils.) Pressing the whole fruit results in juice that is much higher in the pericarp polyphenols. Luteolin, quercetin, kaempferol, and narigenin are also found in the peels. The seed oil consists of about 63.5% punicic acid—a rare *trans* 18-carbon fatty acid (structurally related to conjugated linolenic acid).[4] According to one source, the seed also contains the highest concentration of estrone in the plant kingdom—approximately 17 mg/kg of dried seed.[9] Interest has been growing in the past few years about the potential of pomegranate oil as a potent phytoestrogen and its potential cancer preventive properties, especially with regard to breast cancer.[10]

For the past several years, Israeli researchers, lead by Dr. Michael Aviram (Lipid Research Laboratory, Rappaport Family Institute for Research in the Medical Sciences, Rambam Medical Center, Haifa, Israel) have been focusing on the antioxidant properties of PJ as well as the potential cardiovascular benefits. In one study, pomegranate juice was found to reduce atherosclerotic lesion size in apolipoprotein E-deficient mice.[11] An ex vivo study with healthy male volunteers found that consumption of 50 ml of concentrated pomegranate juice per day (equal to 8 oz./day of 100% juice) reduced LDL susceptibility to oxidation and increased activity of serum paraoxonase (PON1).[12] Finally, a clinical trial found that consumption of 50 ml of concentrated pomegranate juice per day (equal to 8 oz./d of 100% juice) for 2 weeks resulted in a 36% decrease in serum angiotensin converting enzyme (ACE) activity and a 5% reduction in systolic blood pressure in 10 patients (age 62-77 years) with hypertension.[13] The reviewed study with PJ is a continuation of their work and hopefully the beginning of new, exciting findings into the cardiovascular health benefits of pomegranate.

Practice Implications: Although the patient population is small in this new clinical trial, the results are impressive when considering the length of the study. Focusing on patients with CAS, the study supports previous findings that PJ possesses anti-atherosclerotic properties and also decreases systolic blood pressure. Hopefully, this study will result in larger trials focusing on the long-term cardiovascular benefits of PJ and will do a more thorough comparison statistically with a placebo group. The availability of encapsulated extracts of pomegranate also offers health care professionals alternatives to the juice for diabetic patients and those wishing to use a more concentrated form of pomegranate for prevention of cardiovascular disease. Hopefully, companies will develop standardized extracts that reflect the tannin and total polyphenol content critical to the cardiovascular benefits of PJ.

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Calendula Ointment Reduces Radiation-Induced Dermatitis in Breast Cancer Patients

Reviewed: Pommier P, Gomez F, Sunyach MP, et al. Phase III randomized trial of *Calendula officinalis* compared with trolamine for prevention of acute dermatitis during irradiation for breast cancer. *J Clin Oncol.* 2004;22:1447–1453.

Summary: In a randomized, single-blind clinical trial, 254 women (ages 18-75 years; mean 55.8 years) with breast cancer receiving postoperative radiation therapy were randomized to receive either topical calendula (*Calendula officinalis* L., Asteraceae); ointment in 100 gram tubes or trolamine (Beirsdrof, Inc., Wilton, CT). (The calendula extract ointment is sold as Pommade au Calendula par Digestion, made by Boiron Ltd, Levallois-Perret, France.*) Women applied the study medication at least twice a day, but could apply more if their dermatitis and pain warranted additional applications. Participants applied topical treatment at the onset of radiation therapy and until its completion. For inclusion in the trial, women were required to have nonmetastatic adenocarcinoma treated with either lumpectomy or mastectomy with and without adjuvant postoperative chemotherapy or hormonal therapy, and referred to the Department of Radiotherapy (Centre Léon Bérard, Lyon, France) for postoperative radiation therapy. The clinical trial lasted 8 months.

The primary outcome measure was the efficacy of calendula and trolamine for the prevention of grade 2 or higher dermatitis caused by radiotherapy for breast cancer. Skin toxicity grading has previously been defined by the Radiation Therapy Oncology Group (RTOG). Grade 0 corresponds to no physical signs of skin toxicity. Grade 1 skin toxicity displays follicular, faint, or dull erythema (redness of the skin caused by dilation and congestion of the capillaries); epilation (the act or result of removing hair), dry desquamation (the shedding or peeling of the epidermis in scales), or decrease in sweating. Grade 2 skin toxicity is tender with bright erythema; patchy, moist desquamation or moderate erythema. Grade 3 skin toxicity is defined as having confluent, moist desquamation, other than skin folds, and pitting edema. Grade 4 skin toxicity exhibits ulceration, hemorrhage, and necrosis. Secondary measures included weekly assessments of pain using a visual analog scale (VAS), interruptions to treatment due to skin reactions from the ointments, patient satisfaction, and the quality of the study medication.

Grade 2 or 3 skin toxicity was experienced in 41% of the women in the calendula treatment group compared to 63% of women in the trolamine group ($p < 0.001$). Women in the calendula group also experienced significantly less grade 3 toxicity (7% using calendula vs. 20% using trolamine; $p = 0.034$). Less grade 2 or 3 skin toxicity was observed in women using calendula compared to women using trolamine in the submammary fold (34% vs. 50%, respectively; $p = 0.02$), armpit and tangential area (28% vs. 48%, respectively; $p = 0.004$), and the supraclavicular nodes (28% vs. 63%, respectively; $p < 0.001$). None of the women in either group experienced grade 4 toxicity. The VAS for pain was significantly less in the calendula group compared to the trolamine group (1.54 vs. 2.10, respectively; $p = 0.03$).

Volunteers using the calendula ointment did not experience any allergic reactions, while 4 patients using trolamine experienced itching and hives. Twelve treatment interruptions (9%), for a mean duration of 10 days each, occurred in the trolamine group due to skin toxicity. No interruptions for skin toxicity occurred in the calendula group. Thirty percent of volunteers rated application of the calendula ointment as "difficult" compared to 5% of volunteers using trolamine. (There was no explanation in the paper regarding the meaning of the term "difficult" so it is not possible to determine the significance of this finding.) Two patients discontinued using the calendula ointment due to this difficulty. Eighty-four percent of physicians rated adherence to application of the medications as "good" for calendula compared to 92% for adherence to trolamine ($p = 0.047$). Women in the calendula group used 1.62 times less ointment during the study period compared to women using trolamine (2.7 tubes vs. 4.4 tubes, respectively).

Comments/Opinions: This large clinical trial suggests that calendula ointment is a safe and cost effective treatment for prevention of mild to severe radiation-induced dermatitis in women being treated with radiation therapy for breast cancer. Although the trial lacks a placebo group (based on ethical concerns), the comparison to the control substance, trolamine, points to calendula as an interesting alternative for women not wishing to use steroid-based creams or other more aggressive treatment such as sucralfate or hyaluronic acid.

The reference drug, trolamine (a soap substitute used for burn patients), is widely recommended in France for radiation-induced dermatitis due to a small risk of side effects. The researchers note that it has been used for several years in their clinic. This trial suggests that not only is calendula superior for preventing acute dermatitis but it is also less likely to lead to side effects such as itching or hives. However, it is important to note that some studies have found that trolamine was no more effective in preventing

* The calendula product used in the study is obtained by incubation of calendula flowers (marigold) at 75°C in petroleum jelly to extract the liposoluble components.

radiation-induced dermatitis than supportive care or no treatment at all, although one study did suggest that trolamine might have curative properties.[1,2] Other nonsteroidal topical agents (e.g., aloe vera, soy oil) have also failed to prevent dermatitis in smaller clinical trials.[3,4] In a randomized, open-label, parallel group study with 156 patients with second and third degree burns, the effectiveness of topical calendula ointment was compared with Elase (a "proteolytic" ointment; Pfizer, New York, NY) and petroleum jelly.[5] The calendula ointment was found to be better tolerated but only marginally better than petroleum jelly alone for healing. Randomized trials with more aggressive treatments such as corticosteroid creams and sucralfate have accrued few patients and the radiation sites were more numerous and not as uniform as those in the reviewed study with calendula.[6,7] The results using calendula certainly point to a follow-up trial using corticosteroid cream or ointment as a comparison to calendula ointment.

In addition to its potential use for radiation-induced dermatitis, healthcare practitioners should also be aware that topical calendula has been reported to reduce pain associated with post-mastectomy lymphedema.[8] However, one study was unable to support this claim.[9]

Traditionally, calendula (pot marigold) has been used both externally for treating superficial wounds and burns, and internally for stomach ulcers and liver complaints.[10] The German Commission E approves the topical use of flower preparations for the treatment of poorly healing wounds.[11] While the wound-healing and anti-inflammatory actions have been demonstrated, the active principles that promote wound healing have yet to be clearly identified.[12] The renowned German phytotherapy expert, Rudolf Fritz Weiss, MD, warned that the potent stimulation of granulation tissue by calendula may result in a later risk of keloid formation when using it for more severe wounds.[13] Warnings for the topical use of the herb also extend to allergic reactions, particularly in those individuals with known hypersensitivity to plants of the family Asteraceae.[14]

The research was completed at the Department of Radiation Oncology at the Centre Léon Bérard in Lyon, France, and funded by a research grant from Boiron, Ltd., France.

Practice Implications: This trial suggests that calendula ointment is an effective option in the prevention of acute dermatitis in women receiving radiation therapy for breast cancer. While topical treatments such as corticosteroid cream are often used for the treatment of acute radiation-induced dermatitis, there are no standard treatments for prevention of the condition—one that affects approximately 80% of women receiving radiation therapy. Hopefully, manufacturers of calendula ointments will take a close look at the issue of application difficulties and work on topical forms that are easier to apply.

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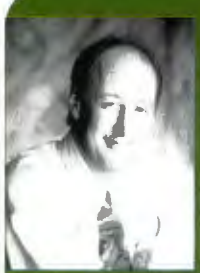

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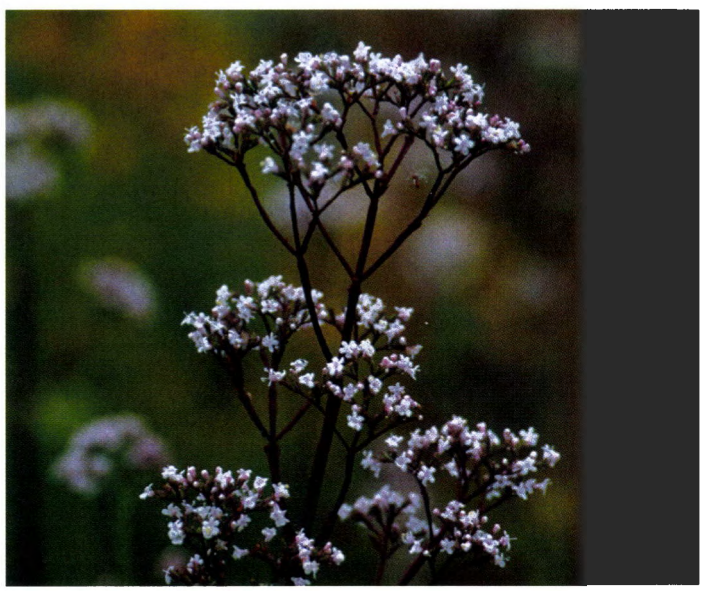
Low Doses of Valerian Do Not Reduce Chronic Insomnia Symptoms in Short Clinical Trial

Reviewed: Coxeter PD, Schluter PJ, Eastwood HL, Nikles CJ, Glasziou PP. Valerian does not appear to reduce symptoms for patients with chronic insomnia in general practice using a series of randomized n-of-1 trials. *Complement Ther Med.* 2003;11:215-222.

Estimates suggest that one-third of adults in the industrialized world experience sleep problems, and insomnia is the most common sleep-related problem. Prescription drugs, primarily benzodiazepines (e.g., diazepam, aka Valium® from Roche Pharmaceuticals), are frequently used to treat insomnia. Their adverse side effects lead many people with sleep problems to seek out other treatments. Valerian (*Valeriana officinalis* L., Valerianaceae) root and rhizome have a long history of use as a traditional sleep aid. A recent review on 29 clinical trials conducted with various valerian preparations on over 5,200 subjects concluded that valerian has a positive effect on anxiety, sleep disorders, and mood.[1] Thus, under the right conditions there is evidence that some valerian preparations are safe and effective alternatives to prescription drugs. The purpose of this study was to investigate the effectiveness of valerian in people seeking treatment for insomnia.



Valerian *Valeriana officinalis*. Photo © 2005 stevenfoster.com

Randomized controlled trials are viewed as the gold standard for evaluating the safety and effectiveness of a treatment. Single patient trials, also known as "n-of-1" trials, are sometimes used to evaluate safety and effectiveness in the absence of controlled clinical trials. Single patient trials involve a randomized, double-blind, placebo-controlled, crossover design in a general practice setting.

Forty-two Australian adults (mean age, 54 years) were enrolled in the study, and 24 (57%) completed enough of the study to be included in the data analysis. Subjects were not selected randomly from the general population, but were habitually poor sleepers who often were not satisfactorily treated by conventional drugs—a population group that presents more treatment challenges. Each individual took 2 placebo tablets or 2 valerian tablets daily, 30 minutes before bed, for 1 week, and then crossed over to the other tablets for 1 week. Each valerian tablet contained 225 mg of root and rhizome extract standardized to contain 2.94 mg total valerenic acids, 0.46 mg valerenal, and 1.23 mg valtrates (MediHerb, Warwick, Australia). Individuals completed 3 of these treatment cycles for a total of 6 weeks. The subjects filled out a sleep questionnaire before starting the study and completed daily sleep diaries during the study. The sleep diaries measured 6 sleep outcomes: latency to sleep onset, number of night awakenings, total sleep time, quality of sleep, level of perceived refreshment after sleep, and energy level in the previous day. The researchers were advised by Mediherb that valerian works best when taken for 3 to 4 weeks consecutively, rather than 1 week. However, despite the suggestions by the manufacturer of the product used in this trial, the researchers chose to use a 1 week time period because in their view it better suited the n=1 design. A 3-to-5 day wash-out period (no valerian or placebo given) was included to help ensure that there was no carry-over of the effect of the valerian in patients who were going into the placebo phase of the study.

Nearly all of the participants (96%) reported a "fair" response in their energy level during the previous day and a "modest" or "poor" response in total sleep time, number of night awakenings, and morning refreshment while taking the valerian tablets. Half the participants reported a "fair" response to sleep quality and latency to sleep onset while taking the valerian tablets. The number and severity of side effects reported during the valerian and placebo treatment periods was not significantly different.

The authors conclude that valerian was not shown to be appreciably better than placebo in promoting sleep for any individual patient or for all the patients as a group. Possible explanations for the lack of effect could include the relatively low dosage of valerian extract given (450 mg per day), the relatively short treatment period (1 week), and the limitations of the n-of-1 study design. In fact, the relatively low dose and short duration of use, given results of previous controlled clinical studies, almost predict a negative outcome of results in this present study, particularly since the patient group represented subjects who had not responded positively to previous conventional treatments. According to Kerry Bone, herbalist, noted author, and the founder of MediHerb, the dosage of 450 mg of the extract per day was on the low side, although some trials have been successful with 500-600 mg of valerian extract per day. However, Bone writes that, "had we known that they would be using the most difficult cases possible in the trial, we would certainly have recommended a higher dose of that order" (K. Bone, written communication to M. Blumenthal, November 23, 2004). Larger randomized controlled trials that address and correct these limitations are required to fully explore the effects of valerian on insomnia in difficult-to-treat patients.

—Heather S. Oliff, PhD

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Prickly Pear Fruit Pulp Improves Platelet Function in Small Human Trial

Reviewed: Wolfram R, Budinsky A, Efthimiou Y, Stomatopoulos J, Oguogho A, Sinzinger H. Daily prickly pear consumption improves platelet function. *Prostaglandins Leukot Essent Fatty Acids.* 2003;69:61-66.

Recent research suggests that the Pima Indians of Arizona show the highest prevalence of diabetes mellitus in the world. The pads (leaves) of the prickly pear cactus (*Opuntia ficus-indica* Mill., Cactaceae) and the purple fruits are historically used by this population as traditional foods. The pads are a well-known natural treatment for diabetes. Prickly pear (PP) pad is well-known for its antidiabetic and lipid lowering properties. Research indicates that both the PP pad and fruits were widely consumed about 6,000 years ago by Native American populations and have been used in the traditional medicine practices of Native Americans, particularly in Northern Mexico and Arizona areas. PP pad is known to lower LDL-cholesterol, most likely as a consequence of its pectin content.

Disturbances in glucose and lipid metabolism are also linked to impaired platelet function, which is thought to contribute to the initiation and progression of atherosclerosis. However, no research has been available on the influence of PP edible parts on platelet function.

Prickly pear cactus *Opuntia ficus-indica*
Photo © 2005 stevenfoster.com

Despite the folkloric use of the pads for diabetes, there has been a lack of published papers on the *fruits* of PP in controlled human clinical trials. The current study examined the effect of daily consumption of 250 g of PP fruit pulp in 8 healthy volunteers and 8 patients with mild familial heterozygous hypercholesterolemia (FH) (n = 4 male and 4 female in each group) on various parameters of platelet function. All subjects received dietary counseling but no one received conventional medication.

Food records were collected and intake was controlled so that macronutrient, energy, and dietary fiber intake did not change throughout the course of the study. All subjects were nonsmokers and none had any established risk factors for the development of atherosclerosis. All were given extensive dietary counseling. Before starting PP fruit pulp consumption, a basic investigation consisting of lipids and lipoproteins (LDL, HDL) as well as platelet function parameters was performed in the morning after a 12-hour fast.

Four weeks of dietary intervention exhibited no significant effects on lipids and lipoproteins or ADP- and collagen-induced platelet aggregation in either the healthy volunteers or the patients with FH. However, the regular consumption of PP fruit pulp resulted in significant decreases in total- and LDL-cholesterol and significantly reduced platelet aggregability in both groups. HDL, in contrast, revealed no differences. The findings were similar for men and women.

This study showed that the ingestion of PP fruit pulp both by healthy individuals and by patients with mild FH, results in a significant improvement in platelet function, a benefit which may partly explain the clinical successes previously reported for PP consumption. PP fruit seems to possess significant antiplatelet activity, which may be of particular significance in patients with prothrombotic conditions such as diabetes and hyperlipidemia, the conditions for which PP pad has traditionally been used.

Curiously, throughout this paper the authors do not state whether the pads or fruit were used in the study since both plant parts are available commercially and in local markets as foods. In a personal communication by the author of this review with Dr. Sinzinger (e-mail, July 5, 2004), he states that the pulp of the cactus' fruit was used. However, references relative to consumption of both the fruits and vegetative plant parts (pads) are cited in the article, creating confusion as to the relevance of the outcomes of this small trial. Nevertheless, as this study suggests, with the growing public health concern related to obesity and non-insulin-dependent diabetes (NIDDM or type-2 diabetes), the use of traditional foods like prickly pear pads and fruits can offer a safe, nutritional, and low-cost way of helping to control various glucose and blood parameters associated with this mounting problem.

—Denise Webb, PhD

Japanese White Sweet Potato Controls Type 2 Diabetes in Small Trial

Reviewed: Ludvik B, Neuffer B, Pacini G. Efficacy of *Ipomoea batatas* (Caiapo) on diabetes control in type 2 diabetic subjects treated with diet. *Diabetes Care.* 2004;27(2):436-440.

Type 2 diabetes is caused by insulin resistance and impaired insulin secretion from the pancreas. Insulin resistance occurs when the normal amount of insulin secreted by the pancreas is not sufficient to allow the body to utilize blood glucose. Treatments for type 2 diabetes include modifications of diet, increased exercise, medications, and supplemented insulin. A Japanese white sweet potato, called caiapo (*Ipomoea batatas* [L.] Lam., Convolvulaceae), cultivated in the mountains of Kagawa Prefecture in Japan, has been eaten as a traditional food and used as a traditional remedy for treating anemia, hypertension, and diabetes. This white potato is consumed and sold as a dietary supplement in Japan for the prevention and care of type 2 diabetes.

A previous preliminary study with 18 men who had type 2 diabetes found that caiapo (4g/day for 6 weeks) lowered the total and LDL cholesterol levels and lowered blood glucose by increasing insulin sensitivity without affecting insulin secretion.[1] The objective of the present study was to verify the findings of the preliminary study by increasing the number of participants and the study's duration.

Sixty-one patients with type 2 diabetes treated by diet only participated in this randomized, placebo-controlled, double-blind trial. Patients consumed 4g/day of caiapo or placebo once a day for 12 weeks. Blood glucose, cholesterol, triglycerides, and HbA_{1c} (a measure of long-term glucose control) were monitored.

HbA_{1c} significantly decreased after 2 and 3 months of treatment with caiapo compared to placebo ($P < 0.001$). Both groups had significant weight loss. The group receiving caiapo lost almost 5kg after 3 months. Consequently, statistical analysis could not rule out the possibility that weight loss contributed to the improvement in HbA_{1c}. Fasting blood glucose decreased in both groups, but to a greater degree in the caiapo group ($P = 0.03$). After 3 months of treatment, 48.3% of the patients consuming caiapo had mean fasting blood glucose levels below the upper normal limit compared to 7.7% of those in the placebo group. Blood pressure did not change. At the end of treatment, cholesterol levels in the caiapo group where significantly lower than those in the placebo group ($P < 0.05$). There was no significant effect on triglyceride levels. Caiapo was well tolerated. Adverse events were minimal but were mainly gastrointestinal: 16 reported in the caiapo group and 14 reported in the placebo group.

This study confirmed the beneficial effects of caiapo on glucose and serum cholesterol levels in type 2 diabetic patients. The study also showed for the first time an improvement in long-term glucose control. However, the exact contribution of weight loss on the effects observed was not quantified. The authors hypothesize that since glucose levels continued to decline when the weight loss had stabilized, caiapo had an effect on glucose beyond that caused by weight loss. Caiapo may have increased the body's sensitivity to insulin. Although the caiapo-induced improvement in insulin sensitivity would not explain the decrease in cholesterol levels, the weight loss might bear some responsibility. Alternatively, an independent effect of an unidentified compound could be responsible for the cholesterol-lowering effect.

The authors conclude that caiapo aids in the management of type 2 diabetes. Considering that this study confirms the findings of the previous study, has a larger set of subjects, and was well conducted, the authors' conclusions warrant attention. But to evaluate the true value of caiapo in the management of type 2 diabetes, future investigations will need to disentangle whether its antidiabetic effects are primary or secondary to weight loss.

—Heather S. Oliff, PhD

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Special Red Clover Extract Lowers LDL Cholesterol in Men, Not Women in Clinical Trial

Reviewed: Nestel P, Cehun M, Chronopoulos A, DaSilva L, Teede H, McGrath B. A biochanin-enriched isoflavone from red clover lowers LDL cholesterol in men. *Eur J Clin Nutr.* 2004;58:403-408.

Isoflavones are believed to be partially responsible for the cholesterol-lowering effects of soy protein, derived from soy (*Glycine max* [L.] Merr., Fabaceae). Consumption of soy protein has been shown to reduce blood levels of low-density lipoprotein cholesterol (LDL-C). LDL-C contributes to the buildup of plaque in the arteries, and reducing blood levels of LDL-C decreases the risk of heart disease. However, clinical trials using purified isoflavones have shown inconsistent results. The purpose of this study was to evaluate the impact of two isoflavone-rich extracts of red clover (*Trifolium pratense* L., Fabaceae) leaf and stem.

This study was a randomized, double-blind, placebo-controlled, crossover trial among 80 men and women living in Australia. The average age of the participants was 58 years and all the women were postmenopausal. The participants were randomly assigned to one of two isoflavone groups. One group took 40 mg per day of a red clover extract of which the isoflavone fraction contained mainly biochanin (B) (biochanin to formononetin ratio = 3.5:1 with 4% genistein and <1% daidzein). The second group took 40 mg per day of a red clover extract, the primary isoflavone being mainly formononetin (F) (formononetin to biochanin ratio = 4.9:1 with <1% genistein and daidzein). Both extracts were provided by Novogen Ltd, North Ryde, NSW, Australia. In this crossover design, half of the participants in each group took the red clover isoflavone extract for 6 weeks and then switched to the placebo for 6 weeks, and the other half took the placebo for 6 weeks and then switched to the isoflavone for 6 weeks. There was a one-week washout period (no isoflavones or placebo given to help ensure that there was no carryover effect from the isoflavone period to the placebo period). Blood lipids (cholesterol and triacylglycerols), urinary excretion of isoflavones, and dietary intake were evaluated at the end of each 6-week period.

Men in the B group had significantly lower LDL-C levels when taking the B extract compared to placebo ($P < 0.05$). Men in the F group had slightly lower LDL-C levels when taking the F extract compared to placebo, but the difference was not statistically significant. There were no significant changes in LDL-C levels for women taking the B or F extracts. There were no changes in blood levels of high-density lipoprotein cholesterol (HDL-C) or triacylglycerols among men or women in the study. Urinary analysis showed that most of the biochanin was converted to genistein, most of the formononetin was converted to daidzein, and there was large variability among individuals in terms of excretion of isoflavones. These urinary results are consistent with those of previous trials.

Red clover *Trifolium pratense*.
Photo © 2005 stevenfoster.com

In this study, only the biochanin-rich red clover extract lowered LDL-C and that effect was observed only in men. These results support the theory that individual isoflavones affect LDL-C differently. The mechanism of LDL-C lowering by biochanin may involve stimulation of LDL-C receptors and increased clearance of LDL-C from the blood in a manner similar to estrogen. This study is the first to report that red clover extract could lower LDL-C and that there appears to be a gender difference in lipid responses to isoflavone supplementation. These findings require confirmation and duplication in additional clinical trials.

—Heather S. Oliff, PhD

Combination of Feverfew, Magnesium, and Riboflavin for Migraine Prevention

Reviewed: Maizels M, Blumenfeld A, Burchette R. A combination of riboflavin, magnesium and feverfew for migraine prophylaxis: a randomized trial. *Headache.* 2004;44(9):885-890.

An advertisement in a Canadian trade publication proclaims: "Doctors discover new hope for MIGRAINE sufferers!" The product being promoted, MigraHealth™ (Health Assure, Sunrise, Florida), is a combination of "magnesium, vitamin B2 (riboflavin), and a proprietary feverfew extract, formulated by leading headache experts and neurologists." In the ad it is touted as "Triple Therapy" and the ad suggests that deficiencies in magnesium and riboflavin can trigger migraine attacks.[1]

Both magnesium and riboflavin, with excellent safety profiles, have shown promise as migraine prophylactics in controlled trials (see below). Further, an uncontrolled trial found that an intravenous infusion of magnesium sulfate caused prompt and sustained relief in roughly 50% of patients experiencing acute migraine: a significant correlation was noted between response and serum ionized magnesium levels.[2] While the mechanism of action of magnesium in migraine is not clearly understood, the metal ion is known to have strong vasodilating effects which may interrupt a vasoconstrictive phase of the migraine process; magnesium also inhibits platelet aggregation in a dose-dependent manner.[3]

This study reported the results of a randomized, double-blind, placebo-controlled trial (RCT) of a combination formulation, the daily dose of which provided 400 mg riboflavin, 300 mg magnesium, and 100 mg of a proprietary feverfew extract; the "placebo" contained 25 mg riboflavin. This product has the same combination of ingredients as the advertised MigraHealth™ and gives no indication as to the manner of preparation of the feverfew extract. (It is interesting to note that of the three trials of extracts of feverfew leaf, two employed supercritical CO_2 extracts[4,5] and were successful, whereas an extract produced from protracted extraction [19 days] with 90% ethanol was unsuccessful in migraine prophylaxis.[6])

The results of this recent RCT are intriguing since the "placebo" response exceeded that reported for any other placebo in trials of migraine prophylaxis, suggesting that 25 mg riboflavin was an active comparator. Of the 49 patients who completed the 3-month trial, there was no significant difference noted between verum (the feverfew combination) and "placebo" groups. For the primary outcome measure, a 50% or greater reduction in migraines was achieved by 10 (42%) and 11 (44%) subjects, respectively. There was also no significant difference between the 2 groups respecting the secondary outcome measures of 50% or greater reduction in migraine days or change in mean number of migraines, migraine index, or triptan doses, being 33% and 40%, respectively. There is a clear indication from these observations that 400 mg riboflavin daily is no better than 25 mg, and that magnesium and this feverfew extract made no perceptible contribution to the anti-migraine effect of the tested formulation. The single positive RCT so far conducted with riboflavin involved a daily dose of 400 mg.[7] This further suggests that the feverfew extract may not have been properly prepared, since there was no enhancement of prophylactic effect by addition of the extract.

Feverfew *Tanacetum parthenium.* Photo © 2005 stevenfoster.com

Regarding magnesium, oral supplementation has been found effective in 2 of 3 RCTs. In a trial of 24 women with menstrual migraine,[8] subjects received magnesium pyrrolidone carboxylic acid 3 times daily (equivalent to 360 mg magnesium ion daily) or placebo from the 15th day of their cycle until menses. The women taking the magnesium supplement experienced significantly less pain and reduced number of days with headache than the placebo group. In the second positive study, 81 patients, aged 18 to 65 years, received either magnesium (600 mg trimagnesium dicitrate daily) or placebo for 12 weeks.[9] The frequency of migraine attacks was reduced by 42% and 16%, respectively, while the number of days with migraine was significantly reduced only in the treated group. The third trial of 69 subjects showed no benefit from a daily dose of 500 mg magnesium over placebo for 12 weeks.[10]

Based on the trials summarized above, it seems possible that the amount of magnesium in the feverfew combination product (360 mg/day) was not sufficiently large to exert a prophylactic effect. The reason for the failure of the third magnesium trial[10] (500 mg/day) is not apparent.

A fundamental problem in the trial of combination products is that trials of such products are often conducted without the activity of all constituents having been established individually. It appears that the specific feverfew extract employed in this recent trial had not been clinically tested to determine its efficacy. So far there have been three positive trials recorded that use encapsulated dried feverfew leaf of a parthenolide-dominant sesquiterpene lactone chemotype; however, it is quite evident that parthenolide is not a direct appreciable anti-migraine principle,[11] though conspicuously still regarded in some quarters as the main feverfew active in that respect.

– Dennis V.C. Awang, PhD, FCIC
MediPlant Consulting Inc., White Rock, Canada

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Traditional Australian Aboriginal Bush Medicines

by Marcello Pennacchio, PhD
Institute for Plant Conservation
Chicago Botanic Garden

The vast majority of Aboriginal herbal treatments were for external use.

Most travelers to Australia who have visited any beautiful, modern city with its lovely landscaped gardens would get the impression that Australia has fertile soils and an abundance of water. One need only travel north to Queensland or to the southwest corner of Western Australia to be somewhat convinced of this. Yet, the reality is that most of Australia is either arid or semi-arid with nutrient deficient soils and low rainfall (see Figure 1). It is a harsh environment, the kind some people would consider totally uninhabitable. In fact, the first European explorers were so appalled with what they saw that they could scarcely believe anybody could exist in such a land. Colonel Peter Egerton-Warburton, for example, after exploring the northwestern area of Central Australia claimed that, "The land is terrible. I do not believe that man ever traversed so vast an extent of continuous desert." Yet there are those who did so periodically and have been quite at home in this environment for at least 40,000 years.

Traditional Bush Medicines

Indigenous Australians have managed to survive very well in the deserts of Australia. These very competent and astute aboriginal botanists[1] were so diligent at "living out bush" that not only were they able to find food and water out there, but also a variety of medicinal plants and animals as well. The extent of this incredible knowledge is only in recent years being recognized; sadly, it began to disappear with the arrival of European colonizers. In fact, the eroding influence of western medicine has had such an adverse impact on traditional healing practices that many fear much of the information on cures to a variety of illnesses and diseases has already been irretrievably lost.

Fortunately, some traditional information has been salvaged. For some time now there has been a growing interest in preserving traditional knowledge, culture, and practices by non-Indigenous Australians, coinciding with a renaissance in these ways by the traditional owners of this land. Working in collaboration with Indige-

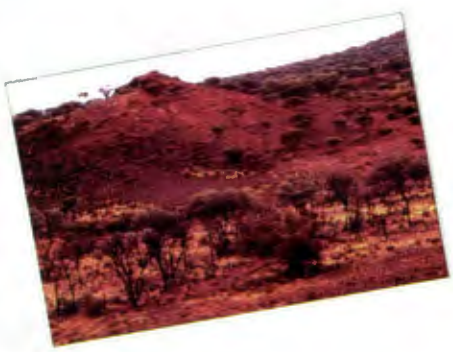

Figure 1. This breakaway country is typical of the semi-arid and arid zones of Australia. The soils are deficient in nutrients and there is little annual rainfall. Photo ©2005 Marcello Pennacchio, PhD.

Figure 2. *Eremophila longifolia* was of sacred and mystical importance to Indigenous Australians. The methanol extract yielded the cardioactive agent, geniposidic acid. Photo ©2005 Marcello Pennacchio, PhD.

nous Australians, numerous ethno-scientists have started documenting in earnest the indigenous use of plants and other organisms. Several ethnobotanical texts have thus recently emerged, cataloguing the plants that were beneficial to Native Australians.[2-8] Information on the uses of plants, as well as methods for preparing herbal treatments, is also provided in these texts.

In going over these seminal works, it becomes immediately apparent that the vast majority of Aboriginal herbal treatments were for external use.[9] Treatments for cuts, scabies, and skin sores, for example, were common and often treated with plant parts obtained from a variety of species. Internal complaints, in contrast, were considered spiritual in nature and may have required the services of powerful medicine men.

The literature also reveals that among the most popular plants were those that the Native Australians would have encountered on a regular basis. These are primarily those plants that thrive in semi-arid and arid zones. Two genera that feature prominently in Aboriginal pharmacopeias are *Acacia* Miller (Mimosaceae) and *Eremophila* R.Br (Myoporaceae).

At least 30 species of *Acacia* were used for medicinal purposes by Native Australians.[10] This figure almost triples if one were to include other uses, e.g., wood for weapons and other tools, and food. *Acacia* species, such as *A. ancistrocarpa* Maiden & Blakely, *A. pruinocarpa* Tindale ("gidgee wattle"), and *A. holosericea* (G.Don) A. Cunn, were much sought after for their ability to treat a variety of sores and illnesses. Of particular note are the leaves of *A. ancistrocarpa*, which reportedly were useful in treating skin sores and headaches.[11] These were also ideal for reducing swelling and general pain.[6] Interestingly, inhaling the smoke of burning *A. ancistrocarpa* plants was useful in treating diarrhea in babies.[8]

Smoke treatments of this type also had a variety of other uses. These include strengthening babies and their mothers following parturition. The birth of children was considered of such importance to the Aboriginal people that every effort was made to improve their chances of survival. Species such as *A. aneura* F. Muell ("mulga wattle"),[3] *A. dictyophleba* F. Muell,[12] *A. kempeana* F. Muell ("witchetty wattle"), *A. ligulata* (Benth.) A. Cunn, *A. lysiphloia* F. Muell

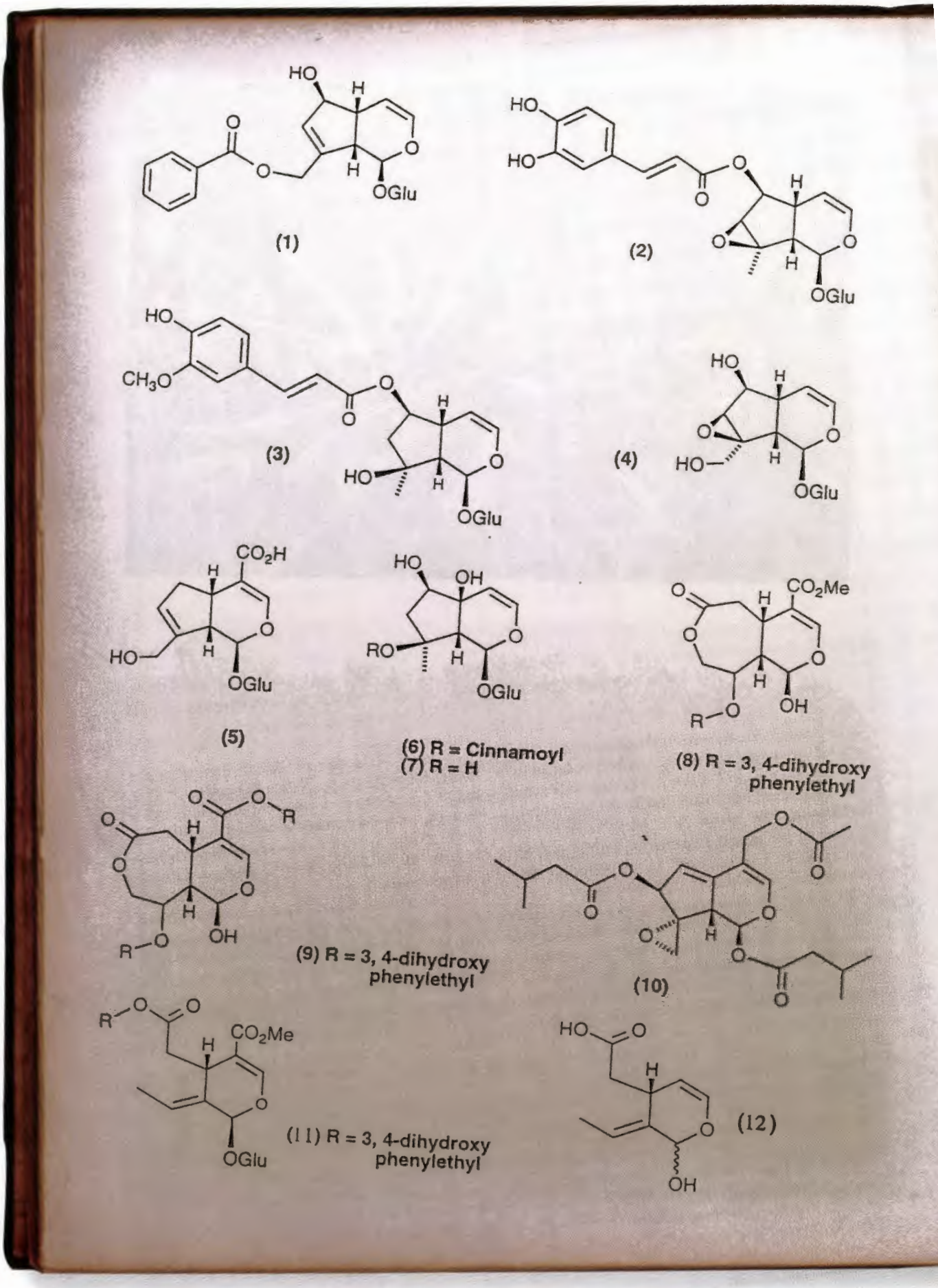

Figure 3. These iridoid glycosides have all exhibited cardioactivity.

("turpentine wattle"), and *A. pruinocarpa*[3] were regularly burned in the presence of newborn babies and their mothers. This was also thought to induce lactation and to stem the flow of post-partum bleeding in some cases.

A variety of other plant species were similarly ideal for smoke treatments. One example is *Eremophila longifolia* F. Muell (berrigan bush) (see Figure 2). This species was of sacred and mystical significance to many Native Australians.[13,14] It is widely distributed over Australia but occurs mostly in the semi-arid and arid zones where most of the 218 recognized species of *Eremophila* occur. This species was also commonly used as a skin and body wash,[15] counter-irritant,[16] and as an eye wash.[17] Spencer and Gillen[18] reported that an infusion of the leaves was taken internally for colds and headaches. However, Barr[3] warns against taking preparations of this species for internal purposes.

Figure 4. The leaves of *Eremophila maculata* produce the cardioactive agent, catalpol, and a cyanogenic glucoside called prunasin. Photo ©2005 Marcello Pennacchio, PhD.

Biological Activity

Armed with ethnobotanical knowledge of this type, a team made up of several colleagues and this author screened extracts from the leaves of *E. longifolia* for biologically active compounds. Following a number of pilot studies, the team tested the methanol extract for cardioactivity and soon discovered that it produces a biologically active substance called geniposidic acid[19] (see Number 5 in Figure 3). This iridoid glycoside had previously been described by others, but had never been associated with any activity until this study. Geniposidic acid significantly decreased heart rate (negative chronotropism) in rat hearts.[19] In addition, it decreased both coronary perfusion rate (CPR) and the strength of the contractility of the heart muscle (negative inotropism). Its mechanism of action has yet to be determined, however.

The team detected similar activities for iridoids from three related species of *Eremophila*. As shown in Figure 3, these include verminoside (number 2) from *E. ionantha* Diels.; melampyroside (number 1) and ferruloylajugol (number 3) from *E. pantonii* F. Muell; and catalpol (number 4) from *E. maculata* subsp *brevifolia* (Ker-Gawler) F. Muell[20] (see Figure 4). Each of these has exhibited the type of cardioactivity previously seen with other interesting iridoids (see Numbers 6-12 in Figure 3).[21,22]

Another potential source of cardioactive agents are the leaves of the native honeysuckle, *E. alternifolia* R. Br (see Figure 5). This species was highly prized by various tribes of Native Australians.[2,3] In fact, its importance to these people can be inferred from the fact that it was one of few species that they actually harvested and carried with them in case of need. Native Australians recognized early the benefits of a nomadic lifestyle in a nutrient-deficient and dry land. They were therefore continually on the move, taking with them only those items that were considered extremely valuable.

Figure 5. *Eremophila alternifolia* was considered the "Number One" medicinal plant by certain Indigenous Australian tribes. Photo ©2005 Marcello Pennacchio, PhD.

The leaves of *E. alternifolia* were useful in treating a broad spectrum of illnesses. Their uses reportedly range from treating colds and flu to reducing fever and headaches.[23] In addition to these, they promoted sleep,[24] pleasant dreams, and well-being.[2,5,8] A preliminary study revealed that this species was also a potential source of cardioactive agents.[25] By a process of elimination, the team detected a potent cardioactive agent called verbascoside (syn. acteoside and kusaginin).[19] Compounds of this type appear to be common in the family Myoporaceae.[26,27]

Figure 6. *Acacia pruinocarpa* produces compounds that are allelopathic (eliminate the growth of competing plants in the direct area) and cytogenic in nature. Note that there are no other plant species growing below this one. Tannins are not thought to play any role in the activities seen. Photo ©2005 Marcello Pennacchio, PhD.

Unlike geniposidic acid, verbascoside significantly increased chronotropism (positive chronotropic effect), inotropism (positive inotropic effect), and coronary perfusion rate in Langendorff rat hearts. These were the first reported activities of this type, but not the first involving the cardiopulmonary system. In 1980 verbascoside was shown to decrease blood pressure[22,28] and potentiate the anti-tremor effects of L-dopa.[28] Interestingly, it also appears to have potential as a pain killer and reduces peristaltic muscle activity.[29] Prior to the discovery of verbascoside in *E. alternifolia* leaves, graduate students working in the team's laboratory screened the methanol extract of *E. alternifolia* leaves for both these types of activities and detected decreases in activity in toad sciatic nerves and blood pressure in spontaneously hypertensive rats (Wistar strain).

Having identified the cardioactive agent in the leaves of *E. alternifolia*, the team set about the difficult task of identifying its probable mechanism of action. Without going into too much detail, the team eventually determined that it acts through a similar system to epinephrine (adrenaline).[30] It does not, however, act via the same receptors. Its activation may be through an entirely different mechanism involving hormone-like substances called prostaglandins.[31] Those familiar with these substances will know that "wonder drugs," such as aspirin (acetyl-salicyclic acid), mediate their effects through the inhibition of prostaglandins.[32] Verbascoside's ability to inhibit prostaglandins may therefore explain why the leaves of *E. alternifolia* were useful in treating headaches.

During this time, the team also discovered another phenylethanoid glycoside from an unrelated species. The leaves of the highly invasive plant, *Lantana camara* L. (Verbenaceae), yielded di-methyl verbascoside.[33] This compound mediated the same effects on rat hearts as did verbascoside. This suggests that minor changes to the chemical structure of verbascoside do not appear to significantly alter its cardioactive effects. Whether or not *L. camara* has potential as an herbal treatment is doubtful because its leaves are usually considered toxic.

Equally as toxic is *E. maculata*. In addition to yielding the cardioactive compound, catalpol,[20] it also produces a cyanogenic glycoside called prunasin.[34] Damage to the leaves results in the release of cyanide. Interest in this species by "white Australians" dates back more than 100 years, when it was first realized that it was toxic to livestock.[27] As far as the team can determine, the leaves of *E. maculata* had no internal uses. Native Australians used only a poultice of the leaves to cure headaches.[35] Despite this one use, a number of extracts recently tested positive for antibiosis in the team's laboratory.

To be successful, Indigenous Australians should be involved in every aspect of the planning and implementation of such projects.

The team has finished screening a variety of *Acacia* species that were also prized by Indigenous Australians. A preliminary study revealed that *A. pruinocarpa*, *A. adsurgens* Maiden & Blakely, and *A. bivenosa* DC were themselves potential sources of cytogenic and antibiotic compounds.[10] *Acacia*

pruinocarpa also exhibits strong allelopathic effects, i.e., it produces compounds that inhibit the growth of nearby plants that would compete with its roots for scarce moisture in the soil[10] (see Figure 6). The active constituents in these species have not yet been identified, but certain classes of compounds, including tannins, have been excluded from consideration. This was determined with the use of high through-put bioassays, such as the brine shrimp lethality test, the crown gall bioassay, and standard assays for antibiosis.

Conclusions and Recommendations

Studies of this type, despite being conducted by various researchers throughout Australia, are few in number and often poorly funded. Most of the researchers working in this field have realized that what is needed are larger, more coordinated endeavors that document useful plants, their collection, screening, commercialization, and finally, restoration. This requires considerable funding and large groups of specialized researchers working together with the same goals. Fortunately, large-scale studies of this type are currently in the advanced planning stage, with some ready for funding. These studies involve universities, governments, industry, and most appropriately, Indigenous Australians.

In fact, to be successful, Indigenous Australians should be involved in every aspect of the planning and implementation of such projects. They are, after all, the holders of the traditional knowledge. Also, it is important that the principal investigators realize that their primary aims should be, first and foremost, to conserve traditional knowledge, as well as any time-honored indigenous practices, Aboriginal culture, and finally, the plants and other organisms that they use. The commercialization of any foods or pharmaceuticals also should be realized where possible. Where this is indeed the case, Indigenous Australians should have the right to a significant share of any royalties arising from these studies. This is in accordance with those who routinely deal with such issues.[36]

In conclusion, there is no doubt that some Indigenous Australians still have a deep and intimate knowledge of the plants and animals of their land. It therefore makes perfectly good sense to learn from these remarkable people. This could lead to novel foods and natural products that may be of benefit to the entire world. But there is a great deal more that can be learned from these people. It is now abundantly clear that they have found ways to exist in some of the very harsh and often treacherous Australian areas where so many experienced explorers perished without a trace. Their ability to find food and water in these environments is a testimony to their brilliance and without a doubt worthy of learning.

It is important that the principal investigators realize that their primary aims should be, first and foremost, to conserve traditional knowledge, as well as any time-honored indigenous practices, Aboriginal culture, and finally, the plants and other organisms that they use.

Also worth learning, if they are willing to part with this knowledge, are Aboriginal "stories of the dream time." Indigenous Australians kept no written account of their erudition. They therefore passed on knowledge about their way of life and spirituality to succeeding generations in what to us appear as mythical and legendary stories. Surprisingly, these stories may help unlock the hidden secrets about plant and animal ecology in Australia. They may also provide some insight into Australian geography and geology. After all, Native Australians have inhabited Australia for thousands of years, during which time they would have astutely observed the unique features of that great land.

Acknowledgments

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The Potential Health Benefits of PURPLE CORN

BY KENNETH JONES

Purple corn is fast approaching classification as a functional food—an integral component of the diet that provides energy and essential nutrients. Researchers in the fields of food and nutrition are intensely searching for functional foods in almost every corner of the world and from a diversity of plants. Examples include purple corn (*Zea mays* L., Poaceae), green tea (*Camellia sinensis* [L.] Kuntze, Theaceae), soy isoflavones (*Glycine max* [L.] Merr., Fabaceae), various nuts, plus various other natural substances in the human diet containing antioxidant and other substances with alleged or proven potential disease-preventive properties.

Purple corn (frequently referred to as blue corn) is botanically the same species as regular table corn. Yet by a twist of nature, this corn produces kernels with one of the deepest shades of purple found anywhere in the plant "kingdom." Research has shown that purple corn contains cell-protecting antioxidants with the ability to inhibit carcinogen-induced tumors in rats. Many plant-derived substances are believed to show these properties, but few have also demonstrated anti-inflammatory capabilities and the potential to help prevent obesity.

The kernels of purple corn (*maiz morado* in Spanish) have long been used by the people of the Peruvian Andes to color foods and beverages, a practice just beginning to become popularized in the industrialized world. They also make a fermented/alcoholic drink from the kernels which they call *chicha morada*.[1]

Rich in Anthocyanins

The source of this natural alternative to synthetic food dyes is the largest group of natural, water-soluble pigments in the plant world, known as "anthocyanins."[2] (The word anthocyanin is derived from the Greek terms, *anthos*, meaning flower, and *kyanos*, meaning blue.[3]) Anthocyanins are responsible for the purple, violet, and red colors attending many plants. Anthocyanins belong to an even larger class of plant chemicals known as flavonoids and are found in diverse plants, including many food plants.[4]

Researchers at the Horticultural Sciences Department of Texas A&M University in College Station, Texas, recently determined that the mean anthocyanin content of whole, fresh purple corn from Peru was 16.4 mg/g, which was much higher than fresh blueberries (1.3-3.8 mg/g). On a dry weight basis, the mean content of purple corn was comparable to blueberries (17.7 and 9.2-24.0 mg/g, respectively). The kernel pericarp held by far the greatest concentration of anthocyanins, contributing 45% of the total content. More intriguing, the in vitro antiradical capacity of purple corn extract against the DPPH (2,2-diphenyl-1-picrylhydrazyl) radical was greater than that of blueberries (*Vaccinium corymbosum* L., Ericaceae), which have shown higher antioxidant values than many other commercial food plants.[5]

Research has shown that purple corn contains cell-protecting antioxidants with the ability to inhibit carcinogen-induced tumors in rats.

Powerful Antioxidant

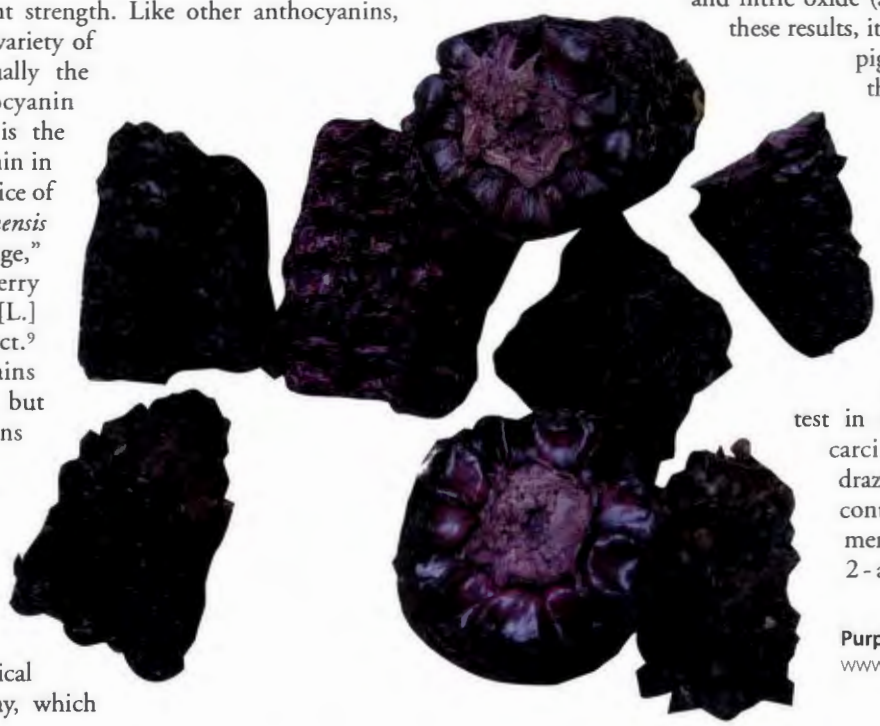
Digging deeper, the most abundant anthocyanin found in purple corn, called "C3G" (3-*O*-β-D-glucoside[6,7]), also known as cyanidin-3-*O*-β-glucopyranoside,[8] has been keeping researchers very busy lately. In a number of tests designed to assess the potential health benefits of this anthocyanin, one study after another has proven its antioxidant strength. Like other anthocyanins, C3G is found in a wide variety of food plants and is actually the most common anthocyanin found in nature. C3G is the most abundant anthocyanin in some foods, such as the juice of ruby oranges (*Citrus sinensis* [L.] Osbeck "Blood orange," Rutaceae)[8] and blackberry (*Rubus allegheniensis* [L.] Bailey, Rosaceae) extract.[9] Red wine also contains appreciable amounts,[10,11] but other anthocyanins predominate.[12]

C3G displays significant in vitro antioxidant activity. In one study C3G came out on top when compared to 13 other anthocyanins in the ORAC (oxygen radical absorbance capacity) assay, which tests for antioxidant activity. The strength of C3G was 3.5 times that of Trolox® (a synthetic and potent antioxidant analogue of vitamin E).[13] To date, the radical scavenging/antioxidant capacity of C3G has been demonstrated in at least a dozen different assays.[8,14-20] In one in vitro study, C3G was tested for the potential to prevent damage caused by ultraviolet (UV) light. Its ability to inhibit the oxidation of fat cells induced by UVB (280-315 nm) light was at least 40 times that of vitamin E; however, vitamin E is a weak inhibitor of UVB-induced lipid oxidation because it rapidly breaks down under UV light.[19] Oxidative stress and immune suppression caused by UV light are well-known for their role in the induction of skin cancers.[20]

Oxidative stress is described as a state in which there is an excess of oxygen-based free radicals. To avoid the damage they can cause to cells, the body produces antioxidants to inactivate these free radicals. If they prove insufficient, however, the body suffers from oxidation of lipids, proteins, and nucleotide bases. In models of oxidative stress using oxidative injury to the liver, male rats fed a diet containing 0.2% C3G (2 g/kg of feed) for 2 weeks beforehand showed significantly less liver injury compared to the control group.[21] A similar study in rats fed C3G in liquid form (0.9 mmol/kg) also found significant hepatoprotective effects.[22]

Anti-inflammatory Capabilities

In a study on the anti-inflammatory potential of C3G, male rats administered the anthocyanin orally in liquid form (0.9 mmol/kg) prior to chemically-induced acute inflammation showed significantly less inflammation and significantly attenuated levels of pro-inflammatory cytokines (interleukin-6, interleukin-β, and tumor necrosis factor-α, and inducible nitric oxide [iNOS] expression) and nitric oxide (a free radical).[23] Based on these results, it is possible that this plant pigment may also suppress the inflammatory response in diseases marked with inflammation.



Purple corn cobs Photo ©2005 www.essentiallivingfoods.com

Preventing Cancer

Could the anthocyanin pigment also help prevent some types of cancer? That question was put to the test in rats first treated with a carcinogen (1,2-dimethylhydrazine) and then fed a diet containing a known environmental carcinogen (PhIP or 2-amino-1-methyl-6-

phenylimidazo[4,5-*b*]pyridine) that also targets the mammary gland, prostate, and large intestine in rats and causes colorectal cancer. Incidentally, the carcinogen used in the study, known as a heterocyclic amine, is the most abundant of around 20 other types found in cooked meats and fish. Both the early signs of colorectal cancers and the numbers of malignant and benign tumors that formed in the colons of rats that had the purple pigment in their diet (5% of feed for 32 weeks; a nontoxic dose based on previous carcinogenicity studies of PCC) were significantly reduced, and there were no adverse effects. The authors of the study note that extract or juices of plants that contain high amounts of anthocyanins have previously been reported to inhibit mutagenesis induced by heterocyclic amines.[24]

Purple corn Photo ©2005 www.essentiallivingfoods.com

The oxidation of fats or lipids in blood serum contributes to the condition known as atherosclerosis. When male rats were fed a diet containing a high amount of C3G (0.2% of feed for 2 weeks) in place of sucrose content in the control diet, their blood serum showed a significantly lower level of oxidation along with a significant decrease in the susceptibility of their serum lipids to undergo oxidation, yet their body's natural antioxidants (serum levels of vitamins C and E, glutathione, and uric acid) remained unaffected. Another intriguing discovery in this study was that the rats with C3G in their feed also showed significant decreases in levels of total cholesterol—about 16% less.[25]

Purple corn pieces Photo ©2005 www.essentiallivingfoods.com

Anti-obesity Potential

What would happen if rats were fed C3G as part of a high-fat diet? To find out, researchers in Japan compared the body weights of male mice fed a high-fat (HF) diet with another group fed the same HF diet but with the addition of purple corn color (PCC) which provided C3G (0.2% or 2 g/kg of feed). Results were also compared to 2 control groups: one fed a normal diet and one fed a normal diet with C3G. After 12 weeks, the results were obvious: mice in the PCC-HF group showed significantly less signs of developing obesity, yet exhibited no significant difference in food consumption compared to the control groups with or without the PCC in their feed. When related to the primary control group (no HF diet or PCC), the adipose tissue weights of the PCC-HF group were not significantly different. In addition, fatty tissue in HF-diet group was found to be growing in size but showed no increase in the PCC-HF group. The HF-diet group also developed a state of hyperglycemia along with an over-production of insulin. Interestingly, this was not observed in the PCC-HF group in which both pathologies were completely normalized. In conclusion, the researchers stated that their tests of PCC provide a nutritional and biochemical basis for the use of the pigment or anthocyanins as a "functional food factor"—one that may be beneficial for helping to prevent diabetes and obesity.[26] It now remains for future studies to determine the possible contributing effects of other substances from purple corn which are extracted along with PCC.

More recent efforts to determine the potential anti-obesity mechanisms of purple corn pigment have focused on the effect of C3G on fat cell dysfunction, fat cell-specific gene expression, and the regulation of chemical messengers (adipocytokines) secreted by fat cells, such as the fat-derived hormone adiponectin. After feeding male mice a diet containing PCC to provide C3G (2 g/kg of feed for 12 weeks), gene expression levels of adiponectin in white fatty tissue was upregulated 1.7-fold compared to the control group not fed the food colorant.[27] Plasma and gene expression levels of adiponectin are decreased in obese humans and mice and in insulin resistant states.[27,28] When adiponectin was administered intravenously to mice fed high-fat/sucrose diets, weight gain was significantly inhibited. Adiponectin (i.v.) also lowered plasma glucose levels in lean mice fed a high-fat meal.[28]

Rich in C3G (approximately 70 mg/g), about 50,000 kg of PCC is used in Japan as a food color for confections and soft drinks annually.[26] So far, PCC remains to be officially approved for use as a food colorant by the U.S. Food and Drug Administration. However, approval seems likely because "grape skin color" and "grape skin extract" ("enocianini" or "enocyanin")[2] made from Concord grapes[29] (*Vitis vinifera* L., Vitaceae) are also rich in anthocyanins[2] and both are FDA-approved for use in beverages and non-beverage foods.[29]

Kenneth Jones is a medical writer specializing in the field of medicinal plants. He is the co-author of *Botanical Medicines: The*

Desk References for Major Herbal Supplements by McKenna, Jones, and Hughes (Haworth Herbal Press, 2002). He has no affiliation with any commercial producers of purple corn or any of the other products mentioned in this article.

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The Aboca Museum

Displaying the History of Herbal Medicine in Italy and Europe

by Robin DiPasquale, ND, RH

In prehistoric times, knowledge of the healing powers of herbs was passed down orally, often within a family lineage. Sacred clay tablets, hieroglyphics, then later, books and manuscripts all marked the beginning of written knowledge. One of the earliest documentations of the medicinal uses of plants is the Ebers Papyrus, believed to have been written around 1550 BCE.* This Egyptian text describes 500 natural materials and medicinal plants and their properties. Chinese and Ayurvedic medicine contain texts written between 2700 and 1500 BCE.

Europe holds a significant portion of the history regarding the use of medicinal plants in health and healing. Empirical medicine began its evolution into a more scientifically-based medicine through the work of the Greek physician, Hippocrates (468–377 BCE) in the 5th century BCE. During the Middle Ages in the Roman Empire, beginning with the 1st and 2nd centuries CE, the Greek physician/herbalist Dioscorides (whose writings date from ca. 50–70 CE) first catalogued the curative properties of plants (empirically based on his experiences as a physician) in the five books of *De Materia Medica*. Also, Galen (129–199 CE, though some sources say post 205 CE), physician to Roman emperor Marcus Aurelius, refined the humoral theory, first introduced by the Hippocratic corpus (i.e., the body of work generally ascribed to what may be the mythical physician Hippocrates, known as the "father of medicine"). Galen created a system of medicine whose ideas dominated herbal medicine in Europe for 1500 years. Some of the principles of this humoral system are still applied in many strains of traditional herbalism today—the idea that herbs have energetic properties (e.g., cold, hot, damp, dry) that affect various bodily "humors" (bile, phlegm, melancholia, etc.). Much later, the famous Persian physician Avicenna (aka Ibn Sina; 980 – 1037 CE) wrote the *Canon of Medicine* in the 11th century CE.

Much of what passed for medicine belonged to the domain of monks in the Christian monasteries from the 9th through 11th centuries, a tradition still visible in contemporary Italy and throughout Europe. During the 14th and following centuries, plants were documented according to their true physical morphology, a focus on botany. The printed herbal became more available in the 15th century through the invention of the printing press. The Swiss physician and alchemist Paracelsus (1493–1541) often called the "father of pharmacology," traveled extensively throughout Europe, Russia, and the Middle East studying medicine. He opposed and challenged Galen's theories,† opening the doors of herbal medicine in Europe and creating a potentially new depth for herbs. By introducing the systematic use of heavy metals, he created a schism in the evolu-

A tour of the museum begins with the building, The Palazzo Bourbon del Monte, where the museum is housed. This is an 18th century palace restored and conserved according to the parameters of the town of Sansepolcro's cultural committee. During the restoration, a stone bearing the inscription "PRODEST.OBEST" ("it heals – it harms") was found on the door molding, suggesting the practice of the art of herbs in this building in ancient times. Just across the street from the Palazzo, a collection of medicinal plants fills the Piero della Francesca Garden, named after a famous Renaissance painter from Sansepolcro.

tion of medicine, with one branch continuing to use herbs, and the other, relying more on chemistry, particularly heavy metals (e.g., lead, mercury). The British physician Nicholas Culpepper (1616–1654), trained in medicine and pharmacy, translated Latin medical writings dealing with herbs into English, thereby helping to make herbal medicine more accessible to common people (who could read English). He reduced the exclusivity of formal herbal medicine knowledge held by the physicians and apothecaries. In the late 15th century, the "discovery" of America began the process of the importation and eventual melding of North American plants into the European materia medica, altering the face of herbal medicine in Europe.

The Aboca Museum, located in central Italy in the historic center of the Tuscan town of Sansepolcro, is an exquisite and sensate journey through the utilization of herbs and herbal medicine through the ages. A major cultural and educational initiative by Aboca, one of Italy's leading cultivation and manufacturing companies for medicinal herbs, the museum project was born out of Aboca's commitment to the study of historic sources for the medicinal uses of plants and to reviving their traditional uses in modern times.

The museum's primary goal is to illustrate and document the use of medicinal herbs throughout the centuries through a large number of artifacts, with an exhibition that shows how remedies were prepared in different historical periods in various locations in Europe. In addition, there are several key operating components to the Aboca Museum:

- A virtual museum Web site (www.abocamuseum.it) that provides interactive information about every object presented in the Aboca Museum.
- A research center dedicated to studying the historic scientific sources.
- A reproductive center that handcrafts reproductions of artifacts and reprints of important herbals.
- The Bibliotheca Antiqua, an "ancient library" that contains old herbals, botanical books, and related manuscripts.

The "Bibliotheca Antiqua," a collection of over 1,000 printed volumes from the 16th to the 20th century, is an integral part of the museum and the vital force of the institution. This collection holds works related to medicinal plants and natural sciences, including treatises on materia medica, the study of pharmaceutical botany, alchemy, and pharmacy, renaissance antidote books, and 19th century surveys on physics, chemistry, and natural sciences. The oldest book is dated 1542, *De historia stirpium commentarii insignes* (*Notable*

commentaries on the history of plants) by the German botanist Leonhart Fuchs. Reserved for scholars and researchers, the Antique Library is generally closed to the public. Because of the significance of the contents of this library, however, the Aboca Museum Web site team has been developing its "online" project. Since 2000, ongoing work is being done to digitalize key acquisitions of the collection to make them available to everyone through the Internet. Currently, there are about 150 ancient books, at least 16,133 pages of text, and about 4,500 digital photos of illustrations available through this site (http://www.abocamuseum.it/bibliothecaantiqua/prodotti.asp).

Using two different search engines, books can be searched by title, author, or subject. The book search allows the reader to access extracts from the included books, and the image search uses the plant names in Old Italian, English, German, French, Italian, Latin, and common names as keywords to bring up images of botanical species.

* The date given refers to actual papyrus but on internal evidence the copy was based on a prototype traced back to the Old Kingdom, roughly 2500 BCE.

† The traditional attribution of Paracelsus' contributions was to challenge the established practice of compounding simple drugs (a species of a plant, for example) into complex formulae to balance the theoretical considerations. Paracelsus argued that each simple was itself a compound and pointed towards alchemical approaches to formulating prescriptions.

In the lobby, where the herbal journey begins, a panel depicts the herbal symbolism woven into the many Oriental carpets found throughout the museum. Ancient symbols of The Tree of Life depict the divine tree that bestows immortality, heals, and restores humanity to life. One of the oldest and most widespread symbols is The Lotus Flower, signifying rebirth. Representing the initiation into the mystery, The Rose symbolism varies according to color: the red, passion, the white, purity, and the wild rose, ardent desire.

The 19th century marked the passage of the old art of pharmacy to the more modern chemistry dominated by pharmaceutical sciences. Active compounds were separated in medicinal plants, and synthetic drugs were being produced in mass instead of being prepared one dose at a time by the owner of a small apothecary shop for the individual. The apothecary's duties were reduced to the monitoring of medical treatments and the preparation of magistral remedies—tablets, pills, powders, syrups, medicated oils, ointments, and tinctures.

Antora

Looking upward toward the heavens, reproduced on the ceiling of the lobby, is Paradisus Terrestris (Earthly Paradise), the title page from *Paradisi in Sole* by John Parkinson, printed in London in 1656. It speaks of "a garden of all sorts of pleasant flowers, a kitchen garden of all manner of herbs, roots, and fruits, and an orchard of all sorts of fruit bearing trees and shrubs."

The staircases between the floors of the museum are lined with original plates from Basilius Besler's *Hortus Eystettensis*. Besler was a botanist and pharmacist in Nuremberg, 1561-1629. This anthology of scientific and artistic importance describes the medicinal plants of the botanical garden of the archbishop of Eichstatt, north of Munich. The original book contains 367 illustrations of 1,084 plants. The first edition was printed in 1613.

Hyosciamus vulgaris

Moluca odorata spinosa

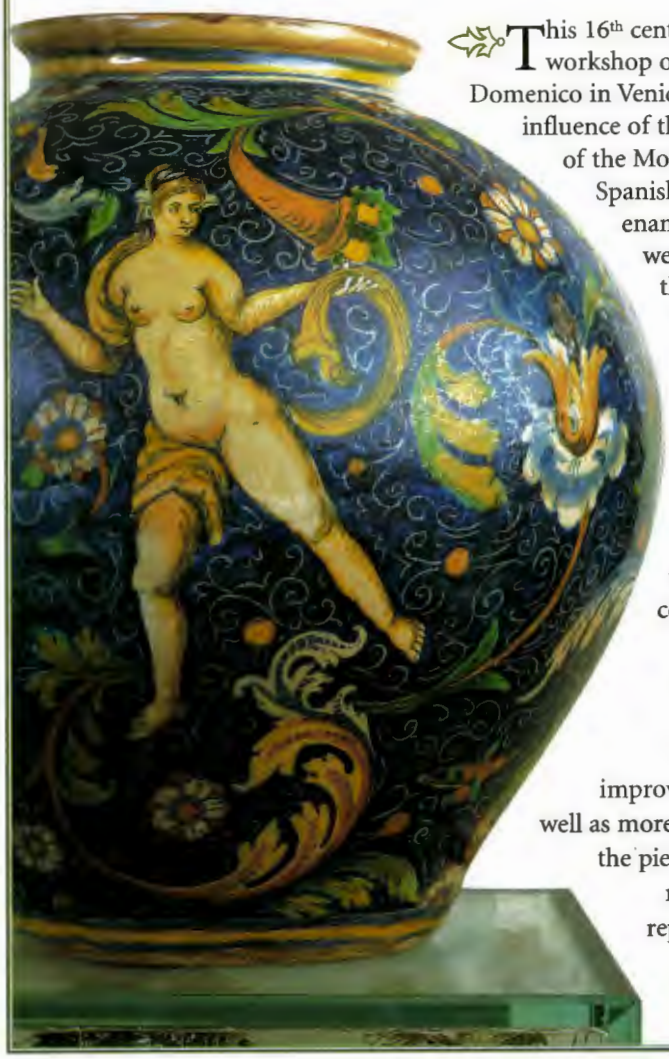
Colus Iovis

Scabiosa indica flore saturate rubro

Original plates from Basilius Besler's *Hortus Eystettensis*.

The apothecary shop was a meeting place of the herb gatherers, the apothecary, the doctor and the sick people, a place where the medicine was made for the people. Also appropriately named the alchemy lab, it was characterized by furnaces, distillation units, mortars, containers of many types, a press, local herbs, and imported spices. The furnaces of the 16th and 17th centuries were either fixed (made of earthenware) or movable (made of copper or iron). At this time, *bainmarie* (water bath distillers) took the place of *cinerarium* (ash bath) and *arenarium* (sand bath distillers).

An eloquent display of books about the use of herbs, cards, calendars, exclusive reprints with botanical images, and elegant reproductions of museum pieces fills this room. Online purchases are available, as well, through the Aboca Web site (www.abocamuseum.it).



This 16th century vase, from the workshop of Mastro Domenico in Venice, shows the influence of the Arabic culture of the Moorish craftsmen in Spanish workshops, using enamel inlays, which were exported throughout the European peninsula. The Renaissance influence is strongly depicted through the images of wildflowers and the deep blue color.

The ceramic room contains the pitchers, vases, bottles, and apothecary jars that were venerated for both their functional and artistic value. Over time, the functional quality was improved through techniques that yielded the containers more waterproof as well as more able to prevent sugar fermentation and fat rancidity. The aesthetics of the pieces moved from simple earthenware with *sgraffito* decoration to elaborately inlayed and glazed pottery pieces with patterning and techniques representative of various regions of Italy and Europe. (Sgraffito is a word used in Italian to depict the decorative patterning that is often seen in art, particularly ceramics, and on the outside of buildings.)

The principle room of the museum is dedicated to the most ancient and irreplaceable tool for chemists and herbalists, the mortar. The mortar has always held a strong symbolic value in the art of pharmacy. Although the materials with which mortars were made have varied during the centuries, including bronze, stone, marble, alabaster (a translucent gypsum or calcite), iron, silver, copper, wood, terracotta, ceramic, glass and ivory, it is the bronze mortar that was most widely used in the apothecary shops. Illuminated by a central chandelier, this room frames three preserved frescos and houses a collection of ancient mortars and pestles, many filled with fragrant dry herbs.

A 16th century bronze mortar with dolphin handles from Switzerland. These bronze mortars were forged with the same molds used for bell-founding.

The history room houses the most significant volumes from the Bibliotheca Antiqua. Herbals and anthologies are displayed with their original xylographic (wood engraving), calcographic (copper engraving), and lithographic colored illustrations. Some of the key herbals in this display can be reviewed online at the Aboca Museum Web site (www.abocamuseum.it) by searching title or author. Some of these works include Pierre Pomet's *Histoire Generale des Drognes* (1694) and Elizabeth Blackwell's *Herbarium* (1757), among many others.

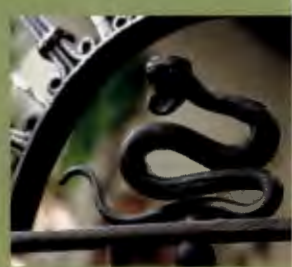
Panels on the wall describe the significant herbal attitudes and events chronologically. These begin with prehistoric time, which attributed the effects of plants to the supernatural. Through the centuries, knowledge was enhanced and techniques were refined as each individual and culture added to the awareness of plants as medicine. The story ends with a projection into the third millennium where it is postulated that if man continues to exceed biological laws, he will not be able to survive.

A photo gallery honors the most important protagonists from the history of botany and medicine in Europe. Some key members include: Asclepius, the Greek god of healing; Hippocrates and Dioscorides (40-90 C.E.) for their early contributions; Avicenna (980-1037 C.E.) who represents the roots of Persian and Unani Tibb (Greek and Arabic medicine); Paracelsus for his work with alchemy; and Linneus (1707-1778) who solidified the botanical nomenclature and classification system of taxonomy as it is known today.

In the herb room, surrounded by earthy fragrances of herbs hung to dry, stocked with the tools of the trade—sifters and sieves, sickles and scythes, bags, baskets, and balances—is the representation of the work of collecting and gathering the medicinal plants. Beginning with proper identification of the plant species, plants and their useful parts such as buds, flowers, leaves, fruits, roots, bark and resin, must be harvested at their "balsamic time." This is the time during the growth cycle of the plant that is optimal for the medicinal properties, chosen according to the lunar cycle and the weather conditions, which varies for each plant and for the plant parts being harvested. Following harvest, appropriate drying techniques, a dry, airy place, sheltered from direct light, assure preservation of the healing components of the plants. Several herbarium books from 1901 can be viewed with their plant samples well preserved and intact.

Inula helenium, Primula auricula
Erbario Secco di Piante Medicinali,
Francia, fine XIX sec.

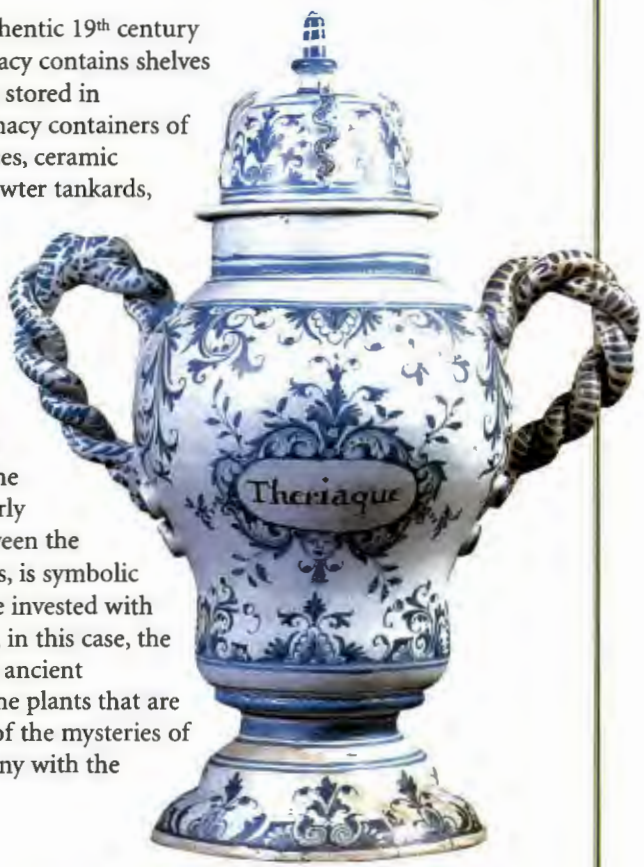
Some medicinal plants can be deadly poisons. These plants, skillfully mixed and administered in minute doses, can be transformed into beneficial medicines. Shakespeare wrote of the use of poisons made from plants in several of his tragedies, including *Hamlet* and *Romeo and Juliet*. Historic apothecaries, as well as contemporary pharmacies, mandated a separate, locked place to store these substances.



The poison cell in the Aboca Museum is guarded at the entrance by a serpent. The utensils, scales, and bottles are very small, for working with, measuring, and storing minute amounts. Plant samples are hung and labeled, including plants from some of the key families containing poisonous plants: Solanaceae, Liliaceae, Apiaceae, and Ranunculaceae.

Datura stramonium (Jimson weed)
Drimia maritima (Indian squill)
Veratrum viride (American hellebore)
Cicuta douglasii (water hemlock)
Conium maculatum (hemlock)
Adonis vernalis (false hellebore)
Helleborus nigra (black hellebore)

This authentic 19th century pharmacy contains shelves of medicaments stored in authentic pharmacy containers of glass bottles, vases, ceramic *albarelli* jugs, pewter tankards, and wooden boxes. A marble based balance, used to weigh preparations sold to patients, is sitting on the center bench. The little door, cleverly minimized between the medicine shelves, is symbolic of a boundary between the ordinary space and the special space, a space invested with an aura of mystery and the extraordinary, reserved only for the learned, in this case, the pharmacist. The crocodile on the wall has symbolic relevance in several ancient cultures. In Mayan mythology, the head of the crocodile poured forth the plants that are useful for humankind. In Egypt, the crocodile was considered the lord of the mysteries of life and death. It is connected with water and lush vegetation, in harmony with the fertility of green nature.



Apothecary containers from the 17th and 18th century.

President Signs New Law Banning Designer Steroids Dietary Supplements: DHEA Exempted from Ban

by Mark Blumenthal

A new law closes the legal loophole that allowed the sale in dietary supplements of steroid chemicals used as hormone precursors. The Anabolic Steroid Control Act of 2004 was signed into law by President George W. Bush on October 22, 2004.[1]

The Act was unanimously approved by the United States Senate on October 6, 2004. The Senate bill (S. 2195) was sponsored by Senator Joe Biden (D-Del.) and Senator Orrin Hatch (R-Utah) and had received significant interest in and support from many members of Congress due to concerns about the adverse health effects of steroids and steroid precursors. The House of Representatives passed similar legislation on June 6, 2004. The law was scheduled to go into force 90 days from signing.

An area of concern by the industry has been how the steroid issue has adversely and unfairly affected public perceptions of the responsible elements in the dietary supplement industry, particularly after the negative publicity generated by the ephedra controversy.

Last year President Bush elevated the public's awareness on the use of steroids in sports to national political prominence by mentioning it in the 2004 State of the Union address. "The use of performance-enhancing drugs like steroids in baseball, football, and other sports is dangerous," he said. "And it sends the wrong message—that there are shortcuts to accomplishment, and that performance is more important than character."[2]

Anabolic steroids are compounds which exhibit similar pharmacological effects as illegal steroid drugs. The term *anabolic* refers to the process of building muscle tissue.

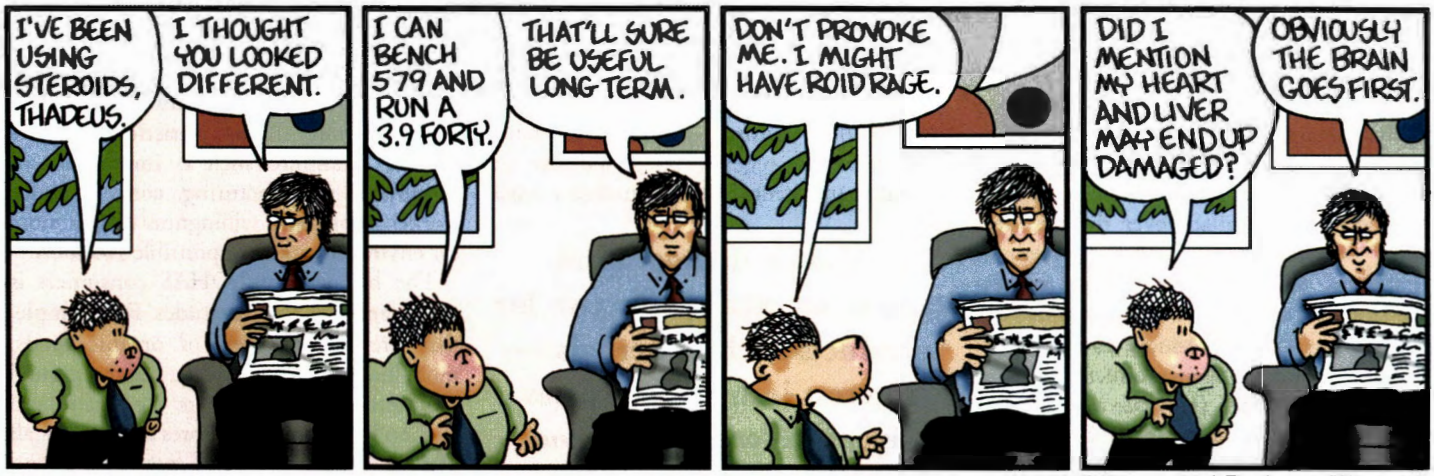
Significant interest has arisen in this area in the past few years since the revelation that various high-profile professional athletes had taken the controversial substance for increased muscle mass and performance (e.g., baseball player Mark McGwire of the St. Louis Cardinals reportedly used the steroid androstenedione [aka "andro"] in his record-setting 1998 season).

In December 2004, the steroid issue again became front-page news with allegations that baseball player Barry Bonds of the San Francisco Giants and other professional athletes may have been using steroids to enhance their performance.

Anabolic steroids had been previously controlled by the Anabolic Steroid Control Act of 1990. The new law authorizes the U.S. Drug

THADEUS & WEEZ

by Charles Pugsley Fincher



Enforcement Agency (DEA) to add androstenedione, tetrahydrogestrinone (THG), and other steroid precursors to the list of anabolic steroids that had previously been classified as Schedule III controlled substances. There are a total of 49 steroid compounds specifically listed in the law, which are now officially considered drugs. The list also includes "any ester, or ether of a drug described" in the list. The law authorizes $15 million for enforcement of the act from 2005 to 2010.[1]

"Steroid products are dangerous," Senator Hatch said in a press release. "They hurt the public health. They are giving sports a black eye, and they endanger kids. So, it's a no-brainer that outlawing steroid look-alikes will protect the public health."[3]

"To me, it should be simple: If it walks like a duck, and it quacks like a duck—it's a duck," explained Hatch. "Under this bill, clever chemists will no longer be able to dodge the law by disguising their chemicals to skirt the legal definition of a steroid. Our bill gives the DEA the power to schedule nearly any steroid precursor now or in the future—giving the law flexibility so we don't have to play catch-up with every new andro look-alike that comes along."[3]

The bill received strong support by numerous groups in healthcare and professional athletics professions, including the American Medical Association, American Academy of Pediatrics, National Football League, National Basketball Association, and the National Hockey League. The legislation was also supported by various law enforcement agencies, including the U.S. Anti-Doping Agency.

In addition, the law has received support from five major trade associations representing the herb and dietary supplement industry: the American Herbal Products Association, Consumer Healthcare Products Association, Council for Responsible Nutrition, National Nutritional Foods Association, and Utah Natural Products Association. These organizations have supported the legislation since it was initially introduced on January 20, 2004, based on the general recognition and agreement in most sectors of the dietary supplement industry that steroids are drugs and should not be sold as dietary supplements.[4]

One area of concern in the herb and dietary industry has been the status of a relatively popular ingredient in dietary supplements, dehydroepiandrosterone (DHEA), a naturally occurring steroidal structured hormone produced from cholesterol by the adrenal glands. DHEA is a chemical precursor to testosterone, estrogen, and other hormones to which it converts in the human body. The DHEA used in dietary supplements is derived commercially from wild yam (*Dioscorea* spp., Dioscoreaceae), the roots of which contain diosgenin, a steroidal saponin, which can easily be converted into DHEA in the laboratory.[5]

Another area of concern by the industry has been how the steroid issue has adversely and unfairly affected public perceptions of the responsible elements in the dietary supplement industry, particularly after the negative publicity generated by the ephedra controversy. According to a joint press release from industry groups, "Led by the industry trade associations, the dietary supplement industry believes this bill presents a step forward toward resolving issues affecting consumer confidence in the dietary supplement category. The trade associations are eager to create an opportunity to refocus visibility on the safety and benefits of our industry's core products including vitamins, minerals, botanicals, amino acids, and specialty ingredients such as omega-3 fatty acids, SAM-e, glucosamine, and chondroitin sulfate."[4]

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Herb Consumers' Attitudes, Preferences Profiled in New Market Study

by Gwynne Rogers

As noted by numerous surveys and econometric tracking services, sales for herbal dietary supplements have dropped in the past five years from their previous record high levels.[1-4] This difficult state of the herbal marketplace over the past few years has challenged herbal supplement marketers to continually appeal to new consumers, attempt to demonstrate the superiority of their products, and find new ways of promoting their products.

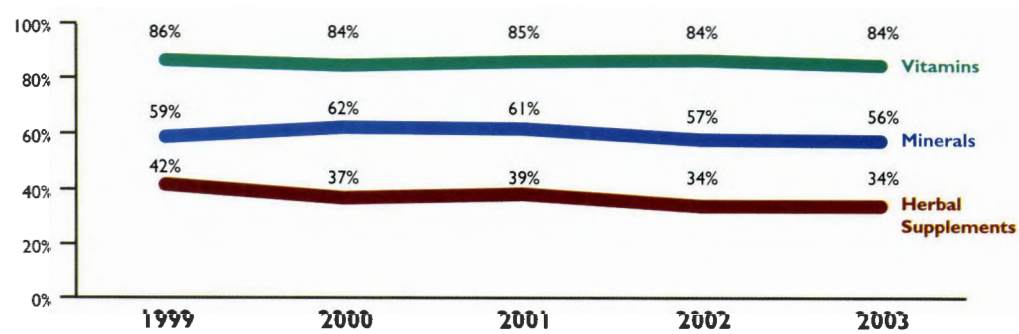
In such a market, the value of consumer research increases substantially because the cost of a misstep is magnified. The Natural Marketing Institute (NMI), a leading market research and strategic consulting firm, has researched the natural products marketplace since 1990. Its Health and Wellness Trends Database (HWTD) currently has five years of trended consumer data, with the sixth study just recently fielded. (A report on NMI's previous consumer research was published in *HerbalGram* 54.[5]) According to the HWTD, 34% of the U.S. general population used herbal supplements in the previous year (i.e., prior to the June 1, 2003 survey date).[6] This represents a market of over 60 million adults; and while it is constant relative to a year ago (i.e., relative to the last half of 2002 and the first half of 2003), the data reflects a decline in usage over the past five years (Figure 1).

NMI has identified a more integrated group of users: those who have used herbal supplements for more than a year on a regular and consistent basis. This group represents 14% of the general population. Compared to vitamins and minerals, of which 50% of the general population can be described as integrated users, one can see that while vitamins and minerals have mainstreamed, regular, integrated use of herbal supplements is still limited to a small group of consumers, relative to the potential. Based on this research, and other similar studies, NMI finds strong evidence of the importance of targeting consumers and understanding the benefits consumers seek.

Simple demographic targets are not as effective for products such as herbals — interest in herbals crosses age, gender, and income boundaries.

First, optimizing the consumer target is critical for efficiently using marketing dollars. NMI has found that simple demographic targets are not as effective for products such as herbals—interest in herbals crosses age, gender, and income boundaries. Understanding consumers' attitudes and lifestyle is a more productive means of identifying targets.

Figure 1. General Population Usage of Supplements



Source: Natural Marketing Institute, © 2004

One segment NMI found to be particularly fruitful for products such as herbals is the LOHAS consumer. "LOHAS" stands for "Lifestyles of Health and Sustainability," and LOHAS consumers represent approximately one in every three U.S. adult consumers.[7] They are driven by their interest in health, wellness, the environment and society, and they buy products accordingly. NMI identifies these consumers using a proprietary, 16-variable attitudinal segmentation model. This statistical analysis includes questions such as importance of sustainable manufacturing, concern about worker rights, and willingness to pay more for environmentally responsible products.

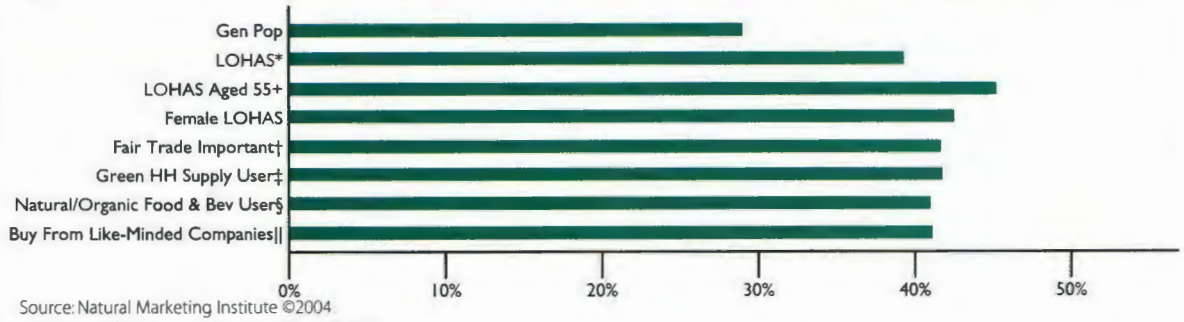
The behavior of LOHAS consumers is consistent with their attitudes. For example, they are heavier users of organic foods, more likely to practice yoga, heavier natural products channel shoppers (i.e., they tend to shop in natural food stores for some or all of their supplements and food items), and more likely to be members of environmental organizations. And, almost 40% of them use herbal supplements—a rate 37% higher than that of the general population.

For example, the data in Figure 2 show that a combination of attitudes, other product usage patterns, and some demographics can identify much more fertile consumer target groups.[7]

Second, it is important to understand why consumers use herbal supplements. According to the HWTD, the primary reason integrated herbal supplement users use them is for overall health and wellness (71%). Usage of herbs for treating or preventing specific health issues is statistically equivalent, at 35%.

Herbal supplements also satisfy an interest among users to lead a more healthy and natural lifestyle. Looking at numerous lifestyle measures, herbal supplement users are simply more intense about the beliefs they hold, the role of health and wellness in their lives, and the activities in which they participate. For example, 36% of herbal supplement users are LOHAS consumers (more than one-third higher than in the general population). This plays out in several attitudes, such as the importance of spirituality (with 58% of herbal supplement users stating they care about spirituality, versus 47% of the general population), and environmental issues (with 24% of herbal supplement users saying they prefer to purchase products manufactured in a sustainable way, versus 16% of the U.S. population).

Figure 2. Usage of Herbal Supplements Among Other Consumer Segments



Source: Natural Marketing Institute ©2004
* Lifestyles of Health and Sustainability (LOHAS)
† Indicates that "Fair Trade Certified" is very important for foods and beverages.
‡ Indicates they have purchased 1 of 12 different types of environmentally friendly household products.
§ Indicates they have purchased natural or organic foods and beverages in the past 6 months.
|| Indicates they agree completely with, "I will usually buy products from companies whose values are most like my own."

These attitudes pervade not just their usage of dietary supplements, but other healthy products. Herbal supplement users are 32% more likely to buy energy and nutrition bars than the general population, 59% more likely to buy organic foods and beverages, and 54% more likely to buy soymilk or other soy beverages. This pattern holds across natural personal care products, socially responsible investing, green building products, and natural household products. Usage of these products leads them to be heavier shoppers in natural channel stores; they shop at stores such as GNC, Trader Joe's, Whole Foods, and Wild Oats 40% more than the general population. And, perhaps not surprisingly, herbal supplement users also consume more healthy products, spending approximately 50% more on supplements each month than the general population.

Usage of herbs for treating or preventing specific health issues is statistically equivalent, at 35%.

Therefore, when all of these attitudes and behaviors are viewed in aggregate, an interesting trend becomes apparent: herbal supplement users are not just buying a supplement that treats or prevents a particular medical condition, they are looking for a natural approach to maintaining their health and wellbeing across most of their consumer behavior. These consumers want herbal products that provide the primary benefit of treating or preventing a specific health issue while improving their overall health and wellness. They also have an emotional need for a product that is pure, natural, and has a minimal planetary and societal impact.

Gwynne Rogers is a Strategic Marketing Analyst at The Natural Marketing Institute in Philadelphia. NMI provides in-depth market trend analysis and consumer attitude surveys in the natural products industry. More at www.nmisolutions.com.

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6. NMI's Health and Wellness Trends Database, © 2004. [Note: Data based on responses of more than 2,000 in June 2003 U.S. primary grocery shoppers, bringing the total number of respondents in the database to over 10,000. The data gathered are statistically significant to ± 2% at the 95% confidence level.]
7. NMI's LOHAS Consumer Trends Database, © 2004. [Note: Data based on responses of more than 2,000 U.S. general population adults, bringing the total number of consumers in the database to 6,000. The data gathered are statistically significant to ± 2% at the 95% confidence level.]

Anheuser-Busch Introduces New Beer with Caffeine, Guarana, and "Ginseng"

by Mark Blumenthal

In November 2004, Anheuser-Busch, the world's largest brewer, introduced a new beer—sporting the unusual name "B-to-the-E" (B^E), the "B" for beer and the "E" for "extra." The "extra" ingredients include caffeine, guarana, and "ginseng."

The new B^E will have a slightly sweet but tart taste—with fruit overtones of blackberry, raspberry, and cherry. "We created a great new drink that's outside the boundaries of the taste adults would expect from a traditional beer," said Nathaniel Davis, brewmaster at Anheuser-Busch (A-B) in a press release. "With B-to-the-E, we've come up with a beer that has a taste with a 'wow' factor at the finish."[1]

The target market is consumers aged 21 to 27 years. The idea of adding caffeine (both the pure compound and the caffeine in the guarana) plus the "ginseng" is unique in a commercial beer, and it is oriented towards active, young adults living highly energetic, fast-paced lives.

"Contemporary adults thirst for variety and what's new, and our B-to-the-E delivers a beverage that is true to their lifestyles and range of drinking occasions," said Pat McGauley, senior director of New Products and High End Brands at A-B. "Our new B-to-the-E provides caffeine, guarana, and ginseng in a great tasting beer."[1]

Assuming that the company is implying a slightly stimulating effect for this beer, the actual stimulant effect would depend on the amount of the caffeine and each herbal extract per can. The company would not reveal the amount of the two herbal extracts, but disclosed that one 10-ounce can of B^E contains a total of 54 milligrams of caffeine. Plus, each can produces 203 calories and contains 6.6 percent alcohol by volume and 22.5 carbohydrates.[1]

A-B's new launch is based on its strategy to increase its presence in the niche market for specialty beers and beverages. Beer sales have been declining among traditional beer drinkers, including young male adults. Major breweries have introduced new alcoholic beverages intended to capitalize on new trends; this includes Coors' recent introduction of the Zima® line of flavored alcoholic beverages (www.zimaxxx.com). Also expressing this new trend is Zygo™, a newly-introduced flavored vodka containing the amino acid taurine, plus guarana, d-ribose, and yerba mate (*Ilex paraguariensis* A. St.-Hil., Aquifoliaceae); more at www.energyvodka.com.

The new B^E brew will be produced at the company's Houston brewery. B^E will be launched in multiple phases throughout the year in various markets in the U.S.

What type of "ginseng"?

The South American seed guarana (*Paullinia cupana* Kunth., Sapindaceae) is a commonly used ingredient in beverages in Brazil and other countries. Compared to other natural sources of caffeine, it contains a relatively significant amount (usually about 2.6 – 7%).[2]

It is relatively simple to determine what A-B means when it puts "guarana" on its label; it is less clear what it means when it uses the word "ginseng." Several requests by this writer via e-mail and telephone to A-B to clarify the specific type of ginseng were answered by spokeswoman Gayle Daugherty who said she was not authorized to reveal this information: "We are unable to provide some of the information you requested based on confidentiality. Please call me with any questions." (Written communication to M. Blumenthal [e-mail], December 3, 2004.) This writer responded by telephone with additional questions, but Ms. Daugherty was unable to provide answers. (Oral communication to M. Blumenthal [telephone], December 6, 2004.)

The "ginseng" in B^E could be derived from either of several botanical sources, and as this publication has noted previously, there was formerly considerable confusion in the marketplace as to what botanical material was being sold in a product labeled as containing "ginseng."[3] The most common and presumptive material is from either Asian ginseng (*Panax ginseng* C.A. Meyer, Araliaceae) root, long believed to have "stimulant" properties, or roots of American ginseng (*P. quinquefolius* L.).

It is also at least theoretically possible that the "ginseng" in the new beverage might be a third type of herbal material. From the mid-1970s until May 2002, many dietary supplements and beverages sold in the United States contained plant material labeled "Siberian ginseng," which purportedly contained the root of eleuthero (*Eleutherococcus senticosus* [Rupr. & Maxim.], Harms, Araliaceae). [Note: The qualifier "purportedly" is used to denote the fact that although much of the so-called "Siberian ginseng" sold in the U.S. in 1970s and 1980s that was sourced from China was labeled as being "*Eleutherococcus senticosus*," subsequent analysis of some batches revealed that it was actually Chinese silkvine (*Periploca sepium* Bunge., Asclepiadaceae), an entirely different plant from a different family.[4,5,6]] Eleuthero/"Siberian ginseng" became particularly popular because the cost of eleuthero is considerably lower than root material from either of the *Panax* species. Although eleuthero is in the same botanical family (Araliaceae) as are the ginsengs from the genus *Panax*, a provision in the Farm Bill of 2002 made it illegal for any herbal material from a genus other than *Panax* to be labeled or sold as "ginseng" in the U.S.[7,8]

The idea of adding caffeine (both the pure compound and the caffeine in the guarana) plus the "ginseng" is unique in a commercial beer.

In an e-mail sent to A-B, this writer explained this potential confusion to A-B. The e-mail contained both *HerbalGram* articles on the ginseng confusion and the Farm bill articles (both cited above). (Written communication to G. Daugherty [e-mail], December 8, 2004.) On December 28 this writer contacted Ms. Daugherty again to see if there was any chance for further clarification of the "ginseng" material. She noted that she was still not author-

ized to provide any additional information and that she had forwarded this writer's e-mail about the potential species confusion to the appropriate people at A-B. At press time (early January) there has been no response from A-B.

Regulations governing herbs and flavors in alcoholic beverages

In response to this writer's question as to what extent, if any, A-B has taken measures to confirm the safety of its "ginseng" ingredient, as would be required by most conventional food or beverage manufacturers under FDA regulations, A-B's brewmaster Nathaniel Davis provided the following response in an e-mail from Ms. Daugherty: "The ginseng we use in B^{E} is certified by our supplier as GRAS. The U.S. Treasury Department's Alcohol and Tobacco Tax and Trade Bureau (TTB) has approved B^{E}'s formulation and labeling under its procedures." (Written communication to M. Blumenthal [e-mail], December 3, 2004.)

From a regulatory perspective, this is probably all that would be required of A-B with respect to documenting the safety of its flavoring ingredients. Unlike conventional foods and dietary supplements, manufacturers of beer and related malt beverages are not regulated by the Food and Drug Administration (FDA) and are not required to list the identity of flavorings used in beers. While a manufacturer of a conventional food wanting to include an herbal ingredient must use one that is GRAS (generally recognized as safe), it is worth noting that the original GRAS list was developed by the Flavor and Extracts Manufacturing Association (FEMA), an industry trade association, for use in flavoring foods and alcoholic beverages. FDA eventually adopted the list as official policy.

According to Rakesh M. Amin, a pharmacist and regulatory attorney in Chicago (www.amin-law.com), the labeling and advertising requirements for malt beverages are outlined in the *Code of Federal Regulations* (27 CFR §7).[9] The definition of malt beverage is found in 27 CFR §7.10. Most importantly, subpart C outlines the labeling requirements for malt beverages (27 CFR §§7.20-7.29). In general, a malt beverage label must contain its brand name, class, name and address, net contents, alcoholic content if required by state law, and other statements of content if required (27 CFR §7.22).

In addition to the malt beverage labeling requirements, regulations specific to flavored malt beverages have been proposed but are not yet required. These are outlined in the *Federal Register* (Vol. 68, No. 56)[10] and define the difference between malt beverages and flavored malt beverages. Specifically, flavored malt beverages contain: (1) a beer base treated to remove the taste and bitterness that is generally associated with beer; (2) a taste that comes from added flavors rather than fermentation of malt; (3) low carbonation; (4) clear coloring or coloring from added flavoring or coloring materials; and (5) an alcohol content derived largely from the distilled spirits in the added flavoring.

It appears that the new brew meets all regulatory requirements, despite the probable preference by members of the botanical community, and possibly also consumers, for more clarity on the nature of the "ginseng" in B^{E}.

Amin stated that according to the Alcohol and Tobacco Tax and Trade Bureau (ATTB), in order to get specific labeling requirements for the beer product, the manufacturer would have to submit the list of ingredients with the method of manufacture on the company's letterhead to the ATTB in Washington, D.C. The ATTB would review the label and let the company know what it would need to include on its labeling based on the information submitted. (Written communication to M. Blumenthal [e-mail], December 8, 2004.) Thus, at this time, under appropriate federal regulations for flavored malt beverages, and assuming that the "ginseng" in B^{E} is from the genus *Panax,* it appears that the new brew meets all regulatory requirements, despite the probable preference by members of the botanical community, and possibly also consumers, for more clarity on the nature of the "ginseng" in B^{E}.

The practice of adding herb-based flavorings to beers has a long and rich tradition. Herbs have been added for flavor as well as for their preservative properties for hundreds of years. In 1516 in response to the addition of many additives to "beers" of the day, the German authorities passed the *rheinheitsgebot*, the German beer purity law, which is still in effect today. This law requires that beers sold in Germany contain only four ingredients: water, barley, yeast, and hops (*Humulus lupulus* L., Cannabinaceae). Predictably, A-B will not attempt to market its new brew in Germany. For more information on the history of herbal ingredients in beers and other fermented beverages, see Stephen H. Buehner's *Sacred Herbal Healing Beers: The Secrets of Ancient Fermentation* (Siris Books, 1998), reviewed in *HerbalGram* 48.

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Hepatotoxicity Assessment for Botanical Dietary Supplements

by Larry A. Walker, PhD

Adverse events with botanical products are relatively rare, but with increasing frequency and duration of exposure, some reports have appeared linking herbal products with serious injury. Among the most troublesome is the reported association of some botanicals with liver injury. These effects in some cases have been linked to consumption of botanicals with recognized hepatotoxic components (e.g., pyrrolizidine alkaloids). However, in other cases the causative agent(s) is less clear, and in any case the mechanisms that relate to hepatotoxicity are usually poorly understood. In recognition of the need for a better scientific base for understanding botanical-induced hepatotoxicity and for better tools for assessment and prediction, the National Center for Natural Products Research (NCNPR), a botanical research center located at the University of Mississippi, hosted a workshop on September 8-9, 2003. The NCNPR hosted the workshop under a cooperative agreement with the Center for Food Safety and Applied Nutrition (CFSAN) of the Food and Drug Administration (FDA). The workshop featured presentations by 22 experts from academia, government, pharmaceutical industry, and the herb and dietary supplement industry trade organizations. It was attended by 65 people from government, academia and the herb industry.

One of the dominant themes of the workshop centered on the variability in predicting hepatic injury.

The purpose of the workshop was to review and discuss methods of assessing the hepatotoxicity of botanical dietary supplements with an emphasis on in vitro laboratory techniques that might be applied in screening for assessment and eventually, prediction of hepatotoxic potential. Although application of existing and emerging methodologies can well characterize and even predict some hepatic insults, the workshop identified important gaps in understanding that should be addressed by researchers.

First, planned implementation of more specific manufacturing controls by the industry will help to minimize the incidence of hepatotoxic and other adverse events due to contamination and will facilitate the tracking of offending agents or products containing contaminants in cases that do occur. Hopefully, the forthcoming final rules for Good Manufacturing Practices, which may be published in early 2005, will hasten this development industry-wide. (Previously proposed rules for GMPs were published by FDA in March 2003.[1]) Second, more awareness and comprehensive utilization of avenues for adverse event reporting will facilitate the identification of problem plants and their toxic constituents. For example, the FDA is implementing an adverse event reporting system specific to dietary supplements, the CFSAN Adverse Events Reporting System (CAERS; http://www.cfsan.fda.gov/~dms/caersltr.html). Third, there is a critical need for more suitable screening methods for predicting hepatotoxicity a priori, so botanicals and their derived products can be reliably assessed. The availability of such methods will, of course, depend on extensive research in order to develop and validate them.

One of the dominant themes of the workshop centered on the variability in predicting hepatic injury; the literature suggests that susceptibility may vary markedly due to genetic or pathophysiological factors (e.g., infection, inflammation) or co-exposures to other agents that impact susceptibility. Because of these factors, it seems unlikely that a single screening approach will be able to predict hepatotoxic potential, given that the mechanisms of action involved are so varied and complex. However, one might envision development of a battery of tests based on the thorough characterization of known hepatotoxic botanicals and correlation to in vivo liver injury. These might be used to screen against the major categories of offending agents. Although perhaps somewhat impractical at present, it might be plausible to create a database of "structural alerts" for known hepatotoxic molecules. However, such a database of structures is not feasible without ways to detect them. The purpose of the workshop was to explore ways to address the problem of predicting/finding/eliminating hepatotoxic constituents or contaminants. The question is whether research can provide the tools to make this more practical. To develop these tools, however, an intensive research effort will be required, optimally with coordinated studies and cross-validation in multiple laboratories.

***Unpredictable* hepatotoxicity associated with either drugs or botanicals is also extremely difficult to recognize or assess because prevalence of adverse reactions ranges between 1 in 10,000 and 1 in 100,000 against a large background.**

Selected presentations of the workshop speakers are highlighted below.

Neil Kaplowitz, MD (University of Southern California School of Medicine), presented an overview of the clinical picture in drug-induced liver injury, with perspectives on reported cases that have been reportedly associated with herbals or natural products. Patients with drug-induced injury may show symptoms of acute hepatitis, or on the other end of the spectrum, with cholestasis (a condition characterized by greatly reduced or obstructed flow of bile), and often may show mixed signatures. In either case, inflammatory processes are usually associated with a wide range of cell types, adaptive immune responses, repeated or prolonged exposure, and to varying degrees, repair/regeneration processes, making the progression very complicated. Drug-induced liver disease may be further categorized as *predictable* (high incidence, dose-related) and *unpredictable* (low incidence that might or might not be dose related).

The chemistry of botanical products can, of course, be quite variable, and the use may be sporadic, so the occurrence of "predictable" hepatotoxicities is rare. *Unpredictable* hepatotoxicity associated with either drugs or botanicals is also extremely difficult to recognize or assess because

prevalence of adverse reactions ranges between 1 in 10,000 and 1 in 100,000 against a large background. Recognition of causality in idiosyncratic hepatotoxicity (i.e., spontaneous hepatotoxicity of no direct or demonstrable origin) is further confounded by combinations of numerous variables, including environmental conditions (underlying disease, co-medication, tissue injury), genetic factors (drug metabolism or transport differences), induction or inhibition of metabolizing enzymes, and the molecular nature of the toxicant.

A few botanicals are recognized for their predictable hepatotoxicity. Botanicals containing pyrrolizidine alkaloids (PAs) were first associated with hepatotoxicity over 70 years ago. Po Chan, PhD, and Abraham Nyska, PhD (National Institute of Environmental Health Sciences), provided a historical overview of PAs, as well as the results of their mechanistic studies with riddelliine, a PA selected for study by the National Toxicology Program. PAs can be found in more than 350 plant species, but are typically in plants from the genera *Crotalaria*, *Heliotropium*, *Senecio*, and *Symphytum* (the genus of the formerly popular herb comfrey). Human exposure to PAs typically occurs from teas, contaminated foods, or herbal preparations. Because of the PAs found in comfrey, companies have been advised by the FDA to remove products for internal consumption from the market.[2]

The most problematic incidences of botanical-induced hepatotoxicity are those that represent "unpredictable" or idiosyncratic reactions. Since the basis for these is poorly understood, determining causation and developing preventive strategies are much more complex. Some of the complicating factors and approaches to a better understanding were explored by several speakers.

A primary consideration in the understanding of potential safety concerns with botanicals is in the arena of drug interactions. Recent studies have highlighted instances of induction or inhibition of drug metabolizing enzymes (DMEs) by botanical constituents. These may have undesirable effects, augmenting or impairing the bioavailability of drugs with narrow therapeutic indices or enhancing bioactivation of some drugs to reactive intermediates, with consequent toxic responses. This is the way in which chronic alcohol is suspected to potentiate the hepatotoxic effects of acetaminophen. In addition, certain botanical constituents themselves could be bioactivated by DMEs to form reactive metabolites.

Considerable discussion focused on the differences in metabolism among different animal species, and the consequent limited ability of animal models to predict toxic responses in humans. Several speakers addressed the utility of using human hepatocytes (liver cells) to address how botanicals can affect (induce/inhibit) cytochrome P450 (CYP450) and Phase II enzymes and drug transporters. Because the hepatocytes contain the important biotransformation enzymes, these systems can also be used to understand how constituents are metabolized and potentially detect what the reactive metabolites are.

Because of these complicated interactions with genetic and environmental factors, it seems unlikely that a single screening approach will be able to predict hepatotoxic potential.

Stephen Strom, PhD (Univ. Pittsburgh School of Medicine), discussed an approach used by his group that entails use of primary cultured human hepatocytes (from liver transplant donors) to study the effects of botanicals on drug metabolizing enzymes. Work in Dr. Strom's laboratory demonstrated the effects of botanical constituents, including the effect of hyperforin from St. John's wort (*Hypericum perforatum* L., Clusiaceae) to induce the expression of cytochrome P450 drug-metabolizing enzymes (CYP 3A4 & 2C9), and the potent inhibition of the enzymes CYP 3A, 1A1, and 1A2 by bergamottin in grapefruit juice.

A disadvantage of utilizing primary hepatocyte cultures is the limited availability of tissue. However, most cultured cell lines lose many of the differentiated features of normal hepatocytes, thus limiting their utility for this type of screening. Jim Kelly (Amphioxus Cell Technologies, Houston, TX) presented work on a subline of HepG2 cells and his company's system for predictive hepatotoxicity testing. This cell line has been selected for its preserved metabolic profile, and thus sensitivity to some toxicants that require metabolic activation. Inhibition of CYP450 metabolism can be observed, and CYP3A and CYP1A induction responses have also been explored in these cells. It is possible to assess multiparameter toxic endpoints in this cell line, including apoptotic indicators (apoptosis refers to the programmed death of normal cells), enzyme release, proliferation inhibition, CYP induction or inhibition, and P-glycoprotein transporter inhibition or induction.

Another "high-content" screening approach was presented by Craig Downs (EnVirtue Biotechnologies, Winchester, VA) wherein responses of cell lines to xenobiotics (foreign compounds, i.e., chemicals from outside the body) can be profiled with an array of quantitative ELISA (Enzyme-Linked Immunosorbent Assay) assays, using antibodies to panels of markers categorized for relevance to genomic integrity, metabolic integrity, oxidative stress, apoptosis, cell structural integrity, and others.

In addition to potential animal versus human differences in susceptibility, it is now well known that certain polymorphisms among humans can significantly affect susceptibility to hepatotoxic injury. Polymorphisms in cytochrome P450 genes can predispose to rapid or slow metabolism, thus leading to variable responses. Therefore, in a rapid metabolizer, clearance of a drug/botanical constituent may be increased; however, for toxic principles that require bioactivation to cause damage, the same person may show an enhanced injury. Ronald Hines, PhD (Medical College of Wisconsin) illustrated this point with CYP3A-mediated metabolism of germander. Germander (*Teucrium chamaedrys* L., Lamiaceae) was formerly used as a weight control adjuvant in some European formulations, and its usage in France led to 26 cases of cytolytic hepatitis. Germander contains neo-clerodane diterpenoids that are bioactivated by CYP3A, and induction of apoptosis in vitro is blocked by a CYP3A inhibitor and enhanced by CYP3A induction. Variability in human CYP3A includes polymorphisms in CYP3A5 and CYP3A7 that occur at different frequencies in various populations. If CYP3A5 or CYP3A7 specifically contribute to diterpenoid metabolic activation, individuals with these polymorphisms could be variably susceptible to germander-induced hepatotoxicity. Such

genetically determined variations in responses should become easier to recognize as the exploitation of the knowledge of the human genome advances and the field of pharmacogenomics matures.

Recent important advances in the understanding of the induction of CYP450s by xenobiotics emphasize the role of a variety of nuclear hormone receptors and their response elements. David Moore, PhD (Baylor College of Medicine), summarized work from his lab on the regulation of CYP450 drug-metabolizing enzymes by constituents of herbal products. As an example of herbal product interactions via this pathway, St. John's wort extracts appear to induce the CYPs by activating nuclear hormone receptors. These receptors also display some species-dependent characteristics (e.g., human and todent receptors respond differently to inducers).

In addition to the uncertainties introduced with species variability and with genetic polymorphisms in human populations, other factors complicate the ability to predict botanical hepatotoxic responses and to study their mechanisms. For example, although some hepatotoxicants are certainly directly toxic to hepatic parenchymal cells in vitro, in many cases other cell types have been implicated, including Kupffer cells, neutrophils, T-lymphocytes, stellate cells, and sinusoidal endothelial cells.

Robert Roth, PhD (Associate Director, Michigan State University's National Food Safety and Toxicology Center), showed his group's work with monocrotaline (MCT), a pyrrolizidine alkaloid that causes cell death in hepatic parenchymal cells following an acutely toxic dose in rats. This response requires more than just MCT and hepatic parenchymal cell interaction. MCT-induced injury to sinusoidal endothelial cells occurs and is associated with activation of the coagulation system, deposition of fibrin in the liver sinusoids, and impairment of blood flow and oxygenation of liver tissue. Although high doses of MCT do not require inflammation to cause liver injury, otherwise nontoxic doses of MCT become very toxic in the presence of modest coexisting inflammation. When rats were treated with doses of lipopolysaccharide (LPS) sufficient to induce a modest inflammatory response, subsequent administration of subthreshold doses of MCT elicited pronounced hepatotoxicity. This synergistic reaction was not observed in isolated hepatocytes exposed to MCT and LPS. The enhanced sensitivity in vivo requires Kupffer cells, neutrophils and tumor necrosis factor-α, as well as an activated coagulation system. This example suggests that the contributions of various nonparenchymal cell types found in the liver and the inflammatory mediators they produce should be considered in assessment of the hepatotoxic potential of botanical supplements. Moreover, it raises the possibility that consumers of PA-containing products who experience an infection or inflammatory episode may be at greater risk for developing liver injury. An important question to be explored is whether the infection or inflammation-mediated "sensitization" may also apply to other botanicals—or to other pharmaceuticals, for that matter. Also, do other such interactions predispose liver injury by drugs/botanicals that may be otherwise innocuous? For example, what is the effect of combining herbal products with acute or chronic consumption of alcohol or other drugs that might cause liver damage?

Because of these complicated interactions with genetic and environmental factors, it seems unlikely that a single screening approach will be able to predict hepatotoxic potential. However, one might envision development of a battery of tests based on the thorough characterization of known hepatotoxic botanicals and correlation to in vivo liver injury. These might be used to screen against the major categories of offending agents. To develop these, however, an intensive research effort will be required (and, hopefully, adequate funding for such research will be awarded), optimally with coordinated studies and cross-validation in multiple laboratories. These studies should help to better exploit the beneficial effects of herbal products, while more accurately assessing and minimizing the relatively rare adverse events associated with their use.

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Ghana and Dakar, Senegal), East Africa (Kigali, Rwanda), and Southern Africa (Stellenbosch, South Africa and Lusaka, Zambia), in concert with their associated universities: Kwame Nkrumah University of Science and Technology (Ghana), Stellenbosch University (South Africa), the National University of Rwanda (Rwanda), and the University of Zambia (Zambia). The program also includes numerous NGO and private sector (i.e., commercial businesses) communities in Africa, along with businesses in the United States.

In addition to Prof. Simon, others involved in running the new project are Ramu Govindasamy, PhD and Associate Professor; Mr. Dan Acquaye; and H. Rodolfo Juliani, PhD (Research Associate), with activities coordinated through the Rutgers New Use Agriculture and Natural Plant Products Program and the Food Policy Institute, in concert with ASNAPP-Africa and ASNAPP-USA. Further information is available from Prof. Simon or Prof. Govindasamy (Tel: 732-932-9711, ext. 355; e-mail: jesimon@aesop.rutgers.edu or govindasamy@AESOP.Rutgers.edu). Additional information on ASNAPP is available at www.asnapp.org and by viewing the article on page 67 of this issue which reports on the ASNAPP conference held in Senegal in August 2004.

—Mark Blumenthal

Source

New USAID Funded Project Supports the Natural Products Sector in Africa [Press Release]. Rutgers University; December 4, 2004.

ASNAPP 4th International Roundtable on Natural African Plant Products Held in Senegal

by Mark Blumenthal

The fourth International Roundtable Conference on African Natural Plant Products was held in Dakar, Senegal, from August 25-27, 2004. The conference was titled, "Market Access and Competition of African Natural Plant Products." It was sponsored by Agribusiness in Sustainable Natural African Plant Products (ASNAPP), an organization funded in part by the United States Agency for International Development.

The conference keynote address was given by His Excellency Maitre Abdoulaye Wade, President of the Republic of Senegal, with welcoming remarks from Madame Viviane Wade, First Lady of the Republic of Senegal. This is the first time a head of state has addressed the ASNAPP roundtable. Even more significantly, President Wade is the first African head of state to officially support natural products development. People from 30 nations attended the three-day conference.

Presentations dealt with varied opportunities, challenges, and obstacles facing African medicinal and aromatic plant producers. Topics included export and quality issues in the herbal tea market; production and quality control in essential oils; the emerging international market for shea butter (*Butyrospermum parkii* [Don] Kotschy, Sapotaceae), which is an increasingly popular ingredient in cosmetics and food products; and the challenges and strategies for introducing new African herbal medicinal preparations into local, regional, and overseas markets.

Presenters from the U.S. included Prof. James E. Simon of Rutgers University, a long-time participant in the ASNAPP process, who gave several talks including: "Medicinals: Overview of emerging crops with high commercial potential (Artemisia, Cryptolepis, Moringa, etc.)" and "Quality Assurance & Quality Control, Regulatory & Trade Standards Issues." Kodzo Gbewonyo, PhD, of BioResources International Inc., gave an "Overview of Natural Products of Africa," while Howard Y. Shapiro, PhD, of Masterfoods USA (division of M&M Mars Inc.) and vice-president of agriculture at Seeds of Change, spoke on "Sustainable development models for commercialization of natural products." Erica Renaud,

Steated (L to R): Jerry Brown of USAID, Madame Viviane Wade, First Lady, President Abdoulaye Wade, Dan Acquaye of ASNAPP, and Barbara Wilde, Advisor to the President on Organic Agriculture and Natural Plant Products.

Research Manager at Seeds of Change, presented on the ever-important issue of Good Agricultural Practices. (Note: please see related story in this issue titled, *WHO Releases "Guidelines on Good Agricultural and Collection Practices" of Herbs* on page 22.) Van Woods, CEO of Sylvia's Restaurant, gave a buyer's perspective on shea butter. This writer gave three presentations: "Overview of the natural products industry in the U.S. and the implications of the Bioterrorism Act"; "Case studies and lessons learned from the recent introductions of [herbal] medications into the international marketplace"; and "Print media: Effective tool for new product introductions." African plant products are becoming increasingly important to the U.S. and world market, as well as for consumption as teas, herbal medicines, and cosmetic ingredients in Africa.

President Wade is the first African head of state to officially support natural products development.

Other presentations were made by Allen Ranft of Food Surveys in South Africa on the subjects of "Good Manufacturing Practices (GMP), essential tool to market access" and "HACCP and Erogap: Overview and requirements for entering international markets." (Note: HACCP refers to Hazard Analysis Critical Control Point, a key process in food manufacturing that allows for the prevention of food safety problems.) Prof. Charles Quansah of the Kwame Nkrumah University of Science Technology in Ghana discussed "The role of research in crop domestication, Product development and technology transfer." Martin Schneider, PhD, Purchasing Manager of the Pharma Division of Frutarom in Switzerland, presented an overview of the natural products industry in Europe with emphasis on market and regulatory challenges. Verena Ruschmeyer, of Berfin (Pty) Ltd in South Africa, provided insights into "The Herbal Tea Industry: Overview of the herbal tea market in the U.S. and Europe." Wayne Barratt, Director of EarthOil in Kenya, spoke on "Essential oils industry: Challenges, opportunities and the potential for economic development in Africa."

Numerous presentations were also made by staff members of ASNAPP from various African countries. Petrus Langenhoven, Agronomist and Greenhouse specialist for ASNAPP in South Africa, spoke on the subject of "Intensive crop production, Use of hydroponics and green house systems in the commercial development of herbs and specialty vegetables." Masseur Nguer, ASNAPP country manager for Senegal, gave an overview of the organization's activities in this country. Elton Jefthas, marketing coordinator and ASNAPP country manager for South Africa, gave a talk on the Wupperthal Rooibos Tea Trust, and a gentleman from Senegal provided information on the efforts to commercialize Kinkeliba tea (from *Combretum micranthum* G. Don., Combretaceae) in Senegal and beyond.

Recent issues of *HerbalGram* have covered numerous herbs and themes related to Africa including: the progress in the treatment of malaria from the roots of *Cryptolepis sanguinolenta,* which was a feature article in issue #60; and the growing popularity of the Rooibos tea (*Aspalathus linearis*), which was the cover story in issue #59. Earlier issues have featured articles on devil's claw (*Harpagophytum procumbens*), appearing in issue #50, and pygeum bark (*Prunus africana*), appearing in issue #43. Long-time ABC members and *HerbalGram*

readers may recall the special issue of *HerbalGram* #43 on African medicinal plants, back issues of which were distributed to the conference attendees.

ASNAPP is funded largely through the U.S. Agency for International Development (USAID). The ASNAPP mission states that, "ASNAPP helps create and develop successful African businesses in the natural products sector providing income, employment and development, through environmentally and socially conscious sustainable production of high quality, healthful natural products for local, regional, and overseas markets."

A translation of the conference opening address by President Wade is provided in a sidebar to this article. For more information about the conference, visit the ASNAPP Web site (www.asnapp.org).

Opening Address by His Excellency Maitre Abdoulaye Wade, President of the Republic of Senegal

President Wade's opening address to the "ASNAPP 4th International Roundtable on Natural African Plant Products" held in Dakar, Senegal, August 25, 2004:

It is with great pleasure that I preside this morning over the opening of the fourth ASNAPP International Roundtable on Natural Products.


Wade

This is the first time that this conference has taken place in a francophone country, and I am convinced that Senegal can serve, for the francophone regions of the African Sahel, as a door of entry into the domain of natural products.

That will be the opportunity to wish a warm welcome to all the participants of this conference.

As you know, agriculture constitutes the backbone of the economy in most developing countries and assures the well-being and livelihood of a major proportion of their rural populations.

Many African countries, including Senegal, have long depended on traditional crops such as coffee, cotton, rubber, and peanuts as sources of revenue and international trade. However, during the last several years, the prices of these traditional commodities have fallen steeply, with negative consequences for the incomes of rural populations.

The Government of Senegal has, for its part, therefore instituted policies and programs oriented toward the diversification of crops, promotion of export, augmentation of producers' revenues, and improvement of the well-being and livelihoods of farmers whose resources have traditionally been limited.

But we know that while the prices of traditional agricultural commodities continue to fall, markets for natural products, especially those which are nutritional, have experienced huge growth during the last ten years.

The strong evolution of the world market for nutritional products (food and dietary supplements) alone is estimated at $60 billion per year. There is an unceasing and growing demand for natural, organic products such as teas and herbal tisanes, nutritional supplements, essential oils, herbs and spices, medicinal plants and plants with cosmetic applications.

Market trends have been influenced by a change in consumer behavior away from synthetic products toward natural products. The natural products industry therefore constitutes a means of assuring alternative revenue sources for exporting farmers, while simultaneously addressing the health and nutritional needs of local populations.

Therefore, in order that the countries of sub-Saharan Africa, and especially Senegal, may better benefit from this expanding market and take advantage of these opportunities, it is necessary to:

1. Implement quality control systems to assure products that are consistent with buyers' quality requirements and specifications.
2. Encourage best agricultural and manufacturing practices.
3. Make market information continually available for potential investors in the market.
4. Assure continuous production and promotion of these products.
5. Develop good packaging and good presentation of product.
6. Build human and institutional capacities in order to boost information exchange and commercial networks linking African businesspeople and the Senegalese to international organizations involved in the production of natural products.
7. Enact the necessary policies and logistical support for investment.

Ladies and gentlemen, the theme of this conference, "Market Access and Market Competitiveness of African Natural Plant Products," conforms perfectly with the political agenda of the NEPAD [New African Partnership for African Development]. African leaders have recognized the need for African countries to have access to world markets by providing high quality products.

The objectives and content of this conference, which are oriented toward establishing a partnership between producers, researchers, processors, exporters, and political decision-makers, further underline the call of the NEPAD for regional partnership and integration.

With more than 20 countries represented here, I am convinced that the sharing of expertise among researchers, manufacturers, producers, entrepreneurs, exporters, and political decision-makers will help to meet the challenges of quality control, packaging, manufacturing techniques, and market development.

I could not conclude without thanking USAID [United States Agency for International Development] and the organizers for choosing Senegal to host this conference.

I hope that your meetings will support these activities, which have already started in Senegal, and will allow both institutions and participants to benefit from ASNAPP programs.

My government will continue to support your efforts, so that we may achieve our objectives and so that Senegal can show the way and serve as an example to other countries.

I declare the ASNAPP conference on market access and competitiveness of African natural plant products now open.

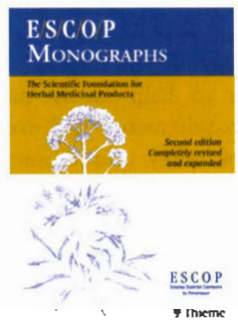
book reviews

E/S/C/O/P Monographs: The Scientific Foundation for Herbal Medicinal Products, 2nd ed. Published by ESCOP, the European Scientific Cooperative on Phytotherapy: Exeter, UK, in collaboration with Georg Thieme Verlag, Stuttgart, Germany, and Thieme New York. 2003. 556 pp. ISBN 1-901964-07-8 (ESCOP), ISBN 3-13-129421-3 (GTV), and ISBN 1-58890-233-1 (TNY). $139.00. ABC catalog #B524.

The European Scientific Cooperative on Phytotherapy (ESCOP) was established in 1989, and the first ESCOP monographs were published in March 1996 as the first of 6 fascicules (installments of 10 monographs each, in loose-leaf, ring binder format) with the final fascicule published in October 1999. The second edition, a hard-back book, contains 60 fully revised and expanded therapeutic monographs from the first edition in addition to 20 completely new monographs. The monographs are arranged alphabetically according to their pharmacopeial names, and the corresponding common names used by ESCOP, in many cases, do not match the Standardized Common Names[1] collected and promoted by the American Herbal Products Association that are accepted in North America. For example, ESCOP uses Hamamelis Bark instead of Witch Hazel Bark (*Hamamelis virginiana*) and Pale Coneflower Root instead of Echinacea Pallida Root (*Echinacea pallida*).

ESCOP is a consortium of many of the most respected and knowledgeable phytomedicine experts in Europe. Accordingly, the ESCOP monographs are considered to be an authoritative source of scientific evidence for phytomedicines and in fact are being utilized by the Committee for Herbal Medicinal Products (CHMP) of the European Medicines Evaluation Agency (EMEA) as a basis for establishing "core data" on leading European herbal medicinal products. Such core data is referenced by product manufacturers for their product license applications in order to obtain premarketing authorization for phytomedicinal products in the European Union (EU).

The ESCOP monographs are intended to be a contribution to the harmonization of therapeutic guidelines and standards for herbal medicines in the EU. The ESCOP monographs do not contain data on identity, quality control, analytical methods, etc., as are found in the *European Pharmacopoeia* (PhEur) and other national pharmacopeias, and to some extent in the monographs produced by the World Health Organization (WHO). However, each ESCOP monograph specifies the quality standard with which the botanical raw material must comply. For example, Ginkgo Leaf must comply with the monograph of the PhEur and Standardized Ginkgo Dry Extract must comply with the monograph of the *German Pharmacopeia* (DAB).



It is of particular interest for this American writer that 12 of the 80 monographs (15%) are native American herbs that have been introduced into European phytomedicine over the last couple of hundred years, another 3 monographs are Pacific Island herbs (eucalyptus [*Eucalyptus globulus*], Java tea [*Orthosiphon stamineus*], kava-kava [*Piper methysticum*]), and at least 15 of the 80 monographs cover herbs of Asian origin, stemming from traditional use in the Indian and/or Chinese systems of medicine, among other Asian systems. These include Asian ginseng (*Panax ginseng*), cinnamon (*Cinnamomum zeylanicum*), eleuthero (*Eleutherococcus senticosus*), garlic (*Allium sativum*), ginger (*Zingiber officinale*), ginkgo (*Ginkgo biloba*), Tinnevelly senna (*Cassia angustifolia*), and turmeric (*Curcuma longa*), among others. Table 1 lists ESCOP monographs of Native American herbs. Table 2 shows ESCOP Monographs appearing for the first time in the second edition.

Each monograph includes the following elements: definition, constituents, clinical particulars (therapeutic indications, dosage, method of adminisrration, duration of administration, contraindications, special warnings and precautions, interactions, pregnancy and lactation, effects on ability to drive, undesirable effects, overdose), pharmacological properties (pharmacodynamic properties, in vitro experiments, in vivo experiments, pharmacological studies in humans, clinical studies, pharmacokinetic properties, preclinical safety data), and references. In some cases there are also a number of tables provided. For example, in the Ginkgo folium monograph there are five tables: (1) Critical reviews and meta-analysis of clinical studies; (2) Clinical studies in dementia; (3) Clinical studies in cerebral insufficiency; (4) Clinical studies in neurosensory disturbances; and (5) Clinical studies in peripheral arterial occlusive disease. Aside from the 80 monographs, the book has only a subject index that includes the botanical names, common names, and pharmacopeial names. No constituents, actions, indications, or other terms are indexed.

As an example of the extent of revision and expansion, the ESCOP 1996 Zingiberis Rhizoma (Ginger) monograph referenced 47 citations, mostly from the 1980s with a few up through 1994. The ESCOP 2003 Zingiberis Rhizoma monograph has 58 cita-

Table 1. ESCOP Monographs of Native American Herbs

Pharmacopeial Name Used by ESCOP	Common Name
Boldi Folium	Boldo Leaf
Cimicifugae Rhizoma	Black Cohosh Rhizome
Echinaceae Pallidae Radix	Pale Coneflower Root
Echinaceae Purpureae Herba	Purple Coneflower Herb
Echinaceae Purpureae Radix	Purple Coneflower Root
Hamamelidis Aqua	Hamamelis (Witch Hazel) Water
Hamamelidis Cortex	Hamamelis (Witch Hazel) Bark
Hamamelidis Folium	Hamamelis (Witch Hazel) Leaf
Passiflorae Herba	Passion Flower Herb
Polygalae radix	Senega Root
Rhamni Purshiana Cortex	Cascara Sagrada Bark
Serenoae Repentis Fructus	Saw Palmetto Fruit

tions, mainly from the 1980s, 1990s, and up through 2002. The 1996 monograph stated that the quality of the raw material must comply with the monograph of the *British Pharmacopoeia* (BP), which had no quantitative standard for essential oil content, while the 2003 monograph requires the material to comply with the monograph of the PhEur, containing not less than 15 ml/kg of essential oil.* The 1996 ESCOP Ginger monograph provided summaries of 10 human studies while the 2003 revision includes summaries of 15 human studies (6 under the heading of Pharmacological studies in humans and 9 under the heading of Clinical studies) as well as a summary of 1 systematic review of clinical studies. The 2003 Ginger monograph has an additional "Clinical safety data" section that provides a summary of adverse events extrapolated from the already summarized clinical studies.

Due to the rapid proliferation of research findings on medicinal herbs and herbal products over the past decade, a completely revised edition of the ESCOP monographs is a timely and welcome contribution. Additionally, the second edition of the ESCOP monographs is an essential compendium, at least for the 80 herbs that it covers, to be used in conjunction with other authoritative sources of evidence (e.g., German Commission E monographs, WHO monographs) to help satisfy the levels of evidence requirements and the acceptable sources of safety and efficacy evidence that are required under various regulatory frameworks for the marketing of phytomedicinal products. Such useful documentation applications include substantiation of structure/function claims listed in herbal dietary supplement notification letters to the U.S. Food and Drug Administration (FDA), product license applications/pre-marketing authorizations of natural health products with the Health Canada Natural Health Products Directorate (NHPD), or traditional herbal medicinal product license applications under the new European Union (EU) Directive, among other frameworks. The ESCOP monographs are useful not only for industry substantiation purposes to fulfill their legal evidence requirements in the licensing, notification, and/or re-registration of herbal products, but also as an authoritative reference by healthcare providers, researchers, and journalists.

—Josef Brinckmann
Vice President of Research and Development
Traditional Medicinals, Inc.
Sebastopol, CA.

* Following harmonization of national pharmacopeial monographs between EU Member States, once a monograph becomes official in the PhEur, it is then retired from each of the individual national pharmacopeias (e.g., BP, DAB, *French Pharmacopoeia*) in their next edition.

Table 2. ESCOP Monographs Introduced in Second Edition

Pharmacopeial Name Used by ESCOP	Common Name
Agni Casti Fructus	Agnus Castus Fruit
Chelidonii Herba	Greater Celandine Herb
Cimicifugae Rhizoma	Black Cohosh Rhizome
Cinnamomi Cortex	Cinnamon Bark
Curcumae Longae Rhizoma	Turmeric Rhizome
Cynarae Folium	Artichoke Leaf
Eleutherococci Radix	Eleuthero Root
Filipendulae Ulmariae Herba	Meadowsweet Herb
Ginkgo Folium	Ginkgo Leaf
Ginseng Radix	Ginseng Root
Hamamelidis Aqua	Hamamelis Water
Hamamelidis Cortex	Hamamelis (Witch Hazel) Bark
Hederae Helicis Folium	Ivy Leaf
Liquiritiae Radix	Liquorice (Licorice) Root
Myrtilli Fructus	Bilberry Fruit
Piperis Methystici Rhizoma	Kava-Kava Rhizome
Plantaginis Lanceolatae Folium/Herba	Ribwort Plantain (Plantain) Leaf/Herb
Rusci Rhizoma	Butcher's Broom Rhizome
Serenoae Repentis Fructus	Saw Palmetto Fruit
Trigonellae Foenugraeci Semen	Fenugreek Seed

Reference

1. McGuffin M, Kartesz JT, Leung AY, Tucker AO, eds. *American Herbal Products Association's Herbs of Commerce, 2nd ed.* Silver Spring, MD: American Herbal Products Association; 2000.

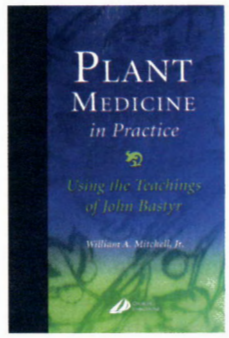
Plant Medicine in Practice: Using the Teachings of John Bastyr by William A. Mitchell Jr, ND. St. Louis, Missouri: Churchill Livingstone, 2003. 458 pp. ISBN 0-443-07238-8. $66.95.

As pointed out in the introduction to this work, the late John Bastyr, DC, ND, left no written works. Therefore, we have only his many students, such as William Mitchell, ND, to help pass along Dr. Bastyr's knowledge. Practitioners of botanical medicine have long desired more information about Dr. Bastyr's use of medicinal plants, and by proxy the use by naturopathic physicians of his era. As one of the co-founders of Bastyr University and a beloved mentor to many in the naturopathic profession, Dr. Mitchell's contribution to the field of naturopathic medicine has been significant. Though his knowledge of botanical medicine is large and eclectic, as represented in *Plant Medicine in Practice*, the book suffers from several shortcomings. The reviewer does not wish to dishonor or otherwise belittle Dr. Mitchell in any way, but only to give his honest thoughts on this work.

The positive features of the book include its collection of interesting facts and the handling of many obscure and potentially toxic herbs, practically ignored in all other botanical literature. Additionally, the strong empirical nature of the book is refreshing amidst the too-often absurdly reductionist and hypocritical demand for "evidence-based medicine," referring of course to one extremely narrow type of evidence, controlled clinical trials. The large number of herbs covered also stands out amidst the flurry of books rehashing the same 10-20 herbs that have been extracted, standardized, and researched in Europe.

Of particular importance is Mitchell's willingness to mention both herbs that are routinely considered toxic, though of course all toxicity is dose-dependent, and herbs

that are uncommon or even unknown to Mitchell. This is hugely important in helping maintain a vital, broad materia medica and to avoid the trap of overly narrowing and limiting the number and type of herbs available to practitioners. Additionally this approach opens our eyes to new potential in the plant and fungal kingdoms to further the health of our patients. These elements make *Plant Medicine in Practice* worth perusing by scholars of botanical medicine and serious herbal practitioners, but it is not suitable for the lay public or as an authoritative text on botanical medicine.



One of the major issues with the book is that a strong editorial hand was absent. The numerous misspellings of herb names and other words, pointless repetitions, improper sentence structure, and other grammatical and technical problems occur far too frequently. An accepted source for modern botanical nomenclature such as the American Herbal Product Association's *Herbs of Commerce* 2nd edition or other authoritative work was not the basis for the Latin nomenclature.

As for more technical shortcomings, the most significant failure may be the lack of systematically integrating new information throughout all of the entries. The mixing of empirical information from Mitchell's practice, anecdotes about Dr. Bastyr, and tidbits of recent research is interesting at times, but his format fails to produce the stated goal that the book is about transmitting Dr. Bastyr's teachings. In that regard, the amount of Dr. Bastyr's input on a particular subject varies wildly from herb to herb and section to section.

There are several technical errors in the book that are troublesome, such as the continued attribution of anticoagulant activity to coumarin-containing herbs such as *Melilotus alba* (sweet clover). Dr. Mitchell writes:

"Coumarin itself is not an anticoagulant but contains dicumarol, which inhibits hepatic synthesis of the vitamin K-dependent coagulation factors. Drugs based on coumadin are used as anticoagulants. A decoction or a tincture of this plant may be used to prevent unwanted clotting."

Coumarin does not contain dicoumarol; it dimerizes to it in the presence of microbial enzymes. Non-fermented herbs do not contain dicoumarol and are not anticoagulant. The drug Coumadin™ (a trademarked name for the synthetic brand of the drug warfarin [Bristol-Meyers-Squibb, New York, New York], which was synthesized based on dicoumarol) is used as an anticoagulant. There is no evidence that whole plants containing coumarin are anticoagulant. Coumarin by itself has been shown to have no effect on clotting in human clinical trials,[1] a fact admitted by Mitchell in one sentence then contradicted two sentences later. A weak attempt is made to say that these herbs should not be used in serious cases, but this still does not clear up the fundamentally erroneous and confused attempt to explain coumarin-containing herbs. While the confusion of coumarin and Coumadin™ is hardly unique, the bottom line is Dr. Mitchell, as an expert clinician, should have provided clearer direction on this subject and others.

Another troubling feature of this book is the near total lack of information about toxicity. Of course, the majority of herbs are amazingly free of serious adverse effects and have minimal contraindications, but some can be quite dangerous. Dr. Mitchell is to be commended for continuing to discuss these herbs, unlike most authors in the field. However, it is lamentable that he did not provide sufficient information for their safe clinical application in most cases. A poor attempt is made to cover for this by giving general warnings about safety in some instances, but they are so improperly applied as to be thoroughly questionable. For example, *Chenopodium ambrosioides* (wormseed) is listed as "...toxic, and should be used with care" while the arguably vastly more dangerous *Digitalis purpurea* (foxglove) has no such warning.*

Another example of failing to address toxicity is Dr. Mitchell's discussions of *Atropa belladonna* (belladonna). He mentions that this herb is contraindicated in patients with glaucoma, but does not mention that it is equally contraindicated in those with urinary retention and/or arrhythmias, and should not be combined with anticholinergic drugs due to the potential for synergistic toxicity. Nowhere in the book does he give a list of signs or symptoms of overdose or suggest a treatment if this occurs, all of which are well known and important. Without this information, it is impossible to use belladonna safely, even though Dr. Mitchell does provide rather low and thus likely safe doses.

As someone who has taken numerous courses from Dr. Mitchell, these style and format flaws are not unexpected. Dr. Mitchell tends to work in a very stream of consciousness manner, studying tangential issues of interest, but rarely wrapping things up in a complete, logical package. While this approach is creative and often insightful, it runs the risk of leading to wrong conclusions or promoting confusion. For instance, when discussing *Convallaria majalis* (lily-of-the-valley), Mitchell writes, "When Dr. Bastyr taught about this remedy, he specifically used the term 'mitral insufficiency.'" Without any clarification, while it is implied that Dr. Bastyr used the term to say that *Convallaria* would alleviate the condition, we are left feeling that the entry was severely incomplete or even wondering if perhaps it was meant that the plant could lead to mitral insufficiency. Again, careful editing would have led to clarification.

Dr. Mitchell also has a tendency to mention facts with no apparent rhyme or reason, or completely out of context (such as his discussion of the binding of amyl nitrate to cyanide in the section on cardiac remedies). The postulation of interchangeability of various herbs and homeopathic dilutions of the same herbs for the same indications, as frequently espoused by Dr. Bastyr and Dr. Mitchell, is also very questionable both from the perspective of scientific herbalism and homeopathy.

Dr. Mitchell attempts to bridge the gap between traditional perspectives on a particular plant and modern pharmacology with his frequent references to the "active constituent" within an herb. However, as someone who is clearly aware of the perspective that herbs contain many "active constituents" working in concert, it is hard to understand why he fails to clarify what he means by this designation at times or fails to stress the importance of other constituents within the plant. As just one example, Dr. Mitchell states that though

* Editor's note: The *leaf* of *C. ambrosioides* is the source for the increasingly popular Mexican culinary herb *epazote*, long used to flavor beans and reduce their flatulence; the *oil* distilled from the *seeds* of this same plant is potentially toxic, formerly used in pharmacy as an antihelmintic, a substance that expels parasitic worms from the intestinal tract.

the alkaloids berberine and hydrastine are the active constituents in *Hydrastis canadensis* (goldenseal), they do not contribute significantly to the valuable astringent effects of this plant, which are attributable instead to numerous tannins. Hence, the clarification should have been perhaps that the two alkaloids are the most active *antimicrobial* constituents within the plant while at the same time highlighting that there are many other types of compounds in the plants that work with the alkaloids to achieve their therapeutic effects.[2]

In summary, the attempt to document Dr. Bastyr's and Dr. Mitchell's knowledge of herbs is extremely laudable. Perhaps the current edition of *Plant Medicine in Practice* represents only the first step in that direction. The current work provides an interesting perspective, but is limited in its clinical usefulness. Hopefully, a future edition will be more complete and better edited.

—Eric Yarnell, ND, RH (AHG)

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2. Stermitz FR, Lorenz P, Tawara JN, et al. Synergy in a medicinal plant: Antimicrobial action of berberine potentiated by 5'-methoxyhydnocarpin, a multidrug pump inhibitor. *Proc Natl Acad Sci.* 2000;97:1433-1437.

Dr. Mitchell's Response to the Review of *Plant Medicine in Practice*

I pretty much concur with Dr. Yarnell's critique. If a second edition is published, the text should be improved and the mistakes mentioned will be addressed. If anyone else notices any confusions or errors, please let us know so that corrections can be made as appropriate.

The book contains a lot of hopefully interesting and useful material. Two things will become apparent. First, there is a lot more to be said about all of the plants. I put in only material I have had direct experience with. Even the comments by Dr. Bastyr (material he underscored as important for each plant) are things I have tried in my own practice, by and large. Secondly, there is a lot of new information that science is showing us, literally daily, that excites us further about the plants.

Now the task of getting to a second edition. I think that that will not be forthcoming for some time, unfortunately. It will take several years to rewrite it. Information comes in occasionally about the practice of Dr. Bastyr which I am noting. Dr. Bastyr did not really talk about the *science* of botanical remedies. Including really good, hard scientific evidence will be a useful and important addition to the next edition. I think that can be done without compromising the eclectic flavor of the original text.

My thanks to my good friend Dr. Yarnell. He and so many other herbalists and NDs are writing on current topics in plant medicine. Constructive criticism helps us all to write better and to pay attention to details. In this day and age, the production of quality written material is critical to the credibility of botanical medicine's continued acceptance into mainstream society.

—Bill Mitchell, ND

New Book Profiles

Due to economic considerations and the natural evolution of book marketing and sales, the American Botanical Council is adding to its catalog only a few of the good new books that are being published. However, we do intend to keep our readers informed about books of particular interest that have arrived in our offices. In this ongoing feature, we describe only these new books that we have not yet reviewed.

If you are interested in purchasing any of these books or those that have been reviewed fully, and you want to help ABC at the same time, please go to the online version of this article on our website <www.herbalgram.org/herbalgram/deptarticlelist.asp?d=11> and click on the "Order from Amazon.com" button. ABC will receive a small commission from your order.

Cardamom: The Genus Elettaria. P.N. Ravindran and K.J. Madhusoodanan (eds.). Taylor & Francis: New York; 2002. 374 pp., hardcover, index, tables, graphs, charts, illustrations. $139.95. ISBN 0-415-28493-7.

Extensive details on the origin, history, and diversity of the exotic and increasingly popular spice, cardamom. Has 14 chapters on cardamom plus one each on large cardamoms and false cardamoms. All aspects of the cardamom crop are covered.

Geranium and Pelargonium. Maria Lis-Balchin (ed.). Taylor & Francis: New York; 2002. 318 pp., index, charts, tables, graphs, illustrations. $149.95. ISBN 0-415-28487-2.

Includes information on species of both closely related genera *Geranium* and *Pelargonium*. Historical uses are discussed, as well as modern applications. Focuses on the utility of *Geranium* species in the herbal medicine industry, and how *Pelargonium*-derived geranium oil is most commonly found in perfume, cosmetics, and aromatherapy products. Covers all aspects of taxonomy, phytochemistry, cultivation, pharmacology, and industrial processing of species in both genera.

The Rhodiola Revolution. Richard P. Brown and Patricia L. Gergbarg with Barbara Graham. Rodale Press: Emmaus, PA; 2004. 260 pp., hardcover, bibliography, index. $21.95. ISBN 1-57954-924-1.

Discusses the potential health benefits of *Rhodiola rosea* by providing the reader with clinical studies, case studies, and instructions for use. Includes a table of the authors' recommendations for buying rhodiola and other supplements of optimum quality. Authors are two psychiatrists with clinical experience using *R. rosea* and who co-wrote the cover story on Rhodiola in *HerbalGram* 56. Introduction by ABC Founder and Executive Director Mark Blumenthal.

Chinese Herbal Medicine. Chongyun Liu and Angela Tseng with Sue Yang. CRC Press: Boca Raton, FL; 2005. 886 pp., hardcover, index, tables. $89.95. 0-8493-1568-9.

A comprehensive reference for the medical profession on traditional Chinese medicine (TCM). Features information on over 840 formulas, 640 single herbs, and 190 Western medicine-defined disorders and medical conditions with their corresponding diagnosis and formulations in TCM. Includes cross-references of botanical Latin names with Pinyin and English names.

The Lost Amazon: The Photographic Journey of Richard Evans Schultes by Wade Davis. San Francisco: Chronicle Books, 2004. 160 pp. ISBN# 0-8118-4571-0. $35.00. ABC catalog #B536.

As editor of a journal like *HerbalGram*, I receive many books on herbs and natural health for review. Once in a great while a book crosses my desk that causes me to immediately stop whatever I'm doing, pick it up, look through it, and read a few pages or chapters. With this coffee-table book's arrival on a Friday afternoon, I took it home for the pre-winter holiday weekend, knowing that whatever editorial work I was planning would be trumped to give me time to enjoy this beautiful volume.

There are at least three reasons why this book is so compelling. The first is the primary protagonist, Richard Evans Schultes, the famed and highly revered Harvard botanist who is universally considered the "father of ethnobotany." Schultes was a man who in many respects was larger than life. During his many years of research in the Amazonian basin, he lived with dozens of native tribes and mapped uncharted rivers, while seeking new supplies of rubber for the U.S. government prior to and during World War II. During his lifetime Schultes collected over 30,000 botanical specimens, 300 of which were new to science, and he described the uses of over 2000 medicinal plants that had not previously been documented.

Schultes' progeny of students reads like a who's who of ethnobotany: the author Wade Davis; famed integrative medicine advocate and best-selling author Andrew Weil; the late ethnobotanist Timothy Plowman; ethnobotanists and researchers Michael Balick, Steven King, and Marc Plotkin; and others. Davis tells the story of how so many botanists travel a plant-rich locale like the Amazon and, looking into the rainforest, are able to recognize two or three of the plants with which they were familiar. In contrast, Schultes would look at the forest and point out the two or three plants that he did *not* know.

The second reason this book grabs the reader is Davis' writing. Wade is really a poet, but he chooses the (in)convenience of prose. The photos are explained with captions excerpted from Davis' previous book, *One River – Exploration and Discoveries in the Amazon Rainforest* (Touchstone, 1996). *One River* is Davis' tribute to his mentor and to another Schultes' student Timothy Plowman, who was Davis' fellow tropical traveler as they retraced Schultes' journeys in the Amazon some 30 years later. (Some readers will recognize Davis' works; his books include the much misinterpreted *The Serpent and the Rainbow* [Simon & Schuster Touchstone, 1985], which was later distorted by the Hollywood movie of the same name, wherein zombie potions of poisonous herbs catch the interest of a botanist and scout for the pharmaceutical industry—all based on Davis' own post-graduate research experience in Haiti).

The photographs themselves are the third reason this book is so compelling. They are strikingly beautiful, especially since they are black and white! Schultes was not only one of the world's pre-eminent botanists, he was also a great photographer. The large-format book allows these photos to take up the whole page with an almost a life-like effect, that is, as "life-like" as black and white photography can be.

The Foreword by Andrew Weil recounts how Weil was indelibly affected by Schultes. As a young undergraduate student at Harvard, Weil signed up for Schultes' Biology 104, Introduction to Economic Botany. As Weil has stated numerous times in many speeches and interviews, the initial contact with Schultes changed the course of Weil's education and still influences his trajectory as one of the premier leaders of *integrative medicine*, now a widely used term, coined by Weil to describe the rational combination of modern conventional medical practices with empirically sound "alternative" modalities. "Meeting this legendary botanical explorer was one of the truly seminal events in my life....When I entered Harvard Medical School in 1964, I soon realized how valuable my connection to the world of plants was going to be. Most of my classmates and teachers had little experience with it. Even the pharmacologists knew little of the natural sources of the drugs they studied and taught about...."

Weil's three pages contain two classic photos of himself (then black-bearded) with a cultivated specimen of one of the plants that Schultes studied and experienced in native rituals—the powerful hallucinogen and shamanic favorite *yagé* or *ayahusaca* (*Banisteriopsis caapi*), the "vine of the soul." This is also the name of a book by Schultes and Richard Raffauf, *Vine of the Soul: Medicine Men, Their Plants and Rituals in the Colombian Amazonia* (Synergetic Press, 1992).

Generously weaving a web through the photographs is text borrowed from *One River*. Veteran *HerbalGram* readers will recall that a black and white photo of Schultes was the cover photo of

HerbalGram 38, which included an eight-page spread with excerpts and photos from that book.

While *One River* was a narrative of Schultes' ethnobotanical experiences in the Amazon, this book is created from the exquisite photography of Schultes' during the twelve years he spent cataloguing rubber trees and medicinal and psychoactive plants. His photos, taken in the 1940s and 50s, shows an Amazon before it lamentably went the way of modernization and the influences of the twentieth, and the now the twenty-first, centuries.

Davis' Preface is an explanation of the book's genesis and homage to Schultes and to that magical interplay of light, timing, composition, and equipment known as photography. Davis relates how the type of camera (an old 1927-era twin lens Rolleiflex) influenced Schulte's composition and the resulting photographs in the book.

A poignant passage relates that during his last few years, an aging and Alzheimer's-affected Schultes kept a copy of *One River* by his bedside. After his death, Schultes' widow Dorothy (to whom the entire author's royalties are dedicated) told Davis that reading the book had allowed her husband to remember many forgotten details of his own life. "I found this both amusing and very touching," writes Davis. "Here after all was the man who had made my life possible. Now the book had become his life. His life had become my imagination, and my imagination had breathed meaning and content back into the life of an old man who was slowly fading away as all old men must inevitably do."

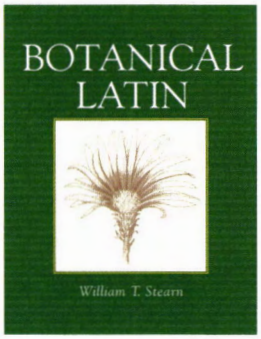
There's probably no richer, more meaningful, more appropriate way any student can repay his or her primary mentor than to help the mentor reconnect to the threads of his or her own life. It's as if Schultes experienced one of the aspects of the meaning of *religion* through his student's work: *religion*, from Latin *religio*, means to *re-connect*.

This book emanates an almost palpable essence or feeling that allows the reader to connect to a place, a time, a world that is now gone, yet beautifully preserved—like an insect encased in a piece of clear amber—in the photography of one of botany's greatest leaders and luminaries. The entire ethnobotanical community owes Wade Davis a deep debt of incalculable gratitude for making these images available to a new generation of plant enthusiasts and potential explorers.

—Mark Blumenthal

Botanical Latin, 4th ed. by William T. Stearn. Portland, OR: Timber Press, 2004. 546 pp. ISBN 0-88192-627-2. $29.95.

First published in the UK in 1966, *Botanical Latin* is the standard reference which ". . . aims to provide a working guide to the special kind of Latin internationally used by botanists for the description and naming of plants." This is the first paperback edition of Stearn's classic, an imprint of the 1992 fourth edition. As such, it is not a new work, only a new affordable cloak that makes it more accessible and affordable to students, gardeners, and the public interested in botanical subjects. Although intended as a guide for plant taxonomists who need to traverse the knowledge of botanical Latin, especially in writing descriptions of new species, this book is useful to anyone who enjoys plants. The book is divided into four parts: (1) Introduction, (2) Grammar, (3) Syntax and other Matters, and (4) Vocabulary and Bibliography. I would venture to guess that most regular users of Stearn's *Botanical Latin* pluck the book from the shelf to reference terms in the 180-page vocabulary section, which essentially serves as a cross-reference dictionary to English terms and their Latin equivalents and the definition of Latin terms invariably encountered in the botanical nomenclature. Various sections on Greek words in botanical Latin, suffixes and prefixes, formation of botanical names, and an extensive section on descriptive terminology all help to remove the subject from the arcane and into the realm of the familiar. Anyone who uses botanical names or plants as part of their daily work whether the person be it in academia, industry, or simple enjoyment of herbs and gardening will find this to be a useful reference on the naming of plants. One needn't be a plant taxonomist to use it. And now that it is in a paperback edition priced like a modest lunch for two, many who previously would not find this among their book-buying priorities can now own it.



—Steven Foster

The Natural Pregnancy Book: Herbs, Nutrition, and Other Holistic Choices by Aviva Jill Romm. Berkeley, California: Celestial Arts, 2003. 318 pp. soft-cover. ISBN: 1-58761-178-3. $16.95.

Choice is a key word when describing this book. Aviva Romm, an expert in natural childbirth, presents an array of choices related to the many aspects of childbirth. Romm reminds the reader of her choices and empowers her to think about what is right for herself and her baby. The author shares her belief "that pregnancy is a natural process of which women's bodies are perfectly capable, and that pregnancy is a process of initiation and growth into a value system that respects and honors women's creative powers." This belief is neatly woven within the words and ideas presented in this book. Romm's words encourage women to explore all parts of themselves and the process of childbirth. The author is able to write from both personal experience as a pregnant woman and from the perspective of a midwife and herbalist, truly giving the topic a holistic view.

This book is divided into two parts. Part I covers pregnancy education for the general population of women interested in natural childbirth. It addresses a pregnant woman's needs from each aspect of childbearing, starting with brief chapters on history and philosophy, body image, the mind-body connection, basic pregnancy anatomy and fetal growth, basic prenatal care, and options for choosing a provider. Also included is a section on nutrition with an informative review of the nutritional needs for pregnancy, ways to assess a diet, and an easy to follow sample diet for the pregnant woman. The chapter on exercise and posture recommends a daily exercise routine that is not overwhelming and provides illustrations for each exercise. Part I ends with a short chapter by the author's husband, Tracy Romm, who has contributed a wonderfully insightful view on becoming a father, speaking on the need to cultivate the nurturing qualities and grow with the pregnancy. He shares some valuable points on the partner's role

and participation in the pregnancy, birth, and childrearing.

Part II of this book could be described as an herbal guide for common pregnancy issues. Once again the author reminds the reader of the fact that pregnancy is a normal process and that there are physiological changes that accompany pregnancy which may cause uncomfortable symptoms. Alphabetically arranged for easy reference, each topic is explained in a clear and accurate manner that includes informative dietary tips and safe, effective herbal recommendations, many of which Romm has used clinically in her practice. It is refreshing to find a book that shares real information on using herbs for natural pregnancy care instead of a list of herbs passed down and copied with the recommendation to avoid them during pregnancy. Romm's clinical expertise in this area is clearly evident. She provides many remedies and formulas that employ a wide range of herbal medicines and some unique clinical practices. The information found in Part II is valuable for all herbalists, physicians, and students of botanical medicines, both as a reference and educational resource.

A resource section at the end of the book provides an extensive list of contact information for organizations and resources that address midwifery or doula care, herbal education, herbal medicinal products, journals, childbirth education, and natural alternative therapies.

Presenting so much information in a manner that is easy and enjoyable to read is quite a task. Romm has not only accomplished this task, she has done it with an empowering, supportive voice. I highly recommended this book as a resource or reference for all who are involved in the care of pregnant women, including parents to be and students of herbal medicine.

—Mary Bove ND, MW, AHG

Medicinal Plants in Folk Tradition: An Ethnobotany of Britain and Ireland by David E. Allen and Gabrielle Hatfield. Portland, OR: Timber Press, 2004. 431 pp. ISBN 0-88192-638-8. $29.95.

This book transcends a lost glimpse of British and Irish ethnobotany based on the naïveté of our assumptions. When most American readers think about historical and ethnobotanical use of plants in the British Isles, our minds invariably travel to the Herbal of John Gerarde (1597, and the more widely reprinted Thomas Johnson edition of 1633) and Gerarde's contemporaries. In Chapter one "Herbs without the Herbals: Retracing a Lost Tradition" Allen and Hatfield reveal that almost half the plants in Gerard are not found wild in Britain and many were probably not found in the best-stocked physic gardens of his day.

They write, "The herbals indeed were trebly misleading. They reflected the general conspiracy of silence among the learned about the extent and efficacy of folk medicine; they gave indiscriminate endorsement to just about every alleged plant virtue that had ever appeared in print; and they were written largely in obliviousness of the differences imposed by geography which make the flora of one region dissimilar from that of another."

Here, the major revelation for the American reader is that the classic British herbals do not necessarily reflect in anyway British folk or local traditions of herb use. Rather they reflect bibliographical influences from Greek or Latin classics, transformed ad nauseam through the centuries to contemporary languages, speckled with influence left in Britain by the Romans, Germanic immigrants of the post-Roman era, and the herbal repertoire that emerged from ecclesiastical confines, all largely to the neglect of ethnobotany at the local level. "Herbs without Herbals" provides a fascinating journey through the history and development of herbal traditions and influences in the United Kingdom. The authors separate ethnobotanical folk wisdom of the British Isles from the published literature and reveal an expanded horizon of herb use.

The majority of the book is devoted to a compendium of uses of over 400 plant species, grouped in chapters according to the sequence of superorders, orders, and families in the Cronquist classification system. Since that order of the world brings only a dizzy yawn to most readers, separate indexes covering both scientific and vernacular names quickly lead the reader to individual species. The index is essential to finding information in this work.

Under each plant article, one finds information on both scientific and common names, its general (continental) distribution, followed by commentary on use. All material is referenced to notes at the end of the chapter, which leads to the bibliography of published and unpublished resources. A unique approach is presenting material according to geographical use. For example under dandelion, we learned of its fame throughout Europe as a diuretic, but the geographic approach reveals 333 specific references from Britain and Ireland for additional uses. Approximately one-quarter of those references relate to the common folk use of dandelion as an application for warts, followed in popularity (55 references) to dandelion's uses for the treatment of coughs, colds, and respiratory troubles. Further analysis of their references helps the authors reveal that there is far greater diversity of additional folk uses in Ireland compared to Britain; some predictable based on the doctrine of signature such as use of the leaves for toothache, and others more arcane, like a belief recorded from a Limerick that for the leaves to be effective as a tonic, those with white veins had to be eaten by a mane, and those with red veins, consumed by a woman.

Based on the weight of several geographical records for a single use, one has to reconsider dandelion and its potential. Uses for cold and respiratory conditions are not what we think of when we think of uses of dandelions. This book uncovers the unexpected. Is the next Digitalis still hidden in British folk traditions awaiting discovery in these pages?

Just another herb book? No! *Medicinal Plants in Folk Tradition: An Ethnobotany of Britain & Ireland* takes a fresh approach to presenting seldom seen data in a single source. Despite its geographical focus, the plants in the book are not limited to the British Isles. At least half are naturalized in North America, and I would bet that more than half of the remaining species are found in American horticulture.

—Steven Foster

in memoriam

George Hugh Neil Towers, PhD, FRSC 1923 – 2004

The herb and medicinal plant research community lost one of its truly great men with the death of Professor Neil Towers on November 15 at the age of 81. Dr. Towers was known internationally as a prolific scientist, an accomplished botanist and phytochemist, and a renaissance man of charming and highly engaging wit and intellect. He held a post as Emeritus Professor of Botany at the University of British Columbia (UBC) in Vancouver and had been on the faculty of UBC for 30 years.

One of Towers' primary areas of interest was photobiology, e.g., psoralens, light-activated plant chemicals with biological activity. Other research areas included medicinal phytochemistry; ethnopharmacology of medicinal plants of British Columbia, Kenya, Nepal, and Peru; chemical ecology relating to plants; fungi and insects; and biotechnology of cell and tissue cultures of medicinal plants of significance, e.g., Asian ginseng (*Panax ginseng*), cat's claw (*Uncaria tomentosa* and *U. guaianensis*), and Chinese club moss (*Huperzia serrata*).

Born in Bombay, India, and educated in Burma, his interest in the natural world began in Asia. He obtained his bachelor's and master's degrees from McGill University, and his doctorate in plant physiology in 1954 from Cornell University. After academic appointments at McGill and the National Research Council in Halifax, Nova Scotia, he was recruited to UBC, where he served as Head of the Department of Botany from 1964-71, a period of great expansion of the Department. After 1971, he devoted his full energies to his successful career in research and teaching, which he continued as an emeritus faculty member from 1989 until his death.

Towers received numerous awards and prizes during his career in recognition of his scholarship. He was a Fellow of the Royal Society of Canada, which granted him the Flavelle Medal in 1986. Most recently, he was awarded the Pergamon Phytochemistry Prize by the Phytochemical Society of Europe in 2000, and in 2001 he was recognized as one of UBC's (and the world's) most highly cited scientists. He published more than 425 papers and book chapters, starting with a 1953 paper in *Nature*. He devoted his extraordinary life to science and traveled extensively to collect plants worldwide. Dr. Towers had a lifelong passion for tennis, music, travel, botanical and phytochemical diversity, and had many stimulating discussions with colleagues and students, all of which he actively pursued until shortly before his death.

Towers developed strong bonds with his many students and post-doctoral fellows, and like many brilliant professors, kept ongoing personal and professional relationships with many of them. Two of his former students, Dennis McKenna, PhD, of the University of Minnesota, and Eloy Rodriguez, PhD, of Cornell University, are members of the ABC Advisory Board, as was Dr. Towers.

Dennis McKenna, an ethnopsychopharmacologist at the University of Minnesota, received his doctorate from Dr. Towers. In an e-mail from the Peruvian Amazon, where he was working on a research project, McKenna wrote: "He [Dr. Towers] was and is one of those great men of science, a pioneer in the grand tradition....His lifelong passion for, and drive to understand, the chemical language of plants was the force behind an insatiable curiosity and a child-like wonder that kept Neil young and strong even to the very end of his days. But his was no cold scientific rationalism, or some egotistical exercise in producing papers and getting grants (though he did plenty of both). He did what he did because it was fun. He enjoyed his work, and there was nothing else that he would rather spend his time doing than exploring the intricacies of the chemical webs that tie together all of life, plant and animal alike."

Eloy Rodriquez, now a professor at Cornell, one of Tower's post-doctorate students, recounted a research trip to West Texas: "The one thing I remembered about the expedition was Neil asking a West Texas rancher if he had seen any millipedes in the area and the rancher responded, 'Nope, but I have seen plenty of stampedes!' I, and all of my colleagues and students, will miss such a great mentor and *compadre*. He was a great wit, musician, lover of all fine things in life and most of all he had a great sense of humor and a love of all varieties that were tropical and spicy."

Another of Towers' post docs, Alister Muir, PhD, now a researcher at Agriculture and Agri-Food Canada in Saskatchewan, reminisced, "In the 21st century in Canada we sometimes take cultural and ethnic diversity for granted but for me, a young Kiwi PDF [post-doctoral fellow] arriving in Canada from a predominately Caucasian work environment, the ethnic and cultural diversity of the Tower's lab was an incredibly exciting and stimulating place to be in and learn from."

"I will miss Neil; he inspired me in many ways, both scientifically and socially, especially with his dogma that every day should be lived to the fullest with no regrets as a part of life's exciting journey," said Tom Mabry, PhD, of the University of Texas at Austin, a fellow winner of the Pergamon Prize.

This writer will always remember Neil for his wit and *gemutlicheit* and the twinkle in his eye. Neil embodied the idea that people of high intellectual activity and brilliance need not be stodgy old professor types; to the contrary, they can exude a *joie de vivre* that infects everyone around them. A prolific story-teller, Neil was a great guy to close a bar with!

Funeral services were held on November 22 and a memorial service was held on December 16 on the UBC campus. Neil Towers is survived by his wife Elizabeth and his eight children, four sisters, a sister-in-law, as well as numerous nephews and nieces. Donations may be made to The George Hugh Neil Towers Memorial Fund, Awards Services, UBC Development Office, 6253 NW Marine Drive, Vancouver V6T 1Z1. Phone 604-822-8920 (Canada).

—Mark Blumenthal

Leo Weinstein
1942 – 2004

Herbal cosmetic pioneer Leo Weinstein, founder and president of Levlad, Inc., a major manufacturer of natural cosmetics, died in Los Angeles on July 30 at the age of 61 after a long battle with cancer.

Mr. Weinstein's life story is an inspiration to all would-be entrepreneurs, especially those who have immigrated to the United States. Leo and his brother Vladimir were émigrés, born in Uzbekistan, and after emigrating to Poland, arrived almost penniless in California in 1961. Twelve years later, they virtually helped pioneer the natural personal care industry with the creation of their first product, Rainwater Herbal Shampoo. At the time they owned a Venice Beach herb shop, and after a rare California downpour, they decided to combine pure rainwater with herbal extracts and came up with a unique shampoo. As a graduate of California State University at Northridge, Leo provided his business acumen while Vladimir, a UCLA-trained physicist, developed and refined the formula. The shampoo, first sold at the Weinsteins' herb shop, quickly became popular in health and natural food stores nationwide, and the brothers soon found themselves on the cutting edge of the natural beauty products industry.

Weinstein was one of the first cosmetic manufacturers to create his products with an environmental and planetary vision, with no animal testing, animal byproducts, potentially harsh preservatives, or artificial colorings. In addition to his own Nature's Gate brand, Weinstein's company developed an extremely successful private label business, producing herb-based cosmetics for many other companies.

Weinstein's sister Linda Etting recounted his business philosophy: "He would always say, 'Look at the big picture,' when he was being pressured in the market by increasing competition from other manufacturers. He said that 'We'll take it slowly, and our time will come.' He was big-hearted and helped many people out financially, even when he didn't have any money himself."

Weinstein was widely admired and respected in the natural products industry. Evidence of his friendship with so many people is seen in the fact that over 500 people attended his funeral, and all in attendance stood and clapped for 20 minutes to express their respect to his memory, according to Etting.

One of Weinstein's first distributors back in 1973 was Rishi Schweig, founder of Feather River, a former Northern California distributing company specializing in natural body care products. When he learned of Weinstein's death, Schweig wrote, "There is nothing about Leo that could make me sad. Creative, intelligent, innovative, friendly and dedicated to his family and his work, Leo always made me and others around him happy. It has been a gift to know him and to work together with him. We first met in 1973, very early in the history of Nature's Gate. While I would tease them about the water they were using in their wildly popular Rainwater Shampoo and Rainwater Conditioner (Los Angeles rainwater?), I knew that they were giving our industry some substance and quality it sorely needed. This was a time before Tom made his first toothpaste, when artificial color and harsh ingredients were common in personal care and cosmetics, yet still called 'natural.'"

Santosh Krinsky, owner of Lotus Light, one of the nation's largest distributors of natural specialty and body care products, opined on Weinstein's strong commitment to natural ingredients: "Leo cared deeply about the quality and purity of the products he produced. He wanted to provide alternatives to the harsh chemical-based personal care products sold in the mass market, and to show that these alternatives could and would be adopted by caring people everywhere. He was a pioneer and had to overcome incredible odds to turn his passion into a successful and continuing business."

Leo Weinstein is survived by his wife Lela, his children Jason, Robb, and Lisa, his brother Vladimir, along with his mother and his two sisters, Linda Etting and Rosalyn Feldman.

—Mark Blumenthal

Dear Reader

Continued from page 5

eponymous line of products from Enzymatic Therapy. The entire segment's message was that herbs can and do have properties that can be useful in promoting sexual activity. (We were interviewed by phone three times to provide background information for the segment.) A few weeks earlier on "Flipside" on CNNfn, Chris responded to a question regarding the efficacy of the herbs with what may become one of the classic lines of all time: "There's no such thing as a placebo erection."

Even though critics have dismissed herbs' "aphrodisiac" effects, there is increasing scientific evidence supporting the use of botanical preparations to enhance sexual performance. A recent clinical trial on Korean red ginseng demonstrated its nitric oxide-producing effect and efficacy in erectile dysfunction. Several clinical trials on ginkgo leaf standardized extract showed positive results in ameliorating sexual dysfunction caused by some SSRI antidepressant drugs in men and women.

On Sunday, November 21, the CBS news program *60 Minutes* aired a segment on hoodia (*Hoodia gordonii*), the increasingly popular succulent plant in the dogbane family (Apocynaceae) from Namibia in southwestern Africa, now being touted for its ability to suppress appetite. Hoodia was in the news a few years ago, apparently prematurely, when the pharmaceutical giant Pfizer was planning to introduce a new diet drug made from the plant. Pfizer has abandoned its research into hoodia but the ensuing publicity, and now the *60 Minutes* coverage, has caused a surge in interest in this new botanical, which to our knowledge, has never been sold previously in the United States. As with any new herb experiencing rapid market demand, we urge manufacturers to ensure that they are obtaining properly identified material and that it is being sustainably harvested.

Mark Blumenthal

calendar

2005

February 11-13: Natural Health Product Research Society of Canada's Second Annual Conference: Integrating Basic & Clinical Research on NHPs. Vancouver, British Columbia. The key objectives of this 3-day conference will be to showcase leading edge NHP research, increase awareness of NHP research capacity and facilitate the development of new collaborations amongst stakeholders. Web site: <www.nhpresearch.bcit.ca/aboutconference.html>

February 12: Health from the Rainforest with Leslie Taylor, ND. Austin, TX. The Austin Herb Society and the American Botanical Council invite you to this stimulating presentation about medicinal plants from the rainforest of South America at the Zilker Botanical Gardens. This event takes place from 9:00 AM – 12:30 PM and includes a light breakfast and exotic treats of fruits, nuts, chocolate, teas, juices, displays of raw materials, and handcrafts from the Amazon as well as books, plants and products. Registration deadline is February 1, 2005. For more information e-mail <abc@herbalgram.org> or visit <www.herbalgram.org/default.asp?c=hrtrf>. Austin Herb Society Web site: <www.austinherbsociety.org>

February 12-13: The International Complementary and Alternative Healthcare Conference and Expo. New York. A premier global event designed to bring information, products and services to the Complementary and Alternative Healthcare community. Program includes the latest research, clinical trials, case studies, and the most cutting-edge approaches in the fields of complementary healthcare and alternative therapies. Exclusive offer to ABC members: 15% off registration fee - just enter priority code DM11 when registering. For more information: E-mail: <info@camexpo.com> or visit the Web site: <http://www.camexpo.com>. To register go to: http://www.camexpo.com/visreg.asp

February 17-19: Integrative Medicine For Healthcare Organizations: What's New, What's Working, and How You Can Achieve Success. Phoenix, AZ. This event offers CAM professionals with a unique opportunity to gain exposure to state-of-the-art working strategies, learn how they are being implemented, and to benefit from practitioner experiences. The two-and-half-day program will provide educational sessions, in-depth case studies, a cutting-edge exhibit and poster display forum, and networking opportunities. Ph: 866-828-2962. Web site: <www.healthforum.com> (click on Complementary and Alternative Medicine).

February 25-26: Multicultural Summit on Complementary Alternative Medicine (CAM). New York. The Network Journal, the northeast's premier magazine for Black professionals and business owners, will host and bring together a diverse group of professionals, practitioners and industry leaders to explore developments in this burgeoning sector of the healthcare industry. Ph: 212-962-3791. E-mail: <levity@optonline.com> Web site: <www.tnj.com>

February 25-26: International Conference on "Promotion and Development of Botanicals with International Coordination: Exploring Quality, Safety, Efficacy and Regulations." Kolkata, India. This conference will emphasize drug development from natural resources with a special focus on botanical products used in Indian system of medicines. This event will further highlight the needs and requirements for research and development of natural products in general and phytomedicine in particular through international coordination and collaboration. E-mail: <mukherjeepk@rediffmail.com> Web site: <www.jadavpur.edu/conference/conference.htm>

March 6-9: The 2nd Annual Nutrition and Health: State of the Science & Clinical Applications. Tucson, AZ. This conference is designed for physicians, nurses, pharmacists, registered dietitians, certified clinical nutritionists, naturopaths, chiropractors, and other professionals who make nutritional recommendations as part of their clinical practice. Ph: 212-305-3334. Web site: <http://ColumbiaCME.org>

March 16-18: Nutracon 2005. Anaheim, CA. This tradeshow and conference is for retailers, manufacturers, and suppliers in the health & nutrition industry. Contact: Customer Service, New Hope Natural Media. Ph: 866/458-4935. E-mail: tradeshows@newhope.com. Web site: <www.nutraconference.com>

March 18-19: Fifth UNC Integrative Medicine Conference: Improving Outcomes Through Integrative Practice. Chapel Hill, NC. This conference is presented by The University of North Carolina School of Medicine. Experts in Complementary and Alternative Medicine (CAM) research and clinical practice will offer updates, overviews, and interactive workshops in environmental medicine, energy medicine, massage, nutrition, and herbs. This program will benefit professionals in the fields of general medicine, family practice, pediatrics, osteopathy, chiropractic, mental health, nursing, preventive medicine, public health, health promotion, nutrition, dentistry, pharmacy, botanical and herbal medicine, biofeedback, energy medicine, acupuncture, naturopathy, creative therapies, massage and craniosacral therapies, holistic and eco-environmental medicines. CE credits available. Program on Integrative Medicine: Ph: 919-966-8586. E-mail: <sysiegel@med.unc.edu>. Web site: <http://pim.med.unc.edu>. Office of Continuing Medical Education: Ph: 919-962-2118. Web site: <www.med.unc.edu/cme>.

March 4-12: Herbal Adventure in Costa Rica. Samasati Retreat Center, Costa Rica. Susun Weed will lead this nine day herbal adventure, sharing her vast knowledge of the natural world. Susun will teach about green allies, plant journeying, the secret language of plants, and much more. Contact: Sherri Brown at 541-683-5403 or E-mail: <sherrimelissa@yahoo.com> Web site: <www.susunweed.com>

March 17-20: Natural Products Expo West 2005. Anaheim, CA. This tradeshow and conference is for retailers, manufacturers, and suppliers in the health & nutrition industry. Contact: Customer Service, New Hope Natural Media. Ph: 866/458-4935. E-mail: <tradeshows@newhope.com> Web site: <www.expowest.com>

March 18-19: West Chester University's 5th Annual Integrative Health Conference. Philadelphia, PA. The conference theme is botanical medicines for health promotion, disease prevention, and symptom management. A special clinician/practitioners session will focus on evidence-based research on botanical medicine efficacy. CEUs and CMEs for physicians and nurses will be offered for all sessions. A concurrent general session, open to the public, will focus on topics such as botanical medicine safety, working with a clinical herbalist, and drug/herb interactions. This event co-sponsored by West Chester University of PA and the American Herbalists Guild. For complete information, go to WCU's Web site: <http://healthsciences.wcupa.edu/>

March 18-20: SupplyExpo 2005. Anaheim, CA. This tradeshow and conference is for retailers, manufacturers, and suppliers in the health & nutrition industry. Contact: Customer Service, New Hope Natural Media. Ph: 866/458-4935. E-mail: <tradeshows@newhope.com> Web site: <www.supplyexpo.com>

April 2-3: Southwest Conference on Botanical Medicine. Tempe, AZ. The ninth annual conference - speakers include Paul Bergner, Bill Mitchell, ND, David Winston, Kenneth Proefrock, ND, David Hoffmann, Cascade Anderson Geller, Tori Hudson, ND, Phyllis Hogan and Jill Stansbury, ND. Topics include botanical therapies for West Nile fever, thyroid disease, cardiac health, Parkinson's disease, balancing health in midlife, treating migraine, cluster and tension headaches, plus a panel on natural alternatives to statins and other cholesterol lowering drugs, herb walks at the Desert Botanical Garden and much more. CE credits for health professionals. Ph: 800-252-0688. Web site: <www.botanicalmedicine.org>

April 4-5: The "Omics" Revolution: Emerging Scientific Technologies & Their Application to Dietary Supplements & Natural Products Research. Kauai, HI. This conference will highlight new technologies in the dietary supplement, functional food, and natural products industry. With specific focus on new and innovative research technologies and methodologies such as DNA microarray, chip technology and proteomics. E-mail: <mahady@uic.edu> Web site: <http://genomics.uic.edu/index.htm>

April 15-16: 4th Annual Course on Integrative Pain Medicine at Columbia University Medical Center. New York, NY. The purpose of this course will be to give an evidence-based overview of pain medicine using an integrative model that combines current conventional medicine and procedures with the best of the CAM therapies. At the end of this two-day course, participants should be able to: understand the fundamentals of modern pain medicine, describe some of the best conventional and CAM therapies for use in pain management, and the research data that exist to support them, know how to identify and evaluate competent CAM practitioners, and have a sense of how to interact with these practitioners and be knowledgeable about the practical integration of useful CAM therapies into the treatment of pain patients with and without cancer. This course is sponsored by the College of Physicians and Surgeons of Columbia University and The Richard and Hinda Rosenthal Center for Complementary & Alternative Medicine. The College designates this educational activity for a maximum of 15.0 category 1 credits towards the AMA Physician's Recognition Award. Ph: 212-305-3334. E-mail: <cme@columbia.edu> Web site: <http://ColumbiaCME.org>.

April 25-30: Clinical Herbal Medicine Training For Health Care Professionals. Ashland, OR. Under the supervision of master herbalists, students undergo intensive experiential training in case-taking, physical examination techniques, differen-

tial analysis of symptoms, case follow-up, formulating, prescribing and dispensing. Additional topics covered include assessing disease processes from a holistic perspective, materia medica, and case studies of natural therapies with cancer and other chronic illnesses. Contact: Centre for Natural Healing 300 N. Pioneer St., Ashland, OR 97520, Tel 541-488-3133, Fax 541-488-6949 or online at <www.centrehealing.com/Programs/clinicTrain.html>

May 4-6: SupplySide East. Baltimore, MD. The trade show and conference will include exhibitions of functional, healthy and nutritional ingredients, plus education programming, special events and promotional opportunities for participants. Contact: Amy Sharman, Marketing and Communications Manager 480-990-1101, ext. 1543. Web site: <asharman@vpico.com>

May 20-21: The 25th Anniversary of the National Herb Garden. Washington, DC. This gala will take place at the garden, located within the National Arboretum in Washington, DC. Web site: <www.usna.usda.gov>

June 4-6 Medicines from the Earth. Black Mountain, NC. Annual symposium on herbal medicine at Blue Ridge Assembly near Asheville, NC. Presentations include: childhood obesity, osteopenia, irritable bowel syndrome, musculoskeletal health, root tonics for vitality, early Alzheimer's, the ceremonial uses of herbs, syndrome X, fever, Maya healing herbs, cancer prevention, clinical Ayurveda, environmental causes of thyroid dysfunction, herb contraindications update, Cherokee herb walks and much more. CE credits for health professionals. Ph: 800-252-0688. Web site: <www.botanicalmedicine.org>

June 23-26: The 19th Breitenbush Herb Conference: Herbal Traditions and Healing Waters. Portland, OR. Teachers include Rosita Arvigo, Shar Andrews-Miller, Julie Bailey, Trace Bosnian, and many more. Phone: 503-236-3185. E-mail: <info@trilliumbotancials.net> Web site: <www.trilliumbotanicals.net>

June 25-30: The Drug Information Association (DIA) 41st Annual Meeting: "Challenges In Product Development Involving Chinese Medicinal Herbs: A Canadian-Chinese Perspective." Washington, DC. This presentation will focus on recent developments and challenges in evidence-based studies for the development of Chinese herbal products. Case studies will be presented to illustrate the importance of evidence-based research on product quality, product standardization, pharmacological and clinical studies. Ph: +1-215-442-6100. E-mail: <dia@diahome.org> Web site: <www.diahome.org>

July 14-15: The AICR/WCRF International Research Conference on Food, Nutrition, and Cancer. Washington, DC. Attendees of this year's conference will hear about the latest research developments in this rapidly expanding field and take part in the process of open discussion that drives scientific progress. Ph: 703-683-6334 or 540-373-4493. Fax: 540-373-8893. E-mail: <aicr@pearson-planners.com> Web site: <www.aicr.org>

July 15-17: NNFA 2005: 68th Annual Natural Products Convention and Trade Show. Las Vegas, NV. This multi-faceted event offers the natural products community a venue to discover health and nutrition trends, scientific advancements, innovations in supplements, foods, health products, personal care, organics, sports nutrition, and more. Ph: 1-800-966-6632. E-mail: <conventions@nnfa.org>. Web site: <www.nnfa.org>.

July 23-24: Northwest Herb Fest: Herbs For Everybody. Eugene, OR. This event filled weekend at Wise Acres Farm will include lectures by renowned speakers, herb walks and 26 beginning and advanced classes. Topics range form thyroid health, cancer, and sexuality to animal care. Ph: 541-736-0164. E-mail: <class@herbaltransitions.com> Web site: <www.herbaltransitions.com>

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The Center for Ethnobiology and Natural Products at Florida International University (FIU) has several graduate fellowships for students beginning in May 2005. The NIH-funded Training in Tropical Botanical Medicines Program seeks applicants with interests in ethnobotany, ethnopharmacology, phytochemistry, microbiology, immunology, or related disciplines. Prospective students should have strong interests in complementary and alternative medicines and must be U.S. citizens or have permanent resident visas. Support includes a stipend, tuition, and research funds. In addition, participants will receive support for field courses and attendance at national meetings. FIU is especially interested in under-represented minority applicants who would like to pursue careers in alternative medicine. For more information, e-mail Dr. Bradley C. Bennett <bennett@fiu.edu> or visit the CENAP Web site <http://www.fiu.edu/~cenap/>.

The American Shea Butter Institute (ASBI) provides Consumer and Industry Education on Shea Butter; establishes voluntary standards on quality of Shea Butter entering the USA; engages in basic and applied research to identify Shea Butter ingredients or derivatives of its ingredients as new solutions for important problems in nutrition, health care and material science; and promotes the benefits of shea butter in various industries. Visit <www.sheainstitute.org> to learn more about the Institute.

Annual Global Supplier Guide In Functional Foods & Nutraceuticals Website. In August 2004, Functional Foods & Nutraceuticals magazine published its Annual Global Supplier Guide which includes listings and contact information for suppliers of botanical raw materials and extracts. The Supplier Guide can be accessed free online at: <www.ffnmag.com/esearch/Search/search_60.asp?GLSITENO=60&Where=ALL>.

World Tea Markets Monthly is published by expert commodity analysts F.O. Licht. World Teas Markets Monthly provides the latest market reports and detailed statistics on tea markets worldwide. F.O. Licht's statistical database is comprehensive, continually updated, and every issue includes the latest statistics for more than 30 countries. Each issue of World Tea Markets includes International Trade Statistics, Market News, In-depth Analysis, and Auction Reports. To subscribe, call +44 (0) 1892 533813, fax +44 (0) 1892 544895, email <marketing@fo-licht.com>, or visit the Web site: <www.agra-net.com>.

Elsevier Launches New Health Care Journal: *EXPLORE: The Journal of Science and Healing.* In 2005, Elsevier begins publication of a new journal written for a broad spectrum of healthcare providers. This journal will address the scientific principles behind and applications of evidence-based healing practices from a wide variety of sources, including conventional, alternative, and cross-cultural medicine. The first issue of *EXPLORE* will publish January 15, 2005. For more information or to order, contact Elsevier Periodicals Services: 6277 Sea Harbor Drive, Orlando, FL 32887-4800, USA, call 1-800-654-2452, visit the Web site <www.elsevier.com>, or e-mail <elspcs@elsevier.com>. Manuscripts are welcome and can be submitted electronically to <explore-journal@cox.net>.

Wild edible plants and botanical identification on "Wildman" Steve Brill's website. Information on foraging for wild edible plants and fungi in the New York City and New England areas. Wildman Steve Brill is an author, forager, teacher, and raconteur and has been on many radio and TV shows, including "LateNight with David Letterman," "CBS News with Dan Rather," and NPR's "All Things Considered." Clever animation, photos, tips, books, educational resources, much more, etc. http://www.wildmanstevebrill.com.

Medical Marijuana ProCon.org, formally known as MarijuanaInfo.org, is a research project of ProCon.org, a 501 (c) (3) non-profit (pending), non-partisan private foundation, without government affiliation of any kind. Visit the Web site for an exhaustive compilation of reports, surveys, and expert opinion on both sides of this increasingly important public debate. Information sources include, but are not limited to, peer-reviewed articles, books, news reports, magazines, government reports and research data. <www.MedicalmarijuanaProCon.org>.

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Publications

American Herb Association Quarterly Newsletter — $20/yr. AHA, P.O. Box 1673, Nevada City, CA 95959.

Australian Journal of Medical Herbalism — quarterly publication of the National Herbalists Association of Australia (founded in 1920). Deals with all aspects of Medical Herbalism, including latest medicinal plant research findings. Regular features include Australian medicinal plants, conferences, conference reports, book reviews, rare books, case study and medicinal plant review. AUD/$95 plus AUD/$15 if required by airmail. National Herbalists Association of Australia, 33 Reserve Street, Annandale, NSW 2038, Australia.

HerbalGram — Quarterly journal published by the American Botanical Council. A benefit at all levels of membership in ABC. See page 3 for membership information or join online at <www.herbalgram.org>. P.O. Box 144345, Austin, TX 78714. 800-373-7105 or fax 512-926-2345. Email <abc@herbalgram.org>.

Medical Herbalism — Subtitled "A Clinical Newsletter for the Herbal Practitioner." Edited by Paul Bergner. $36/yr, $60/2 yrs. Canada $39/yr. Overseas $45/yr. Sample/$6. Medical Herbalism, P. O. Box 20512, Boulder, CO 80308.

Schools

Accredited Natural Health Education - ACHS.edu Australasian College of Health Sciences is a respected and renowned industry leader in natural health education since 1978, providing career focused programs in Aromatherapy, Master Herbalist, Holistic Health Practice and more. Your success is our reputation. Call today 800.487.8839

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Herb Training for Retailers, Herbalists, Nutritionists, and others. Take ABC's self-paced, online Herbal Information Course and learn how to answer customer questions about herbs. Includes science-based information on 29 herbs, herb safety, legal and regulatory status of herbs in the U.S., interpreting product labels, and communicating with customers. Earn your Herbal Information Specialist Certificate at www.herbtraining.com. $69.95 (discounts for multiple participants).

ABC E-Newsletter: ABC's HerbalEGram electronic newsletter for members features up-to-date information on ABC and herb news, legal & regulatory issues, upcoming articles in *HerbalGram*, the latest bin of HerbClip, upcoming events & ABC appearances, and much more. Don't miss out. Contact us today to make sure we have your correct email address or to become a member: abc@herbalgram.org or 800-373-7105.

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Medical Botany: Plants Affecting Human Health, 2nd edition

By Walter H. Lewis and Memory P. F. Lewis, 2003. This book's broad coverage includes green plants, fungi, and microorganisms. It is organized by body system and ailment for ease in locating appropriate therapies. Also includes extensive references and citations from both conventional and complimentary medical systems when natural products or their derivatives are involved. Hardcover, 832 pages. B531. $95.00.

CRC Handbook of Medicinal Spices

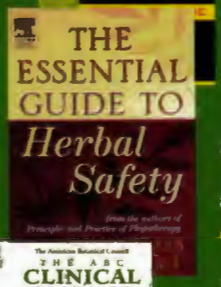
By James A. Duke with Mary Jo Bogenschutz-Godwin, Judi duCellier, and Peggy-Ann K. Duke, 2002. Over 60 popular spices organized by scientific name. For each spice, lists the common name, medicinal activities and indications, multiple activities, other uses (especially culinary), cultivation, chemistry and important phytochemical constituents and their activities. Contains black & white line drawings of the plants. Hardcover, 360 pp. B532. $129.95.

Integrative Medicine: Principles for Practice

By Benjamin Kligler and Roberta Lee. Foreword by Andrew T. Weil, M.D. Combines a body systems approach with practical case studies to clearly illustrate how clinicians can incorporate conventional and alternative therapies into their daily practice. Includes concise reviews of the major disciplines and protocols of complementary and alternative medicine. Hardcover, 700 pp. B533. $59.95.

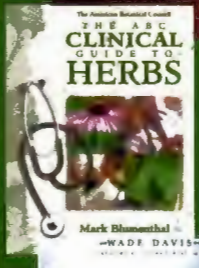
Integrative Medicine CME Study Guide

By Benjamin Kligler and Roberta Lee. Features 658 fully-referenced Q&As following the organization of Kligler and Lee's Integrative Medicine (B533). Includes a 360 question test that provides CME credit from Innovisions. Softcover, 240 pp. B534. $55.00.



The Essential Guide to Herbal Safety

By Simon Mills and Kerry Bone, 2005. Presents an extensive discussion of principles of and current major issues in herbal medicine safety. Contains comprehensive reviews of the published safety data for 125 herbs. Covers issues of quality, interactions, adverse reactions, toxicity, allergy, contact sensitivity and idiosyncratic reactions. Hardcover, 704 pp. B535. $59.95



The ABC Clinical Guide to Herbs

Edited by Mark Blumenthal et al., American Botanical Council, 2003. How does the healthcare professional effectively respond to patient inquiries on the use of herbal supplements? What clinical research has been conducted? How is safety evaluated? This science-based educational course answers these and other questions for healthcare professionals, pharmaceutical companies, health management companies, policy makers, the dietary supplement industry and consumers. Hardcover, 512 pp. $69.95. #905

The Lost Amazon: The Photographic Journey of Richard Evans Schultes

By Wade Davis, 2004. First major publication to examine the work of Dr. Schultes, as seen through his photographs and field notes. Schultes spent 12 years exploring the Amazon basin, living among two dozen different native tribes, mapping rivers, and collecting and classifying 30,000 botanical specimens. 200 pp, 150 b/w photographs. Hardcover, B536. $35.00.

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