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Marshmallow

Althaea officinalis
Family: Malvaceae

Introduction

A perennial herb, marshmallow is native throughout damp areas of Europe and Western Asia. Marshmallow is naturalized in North America in salt marshes from Massachusetts to Virginia, and it's cultivated from Western Europe to Russia.[1,2,3] Its material of commerce consists of both the whole or cut dried leaves and the peeled or unpeeled, whole or cut, dried roots.[4] These materials are harvested from cultivated plants mainly from Belgium, Bulgaria, Croatia, Hungary, Russian Federation, and Serbia.[3,5] The therapeutic activity of high-mucilage-containing materials, like marshmallow, can be predicted in part by volumetrically measuring their swelling index. This quality indicating test directly corresponds to the demulcent action (i.e., the soothing of mucous membranes caused by the expansion of mucilage polysaccharides when they absorb moisture, swell, and form a demulcent gel that has bioadhesive properties). Pharmacopeial quality marshmallow root should have a swelling index of not-less-than 10, and for marshmallow leaf, not-less-than 12.[4] The material used in the traditional systems of medicine in India, the mature dried seeds and roots, are often cultivated in Punjab and Kashmir.[6,7] The plant should be at least two years old before harvesting its roots.[8] The seeds are collected when they are mature, before the dried fruits fall to the ground.[6]

History and Cultural Significance

Reportedly, marshmallow has been used in traditional European medicine for over 2000 years.[2] Its therapeutic use was first recorded in the 9th century BCE, and it was used widely in Greek medicine.[9] Its genus name *Althaea* comes from the Greek *altho*, meaning to cure, and its family name, *Malvaceae*, is derived from the Greek *malake*, meaning soft.[10] The root is often used as a component of preparations intended for the treatment of coughs (e.g., teas and syrups).[11]

Marshmallow's use in traditional Greek medicine spread to Arabian medicine and to traditional Indian Ayurvedic and Unani medicines.[1] Early Arab physicians prepared a poultice with the leaves to suppress inflammation. The *Ayurvedic Pharmacopoeia of India* (2006) reports the therapeutic uses of the roots and/or seeds for treating coughs and bronchitis, coryza (runny nose), and throat disorders, among other conditions. An important formulation that contains both marshmallow seed and root, "*Gojihvadi Kvath,*" indicated for cough, is listed in the Government of India's *Essential Ayurveda Drugs for Dispensaries and Hospitals*.[12] In the Unani system of medicine, marshmallow seed is used for treatment of bronchitis, pleurisy, pneumonia, and kidney stones.[6] The Unani formulation, "*Lauq-e-Sapistan*," is indicated for dry and irritative cough, scanty sputum, chronic bronchitis, and chronic catarrh. *Lauq-e-Sapistan* is a soft, honey-based compound medicine with powdered marshmallow seed, snap melon seed (*Cucumis melo*, var. *momordica*, Cucurbitaceae), jujube fruit (*Ziziphus jujuba*, Rhamnaceae), and quince fruit (*Cydonia oblonga*, Rosaceae), among other herbs.[13]

The sweet confection known as "marshmallow" is related to the plant through history. In 2000 BCE, ancient Egyptians reportedly made a candy of marshmallow root and honey, which was reserved for gods and royalty.[14] In the more recent past (circa mid-17th century CE), French druggists made a meringue of marshmallow root extract, egg white, and sugar called *Pâté de Guimauve* to treat chest complaints.[10] By the late 19th century, marshmallow confections were easily available to the public, mass-produced, and no longer contained marshmallow extract.[14]

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Marshmallow *Althaea officinalis*
Photo by Steven Foster. ©2007 stevenfoster.com

Marshmallow *Continued from page 1*

In 1989, the German Commission E approved both marshmallow leaf and root for irritation of the oral and pharyngeal (throat) mucosa and associated dry cough.[15] The root was also approved for mild inflammation of the gastric mucosa (stomach lining). The German Standard License for marshmallow leaf or root teas indicates their use to alleviate irritation of the mucous membranes of the mouth and throat accompanied by dry irritated cough, and for mild inflammation of the gastric mucosa.[3] As all national pharmacopeias and formularies of European Community member states are in the process of harmonization, a European Community Herbal Monograph for marshmallow root is in development. This monograph will eventually become official in all 27 member states for the purpose of uniform product licensing and labeling for drug preparations containing marshmallow root.[16]

The non-official *British Herbal Compendium*, 1st edition, indicates marshmallow root internally for soothing the stomach and intestinal tract.[8] Topically, liquid preparations made from marshmallow root are indicated as a mouthwash or gargle for soothing inflammations in the mouth and throat.[8]

For marshmallow leaf, the *British Herbal Compendium*, 2nd edition, states that no indications are adequately substantiated by pharmacological or clinical studies. However, uses based on experience or tradition include internal use of the tea infusion or liquid extract for irritation and inflammation of the oral and pharyngeal mucosa, dry irritating coughs, respiratory catarrh and bronchitis, digestive tract disorders (peptic ulcer), and urinary tract disorders (cystitis).[17]

Similarly, the European Scientific Cooperative on Phytotherapy (ESCOP) indicates marshmallow aqueous cold macerate or syrup for dry cough and irritation of the oral or pharyngeal (throat), and the cold macerate form for gastrointestinal irritation.[18] However, the World Health Organization (WHO) monograph states that medicinal uses for marshmallow root are not supported by clinical data. For uses described in pharmacopeias and in traditional systems of medicine, the WHO lists the same aforementioned indications citing the monographs of the *British Herbal Compendium*, ESCOP, and the German Commission E.[19]

In the United States, marshmallow leaves and roots are used as components of herbal teas, dietary supplement products, and topical demulcent preparations.[11] Marshmallow flower and root, and extracts thereof, are also classified by the Food and Drug Administration (FDA) as generally recognized as safe (GRAS) natural flavoring substances when used in the minimum quantity required to produce this intended effect.[20]

Modern Research

In a pharmacological study involving male and female adult cats with mechanically induced cough, a mucilage polysaccharide extractive of marshmallow flowers demonstrated significantly higher antitussive activity than the non-narcotic drug dropropizine (frequently prescribed for cough treatment). However, it showed somewhat lower activity than the narcotic drug codeine, and whereas codeine had a negative impact on expectoration, marshmallow mucilage was shown to be an effective antitussive with no negative impact on expectoration. No adverse effects were observed in the marshmallow group.[21]

In a randomized, placebo controlled study involving 63 patients who had developed dry cough while taking angiotensin-converting enzyme (ACE) inhibitor drugs, patients received a liquid preparation of marshmallow root or placebo. The marshmallow group showed a significant reduction in cough score compared to placebo.[22]

An open-label clinical study containing 42 patients with chronic cutaneous leishmaniasis (CCL) involved the application of an herbal paste to lesions. The herbal paste was prepared from a special extract designated as "Z-HE," which was modified from a traditional Iranian medicine formula. The Z-HE extract contained extractives of marshmallow and the related hollyhock (*A. rosea*) (plant parts not specified in study), as well as other herbs. The study reported that 69% had a complete cure, 12% had partial cure, and 19% failed to respond to the therapy. In a subsequent open-label trial, the authors concluded that although the active ingredient(s) and the mechanism(s) of action of Z-HE are not known, its ease of preparation, topical application, lack of adverse effects, low cost, and satisfactory cosmetic effects make it a promising drug for use in the treatment of lesions of CCL.[23]

An open-label clinical study containing 62 patients with irritating cough used a combination syrup (Weleda Hustenelixier, Weleda, Schwäbisch Gmünd, Germany) containing extracts of English ivy leaf (*Hedera helix*, Araliaceae), thyme leaf and wild thyme leaf (*Thymus vulgaris* and *T. serpyllum*, Lamiaceae), anise fruit (*Pimpinella anisum*, Apiaceae), and marshmallow root. The syrup alleviated coughs resulting from the common cold, bronchitis, and respiratory tract diseases that formed mucous.[24]

A double-blind, placebo-controlled study contained 60 patients diagnosed with acute pharyngitis. The patients were treated with an herbal tea (Throat Coat®, Traditional Medicinals, Sebastopol, CA) that contained marshmallow root, licorice root (*Glycyrrhiza glabra*, Fabaceae), slippery elm bark (*Ulmus rubra*, Ulmaceae), and wild cherry bark (*Prunus serotina*, Rosaceae), among others. The tea was found to be significantly superior to placebo and provided a rapid, temporary relief of sore throat pain.[25]

Future Outlook

Wild marshmallow is considered a threatened plant in Germany and is listed in the German Federal Ordinance on the Conservation of Species.[26] A permit is necessary for import or export of any wild-collected material. Marshmallow is also listed as "nationally scarce" in the United Kingdom,[27] and due to its scarcity in Bulgaria, it is prohibited from collection in the wild.[28] Commercial marshmallow is, and should continue to be, harvested only from cultivated plants, especially when the root is being sought.

—Gayle Engels

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ABC Advisory Board

Each issue of *HerbalGram* is peer reviewed by members of the ABC Advisory Board and other qualified experts before publication.

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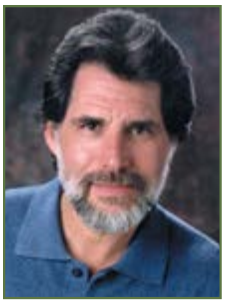
dear *reader*



FDA Finally Publishes GMPs for Herbs and other Dietary Supplements

On June 22, 2007, the US Food and Drug Administration (FDA) announced publication of its final rules for Good Manufacturing Practices (GMPs) for dietary supplements (DS). This event originated in 1994 when Congress passed the Dietary Supplement Health and Education Act (DSHEA) which authorized FDA to produce new GMPs for DS. Industry groups offered guidance to FDA in 1997, and much later in 2003, FDA published proposed rules for public comment. The revision then sat at the White House Office of Management and Budget for several years, possibly due to concerns about the impact on small businesses. During this time, industry, Congress, and others pressured for the publication of GMPs.

Mounting public concerns over food safety, evidenced in the recent scandal over melamine-adulterated Chinese wheat gluten discovered in pet foods, probably increased pressure on FDA to release the GMPs, even though the melamine issue pertains to conventional foods and not directly to DS.

The new GMPs cover rules for handling, processing, labeling, and storing ingredients and DS products, which includes quality control, standardized operating procedures, record-keeping, qualifications for technical personnel, handling customer complaints, etc. FDA also published a proposed interim rule on whether companies should be required to test 100% of all ingredients for identity or whether the frequency of such testing can be reduced, depending on whether certain other requirements are met. Public comment on this proposal is due September 24, 2007.

Manufacturers will have 1-3 years to comply with the GMPs: 1 year for companies over 500 employees, 2 years for companies with less than 500 (the size of most), and 3 years for companies with 20 or less. The GMPs will not apply to licensed practitioners who compound and dispense DS preparations within a clinical practice, nor do they pertain to retail establishments.

The new rules will probably have minimal impact on the many responsible and foresighted manufacturers of DS that anticipated the eventual publication of new GMPs. These manufacturers have invested millions of dollars over the past decade creating or expanding in-house laboratories, hiring the qualified technical personnel needed for testing both the ingredients and the final products produced in their facilities, and instituting newly enhanced procedures and record-keeping necessary to ensure product quality. Some companies have contracted with qualified third-party testing laboratories to perform these quality-control functions. Despite these voluntary steps, the new GMPs may require some revisions to record-keeping procedures for these companies.

The new rules do not require compliance by producers of raw materials (including herb extracts) that are sold as *dietary ingredients* (DI) for finished DS products. This remains potentially problematic. In the past, the herb industry has witnessed numerous cases of misidentified and/or contaminated ingredients. Requiring that the DI processors meet GMP requirements would help reduce quality control problems, although presumably such problems will be detected by the manufacturer of the finished DS products, who will bear the full onus of ensuring the accurate identity and quality of ingredients. FDA may have determined that it simply does not have the resources and ability to inspect facilities in other countries that produce imported DIs.

Another area in which these GMPs are not as stringent as some might prefer is their lack of requirement of the use of validated analytical methods for testing DIs and DS. Instead of requiring consensually validated test methods, which DSHEA does not authorize the FDA to do, each manufacturer and/or laboratory must determine what may be a "scientifically valid" test method. Some experts emphasize that any test method, whether externally validated or not, must still be subjected to in-house validation procedures by each laboratory. While this provides more flexibility, there are concerns that this will perpetuate the use of inappropriate and inadequate test methods, possibly resulting in "laboratory confirmation" of adulterated and/or otherwise poor quality ingredients—a problem that currently exists, and which may continue.

Hopefully, all members of the DS industry will comply with, and the FDA will rigorously enforce, these new GMPs, and quality problems—whether accidental or intentional—will cease. Ultimately, this entire process is designed to help consumers choose DS products with the confidence that packages contain what the labels claim, free of contaminants and adulterated ingredients.

In the long-run, GMP rules may help to "level the playing field" with respect to the manufacture of finished herb products by requiring quality requirements and procedures. Nevertheless, compliance with the new GMP is not a substitute for high quality herbal ingredients. The old Zenith radio and television slogan, "The quality goes in before the name goes on," still applies to herbal products.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30 **Safeguarding the Seeds of Native Plants: A Review of Germplasm Collection Efforts and Conservation Potential**

by Megan Haidet, Mary Byrne, and Joe-Ann McCoy, PhD

Botanists, biologists, and other researchers in the United States are collecting and preserving the seeds of native plant species, including medicinal plants. By storing and protecting native germplasm, researchers hope to conserve plants' genetic material so that they can maintain and restore native landscapes more effectively. Two groups in particular—the National Plant Germplasm System and the Seeds of Success program—are profiled by the authors for their commitment to such conservation efforts. This article explores the history and importance of these collection and conservation efforts and provides suggestions for how the public can become involved.

38 **Grattis! Carl Linnaeus**

by Paul Alan Cox, PhD

May 23, 2007, marked the 300th anniversary of the birthday of pioneering taxonomist Carl Linnaeus, renowned for establishing the binomial nomenclature system of naming plants and animals, for his passionate teaching methods, and for his lasting contributions to ethnobotany, among other feats. The author provides a first-person account of his experiences at the recent celebrations held in Sweden in honor of history's most famous and revered botanist.

44 **Peruvian Maca and Allegations of Biopiracy**

by Josef Brinckmann

Peruvian scientists and government officials are trying to prevent "biopiracy" of the traditional Peruvian food and medicinal plant—maca. Biopiracy is the expropriation of traditional knowledge and resources of indigenous peoples by third parties attempting to capitalize on such resources. The Peruvian government is attempting to challenge several maca-related patents filed in the United States and Japan, which officials suspect could potentially affect exports of maca products from Peru. The author discusses the ethical and legal ramifications of biopiracy and the challenges that Peru faces in protecting its traditional botanical knowledge and resources.

54 **Wisconsin Ginseng Farmers Fight to Protect Product Reputation**

by Courtney Cavaliere and Mark Blumenthal

The Wisconsin ginseng industry, which once served as the world's leading producer of cultivated North American ginseng, has experienced serious decline over the past few decades. Two organizations representing the state's ginseng growers have recently initiated efforts to revitalize Wisconsin's ginseng industry. Chief among such efforts is a recent arrangement with a Singapore-based company, which will purchase a significant annual share of Wisconsin's ginseng crop and exclusively market its product with the Wisconsin Ginseng Seal. This article includes a brief history of Wisconsin's ginseng industry, the challenges it has faced, and the various initiatives underway to strengthen the state's ginseng production and export.

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Integrative Medicine Expert John Weeks Joins ABC Board of Trustees

The American Botanical Council (ABC) recently inducted integrative medicine expert John Weeks into the organization's Board of Trustees. The announcement was made on March 8, 2007, at the American Botanical Celebration banquet held in Anaheim, CA, in conjunction with the Nutracon scientific conference and Natural Products Expo West.

Weeks is the editor-publisher of *The Integrator Blog News & Reports* (www.theintegratorblog.com), one of the leading sources of news and information on the Internet about developments in complementary and alternative medicine (CAM) and integrative medicine. He is also the executive director of the Academic Consortium for Complementary and Alternative Health Care, an organization whose membership consists principally of councils of colleges, accrediting bodies, and testing agencies for the five licensed CAM disciplines (i.e., chiropractic, acupuncture and Oriental medicine, massage therapy, naturopathic medicine, and direct-entry [homebirth] midwifery).

"We are excited that John has joined our Board of Trustees," said ABC Founder and Executive Director Mark Blumenthal. "John brings with him a deep knowledge of individuals and organizations in the integrative medicine field. His extensive relationships will help create new opportunities for ABC in its increased commitment to forward its nonprofit mission to researchers, healthcare professionals, and medical organizations with an interest in well-researched herbal preparations and their appropriate therapeutic roles in self-care and conventional and alternative healthcare."

Peggy Brevoort, president of the ABC Board of Trustees, has known Weeks for many years. "Speaking on behalf of the Board, we are delighted that John will be joining us. As a longtime supporter and participant in the larger CAM community, John will add another level of expertise to our already diverse and talented Board of Trustees."

"I am deeply honored for the invitation to join the ABC Board," said Weeks. "For years ABC has been the premier organization in the herbal medicine field. I have great respect for the work Mark, Peggy, and the rest of the Board and staff have been doing and am excited by the potential to contribute in this next phase of ABC's service."

"The impact of John Weeks' establishing communication and improving understanding among the conventional medicine, natural medicine and natural products community would be hard to overstate," said Joe Pizzorno, ND, co-founder of Bastyr University, and now president of Salugenecists, a health oriented information provider. "His remarkable instincts on how to talk with diverse groups and elicit their commitment to find common ground has resulted in the establishment of coalitions that are making real advances in collaboration and healthcare reform."

Weeks has over 20 years experience in the field of CAM. He served from 2004 through 2006 as the organizer and director of the National Education Dialogue to Advance Integrated Health Care: Creating Common Ground, a not-for-profit initiative involving leading educators from 12 healthcare disciplines.

He was formerly the first vice president for external affairs at the John Bastyr College of Naturopathic Medicine (now Bastyr University). Weeks has been called an "expert in alternative medicine" by *Medical Economics*[1] and an "alternative care (integration) expert" by *Modern Healthcare*.[2] The National Institutes of Health contracted with him for a paper on coverage issues in CAM,[3] and the Institute of Medicine cited his work in its 2005 report.[4] He has consulted with diverse parties on their integration strategies.

Recognizing the need in the evolving field for forums to explore the challenges, opportunities and collaborative possibilities, Weeks has been instrumental in convening various conferences and gatherings—including three Integrative Medicine Industry Leadership Summits (2000-2002). The goal of these meetings is to stimulate communication and cooperation among various healthcare professions and other significant stakeholders in the CAM area, including hospitals and healthcare systems, HMOs, government agencies, academic medical researchers, natural products industry, health policy experts, integrative clinic operators, venture capitalists, and others.

—Nancy Moon

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Employee Profile: Courtney Cavaliere


Cavaliere and Claudia

One of the most rewarding aspects of ABC's nonprofit educational mission for many of us on the ABC staff is our internship program. In past issues of *HerbalGram* we have profiled the activities of various pharmacy and nutrition interns, and we have also published articles by our editorial interns who major in journalism and English.

In 2005 we were fortunate to receive an intern named Courtney Cavaliere, a graduate student working on her master's degree in journalism. Courtney impressed us immediately. Her writing was excellent, she seldom made any typographical or spelling errors, and even her first drafts of articles were formatted properly and almost perfect. Also impressive was how this highly intelligent young woman was able to grasp what many people would consider fairly esoteric concepts related to the research, marketing, and regulation of herbs, dietary supplements, phytomedicines, plant-derived "nutraceutical" ingredients, etc.

Courtney spent about 9 months with us as a highly productive and prolific intern. When her internship was almost over, I asked her about her future plans. She told me that she would like to stay at ABC and work on *HerbalGram* and HerbalEGram, our then new electronic newsletter that is sent to all ABC members monthly. Within a nanosecond, I decided to hire her, and I instructed our finance manager to squeeze some funding from the budget so we could keep her.

This is probably one of the best management decisions I have ever made! *HerbalGram* (and HerbalEGram) readers already know her name; she usually has 6-10 bylines in almost every issue of *HerbalGram* and also writes most of the articles for HerbalEGram. She is responsible for many of our *HerbalGram* features, having co-authored the article on Wisconsin ginseng growers (see page 54 in this issue) and written the article on slippery elm conservation in our last issue (#74). And there are many more.

When given an assignment for a topic to write up, it is not uncommon for Courtney to send me a first draft within 24-48 hours, with the article seemingly ready for publication, with numerous references and interviews of experts already included.

Not only does Courtney write well, she also is instrumental in our editorial process. She has now risen to the position of helping to supervise new journalism interns, and she also helps to manage our extensive peer-review process, among other editorial tasks.

There's an old expression in business: "If you want to succeed, one of the first things you must do is hire people who are smarter than you!" I try to do this every time I am involved in the hiring process. In Courtney's case, this is certainly true!

—Mark Blumenthal

ABC Launches New Version of Its Web Site—www.herbalgram.org

ABC is excited to announce the recent launch of a new version of its Web site at www.herbalgram.org. This new site became live on May 21, 2007.

In an effort to provide ABC members and visitors to the site with a better online experience, ABC has contracted with Convio, a firm that specializes in hosting and enhancing nonprofit Web sites. The new site features more security for financial transactions, easier navigation, and a fresh new design. With Convio's software, e-mails sent from the new site to ABC members will avoid spam filters to improve delivery. The new site will also automate many financial transactions and membership renewals, enabling ABC staff to devote more time to creating and delivering the quality educational materials ABC members have come to expect.

Access to ABC's password-protected Web site is just one of the many benefits offered through membership with ABC. The site includes archives of the journal *HerbalGram* from 1990 through the current issue; more than 3000 HerbClip™ summaries and critical reviews with 28 new HerbClips added each month; hundreds of monographs from *The Complete German Commission E Monographs* and *Herbal Medicine: Expanded Commission E Monographs*; more than 100 overviews of herbs used in personal care products; thousands of images; and much, much more.

One of the big changes to the site is how visitors will access the materials referred to above. Along the top navigation bar, visitors will see a button labeled Herbal Library. When this button is clicked, visitors will see descriptions of and links to *HerbalGram* Online, HerbClip Online, and other ABC educational materials and searchable databases. Currently, the ability to search can only occur within each database, such as *HerbalGram* or HerbClip, but ABC's Information Technology team is working on an enhanced search function that will search all of the site's content at once.

Another major change is that ABC members must now use their e-mail address to log in to ABC's site and gain access to online benefits. Non-member visitors who register their name and e-mail address will have access to more information than casual visitors who do not log in. For ABC members who have not logged in to the new site yet, ABC respectfully requests that such members please log in using the e-mail address they originally submitted to ABC. Then the member will be e-mailed a temporary password. Once that password is used for logging in, the member can go to "My Profile," located on the left navigation bar, and change the password and update the profile if desired.

ABC encourages all ABC members and *HerbalGram* readers to visit the new site and take a short survey, available through a hyperlink on the home page, to give ABC feedback on this new site. ABC deeply values the opinions and suggestions of all of its members and will continue to improve the site over the coming months.

—Gayle Engels and Aileen Truax

AHPA Publishes 2004-2005 Wild Plant Tonnage Survey

By Courtney Cavaliere

The American Herbal Products Association (AHPA), the leading trade association in the United States dealing with herbal products, published its *Tonnage Survey of North American Wild Harvested Plants, 2004–2005* in February of 2007. This is the fifth tonnage survey published by AHPA, quantifying the annual harvests of certain North American plants that are used in herbal products and harvested to some extent from wild, uncultivated populations.[1]

The 32-page report provides aggregate quantities of harvest data for 26 botanical commodities derived from 22 different plant species, and the data are divided into dried and fresh plant materials collected through both cultivation and wild-harvesting practices. The data in the report are based on the voluntary survey responses of 26 primary raw material producers of the botanical commodities featured in the report. Much of the information from AHPA's earlier surveys is also included in the latest report, in the interest of context.

"The long range trends that are now apparent tell a continuing story of our use of these important botanical commodities," said Steven Dentali, PhD, AHPA's vice-president of scientific and technical affairs.[2] "Several valued species are now farmed rather than solely gathered from the wild by collectors, which helps to ensure their future. The visible trends also appear to support the existence of responsible collection practices in the face of continuing loss of habitat."

According to the survey, the combined wild and cultivated harvest of dried black cohosh (*Actaea racemosa,* Ranunculaceae, syn. *Cimicifuga racemosa*) root and rhizome was estimated at 160 tons in 2004 and 72 tons in 2005.[1] The authors of the report offer the following explanation for this precipitous decline: "The decision made in February of 2004 to stop the estrogen-only portion of the Women's Health Initiative study, and an increased interest in herbal alternatives might help account for the sustained harvest of black cohosh for 2004. It is reasonable to suspect that excess inventory built up from the 2003–2004 years could have led to the tonnage drop of 88 tons in 2005 relative to 2004, though this information was not solicited in the AHPA survey and is not known to be the case."

The 2003 figure for dried cultivated and wild-harvested saw palmetto (*Serenoa repens,* Arecaceae) berries from the previous tonnage survey was revised to 1,700 tons (originally noted as "very nearly 1,200 tons") in the new survey based on additional data. Latest figures show 1,460 tons of dried saw palmetto berries in 2004 and 2,900 tons in 2005.

Other species addressed in the survey include cascara sagrada (*Frangula purshiana,* Rhamnaceae, syn. *Rhamnus purshiana*) bark, various species of *Echinacea* roots and above-ground parts, slippery elm (*Ulmus rubra,* Ulmaceae, syn. *U. fulva*) bark, false unicorn (*Chamaelirium luteum*, Liliaceae) root, wild yam (*Dioscorea villosa*, Dioscoreaceae) root, and lady's slipper (*Cypripedium* spp., Orchidaceae) root. Harvest quantities of the featured plants were typically much lower for fresh plant materials, as the majority of herbal materials undergo dehydration before entering the market.

The report provides multiple tables and detailed information on the cultivation and wild-harvesting of goldenseal (*Hydrastis canadensis*, Ranunculaceae), including future projections of goldenseal cultivation. AHPA's first tonnage survey was devoted entirely to goldenseal,[3] and the third survey included a lengthy section on goldenseal that comprised nearly a third of the report.[4] (Previous tonnage surveys have been summarized in past issues of *HerbalGram*.[5,6,7]) The latest figures show that combined cultivated and wild-harvested dried goldenseal root and rhizome rose to 42 and 41 tons for 2004 and 2005, respectively, from 21 tons in 2003.[1] The harvest of fresh wild goldenseal root dropped to nearly insignificant levels compared to previous years.

According to the survey, "Cultivated material represents a more significant proportion of the total harvest of goldenseal root than for any of the other widely used botanicals discussed in this report (arnica [*Arnica montana*, Asteraceae] and Venus flytrap [*Dionaea muscipula*, Droseraceae] aside), with the exception of some echinacea commodities. This is true for both fresh and dried roots." The survey also includes a chart that indicates that 41% of dried goldenseal roots were cultivated and 59% were wild harvested in 2005.

The tonnage survey is available to AHPA members, free of charge. Nonmembers may purchase the report for $35. Prior years' tonnage surveys may also be purchased from the AHPA bookstore at: http://www.ahpa.org/Default.aspx?tabid=68.

AHPA and the American Herbal Pharmacopoeia (AHP), a leading nonprofit herbal research organization dealing with setting and publishing standards for quality control of herbal materials, jointly released a draft document in December of 2006 that is intended to provide guidance to growers and collectors of herbs used in consumer products.[8] The 39-page document, titled *Good Agricultural and Collection Practice for Herbal Raw Materials* (GACP), provides guidelines to help ensure that herbal raw materials are accurately identified and not adulterated with contaminants, are in full conformity with all of the quality characteristics for which they are represented, and are cultivated and harvested in a manner that is environmentally sustainable. According to an AHPA press release, the GACP has relevance to herbal raw materials in all herbal products—including foods, dietary supplements, drugs, and cosmetics—and is applicable to both large and small herbal raw material producers and to producers who collect their herbs through cultivation or wild harvesting.[9] The draft document may be periodically revised based on feedback by farmers and collectors who use the guidelines in their facilities and operations. The AHPA-AHP GACP document is available online at http://www.ahpa.org/portals/0/pdfs/06_1208_AHPA-AHP_GACP.pdf and at http://www.herbal-ahp.org/06_1208_AHPA-AHP_GACP.pdf.

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CRN Launches New Advertising Campaign

By Courtney Cavaliere

The Council for Responsible Nutrition (CRN), a leading trade association for the dietary supplement industry, announced in April 2007 that it has initiated a new advertising campaign. This campaign encourages members of the dietary supplement industry to assist in self-regulation efforts by reporting false and misleading advertisements through competitive challenges filed with the National Advertising Division (NAD).[1]

CRN has partnered with five trade magazines that will run an ad in support of this campaign, beginning in June issues and running through September. The publications *Functional Foods & Nutraceuticals, Natural Products Insider, Nutrition Industry Executive, Nutraceuticals World,* and *Nutritional Outlook* will all publish the CRN-designed ad at special advertising rates. CRN will also run one insertion in *The Tan Sheet*, a leading weekly newsletter for the over-the-counter drug and dietary supplement industries focusing on regulatory matters. The CRN ad urges supplement companies to file a competitive challenge with the NAD of the Council of Better Business Bureaus if they "see a supplement ad that's misleading, untruthful, or includes claims that can't be substantiated." The NAD is the investigative and judicial arm of the advertising industry's self-regulating body.

"The single greatest threat to our industry results from the outrageous claims made by a few companies that consumers associate with the entire category," said CRN President and CEO Steve Mister, in a CRN press release.[1] "We're gratified that these publications have joined us in this effort to help clean up our industry's advertising. Now it's up to individual supplement companies to take action. Part of being a responsible industry is self-policing those members who push the envelope too far."

CRN plans to eventually reach out to consumer publications and advertising agencies to ask for their support in taking responsibility for the ads they accept and the ads they produce. The association also plans to distribute fact sheet flyers about the campaign to members of Congress to demonstrate to legislators that the mainstream supplement industry understands the importance of self-regulation.

This new advertising campaign supports the initiative that CRN launched with NAD in September of 2006.[2] CRN provided funding to NAD so that NAD could add an attorney to its staff who would work exclusively in monitoring advertising for the dietary supplement product category. An article about this initiative was published in HerbalEGram in November 2006.

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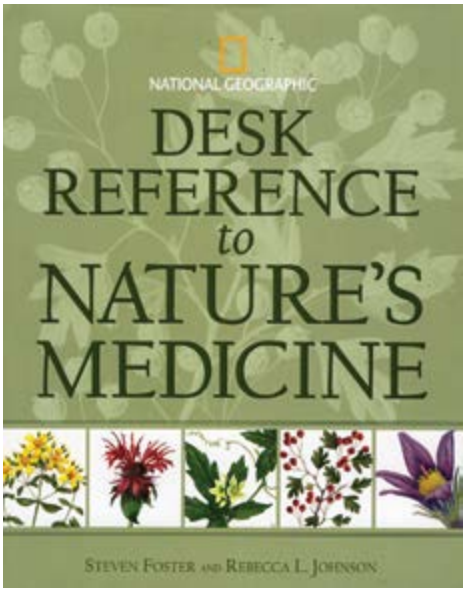
National Geographic's Herb Book Named a "Best of Reference"

By Courtney Cavaliere

The New York Public Library has designated *Desk Reference to Nature's Medicine* as one of the best reference works for 2007.[1,2] The colorful, authoritative herb book was one of several references honored by the library.

The library's annual "Best of Reference" list, compiled by a committee of librarians, includes books, Web sites, and electronic resources that are deemed particularly useful in branch references collections. The selections are chosen for the value of their content, their style of presentation, and the authority of their authors and editors. The announcement of the library's 2007 "Best of Reference" list was made on April 27, 2007.



Desk Reference to Nature's Medicine, written by Steven Foster and Rebecca L. Johnson and published by the National Geographic Society, includes extensive photographs, illustrations, and information concerning 150 species of plants traditionally used in herbal medicine. According to the library's description, "More than the familiar guide to herbal remedies, this is illustrated with botanical drawings and color photographs. It gives the cultural, historical, and scientific background of hundreds of plants used for healing by people the world over."[1] The book was reviewed by James A. Duke, PhD, in *HerbalGram* issue 73.[3]

The book's primary author, Steven Foster, has served as a specialist, writer, lecturer, and photographer of medicinal and aromatic plants for over 30 years.[4] He has authored or co-authored 15 books and his photographs and articles have appeared in hundreds of publications. Among his many affiliations, he is a member of the American Botanical Council's Board of Trustees and is the associate editor of *HerbalGram*.

"This book is remarkable in numerous ways," said Mark Blumenthal, founder and executive director of ABC. "The text is well-written and reliable and the photos and layout are what everyone would expect from National Geographic. Plus, given the marketing power of National Geographic, we expect this book to have a positive impact on public awareness of the rich lore and benefits of herbs."

More information about Foster and his work can be found at his Web site: www.stevenfoster.com. To view the New York Public Library's entire "Best of Reference" list for 2007, go to www.nypl.org/branch/books/index2.cfm?ListID=338.

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Indian Government Funding Medicinal Herb Gardens in Schools

By Courtney Cavaliere

The Indian government's National Medicinal Plants Board (NMPB) launched a new program in 2006 to help fund the establishment of medicinal plant gardens in local schools.[1] The Board is currently attempting to select at least 500 schools from all over the country for inclusion in the initial phase of this program.

According to a press release from the NMPB, the purpose of this new project is to foster a sense of belonging and interest in children toward biodiversity and its conservation, particularly of medicinal plants, which contribute to holistic healthcare in both traditional and conventional systems of medicine. Schools up to the senior secondary/intermediate level will be eligible to participate in the program.

Funding will be provided so that each school may raise an herbal garden of about 1/10 of a hectare (a hectare = 2.5 acres). The cost of establishing the herbal garden will include land development, irrigation, transportation of planting material, organic manure, barbed wire fencing, and other materials. Schools will also be given funding for maintenance of the garden throughout its second year. Each state and Union Territory in India has its own State Medicinal Plants Board (SMPB) working for NMPB, so the funding provided by NMPB will be routed through these state offices. Marketing of cultivated medicinal plant species will be made through networking of SMPBs, traditional herbal products and drug manufacturers, and other areas of commerce.

Within six months of the announcement of the new program, a total of 359 project proposals were submitted by schools interested in participating. According to a press release from the NMPB, this immediate response by country-wide schools "reflects the interest and awareness of schools in the medicinal plants. This interest will be a milestone in developing the medicinal plants sector and the conservation of biological diversity in the days to come."[1]

There is growing interest in cultivation and conservation of medicinal plants used in systems of Ayurvedic, Unani, and other forms of traditional medicine. The article "India's Foundation for the Revitalization of Local Health Traditions," published in *HerbalGram* issue 68, describes the history and mission of an organization known as the Foundation for the Revitalization of Local Health Traditions (FRLHT).[2] This organization has established an extensive system of gene banks and conservation sites throughout India to study and protect traditionally-used medicinal plant species, which are now considered at risk due to over-harvesting, in conjunction with local communities.

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Survey Shows Older Adults Commonly Use CAM but Rarely Discuss with Doctors

By Courtney Cavaliere

The results of a survey released in January 2007 indicate that 63% of US residents aged 50 or older use complementary and alternative medicine (CAM) therapies and that 77% of older adults do not discuss their CAM use with doctors.[1]

The telephone survey was conducted between April 26 and May 7 of 2006 by the American Association of Retired Persons (AARP), a nonprofit organization for people 50 and over, and the National Center for Complementary and Alternative Medicine (NCCAM) of the National Institutes of Health (NIH). Responses were obtained from 1,559 people aged 50 and older. The CAM therapy reportedly used by the most respondents (45%) was bodywork, which includes massage therapy and chiropractic care. The second most popular CAM therapy, reportedly used by 42% of respondents, was herbal products and dietary supplements. Respondents were not asked to specify the types of herbal products or dietary supplements that they have used or how frequently they have employed such products. Other CAM therapies reportedly used by respondents were mind/body practices (15%); naturopathy, acupuncture, or homeopathy (14%); energy therapies (10%); and other forms of CAM (2%).

Only 22% of respondents claimed to have discussed their CAM use with a physician. Reasons given for not discussing CAM use included doctors not asking about such therapies (42%), patients not realizing that they should discuss their CAM use with a doctor (30%), patients not having enough time to broach the subject during an office visit (19%), patients assuming that doctors wouldn't know about the topic (17%), and patients thinking that doctors would be dismissive (12%).

The authors of the report conclude that greater communication between older patients and their doctors is needed in regards to CAM use, particularly since nearly 60% of respondents claimed that they were also currently using prescription drugs. According to the report: "Patients need to mention CAM use to their physicians and physicians need to ask about it—especially given that less than half of respondents who said they had not discussed CAM with their physicians would be comfortable doing so. The lack of this dialogue points to a need to educate both consumers and health care providers about the importance of discussing the use of CAM, how to begin the dialogue, and the implications of not doing so."

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Canadian City Reserves Supply of COLD-fX® for Flu Pandemic Preparedness Plan

By Courtney Cavaliere

As part of a city-wide flu pandemic preparedness plan, the Canadian city of Edmonton, Alberta, has purchased and put into reserve thousands of bottles of Canada's leading natural cold and flu treatment COLD-fX® for future use by the city's emergency workers.[1]

COLD-fX, a patented, chemically distinct fraction of polysaccharides derived from American ginseng (*Panax quinquefolius,* Araliaceae) roots, is marketed as an immune-enhancing dietary supplement in the United States and as a nonprescription natural health product in Canada. In February of 2007, the Canadian government's Natural Health Products Directorate (NHPD), a division of Health Canada, approved the following claim for COLD-fX: "helps reduce the frequency, severity and duration of cold and flu symptoms by boosting the immune system."[2]

"This is one more tool we can add to our pandemic preparedness toolkit," said Bob Black, director of Edmonton's Office of Emergency Preparedness, in a press release from CV Technologies, the Edmonton-based manufacturer of COLD-fX.[1] "There are so many unknowns in planning for a possible pandemic that anything we can do to be prepared makes sense. As cities across North America consider the challenges associated with a pandemic, we need to take every reasonable precaution to help our emergency personnel stay on the job, so they can help others."

Edmonton, the sixth largest city in Canada, has had a general public health emergency contingency plan in place since 2003 and employs one full-time staff person to work exclusively on a city-wide plan for efficiently responding to a possible future pandemic.

According to the new arrangement, CV Technologies will reserve a supply of 10,000 bottles of COLD-fX for emergency use by key city officials (including police, firefighters, and emergency medical personnel) through a cost-sharing arrangement with the city of Edmonton.[1] Rather than storing a set amount of COLD-fX—which has a shelf life of 5 years—the company has guaranteed that enough product to treat 5,000 people over a period of 8 weeks will be available to the city during a pandemic.[3] According to news reports, the city was not asked to pay the full retail price for the product (about $250,000) and has purchased the COLD-fX for approximately $120,000.[4,5]

The arrangement between CV Technologies and the city of Edmonton has generally been viewed favorably in the media. Multiple articles have stressed the uniqueness of the situation, pointing out that Edmonton has become the first municipality in North America to stockpile COLD-fX for this purpose.[4,6] An article in the national Canadian newspaper *Globe and Mail* quoted Mr. Black as stating, "It may make the difference between us having essential service workers on the road or not."[6] An article from CBC News explained that Edmonton's medical officer of health Gerry Predy, MD, acknowledged that there is clinical evidence that COLD-fX does have an effect on preventing viral infections of various types.[4] Dr. Predy was the lead investigator on a large (n = 323 subjects), Phase 3, randomized, controlled clinical trial conducted on COLD-fX, which shows that the phytomedicine was effective in preventing upper respiratory tract infections in people who had had at least 2 colds in the previous year.[7] The CBC News article also states, however, that there is no evidence that COLD-fX would be effective at treating avian flu, which many scientists believe has the potential to become a pandemic.[4] A column in the *Edmonton Sun* openly criticized the plan, arguing that it might just be a costly way for the city to provide the local company with good publicity, in light of recent corporate struggles.[5]

Jacqueline Shan, PhD, DSc, president, CEO and chief scientific officer of CV Technologies, has argued that COLD-fX could be valuable during a pandemic by providing additional protection to emergency workers.[1] "Vaccines may also offer some protection. However current vaccines are not likely to be completely effective if a virus mutates, which is what medical experts fear might happen with the avian flu virus," Dr. Shan said.[1] She also pointed out that it generally takes between four to six months to develop an effective vaccine after a virus strikes. "During this time, COLD-fX may help provide additional protection to front line workers by enhancing their immune systems."

The American Botanical Council (ABC) recently published a monograph of the published scientific and clinical studies on the health benefits of COLD-fX, also known by its scientific code name, CVT-E002.[8]

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Study Investigates Goldenseal Re-Growth after Wild Harvesting

By Courtney Cavaliere

According to a 2006 article published in *The American Midland Naturalist*, wild-harvested goldenseal (*Hydrastis canadensis*, Ranunculaceae) populations may regenerate at different rates according to their locations and the seasons during which they were harvested.[1] The authors of the article conducted a 4-year study in the Wayne National Forest in Ohio, monitoring the re-growth of a goldenseal population wild-harvested during the fall of 2001. These data were compared to previous studies that quantified the re-growth of goldenseal populations wild-harvested during the fall in West Virginia[2] or experimentally harvested during mid-summer.[3]

The authors randomly selected and measured 75 goldenseal ramets (individual members of a cloned strain) from the Ohio population twice, over 2-year intervals, and compared these measurements to the previously published data concerning goldenseal re-growth in West Virginia.[1] The researchers found that ramet densities increased 210% in the fall harvested Ohio population, but declined slightly in the fall-harvested population from West Virginia.* There was also a greater proportion of reproductive plants in the Ohio population. Meanwhile, mean ramet leaf area was similar for fall-harvested populations from both states, whereas the ramet leaf area was much smaller in the summer-harvested populations.† The study therefore suggests that the seasonal timing of harvest *may* impact the rate at which goldenseal populations regenerate (although peer reviewers of this article have emphasized that harvest time, stage of plant growth, and the amount of rainfall immediately preceding the harvest *does strongly* impact regeneration).

According to the authors of the article, "Collectively, studies from OH and WV suggest that fall-harvested goldenseal populations may recover (in terms of leaf size) at faster rates than those harvested during mid-summer." This would indicate that fall harvest of goldenseal root is more conducive to sustainable wildharvest. Patricia De Angelis, PhD, a botanist in the division of scientific authority at the US Fish and Wildlife Service (FWS), added that "from a chemical standpoint, fall is the best time to harvest because the alkaloid content increases as the plant nears dormancy" (e-mail, March 20, 2007). Michael C. Tims wrote about this topic in his 2006 dissertation, submitted to the University of Maryland: "Of note, Renaud and Strauss…compared seasonal variations in berberine and hydrastine content of wild goldenseal root collected from north- and south-facing collection sites in Rutland, OH, during April, June, September, and November...The authors also noted that the total alkaloid content was highest at both sites in November, at which point *Hydrastis* begins winter dormancy, and reallocation of alkaloid to the root may have occurred."[4]

The authors of the present article note that the differences in goldenseal population re-growth found in their study could be associated with a number of factors in addition to wild-harvesting, including variability in harvesting methods, deer browsing, and differences in environmental attributes, among others.[1] They conclude that further study is warranted to determine sustainable harvest rates for goldenseal under different intervals and conditions, particularly since goldenseal has been the subject of conservation efforts.

The authors further note that such studies are warranted since goldenseal's ecological life history "suggest it is sensitive to overharvest." A reviewer of this article, Edward Fletcher of Strategic Sourcing Inc. (Banner Elk, NC), pointed out that this does not mean that goldenseal has difficulty in regenerating. "When harvested under the proper conditions, that is, considering the season and weather conditions, goldenseal rootlets or broken fiber roots have a high survival rate and can regenerate at a high percentage; they are just slow, that is, as in 5-7 years to maturity" (e-mail, March 23, 2007).

According to the Medicinal Plant Fact Sheet for goldenseal, which was recently released by the Plant Conservation Alliance, goldenseal is one of the oldest documented medicinal plants of North American origin and is among the 20 leading herbal materials within the worldwide market.[5] Goldenseal is listed as threatened in Canada and is listed as endangered, threatened, vulnerable, or of special concern in several areas of the United States (Connecticut, Georgia, Maryland, Massachusetts, Michigan, Minnesota, New Jersey, New York, North Carolina, and Vermont). The plant has been included in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) since 1997, and it is listed as "At Risk" by United Plant Savers (UpS), a nonprofit organization dedicated to preserving native medicinal plants. HG

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* The authors of the article claim to have adopted the sampling scheme used in the previously published study from West Virginia (Van der Voort et al, 2003) to census population re-growth. They compared their own Ohio data to the previously published data from Table 2 in Van der Voort et al's 2003 study. The West Virginia population was surveyed annually, whereas the Ohio population was sampled the second and fourth growing season following harvest.

† The authors compared their fall-harvested Ohio results and the West Virginia data of Van der Voort et al to a previously published study (Sanders and McGraw, 2005) concerning summer-harvested goldenseal. The authors do not mention the location of the summer-harvested populations studied by Sanders and McGraw.

Study Finds Hibiscus Extract May Help Control Hypertension

Reviewed: Herrera-Arellano A, Miranda-Sanchez J, Avila-Castro P, et al. Clinical effects produced by a standardized herbal medicinal product of *Hibiscus sabdariffa* on patients with hypertension: A randomized, double-blind, lisinopril-controlled trial. *Planta Med*. 2007;73:6-12.

Hibiscus (*Hibiscus sabdariffa*, Malvaceae), commonly known as *jamaica* or *flor de jamaica* in Mexico and *roselle* in Europe, is used as a flavoring and coloring agent in various herbal beverages, and also as a traditional medicine, particularly in Africa. The part used is the calyx, the outermost part of the flower formed by the sepals. Hibiscus first gained popularity in the United States as a primary flavor of one of America's first popular herbal teas in the 1970s—Celestial Seasonings' breakthrough "Red Zinger," which derived its characteristic color from the dark red wine-colored calyces.

The primary active constituents in hibiscus calyces are anthocyanins, which have antioxidative, antitumor, and anticarcinogenic activity. Studies indicate that hibiscus preparations have shown activity on the cardiovascular system. Hibiscus has been shown to have a natriuretic effect (eliminates extra sodium) and can inhibit angiotensin-converting enzyme (ACE), which causes an elevation of blood pressure. The purpose of this study was to evaluate the efficacy and safety of an herbal medicinal product prepared from hibiscus extract and to compare it with lisinopril, an ACE inhibitor used to treat hypertension. A previously published smaller clinical trial by this Mexican group had indicated a hypotensive effect of hibiscus extract.[1]

Outpatients (n=193) of the Regional General Hospital No. 1 (HGR 1) of the Mexican Institute of Social Security (IMSS) in Cuernavaca, Morelos, Mexico with stage 1 or 2 hypertension participated in this randomized, reference-controlled, double-blind study. Patients received either lisinopril 10 mg/day or hibiscus dried calyx extract standardized to 250 mg of total anthocyanins per day for 4 weeks. The authors performed the extraction of this material.

Hibiscus *Hibiscus sabdariffa* Photo by Steven Foster. ©2007 stevenfoster.com

Blood pressure and urine samples were monitored. At baseline, there were no significant differences in blood pressure between groups. Both treatments reduced blood pressure, but the effects were not immediately evident. After 4 weeks of treatment, the hibiscus extract lowered the systolic blood pressure by 11.58% and diastolic blood pressure by 12.21%. Lisinopril had a greater effect, lowering systolic blood pressure by 15.79% and diastolic blood pressure by 15.68%. Both treatments were well tolerated. Two cases of nervousness were reported in the hibiscus extract–treated patients, but this effect is not consistent with known use of hibiscus, so it is probable that these cases were probably idiopathic (i.e., of unknown cause or origin). Patients treated with hibiscus extract had a significant increase in serum chloride, a decrease in plasma sodium, and no effect on the potassium level. In contrast, lisinopril caused only a significant decrease in plasma chloride levels. The ACE inhibitory effect was significantly higher in the lisinopril-treated patients ($P < 00.004$).

This confirms previous findings that hibiscus increases sodium excretion without modifying potassium. Lowering the plasma sodium level likely contributed to hypotensive effect. The potassium-sparing effect is beneficial because many diuretic drugs can cause potassium deficiency. The authors conclude that hibiscus extract has two of the properties of commonly prescribed antihypertension drugs; namely, ACE inhibition and diuretic actions. This study would be even more convincing if there were a placebo-control group in addition to the positive control group (lisinopril). Dose-response studies are needed to help determine optimal dosing levels for hibiscus for this use.

—Heather S. Oliff, PhD

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Recent Studies Examine Cardiovascular Effects of Chocolate

Reviewed: Ding E, Hutfless S, Ding X, Girotra S. Chocolate and prevention of cardiovascular disease: a systematic review. *Nutr & Metabol*. 2006;3(2):1-12.

Reviewed: Faroque HMO, Leung M, Hope S, et al. Acute and chronic effects of flavonol-rich cocoa on vascular function in subjects with coronary artery disease: a randomized double-blind placebo-controlled study. *Clin Sci*. 2006;111:71-80.

Reviewed: Hermann F, Spieker IE, Ruschitzka F, et al. Dark chocolate improves endothelials and platelet function. *Heart*. 2006;92:119-120.

Several research articles have been published recently in scientific and medical journals concerning the benefits of products based on cocoa (*Theobroma cacao*, Sterculiaceae), including chocolate, for cardiovascular health. Chocolate, especially preparations made from the darker variety (i.e., chocolate without milk and a relatively high level of cocoa "liquor"), contains high levels of flavonoids, which have antioxidant and immunoregulatory properties. Dietary sources of flavonoids have attracted much medical interest in recent years due to flavonoids' potential in protecting against cardiovascular disease (CVD). For instance, a 2007 meta-analysis recently assessed the effects of cocoa and tea intake on blood pressure, due to the high flavonoid contents of both dietary products. This analysis, which included 5 randomized, controlled trials concerning cocoa intake, found that diets rich in cocoa were associated with statistically significant reductions in systolic and diastolic blood pressure.[1] Another 2007 study, in which 25 Japanese male participants consumed a daily placebo or cocoa-based drink for 12 weeks, found that daily intake of cocoa powder decreased the participants' susceptibility of LDL ("bad" cholesterol) oxidation and increased HDL ("good") cholesterol concentrations, which could lead to decreased incidences of arteriosclerotic disease.[2]

Mature cacao pods *Theobroma cacao* ©Photo 2007 Eldon Leiter

This present summary analyzes a systematic review and 2 clinical trials published in 2006, which address the effects of cocoa consumption directly in relation to CVD or assess particular potential cardiovascular benefits of chocolate.

Systematic Review by Ding et al

The authors of a recent article in *Nutrition & Metabolism* conducted a literature search of the MEDLINE database (National Library of Medicine, Bethesda, MD) for clinical, observational, and experimental studies regarding the relation between consumption of cocoa-based products (including chocolate) and CVD, published from January 1965 to June 2005. Approximately 400 articles were found, and 136 were selected for review. Randomized trials, with either a cross-sectional or parallel design, and prospective observational studies were the focus. The strength of the evidence of cocoa and chocolate beneficial effects was based on the study design and quality of individual studies, the consistency of findings across studies, and the biologic plausibility of the mechanisms involved. Relative risks were estimated and pooled according to a random-effects model.

Overall, evidence from the short-term randomized trials and from the epidemiologic studies of chocolate consumption suggested that "flavonoid intake from chocolate is likely protective against CVD, particularly CHD [coronary heart disease] mortality." Evidence from laboratory experiments and randomized human clinical trials suggested that stearic acid (a saturated fat found in chocolate and other foods) has beneficial or neutral effects on clotting factors and blood pressure; thus, it is unlikely that stearic acid would adversely affect CVD risk. However, evidence from observational studies of the relation between stearic acid and CVD risk is inconclusive. A meta-analysis of 7 prospective clinical studies found that intake of chocolate flavonoids may lower the risk of mortality from CHD. Eight cohort studies consistently found that the risk of CHD mortality was lower with total or specific flavonoid intake. However, a large cohort study (n = 38,455 women) found a nonsignificant association between CHD mortality and flavonoid intake.

On the basis of this systematic review, the authors suggested that "stearic acid may be neutral, while flavonoids are likely protective against CVD." Because dark chocolate contains substantially higher amounts of flavonoids than does milk chocolate, the authors recommend consumption of high flavonoid dark chocolate over other varieties and suggest that long-term randomized feeding trials be conducted to definitively determine the effect of chocolate consumption on cardiovascular disease risk. Additional research analyzing total antioxidant content of cocoa-based products indicates that cocoa powders are also excellent flavonoid sources.[3]

Clinical Trial by Faroque et al

A randomized, double-blind, placebo-controlled study of 40 patients with coronary artery disease was recently published in *Clinical Science*, which directly tested the cardiovascular benefits of chocolate. In this trial, subjects were randomly assigned to receive either a flavanol-rich chocolate bar and cocoa beverage (Mars, Inc. Hackettstown, NJ) daily (444 mg of flavanols and about 107 mg of epicatechin monomer daily) or a matching placebo (19.6 mg of flavanols and about 4.7 mg of epicatechin monomer daily) for 6 weeks. Flow-mediated dilation (FMD, a measurement used to determine heart disease risk) of the brachial artery and systemic arterial compliance (SAC) were measured at baseline, 90 minutes after consumption of the first beverage, and at weeks 3 and 6. The responses of soluble cellular adhesion molecules and of forearm blood flow (FBF) to infusions of 3–30 mcg of acetylcholine chloride (ACh) per minute and of 0.3–3 mcg of sodium nitroprusside (SNP) per minute, forearm ischemia, and isotonic forearm exercise were evaluated at baseline and at 6 weeks. Biomarkers of endothelial function [soluble intercellular cell adhesion molecule-1 (ICAM-1), vascular cell adhesion molecule-1 (VCAM-1), and E-selectin] were also evaluated at baseline and at 6 weeks. Statistical differences with a P value greater than 0.05 were considered significant.

No significant differences in FMD, SAC, or FBF were observed between groups at baseline. Neither FMD nor SAC changed significantly, acutely or chronically, in either group. No significant differences in the cell adhesion molecules or in FBF responses to ischemia, exercise, SNP, or ACh were observed in the flavanol group between baseline and 6 weeks. ICAM-1 and E-selectin did not differ significantly between the 2 treatment groups at baseline or at 6 weeks. VCAM-1 concentrations were significantly lower in the placebo group than in the flavanol group at baseline, but did not change significantly after treatment with flavanols for 6 weeks.

Several well-established measures of vascular endothelial function were investigated in response to flavanol consumption for 6 weeks. The results indicated that the treatment was safe but that the consumption of flavanol-rich cocoa did not improve endothelial vascular function or SAC in patients with coronary artery disease. The authors noted that their results contrast with those of an earlier similar study, which tested younger study participants with fewer cardiovascular risk factors.[4] They suggested the possibility that the number of cardiovascular disease risk factors and severity of disease were too great for flavanol to exert a positive effect over the time frame in their study. The authors recommended that "short- and long-term studies of younger subjects with single identifiable untreated cardiovascular [disease] risk factors should be the subject of future investigation."

No significant effect was noted on either systolic or diastolic blood pressure, mean arterial pressure, or heart rate. It is possible that the use of concomitant vasoactive medication for treatment of hypertension and ischemic heart disease in the study population may have offset any potential antihypertensive effect of flavanol-rich cocoa. Finally, these researchers point out that "the lack of improvement on tests of vascular function with flavanol-rich cocoa does not signify a neutral impact on clinical vascular end points. Large and longer-term studies will be required to address such clinical questions."

Clinical Trial by Hermann et al

A second clinical trial, published in *Heart*, examined the effects of dark chocolate on endothelial cell dysfunction and platelet activation in male smokers. The first part of the Swiss study (conducted at the Cardiovascular Center, University Hospital in Zurich) enrolled 25 male smokers who were not taking any medication or dietary supplements. All subjects refrained from eating polyphenol-rich foods for 24 hours before the study. Endothelial cell function was measured by ultrasound before and after the subjects ate 40 g of dark chocolate containing 70% cocoa (Nestle Noir Intense, Nestle SA, Vevey, Switzerland). The subjects' endothelial cell function improved 2-8 hours after eating the dark chocolate.

Semi-sweet chocolate ©Photo 2007 John Jonietz

The second part of the study enrolled 20 male smokers, divided into 2 parallel groups—the first group ate 40 g of dark chocolate and the second group ate 40 g of white chocolate (Nestle Galak, Nestle SA, Vevey, Switzerland), which contains only 4% cocoa and much lower levels of flavonoids and polyphenols. Dark chocolate significantly improved FMD (P=0.026 vs. baseline). The effect started 2 hours after ingestion and lasted about 8 hours. White chocolate did not have a significant effect on FMD. Shear stress dependent platelet function, a.k.a. blood platelet adhesion at the site of plaque, was significantly reduced by dark chocolate after 2 hours, compared to the baseline (P=0.03), but was not affected by white chocolate. Vascular flow response and glyceryl trinitrate-induced vasodilation were not affected by white or dark chocolate. Total antioxidant status significantly increased 2 hours after subjects ate dark chocolate compared to the baseline (P=0.03), but remained unchanged for the white chocolate group.

This study shows that eating commercially available dark chocolate significantly improves endothelial and platelet dysfunction in male smokers, possibly due to the presence of high levels of antioxidants. In addition, the results indicate that dark chocolate may have a direct effect on the vascular endothelium. The authors note that further study is needed to elucidate the mechanism of action and to confirm these initial results. Interestingly, a trial published in 2007 has already helped to corroborate these results. In that trial, 11 male subjects with smoking-related endothelial dysfunction consumed a high-flavanol cocoa beverage daily for one week, and the results showed that this treatment led to a sustained reversal of endothelial dysfunction.[5] Future studies that include women and non-smokers are also needed. The authors of this trial conclude "…a small daily treat of dark chocolate may substantially increase the amount of antioxidant intake and beneficially affect vascular health."

—Brenda Milot, ELS; Marissa Oppel, MS; and Courtney Cavaliere

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Ginkgo Special Extract EGb 761® Demonstrates Efficacy in Treatment of Anxiety and Mild to Moderate Dementia with Neuropsychiatric Symptoms

Reviewed: Woelk H, Arnoldt KH, Kieser M, Hoerr R. *Ginkgo biloba* special extract EGb 761® in generalized anxiety disorder and adjustment disorder with anxious mood: a randomized, double-blind, placebo-controlled trial. *J Psychiatr Res.* 2007;41(6):472-480.

Reviewed: Napryeyenko O, Borzenko I [GINDEM-NP Study Group]. *Ginkgo biloba* special extract in dementia with neuropsychiatric features. A randomised, placebo-controlled, double-blind clinical trial. *Arzneimittelforschung.* 2007;57(1):4-11.

Two recently published clinical trials demonstrate that a ginkgo (*Ginkgo biloba,* Ginkgoaceae) special extract is effective in treating various cognitive disorders. This ginkgo special extract is called EGb 761® (Willmar Schwabe Pharmaceutical Co., Karlsruhe, Germany; imported into the United States and distributed as Ginkgold® by Nature's Way of Springville, UT). EGb 761 is a phytomedicine used in patients with dementia disorders and is licensed in 70 countries worldwide. The results of 2 large trials have shown that this extract improves cognitive performance, activities of daily living, and social functioning.[1,2] EGb 761 is standardized to contain 22–27% flavonol glycosides and 5–7% terpene trilactones (ginkgolides and bilobalides). In the 2 clinical trials featured in this summary, the extract was tested for its efficacy in treating generalized anxiety disorder and dementia, respectively.

The Woelk et al Trial

Generalized anxiety disorder (GAD) and adjustment disorder with anxious mood (ADWAM) are frequent reasons for seeking medical help. Patients with GAD have been shown to respond favorably to psychotherapy and pharmacotherapy, including benzodiazepines, buspirone, and antidepressants (especially the serotonin and norepinephrine uptake inhibitors). However, these drugs are all associated with various unfavorable side effects. Evidence of the effectiveness of treatments for ADWAM is lacking.

The aim of the first randomized, double-blind, placebo-controlled trial was to determine whether the anxiety-alleviating effects of EGb 761 observed in other patient populations would translate into clinically meaningful effects in patients with specified non-psychotic and non-phobic types of anxiety.

The trial contained 107 patients aged 18–70 years with GAD or ADWAM—established in accordance with the Diagnostic and Statistical Manual of Mental Disorders, 3rd edition revised. The patients were enrolled by 15 private practices of medical specialists and by the outpatient clinic of a psychiatric hospital associated with the University of Erlangen-Nuremberg in Bavaria. Patients were compliant during a 7-day qualification period and their Hamilton Rating Scale for Anxiety (HAMA) did not change more than 7 points in either direction during the qualification period. The patients were randomly assigned by the investigators to 1 of 3 treatments: high-dose EGb 761, low-dose EGb 761, or placebo. Over a 4-week study period, the patients took 2 EGb 761 tablets containing either 40 mg (240 mg/day) or 80 mg (480 mg/day) or a placebo 3 times per day. It is unclear how the investigators chose the doses since the "low dose" referred to in this trial is the same as the normally-recommended high dose (240 mg/day) for ginkgo extract while the "high dose" in this trial was double the normally-recommended high dose.

The primary outcome measure was the HAMA score, which was determined at baseline and on days 4, 8, 15, and 29. Secondary outcomes included the safety and tolerability of the treatment as well as clinician- and patient-determined improvements in condition.

The decrease in HAMA score was significantly greater in both ginkgo groups (P = 0.0003 for the high-dose group and P = 0.01

Ginkgo *Ginkgo biloba* ©Photo 2007 ABC

for the low-dose group) than in the placebo group. Scores decreased (mean ± standard deviation) by 14.3 ± 8.1, 12.1 ± 9.0, and 7.8 ± 9.2 in the high-dose, low-dose, and placebo groups, respectively. A greater than 50% reduction in the HAMA score was observed in 44% of the high-dose group, in 39% of the low-dose group, and in 22% of the placebo group. Total remission of the patients' disorder, defined as a total HAMA score less than/equal to 7 on day 29 of the study, was achieved by 9%, 8%, and 5% of the high-dose, low-dose, and placebo groups, respectively. Using global judgment scales, the clinicians determined that 81%, 67%, and 38% of the patients in the high-dose, low-dose, and placebo groups, respectively, were "much improved" or "very much improved"; 78%, 61%, and 30% of these same groups, respectively, rated their condition as at least "markedly improved." Nine adverse events were reported during randomized treatment (3 in each group); none of these events were deemed to be serious.

The results suggest that "EGb 761® has a specific anxiolytic effect that is dose-dependent and significantly exceeds the placebo effect commonly seen in trials of psychoactive drugs." The improvement seen with EGb 761 was similar to that observed for the class of anti-anxiety drugs known as benzodiazepines in previous studies. Although the mechanism of the observed effect of EGb 761 is not clear, suppression of corticotrophin-releasing hormone is one possibility. Because of the excellent tolerability, lack of serious adverse effects, and absence of risk of dependence associated with this extract, the authors believe it to be suitable for treating both young and elderly patients with GAD and ADWAM.

The Napryeyenko and Borzenko Trial

The purpose of the second study was to assess the efficacy of ginkgo in patients with dementia and neuropsychiatric symptoms (also known as BPSD: Behavioral and Psychological Symptoms of Dementia). Studies show that neuropsychiatric symptoms are very common in people with dementia. One study reported that 36% of patients with dementia have apathy, 32% have depression, and 30% have agitation/aggression.[3] Moreover, neuropsychiatric symptoms start early in the course of the disease. The clinical efficacy of ginkgo in dementia has been demonstrated in previous clinical trials.

This large randomized, double-blind, multicenter study with parallel treatment groups was conducted in Kiev, Ukraine, and elsewhere. Patients (n=400) with clinically evaluated mild to moderate dementia and moderate neuropsychiatric symptoms participated in the trial. Patients were medication free for up to 4 weeks prior to randomization. Patients received either placebo or EGb 761 at 240 mg/day for 22 weeks. At weeks 12 and 22, patients underwent a battery of cognitive and neuropsychiatric tests.

Patients treated with EGb 761 improved with respect to the neuropsychiatric symptoms and activities of daily living. In contrast, those who received placebo deteriorated slightly or remained unchanged. EGb 761 was significantly superior to placebo with respect to all efficacy variables ($P < 0.001$). Of those treated with EGb 761, 65.7% had a clinically meaningful improvement in cognitive functioning compared to 6.1% of those in the placebo group. There was a 35% decrease in caregiver distress (related to patients' behavioral and psychiatric symptoms) in caregivers of patients treated with EGb 761 compared with a 4% increase in such distress in caregivers of patients receiving placebo. Fewer people in the EGb 761 group reported adverse events compared to the placebo group.

These results corroborate other studies of EGb 761 in dementia. EGb 761 was well tolerated. There was a marked reduction in caregiver burden as a consequence of EGb 761 treatment. One strength of this trial is that patients were recruited out of the mainstream daily practice and thus the eligibility criteria were less restrictive than those employed in other studies. The authors conclude that patients suffering from both cognitive and neuropsychiatric symptoms of dementia can benefit from EGb 761. The study was well designed and reported, which gives additional support for their findings. The study was sponsored and funded by Schwabe.

—Brenda Milot, ELS, and Heather S. Oliff, PhD

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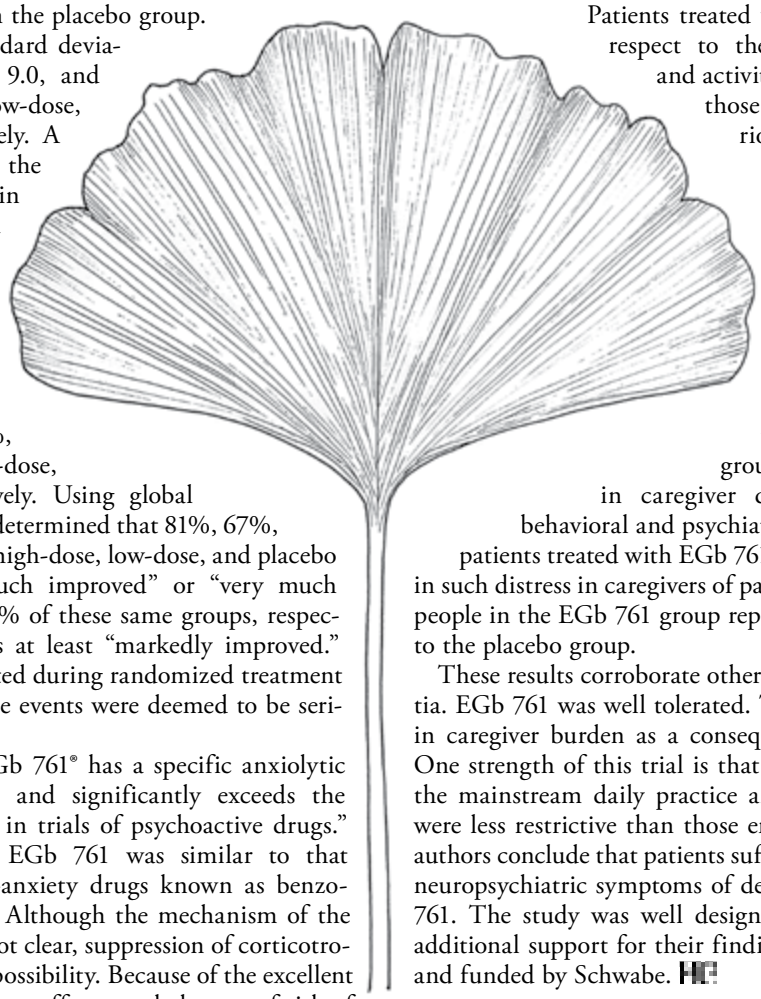

Above: Illustration of **Ginkgo** *Ginkgo biloba* ©2007 MOBOT

Trial Finds No Benefit in Raw Garlic or Garlic Supplements for Hypercholesterolemia

Reviewed: Gardner CD, Lawson LD, Block E, et al. Effect of raw garlic vs. commercial garlic supplements on plasma lipid concentrations in adults, with moderate hypercholesterolemia; a randomized clinical trial. *Arch Int Med.* 2007;167:346-353.

Garlic (*Allium sativum*, Lilliaceae) is promoted to lower cholesterol and to have cardiovascular benefits. It is often packaged in more palatable forms so that the benefits of raw garlic can be obtained without the unpleasant gustatory and odoriferous effects. Nine trials published before 1995 reported that garlic tablets lowered cholesterol; in contrast, 20 clinical trials of garlic supplements since 1995 have shown no effect on cholesterol. The authors assumed that inconsistency was due to poor quality supplements or problems with design of the trials. In order to establish the truth on the cholesterol issue, the present study was conducted with (1) raw garlic, (2) the only brand of garlic powder supplement known to have similar allicin bioavailability as raw garlic (Garlicin®, Nature's Way, Springville, UT), and (3) an aged formulation that has been evaluated in many clinical trials (Aged Garlic Extract®, aka Kyolic®, Wakunaga of America, Mission Viejo, CA).

Patients (n=192) with lower density lipoprotein (LDL) cholesterol levels ranging from 130-190 mg/dl participated in this placebo-controlled, 4-arm parallel group trial. Participants consumed 1 of 4 treatments: (1) placebo tablets, (2) 4.0 g blended raw garlic (an average-sized clove crushed in a blender), (3) 4 Garlicin tablets (twice the recommended dose), or (4) 6 Kyolic tablets (1½-3 times the recommended dose). The raw garlic dose had an allicin content similar to the allicin yield of the Garlicin dose, and both had a dry garlic matter content slightly less than the Kyolic dose. Individually packaged aliquots of raw garlic were frozen at –80°C. When distributed, raw garlic aliquots were thawed, mixed with condiments, and served in sandwiches. The sandwiches were prepared by and distributed through the research center. All participants received the sandwiches, either with raw garlic or without, depending on the treatment group. Blinding of the raw garlic was not possible. However, investigators were blinded until all plasma lipid analyses were completed. The treatments were consumed 6 days per week for 6 months. Participants were instructed not to consume food with garlic and to minimize intake of raw onions and chives (*Allium* spp.). Blood samples were collected monthly.

Adherence to tablet and sandwich consumption was excellent. Approximately 55% of the participants correctly identified that they were receiving garlic supplements. There were no statistically significant differences by treatment group for any of the fasting plasma lipid concentrations over the course of the study. No serious adverse events occurred. Bad body and breath odor was reported as "often" or "almost always" by 57% of the raw garlic group, one participant in the Kyolic group, and no participants in the Garlicin or placebo groups.

The authors conclude that none of the garlic products had a statistically detectable or clinically relevant effect on plasma lipid concentrations in adults with moderate hypercholesterolemia. According to the authors, this study is the most scientifically rigorous clinical trial regarding serum cholesterol that has ever been conducted with garlic products.

Mark Blumenthal, founder and executive director of the American Botanical Council, commented to the *San Francisco Chronicle* in an interview after the trial was published that the "trial had a narrow research focus, i.e., LDL cholesterol, but that garlic's potential and clinically documented cardiovascular benefits cover a wide range, and that it would be a mistake to dismiss garlic as a healthy addition to the diet simply based on the lack of documentation of LDL-cholesterol lowering effects."[1] Blumenthal also mentioned that other research shows that garlic as a food and dietary supplement has some potential benefit in helping reduce the risk of certain types of cancers, particularly those of the gastrointestinal tract.

The bottom-line appears to be that while the trial provides significant evidence for the contention that fresh garlic and some leading commercial garlic dietary supplements do not have a clinically significant cholesterol-lowering effect, the study does not dismiss garlic's potential utility in the prevention of cardiovascular disease. As pointed out by ABC's Blumenthal in his "Dear Reader" column in *HerbalGram* 74, 6 clinical trials support the ability of garlic "to inhibit and even reverse the buildup of arterial plaque (atherosclerosis)."[2]

—Heather S. Oliff, PhD

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Garlic ***Allium sativum*** ©Photo 2007 ABC

Sun Ginseng's Effects on Quality of Life in Cancer Patients

Reviewed: Kim JH, Park CY, Lee SJ. Effects of sun ginseng on subjective quality of life in cancer patients: a double-blind, placebo-controlled pilot trial. *J Clin Pharm Ther.* **2006;31:331-334.**

Asian ginseng (*Panax ginseng*, Araliaceae) root has been traditionally used for a variety of applications, including as a tonic to support and increase energy in debilitating conditions. The researchers in this trial have applied a particular type of ginseng called "Sun Ginseng" (SG)* (Ginseng Science, Inc., Seoul, Korea) to cancer patients to test its ability to improve various quality of life parameters.

This randomized, double-blind, placebo-controlled pilot study enrolled 53 cancer patients (15 male, 38 female) recruited from the Gynecologic Oncology Clinic and the Integrative Medicine Clinic of Gil Medical Center (Namdong-Gu, Incheon, South Korea) during May 2005 to January 2006. All of the patients were diagnosed with cancer, including 10 patients with stage I, 14 patients with stage II, and 29 patients with stage III cancer. The cancer diagnoses included hepatocellular carcinoma (n=11), cholangiocarcinoma (n=1), common bile duct cancer (n=1), uterine cervix cancer (n=16), ovarian cancer (n=8), uterine sarcoma (n=2), endometrial cancer (n=2), rectal cancer (n=3), stomach cancer (n=2), lung cancer (n=2), prostate cancer (n=1), pancreatic cancer (n=1), mesothelioma (n=1), breast cancer (n=1), and pseudomyxoma (n=1).

The authors note that the predominant cancers among the patients were gynecological and heaptobiliary cancers, which may have affected the results. (An *HerbalGram* peer reviewer notes that this is a fairly broad spectrum of tumors and that this trial would have had more statistical power if the cancers had been all of one type and if equal numbers of subjects with liver, uterine, and ovarian tumors had been distributed between both arms of the trial.)

The patients were randomly assigned to receive either SG (3,000 mg/day in 3 doses) (n=32) or a placebo (n=21). The treatment period was 12 weeks. The patients' subjective quality of life was rated using 2 questionnaires: the World Health Organization Quality of Life Assessment-Bref (WHOQOL-BREF) and the General Health Questionnaire-12 (GHQ-12). The WHOQOL-BREF consists of 26 questions in 4 areas: "physical health, psychological health, social relationships, and environment." A higher score on the WHOQOL-BREF indicates a better quality of life. The GHQ-12 is a psychological self-rating tool that covers psychological symptoms, including anxiety, depression, somatic symptoms, and social dysfunction. A higher score indicates better mental health status and functioning.

The 2 groups were statistically similar in terms of cancer stage, age, and gender. At baseline, the "physical health" score on the WHOQOL-BREF was lower in the SG group than in the placebo group ($P<0.05$). In addition, the total GHQ-12 and the "psychological health" score of the WHOQOL-BREF trended towards lower scores in the SG group, but the differences were not statistically significant. The authors suggest that these score differences between the 2 groups may have affected the results of the study. After 12 weeks of treatment there were no patient drop-outs and no observed adverse effects in either group.

The "psychological health" score of the WHOQOL-BREF improved to a greater extent for the patients in the SG group, compared with the placebo group ($P<0.02$). There was also a statistically non-significant trend towards a greater improvement in the WHOQOL-BREF "environment" and "physical health" scores in the SG group, when compared with the placebo group. The GHQ-12 total score was more improved for the SG group, when compared with the placebo group ($P<0.01$). The average change in the "social relationships" section of the WHOQOL-BREF was not significantly different between the 2 groups. The authors speculate that effects seen in this study may be mediated by the biological effects of ginsenosides found in SG on neuroactive steroids and GABAA receptors and ligand binding.

The authors conclude that Sun Ginseng shows "some beneficial effect for improving subjective quality of life" in patients with cancer.

Asian Ginseng *Panax ginseng* ©Photo 2007 Steven Foster

* Sun Ginseng and its manufacturer were not detailed in the "Materials and Methods" section of the trial publication, as is usually customary; however, it is apparent that Sun Ginseng is a trademarked brand name for this special, patented preparation and Ginseng Science Inc., its manufacturer, is mentioned in the acknowledgements as having funded this trial. More information is available at http://www.ginsengscience.com/english/product/sunsam.htm.

The authors conclude that SG shows "some beneficial effect for improving subjective quality of life" in patients with cancer. Therefore, SG may help to improve aspects of the "mental and physical functioning in these cancer patients." Future research is needed to confirm these results in a larger study population and in a trial with more well-reported details. The authors recommend that future studies be conducted to evaluate the effects of SG on the subjective quality of life in patients with different types of cancer. Future studies should also include phytochemical profiling of the SG product used. This trial, testing the biological activity of ginseng steam processed at 100, 110 and 120° C (autoclaved), noted that levels of ginsenosides F4, Rg3, and Rg5—which are absent from non-steam-processed ginseng—are progressively elevated with increasing temperature. Such treated ginseng was most potent of the 3 steamed products in the ability to induce endothelium-dependent relaxation. Also, Shibata[1] (as well as others) has demonstrated that partially deglycosylated saponins, produced by steaming as well as metabolic transformation by intestinal bacteria, have enhanced anti-carcinogenic activity, prominent among them, ginsenosides Rh1, Rh2, and Rg3. Other degraded ginsenosides in raw ginseng, produced by hydrolysis, isomerization at C-20, and dehydration, are present in only minute quantities.

The SG preparation is apparently manufactured by steaming raw Korean ginseng at 120° C (there does not appear to be any published confirmation of this statement available in the English scientific literature).[2] There is ample evidence that red ginseng is more biologically active than raw, unprocessed ginseng in some areas, including free radical scavenging,[2] antioxidant,[2,3] "anxiolytic-like,"[4] and anti-tumor-promoting[3] activities. In the present study, the authors have examined the effect of SG on the subjective quality of life in patients suffering mainly from gynecologic or hepatobiliary cancer.

This trial suffers from the following deficiencies in the reporting of the trial data, as noted by an *HerbalGram* peer reviewer. There is no mention of the method of randomization, no description of placebo product, and no indication if it was made to appear identical to the SG product. There is no discussion of what conventional medications the patients were taking, e.g., whether they were receiving cancer chemotherapy, radiation, surgery etc. Further, there is no assessment for compliance in taking pills or whether patients in either group may have been taking other ginseng products (or even if they were asked not to take other herbal products). Also, there was no apparent assessment for specific adverse events, if any were noted.

— Marissa Oppel, MS, Dennis V.C. Awang, PhD, FCIC

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Acacia constricta

Acer circinatum

Achnatherum hymenoides

Achillea millefolium

Achnatherum lemmonii var. *lemmonii*

Achnatherum lemmonii

Aconitum columbianum

Agoseris retrorsa

Ambrosia deltoidea

Astragalus filipes

Safeguarding the Seeds of Native Plants

A Review of Germplasm Collection Efforts and Conservation Potential

By Megan Haidet, Mary Byrne, and Joe-Ann McCoy, PhD

Ames, Iowa, is home to an important new medicinal plant germplasm collection in the United States. The North Central Regional Plant Introduction Station (NCRPIS) in Ames is part of a network of more than 25 active germplasm conservation sites coordinated by the US Department of Agriculture (USDA) within the Agricultural Research Service's (ARS) National Plant Germplasm System (NPGS). These germplasm repositories, called genebanks, are the storehouses for maintaining genetic diversity within accessions of crop plants and their native relatives. Another program, called Seeds of Success (SOS), is working to establish the largest living collection of seeds from native plants in the United States. These programs represent just two of numerous seed collection efforts around the country. What makes them special is the emphasis on native plants, which reflects an important trend in conservation involving many federal and non-federal partners. Collecting this germplasm and preserving the genetic material that controls heritable traits of native plants will allow researchers to maintain and restore native landscapes more effectively. In the face of increasing concerns about the growing problem of invasive species, the timing could not be better.

Germplasm and Genebanking

Germplasm conservation in the United States is nothing new. Realizing the importance of genetic diversity, the USDA has been collecting and preserving germplasm since the late 1800s. However, farmers and plant breeders were selecting for desirable traits long before Mendel's Laws of Genetics were formally described.[1] This domestication process often leads to the loss of important genetic diversity. For example, of the more than 7,100 named apple varieties grown in the United States since the 1800s, more than 6,800 no longer exist.[2] This loss in variation may reduce a species' genetic diversity, making it more vulnerable to pests, diseases, and envi-

Opposite page: Photos of seeds gathered by the Seeds of Success program. All seed Photos ©2007 Seeds of Success

Opposite page: Scientist examining a seed before storing at the Millennium Seed Bank. Photo ©2007 Royal Botanical Gardens, Kew, United Kingdom

Below: Retrieving seed samples from a -18° C (0° F) storage vault for distribution to NCGRP sites for cultivar development and study of the species. ©2007 United States Department of Agriculture

Bromus sitchensis

Table 1: List of Acronyms

ARS	Agricultural Research Service
BLM	Bureau of Land Management
CGIAR	Consultative Group for International Agricultural Research
GRIN	Germplasm Resources Information Network
INIBAP	International Network for the Improvement of Banana and Plantain
IPGRI	International Plant Genetic Research Institute
MSB	Millennium Seed Bank
NCGRP	National Center for Genetic Resources Preservation
NCRPIS	North Central Regional Plant Introduction Station
NPGS	National Plant Germplasm System
PCA	Plant Conservation Alliance
SOS	Seeds of Success
USDA	US Department of Agriculture

Calocedrus decurrens

Bottom: Researcher at the National Plant Germplasm Repository in Corvallis, Oregon. Photo ©2007 United States Department of Agriculture

ronmental change. The key to protecting against the total loss of these important genetic traits lies in the preservation of their wild relatives. Genebanking, collecting, and preserving plant germplasm attempts to recapture and preserve this genetic diversity.

Agricultural crops have long been the primary focus of germplasm collections. Bioversity International, an organization coordinating the conservation of genetic resources worldwide, reports that almost 95% of the genetic diversity of global staple crops such as rice, wheat, and maize is held safely in genebanks.[3] Unfortunately, native species, including many medicinal plants, are not as well-represented as their commercial crop cousins in germplasm collections. Fortunately there is an emerging emphasis on seed collection efforts that focus on native species, including medicinals.

A Shift toward Native Plants for Restoration Efforts

In the early 1990s, US public land management agencies began to look toward native species for restoration activities following habitat-disrupting disasters, such as wildfires.[4] Particularly devastating wildfires in 1999 prompted the US Congress to direct the agencies to develop a long-term program to manage and supply native plant materials for use in various federal land management restoration and rehabilitation needs. Congress further recommended that the Plant Conservation Alliance (PCA), a consortium of federal and non-federal partners, lead this effort.

The SOS program is PCA's response to this mandate through an agreement with the Bureau of Land Management (BLM). An

Above: Millennium Seed Bank scientist at work. Photo ©2007 Royal Botanical Gardens, Kew, United Kingdom

Carex inops

interagency partnership coordinated through the PCA in cooperation with the Royal Botanic Gardens, Kew, United Kingdom, the SOS program supports and coordinates seed collection of native plant populations in the United States to increase the number of species and the amount of native seed available for stabilizing, rehabilitating, and restoring public lands. The program also provides source identified seed and germination findings that are critical to the development and large-scale production of new native plant materials. SOS partners include the BLM, USDA Forest Service, USDA ARS, US Department of Defense, the US Fish and Wildlife Service, the Chicago Botanic Garden, the Lady Bird Johnson Wildflower Center, Mt. Cuba Center, Inc., the North Carolina Botanic Garden, the New England Wildflower Society, the New York City Department of Parks and Recreation with the Brooklyn Botanic Garden, the Zoological Society of San Diego, and Center for Plant Conservation Gardens.

These partnering organizations and federal agencies are cooperating to produce the largest native seed collection in the United States. The end of the 2006 field season marked the collection of more than 2,000 unique taxa to be maintained in genebank facilities in Pullman, WA (USDA, ARS); Bend, OR (USDA, Forest Service); and Kew, United Kingdom. These collections represent about one-third of the 7,900-species collection goal for the United States.

Parent populations from each of the 2,000 collections have been carefully monitored (often for several growing seasons), identified by a taxonomist or well trained botanist, and generally consist of a minimum of 10,000 viable seeds. When collectors initially target a population for collection, they must adhere to the genetic sampling standard outlined in the SOS Protocol. Collection documentation consists of at least 2 herbarium vouchers (one for Kew and one for the US National Herbarium at the Smithsonian Institution), a completed field data form that captures everything from the associated taxa to the geology of the collection site to the number of plants sampled, and digital images. A sample field data form is available on the SOS Web site (www.nps.gov/plants/sos). All collection information is databased at the BLM and is made available for researchers interested in working with SOS material.

Native Plants for Cultivation and Research

The NPGS is another cooperative effort between state and federal agencies in the United States to preserve the genetic diversity of plants. Beginning with the establishment of four regional stations in 1948, the NPGS has evolved into a coordinated national system and has assembled many important germplasm collections of crop species from both domestic and international sources. The mission of the NPGS includes the conservation of diverse crop germplasm through collection, acquisition and exploration, conducting a variety of germplasm-related research, and encouraging the use of the collections and associated information for research, crop improvement, and product development.

More specifically, the process includes the following:

1. Collection of germplasm through acquisition and/or plant exploration. New germplasm (accessions) enter NPGS through collection, donation by foreign cooperators, or international germplasm collections. An identifying number such as the Plant Introduction number is assigned to each accession.
2. Regeneration and evaluation of germplasm including dormancy, viability, and pathogen studies, when appropriate.
3. Pollination-controlled propagation in screened field cages utilizing a wide variety of pollinators; harvesting, drying, cleaning, picking and processing seed utilizing specialized seed equipment.
4. Long-term seed storage under controlled temperature/humidity conditions.
5. Seed imaging and germination testing.
6. International distribution.

Currently in its second year of operation and funded by both USDA/ARS and the National Institutes of Health, Office of Dietary Supplements, a collection specifically for medicinal taxa has recently been added to the NCRPIS.[5] The current medicinal collection, focusing on three genera, *Echinacea, Hypericum* (St. John's wort) and *Actaea* (black cohosh), has been utilized for a wide range of research projects, including but not limited to animal and human efficacy studies, analyses of metabolites of interest to the phytopharmaceutical industry, identification and synthesis of new compounds, ornamental and crop breeding, restoration ecology, and studies of population genetics.

Frangula purshiana

The development of new collections involves well-developed logistical planning. Fortunately, well-established collection protocols have been published, which address adequate representation of genetic variation for native plant collection.[6] In order to efficiently prioritize future collection efforts for the medicinal collection, an extensive database (6,018 taxa) has been compiled from 29 international medicinal plant compendia. After analysis, a list of 4,209 taxa has been generated that are not included in the NPGS collections. These species will be prioritized by a variety of factors ranging from conservation status to economic use, resulting in a targeted list of priority species on which to focus future collection and acquisition effort. Future plans include significant expansion of the medicinal collection if appropriate funding is maintained.

A summary of the holdings of the NPGS, as accessed from the Germplasm Resources Information Network (GRIN) database in January 2006, includes 216 families; 1,916 genera; 11,850 species; and 476,101 accessions.[7]

Getting Involved

The best way to contribute to seed collection efforts worldwide is to support local botanical institutions. Visiting botanic gardens and arboreta and supporting them financially or as a volunteer is important to help strengthen conservation and horticultural aims. Joining a local native plant society may offer the opportunity to learn more about native plants through activities such as educational flora, native plant sales, and nature walks. At home, choosing natives for gardening, avoiding invasive species, and educating oneself on plant, pollinator, and wildlife interactions can help support healthy ecosystems.

Additionally, both of the aforementioned programs have Web sites and databases where one can check the collection status of various species. Holdings from the NPGS can be accessed on the GRIN Web site (www.ars-grin.gov/npgs). SOS also has a beautiful photo gallery available online (www.nps.gov/plants/sos/). Due to the highly technical skill involved in making SOS collections, privately collected seed samples are not accepted. However, many

Scientist examining the billionth seed stored at the Millennium Seed Bank. Photo ©2007 Royal Botanical Gardens, Kew, United Kingdom

The best way to contribute to seed collection efforts worldwide is to support local botanical institutions.

Above: Retrieving seed samples from a -18° C (0° F) storage vault for distribution to NCGRP sites for cultivar development and study of the species. Photo ©2007 United States Department of Agriculture

Bottom: Seeds stored at USDA-ARS Western Regional Plant Introduction Station, Pullman, Washington. Photo ©2007 United States Department of Agriculture

Madia gracilis

SOS institutions utilize their volunteer force to assist in collecting.

Botanical or phytomedicinal researchers may be interested in collaborative research and development of native plant materials. Most germplasm collection systems offer plant material to researchers and educators at little or no cost. The NPGS is interested in increasing the holdings of current collections and encourages anyone interested to contact them as they, like SOS, have very specific protocols to follow for collection of native species. They also encourage researchers to house their specimens with them for long-term storage and distribution once research has been completed in order to prevent degradation of samples. There have been far too many reported incidences of loss of valuable germplasm after research has been completed due to lack of proper storage conditions. Again, similarly to SOS, they collect voucher specimens for all new accessions along with passport data associated with their origins and precise details concerning propagation. Passport Data Collection includes but is not limited to global positioning system coordinates, county, state, directions to site, elevation, aspect, slope, soil type, habitat, plant associates, population size, photograph, and voucher specimen.

Genebanking is One Step in Conservation

Genebanking is an important *ex situ* (outside native habitat) conservation strategy that contributes to the dynamic process of maintaining and retaining native plant germplasm. But it is just one step in a larger conservation effort. Equally important are *in situ* (within native habitat) conservation, public education, propagation research, restoration activities, and other important activities that are critical to long-term conservation.

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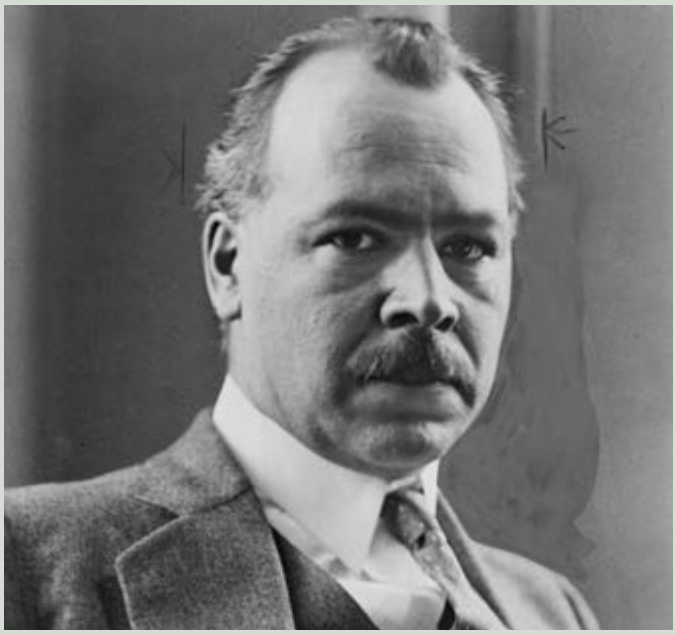

Nikolai Ivanovich Vavilov (1887-1943) Photo ©2007 Library of Congress

Seeds Under Siege

By Suzanne Edwards

Russian botanist Nikolai Ivanovich Vavilov (1887–1943) created a seed bank so large and diverse that his assistants risked their lives for its preservation during the siege of Leningrad in the final years of WWII in Russia. Vavilov is revered as a plant geographer extraordinaire and a pioneer in modern plant genetics. In 1921, Vavilov was appointed director of the Bureau of Applied Botany in Leningrad and expanded its mission to include major international seed-collecting expeditions, transforming the Bureau into a vast repository for seed and plant germplasm from around the world. Today, the Bureau is known as the N.I. Vavilov Scientific Research Institute of Plant Industry.[1]

Beginning in 1941, the German siege of Leningrad lasted for 872 days. The Germans invaded Russia and captured Stalingrad but stopped short at Leningrad when they met fierce resistance. From that point on the Germans blockaded the city, isolating Leningrad from incoming food, water, and firewood. The people of Leningrad turned to eating their pets, pigeons, and lastly rats. Fourteen of Vavilov's assistants stayed at the Vavilov Institute for the winter to protect the plants and seeds from pests, freezing weather, and starving people.[2] When the siege ended in 1944 a third of Leningrad's population had died but the Germans were defeated and Vavilov's seed bank endured.[3]

Those who travel to the Vavilov Institute 20 miles south of St. Petersburg (formerly known as Leningrad) will find a collection of more than 380,000 plants, including valuable genetic material belonging to plants found only in the former Soviet Union—25,000 of which are now extinct in the wild.[1]

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Opposite page: A technician packaging seeds for distribution at the North Central Regional Plant Introduction Station in Ames, Iowa. Photo ©2007 United States Department of Agriculture

International Collection Efforts

The Millennium Seed Bank Project (MSB)

Goal: To collect and conserve 10% (over 24,000 species) of the world's seed bearing flora by 2010.

History: A funding announcement was made in 1995 that monies raised by the British National Lottery would support the MSB Project.

Partners: The Royal Botanic Gardens, Kew Seed Conservation Department, and international partners in 18 different countries.

Funding: A £29.9 million contribution from the Millennium Commission, a distributor of the UK lottery.

Holdings: As of February 2006, the MSB held 14,098 identified species in cold storage. This amounts to 27 collections from 126 different countries.

Primary Activities: When seed collections arrive at the MSB they are cleaned, x-rayed, dried, packed, and stored. Germination monitoring studies then take place.

Interesting Fact: The MSB UK Program has already collected seed from over 94% of the UK's higher plants.

Web site: http://www.kew.org/msbp/index.html

The Global Crop Diversity Trust and the Svalbard International Seed Vault

Mission: To ensure the conservation and availability of crop diversity for food security worldwide.

Goal: To raise $260 million endowment off of which the interest will support the genetic conservation of agricultural species.

History: The Trust was established in October 2004 as an independent international organization.

Partners: The United Nations Food and Agriculture Organization, Bioversity International, and Consultative Group for International Agricultural Research (CGIAR).

Funding: As of May 2007, more than $135 million had been pledged to fund the Trust. Donations have been contributed by the Bill and Melinda Gates Foundation, the company DuPont, various individual countries, and other organizations and corporations. The Norwegian government is funding the construction of the Seed Vault as a service to the world community.

Holdings: The Seed Vault will have a capacity of 3 million seed samples.

Primary Activities: The Trust is raising funds for its endowment while construction on the Arctic or Doomsday seed vault nears completion, expected September 2007.

Interesting Facts: The Vault is being dug into a mountainside north of the Arctic Circle, where permafrost will ensure that samples will remain frozen even if electricity fails.

Web site: http://www.croptrust.org/main/index.php

Bioversity International

Mission: To promote the greater well-being of people, particularly poor people in developing countries, by helping them to achieve food security, to improve their health and nutrition, to boost their incomes, and to conserve the natural resources on which they depend.

History: Established in 1974 as CGIAR, it was designed as an international plant genetic resources program. Forty-three countries have signed the IPGRI's establishment agreement. In 2006, IPGRI and the International Network for the Improvement of Banana and Plantain (INIBAP) merged to form Bioversity International.

Funding: Primary funding comes from programs of the United Nations and various governments worldwide.

Partners: Global partnerships include CGIAR, System-wide Genetic Resources Program, the Global Crop Diversity Trust, the Global Facilitation Unit for Underutilized Species, and the Platform for Agrobiodiversity Research. National genebanks, public sector institutions, non-governmental organizations, and others also partner with Bioversity.

Holdings: CGIAR Centers alone maintain over 600,000 samples of crop, forage, and agroforestry species. Thus, the holdings of all Bioversity partners would likely reach into the millions.

Primary Activities: A wide variety of activities that contribute to the conservation of biodiversity.

Interesting Facts: The recent reorganization of IPGRI and INIBAP resulted in the creation of an entirely new word: "bioversity." This term is intended to evoke feelings of the immensity of nature and the value of working together for the good of humanity.

Web site: http://www.bioversityinternational.org/

GRATIS!

CARL LINNÆUS

By Paul Alan Cox

Portrait of Carl Linnaeus, dressed in Lappish costume in commemoration of his travels in Lappland in 1732.
Courtesy of Hunt Institute for Botanical Documentation, Carnegie Mellon University, Pittsburgh, PA

Herbarium specimen of *Dryas octopetala* collected by Linnaeus during his 1732 journey to Lappland. Courtesy of the Linnaean Society of London. Photo ©2007 Paul Alan Cox.

Grattis in Swedish means "happy birthday." For his 300th birthday, Carl Linnaeus was feted by all of Sweden in a gala celebration for the botanist they term "King of Flowers." And for me, it seemed that for a few magical hours, in his birthplace of Råshult in southern Sweden and his burial place of Uppsala, I traveled three centuries back in time.

Born in a small cottage in Råshult on May 23, 1707, young Carl soon manifested his interest in plants. His mother Christina found that he preferred flowers to toys as an infant and would cry when flowers were taken from his crib. As a young boy, Carl learned that every plant had a different name. His father Nils, exasperated with Carl's constant questioning, told him that he would refuse to tell him any more plant names if he asked about the same plant twice. The little boy quietly determined to remember every plant name he ever heard.

By the time he had graduated from secondary school in Växjö, he had collected and identified all of the plants near his home. A brief year in medical school at Lund University convinced him that he did not want to be a doctor, and so, with holes in his shoes and only a bit of pocket money to sustain him, he made his way to Uppsala University. In the Uppsala system garden, while sitting on a bench, Linnaeus was approached by an older gentleman—Olof Celsius. Intrigued by the young Linnaeus' enthusiasm for plants, Celsius was stunned when he learned that Linnaeus had already amassed a collection of 600 plants. Seeing his tattered clothes and gaunt waistline, Celsius invited Linnaeus to live in his own home. In gratitude, the 21 year-old Linnaeus wrote an essay for Celsius that electrified the botanical world, entitled "*Sponsalia Plantarum*." Linnaeus stunned his mentors

"I do not know how the world could persist gracefully if but a single species were to vanish from it."

—Carl Linnaeus

by suggesting that plants have sex: Yes, love comes even to the plants. Males, females, even hermaphrodites hold their nuptials, by showing their sexual organs. Soon samzidat copies (informally published manuscripts) of the essay, with the male and female plants of the dioecious *Mercurialis annua* (Euphorbiaceae) pictured on the cover, were circulating around Uppsala. (An image of *M. annua* and Linnaeus still appears on the Swedish 100 Kroner note.) One copy found its way to the renowned botanist Olaf Rudbeck, who was so impressed that he asked Linnaeus to teach his lectures. Soon Linnaeus boarded with the Rudbeck family at the Uppsala botanical garden. Instead of the 70 or so botany students who customarily attended the lectures, over 400 would crowd into the garden to hear the young man from Råshult speak about flowers.

A small stipend from the Swedish crown led Linnaeus to leave on his birthday in 1733 at the ripe age of 25 for distant Lappland. Traveling over 5000 km by foot, horse, and canoe, Linnaeus explored Lappland for over four months, living with the Lappish reindeer herders for much of the time. On July 4, 1732, Linnaeus made the first direct interview of a native healer ever conducted by a trained botanist. His record of herbal remedies, which were told to him by the healer, laid the foundation of ethnobotany and my own subdiscipline, ethnomedicine, the study of how indigenous peoples use plants for medicine.

The techniques Linnaeus used—journeying alone with minimal gear, living with the indigenous people, making copious sketches in his journal, and carefully preparing voucher specimens of his plant collections—continue to be employed by ethnobotanists today. During his trip, Linnaeus not only laid the foundations for evolutionary theory, confiding to his diary that human beings and great apes must somehow be related, he also invented binomial

Above: A sketch from Linnaeus' student diary in which he named a new plant species in Lappland after the Greek goddess Andromeda. Photo ©2007 Paul Alan Cox, courtesy of the Linnaean Society of London.

Opposite page: Illustration by Linnaeus from his essay titled *Sponsalia plantarum* (Stockholm, 1746), which addressed the sexuality of plants. This illustration and Linnaeus' portrait appear on the Swedish 100 Kroner note. Photo ©2007 Hunt Institute for Botanical Documentation, Carnegie Mellon University, Pittsburgh, PA.


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nomenclature, the use of two words to name any organism from a beetle to an oak tree. Linnaeus' urge to simplify and unify biological nomenclature sprung, in part, from his attempt to find the name of a small fish he collected in Lappland—"the name is longer than the fish!" Linnaeus lamented in his diary.

Wearing Lappish garb on his return to Uppsala on October 10, 1732, Linnaeus was received with the adoration now reserved for astronauts or rock stars. Crowds thronged into Uppsala's lecture halls to hear Linnaeus. Nearly two decades later, Linnaeus wrote *Species Plantarum*, unquestionably the most important book ever published on plants. Today, any name published prior to the publication date of *Species Plantarum* is regarded as invalid by the botanical community.

As Professor of Botany in Uppsala, Linnaeus raised botany to a high art. Taking students on field trips to the Uppsala forest, Linnaeus hired trumpeters to lead the procession and provided elegant picnics for the occasion. In the lecture hall, he was magical, and soon attracted a large group of devotees—known as his "apostles"—which he dispatched to the four corners of the world. Daniel Solander was sent on Captain Cook's first voyage of discovery to Tahiti in 1768; Pehr Kalm was dispatched to North America where he became a friend of Benjamin Franklin and the great American botanist John Bartram; and Carl Thunberg was sent to Japan (by way of three years in Capetown so he could pass himself off as Dutch). Thunberg wrote an early account of Japan's flora and fauna. Because of the historical connection forged by Thunberg between Sweden and Japan, I found it very appropriate that the tricentenary of Linnaeus' birth was graced by the royal families of both countries.

My own observance of Linnaeus' 300th birthday actually began the day before. Together with Thomas Elmqvist (professor at Stockholm University) and Swedish actor Hans Odöö, I flew to southern Sweden the night before so we could greet the sunrise at the little Råshult cottage where Linnaeus was born. Hans brought his Linnaeus costume so I could take some photos. When we arrived at our little country inn, we found the Bishop of Växjö and all of the local Lutheran clergy having dinner. The entire congregation joined us in a rousing rendition of "Happy Birthday" in Swedish.

Illustration from Linnaeus' essay *Potus theae* (Uppsala, 1765), which discusses the plant, its preparation and uses, the qualities of tea, and its medicinal use. Photo ©2007 Hunt Institute for Botanical Documentation, Carnegie Mellon University, Pittsburgh, PA.

Sunrise was early—4:31 a.m.—and for some strange reason, the three of us were the only ones present at Råshult to celebrate, although we could see the preparations for a celebration later in the day. After seeing the first light reflect off the morning dew, we rushed to the Växjö airport for our 6:25 a.m. return flight to Stockholm. Hans (in costume) and I (in a suit and tie) made it to our places in the Uppsala cathedral in time for the 10:00 a.m. memorial service. Linnaeus was properly eulogized, the King of Sweden placed a blue and yellow wreath (the colors of Sweden) on his grave, and a choir sang a stunning chorale piece accompanied by four trumpeters. After 45 minutes, we followed King Carl XVI Gustaf, Queen Sylvia, and the Crown Princess of Sweden, and Emperor Akihito and Empress Michiko of Japan in a solemn procession out of the cathedral past 1,500 onlookers to the Uppsala University Hall. There, the Uppsala Symphony premiered a chorale with the libretto taken from Linnaeus' Lapland journey, and the Emperor was given an Uppsala university medal. Medals were also awarded to other Swedish and foreign dignitaries, including James Watson, co-discoverer of the DNA double helix.

Later at a press conference, Dr. Watson said his discovery of the double helix was but an extension of the study of nature launched by Carl Linnaeus so many years before. Dr. Watson told the group that within a week, he would become the first human being to have his complete DNA genome published. After the press conference, I rushed to Thomas Elmqvist's home to change into coats and tails for a gala dinner at the Uppsala castle. Since my wife Barbara was stuck in the United States due to the US immigration passport backlog, I was accompanied to dinner by Thomas Elmqvists' wife, distinguished Karolinska surgeon Dr. Eva Pontén. In the castle, Emperor Akihito, an accomplished icthyologist, gave a short

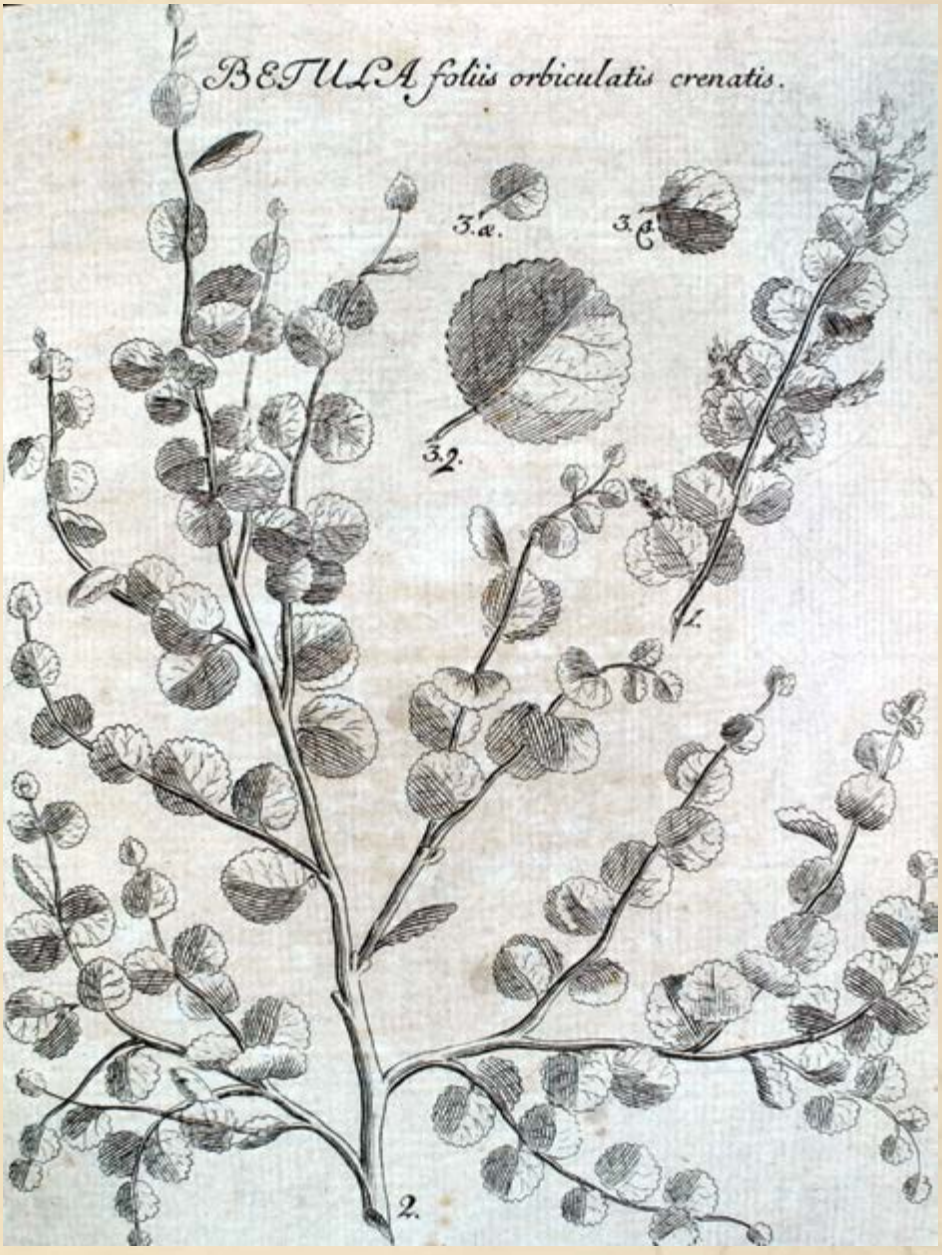


Illustration from Linnaeus' essay *Betula nana* (Stockholm, 1743), which concerns the European arctic and subarctic dwarf shrubby birch. Photo ©2007 Hunt Institute for Botanical Documentation, Carnegie Mellon University, Pittsburgh, PA.

Linnaeus not only laid the foundations for evolutionary theory, he also invented binomial nomenclature, the use of two words to name any organism from a beetle to an oak tree.

but moving speech about how his own study of fish has been helped by Linnaeus' creation of binomial nomenclature. The Emperor said the work of Linnaeus has facilitated international scientific collaboration. Following the Emperor, King Carl Gustaf—former head of the World Wildlife Fund—rose to speak. Although the life and work of Linnaeus have made him the most famous of Swedes, the King said that Linnaeus belonged to the entire world. He hoped his example would lead to greater emphasis on biodiversity conservation. The King asked all of us to rise to toast the 300th birthday of Linnaeus.

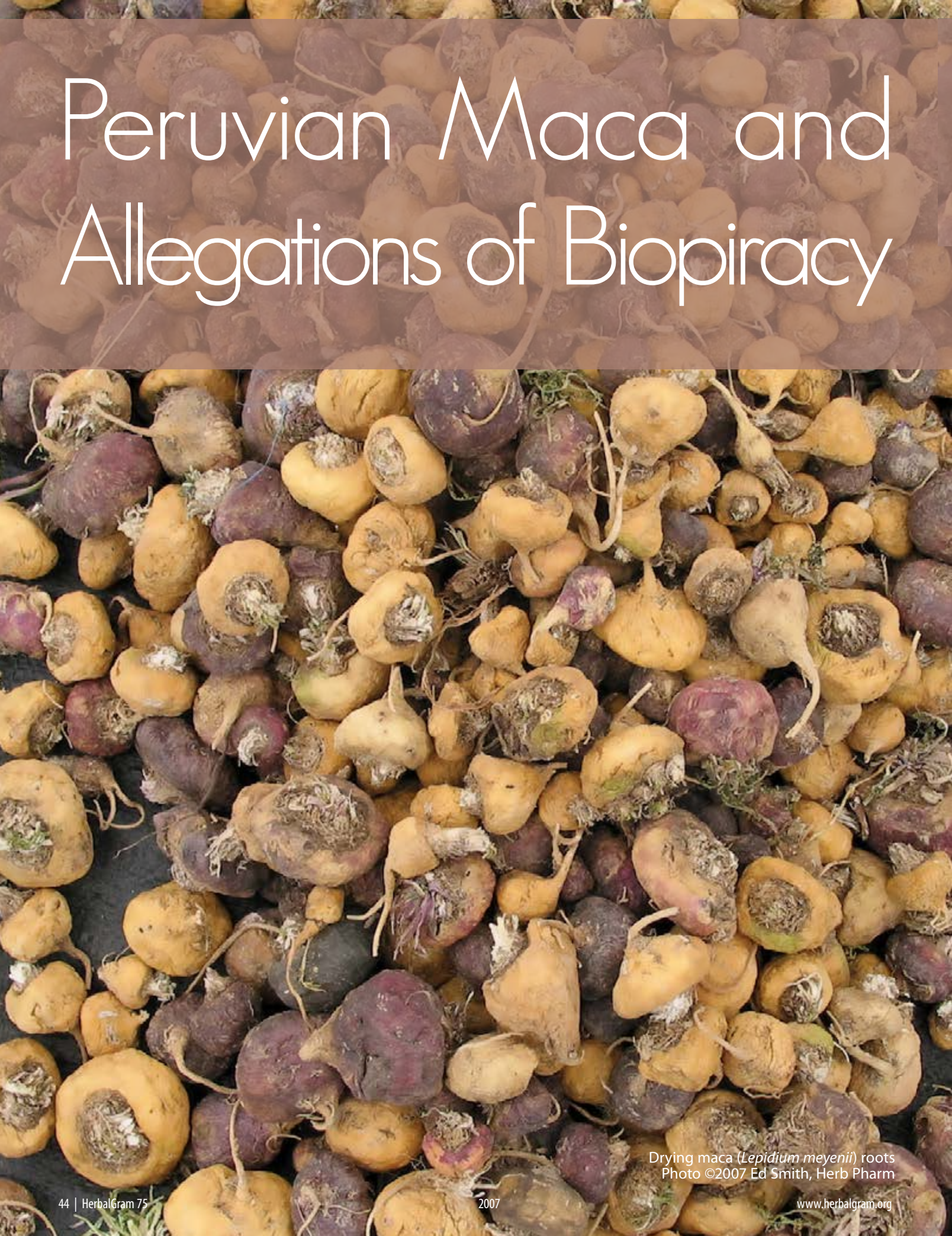
My evening concluded at midnight by giving a lecture on Linnaeus via phone link, complete with slides, to a group of students assembled at the National Tropical Botanical Gardens on the island of Kauai in Hawaii. In Hawaii, it was still noon on May 23, so Carl Linnaeus' birthday celebration, for me at least, stretched for nearly 36 hours.

As we continue to face crises of global climate change, loss of biodiversity, and loss of indigenous plant lore, I take much comfort in the example of Carl Linnaeus. He showed us all how a single person, even an impoverished 25-year-old college student, can use the power of plants to change the world. He wrote of the dignity and sophisticated knowledge of indigenous people. He showed us how plants can bring people together, and highlighted the importance of systematics in allowing us to explore all of nature. With a great deal of prescience, Linnaeus even foresaw our era of species extinctions. "I do not know how the world could persist gracefully if but a single species were to vanish from it," he wrote.

One of the most moving tributes for his 300th birthday came from the citizens of Uppsala. Rather than lay down a red carpet for the man they term "the Flower King," they carpeted the streets of Uppsala in grass. For all who love and value plants, I, like the Swedish King, propose a toast: "*Grattis* Carl Linnaeus—happy 300th birthday to the King of Flowers."

Ethnobotanist Paul Alan Cox, PhD, wrote the introduction to Linnaeus' Philosophia Botanica*, translated by S. Freer (Oxford University Press, 2003). He is a member of the American Botanical Council Advisory Board, founder and chairman of Seacology (an island conservation foundation), and currently serves as executive director of the Institute for Ethnomedicine in Jackson Hole, Wyoming.*

Peruvian Maca and Allegations of Biopiracy



Drying maca (*Lepidium meyenii*) roots
Photo ©2007 Ed Smith, Herb Pharm

This article was originally published in *HerbalGram*, the peer-reviewed journal of the American Botanical Council (ABC).

By Josef Brinckmann

One of the many highlights of the Peru Natura 2006 was a presentation made by Sylvia Bazán Leigh, a representative of the Instituto Nacional de Defensa de la Competencia y de la Protección de la Propiedad Intelectual (the Peruvian National Institute for the Defense of Competition and Protection of Intellectual Property, INDECOPI). (Peru Natura 2006 was a forum and exhibition for natural products and ingredients from the Andean Region held in Lima, Peru, in September 2006.) Mrs. Bazán discussed cases of what has been termed "biopiracy" for several Peruvian natural products and the actions that have been taken to challenge them. Specifically, the case of the traditional Peruvian food and medicinal plant "maca" was used as the primary example, although maca is just one of 32 other Peruvian botanicals that have been prioritized for protection against biopiracy (see Table 1 on page 46). Maca root (fresh or dried hypocotyl of *Lepidium meyenii*, Brassicaceae) is an herbaceous, perennial, cultivated crop, found only on the Andean central sierra of Peru (in Junín and Pasco) in the puna agro-ecological zone above 4,000 meters (13,123 feet).

According to the Action Group on Erosion, Technology, and Concentration (ETC Group), "Biopiracy refers to the appropriation of the knowledge and genetic resources of farming and indigenous communities by individuals or institutions who seek exclusive monopoly control (patents or intellectual property) over these resources and knowledge. ETC group believes that intellectual property is predatory on the rights and knowledge of farming communities and indigenous peoples."[1]* On May 1, 2004, the Peruvian Congress passed Law No. 28216, "The Law Protecting Access to Peruvian Biological Diversity and the Collective Knowledge of Indigenous Peoples." The definition of biopiracy according to this law is "unauthorized and uncompensated access and use of biological resources or traditional knowledge of indigenous peoples by third parties, without corresponding authorization and in violation of the principles established in the Convention on Biological Biodiversity (CDB)...."[2] Law No. 28216 also established the National Commission for the Protection of Access to Peruvian Biological Diversity and to the Collective Knowledge of the Indigenous Peoples, hereinafter referred to as the "National Anti-Biopiracy Commission."

The National Anti-Biopiracy Commission has the task of developing actions to identify, prevent, and avoid acts of biopiracy with the aim of protecting the interests of the Peruvian State. Its main functions are as follows:

- Establish and maintain a register of biological resources and traditional knowledge,
- Provide protection against acts of biopiracy,
- Identify and follow up patent applications made or patents granted abroad that relate to Peruvian biological resources or collective knowledge of the indigenous peoples of Peru,
- Conduct technical evaluations of the above-mentioned applications and patent grants,
- Issue reports on the cases studied,
- Lodge objections or institute actions for annulment concerning the above-mentioned patent applications or patent grants,
- Establish information channels with the main intellectual property offices around the world, and
- Draw up proposals for the defense of Peru's interests in different forums.[3]

In the case of alleged biopiracy involving maca root, the process actually began in mid-2002, 2 years prior to the establishment of the National Anti-Biopiracy Commission, after discovering that patents had been granted in the United States of America for "inventions" related to maca root. INDECOPI solicited the participation of several institutions in order to form a Working Group to analyze the granted patents and to determine to what extent the patents could affect exports of maca products from Perú. The Working Group, coordinated by INDECOPI, was made up of representatives of the (Peruvian) Ministry of Foreign Relations, Ministry of Foreign Trade and Tourism (MINCETUR), National Environmental Council (CONAM), National Institute for Agricultural Research and Extension (INIEA), International Potato Center (CIP), Peruvian Environmental Law Society (SPDA), Pro Biodiversity of the Andes Peru (PROBIOANDES), Peruvian Institute of Medicinal Plants (now Peruvian Institute of Natural Products, IPPN), and the Association for Nature and Sustainable Development (ANDES).[4]

This author was first made aware of the controversial maca patents in the United States from a presentation made at the Latin Pharma 2003 by Dr. Beatriz M. Garcia Delgado, department head of the Scientific Activity Organization at the National Center of

* Biopiracy has several definitions depending on whether one refers to Peruvian statutes or international treaties. According to Jorge Goldstein, an attorney representing Peruvian protesters of a Pure World patent for maca (discussed in this article), Peruvian Law No. 28216 defines "biopiracy" narrower than does ETC, as follows: "unauthorized and uncompensated access and use of biological resources or traditional knowledge of indigenous peoples by third parties, without corresponding authorization and in violation of the principles established in the Convention on Biological Biodiversity (CDB)...." While both definitions might be thought to apply primarily to genetic and biological resources that are misappropriated, i.e., a non-permitted access to secret know-how of the community or in violation of the Biodiversity Treaty, the ETC is less restricted. The ETC definition would actually apply to maca bought in the public markets for the purpose of searching for the active ingredients that cause their well-known effects in order to obtain intellectual property (IP) rights. According to Goldstein, the ETC definition puts forth the concept that obtaining IP rights, even based on publicly accessible knowledge, is illegal.

Scientific Research (CNIC), Havana, Cuba. That presentation, titled "Importance of Patent Information," provided examples of patents that have been awarded to inventors in developed countries—particularly natural products companies in the United States, Japan, and European Union—that appear to be based on already existing traditional knowledge from Latin American sources. One main point of Dr. Delgado's presentation was that producers in developing countries need to become acutely aware of the increasing number of patents that are being issued to corporations in developed countries that may threaten the future ability of people in those developing countries to produce and market certain value-added forms of native plants, even when they are promoted for traditional uses. In these cases, the patents will most likely warrant challenge.[5]

As part of the maca response strategy, the Working Group initially prioritized the investigation of 3 granted maca patents. They collaborated with scientists and maca exporters to compile documents on maca preparation and prior use with verified dates prior to the filing dates of the patent applications.[4] The first prioritized patent for the Working Group was a World Intellectual Property Organization (WIPO) international application titled "Compositions and Methods for their Preparation from *Lepid-*

Table 1: List of Vegetable Biological Resources Prioritized by the Peruvian National Commission against Biopiracy

RANK*	PERUVIAN NAME	ENGLISH NAME	BOTANICAL NAME AND FAMILY
1	Maca	Maca	*Lepidium meyenii,* Brassicaceae
2	Camu camu	Camu-camu	*Myrciaria dubia*, Myrtaceae
3	Uña de gato	Cat's claw	*Uncaria tomentosa*, *Uncaria guianensis*, Rubiaceae
4	Maiz morado	Corn	*Zea mays*, Poaceae
5	Tara	Spiny holdback	*Caesalpinia tara*, Fabaceae
6	Yacón	Yacón	*Smallanthus sonchifolius*, Asteraceae
7	Sacha inchi	Inca peanut	*Plukenetia volubilis*, Euphorbiaceae
8	Hercampuri	Hercampuri	*Gentianella alborosea*, Gentianaceae
9	Caigua	Caygua	*Cyclanthera pedata*, Cucurbitaceae
10	Chancapiedra	Phyllanthus	*Phyllanthus niruri*, Euphorbiaceae
11	Sangre de grado	Dragon's blood croton	*Croton lechleri*, Euphorbiaceae
12	Algodón de color	Creole cotton	*Gossypium barbadense*, Malvaceae
13	Lúcuma	Lucmo	*Pouteria lucuma*, Sapotaceae
14	Chirimoya	Cherimoya	*Annona cherimola*, Annonaceae
15	Oca	Oca	*Oxalis tuberosa*, Oxalidaceae
16	Olluco	Olluco	*Ullucus tuberosus*, Basselaceae
17	Mashua	Anu	*Tropaeolum tuberosum*, Tropaeolaceae
18	Palo de rosa	Brazilian rosewood	*Aniba rosaeodora*, Lauraceae
19	Tarwi o chocho	Andean lupin	*Lupinus mutabilis*, Fabaceae
20	Cañihua	Canihua	*Chenopodium pallidicaule*, Chenopodiaceae
21	Cascarilla o quina	Cinchona	*Cinchona micrantha*, Rubiaceae
22	Ratania o palo hurón	Rhatany	*Krameria triandra*, Krameriaceae
23	Guanarpo	Guanarpo	*Jatropha weberbaueri*, Euphorbiaceae
24	Manayupa	Runa manayupa	*Desmodium molliculum*, Fabaceae
25	Pasuchaca	Pasucha	*Geranium dielsianum*, Geraniaceae
26	Achiote	Annatto	*Bixa orellana*, Bixaceae
27	Capirona	Capirona	*Calycophyllum obovatum*, Rubiaceae
28	Abuta	Velvetleaf	*Abuta grandifolia*; syn. *Cissampelos pareira*, Menispermaceae
29	Chuchuhuasi	Chuchuhuasi	*Maytenus macrocarpa*, *Maytenus laevis*, Celastraceae
30	Muña	Muña	*Minthostachys setosa*, Lamiaceae
31	Barbasco	Barbasco	*Lochocarpus nicou*, Fabaceae
32	Hojas de paico	Epazote	*Chenopodium ambrosioides*, Chenopodiaceae
33	Hojas de guanábana	Soursop	*Annona muricata*, Annonaceae

* Plants are listed in order of priority as assessed by the Peruvian government, based on patents issued on each plant.

ium," listing 132 countries for registration. This was Application PCT/US00/05607 filed by Pure World Botanicals, Inc. (South Hackensack, NJ, US) on March 3, 2000, claiming priority on the basis of application number US 09/261,806 of March 3, 1999, and published on September 8, 2000, in the *Patent Cooperation Treaty (PCT) Gazette* as WO 00/51548.[6] It contains 54 claims referring to extracts, macamides, an extraction process, and therapeutic methods.[7] The second priority was US Patent 6,267,995 (filed on March 3, 1999, and granted on July 31, 2001), also assigned to Pure World Botanicals, titled "Extract of *Lepidium meyenii* roots for pharmaceutical applications."[8] And the third priority was US Patent 6,428,824 (filed on October 19, 2001, and granted on August 6, 2002), again assigned to Pure World Botanicals, titled "Treatment of sexual dysfunction with an extract of *Lepidium meyenii* roots."[9] There is a subsequent Pure World patent of the same title as the 2000 WIPO patent, "Compositions and methods for their preparation from *Lepidium*," US Patent 6,552,206.[10] (For a summary of these US patents, see Table 2 on page 50.)

Aside from the 3 initially prioritized patents for investigation, there have been other maca patents assigned in the United States, including "maca and antler for augmenting testosterone levels,"[11] "Dietary Supplement,"[12] "Herbal composition for enhancing sexual response,"[13] "Topical compositions for enhancing sexual responsiveness,"[14] and yet another patent assigned to Pure World Botanicals titled "Imidazole alkaloids from *Lepidium meyenii* and methods of usage."[15]

The Working Group drew up a report titled "Patents referring to *Lepidium meyenii* (maca): Responses of Peru," which was submitted by the Peruvian delegation at the fifth session of the Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore in May of 2003.[7] According to a revision of the communication from Peru, dated February 28, 2005, and circulated by the World Trade Organization (WTO) Council for Trade-Related Aspects of Intellectual

Fresh (undried) maca roots
Photo ©2007 Ed Smith, Herb Pharm

Property Rights on May 19, 2005, "The report shows some of the problems that a country like Peru has to face upon identification of a pending patent application or patent grant whose subject-matter concerns an invention obtained or developed from the use of a biological resource or traditional knowledge without securing the prior informed consent of the country of origin of the resource or the indigenous people owning rights in the knowledge, and without providing for any type of compensation to that country or indigenous people."[3]

Pursuing the case of maca biopiracy has been made possible, in part, by participation from many interested parties including the following:

- Pro bono assistance of Washington intellectual property rights attorney Jorge Goldstein of Sterne, Kessler, Goldstein & Fox P.L.L.C. of Washington, DC;
- Those involved with the researching, compiling, and shipping of documentation to the attorneys;
- Financial support from the International Potato Center in Lima, Peru (a South American nonprofit group dedicated to research and conservation on potatoes and other Andean root crops and tubers) for the analysis of alcoholic extracts of maca and coordination of technical recommendations for new analysis on the extracts; and
- Those responding to the appearance of new problem cases to investigate.

An example of this participation was obtaining copies of maca patents recently filed with the Japanese Patent Office by applicant Towa Corporation and hiring qualified translators to translate the technical documents from Japanese to Spanish.[4] Japanese patent application number 2003-081157, filed on March 24, 2003, by Towa Corporation (published on January 8, 2004), is titled "Functional food product containing maca."[16] Towa Corporation filed a subsequent Japanese Patent, application number 2004-123438, on April 19, 2004 (published on November 4, 2005), titled "Testosterone-increasing composition, testosterone-increasing food, testosterone-increasing skin care preparation for external use and testosterone-increasing medicine."[17] [Editor's note: Use patents are issued based on the novelty of the claimed use, without the requirement that the patent holder prove the actual efficacy of the claimed use. In the case of maca and the increase of testosterone, this patent may be considered a novel use, even though all published human clinical trials on maca testing for possible increases of serum testosterone levels resulted in negative findings,[18,19] and several animal and in vitro studies have likewise found no effects on testosterone from maca.] But there have been many other Japanese maca invention patent applications in the meantime, none of which mention Peru. Examples include an application published on November 10, 2005, from applicant Suntory Ltd titled "Alcoholic drink containing maca extract";[20] an application published on March 16, 2006, from applicant Yukihiro Hirose titled "Composition for preventing male climacteric disorder and beverage and foods including the same";[21] and another application published on June 8, 2006, from applicant Nippon Menaade Keshohin KK titled "Improving agent of indefinite complaint accompanying with autonomic imbalance."[22]


Three generations of maca farmers in Peru.
Photo ©2007 Ed Smith, Herb Pharm

Actions taken thus far by Peru's National Anti-Biopiracy Commission against the Japanese patents include the submission of technical documents to the Japanese Patent Office in order for it to evaluate whether the Towa Corporation patent meets the requirements of novelty and inventiveness. Concerning the aforementioned US patents assigned to Pure World Botanicals, the current state of action in Peru is the coordination for the challenge of the US patents. However, Chris Kilham, an herb expert and author who has consulted with Pure World on various projects, has noted that Naturex of Avignon, France, a botanical extraction company which acquired Pure World in 2005, i.e., after the filing of the maca patents, has opened up the Pure World maca patents to all Peruvian entities. Kilham writes, "This means that any Peruvian company or trading outfit, large or small, can use the methods and information developed and patented by Pure World freely, and can market their maca products using that information. This is a significant development in the area of intellectual property rights as applied to maca. The Andean people, from whom the use of maca originates, have full and complete access to [Pure World's] patented processes and information" (e-mail to M. Finney, March 5, 2007).

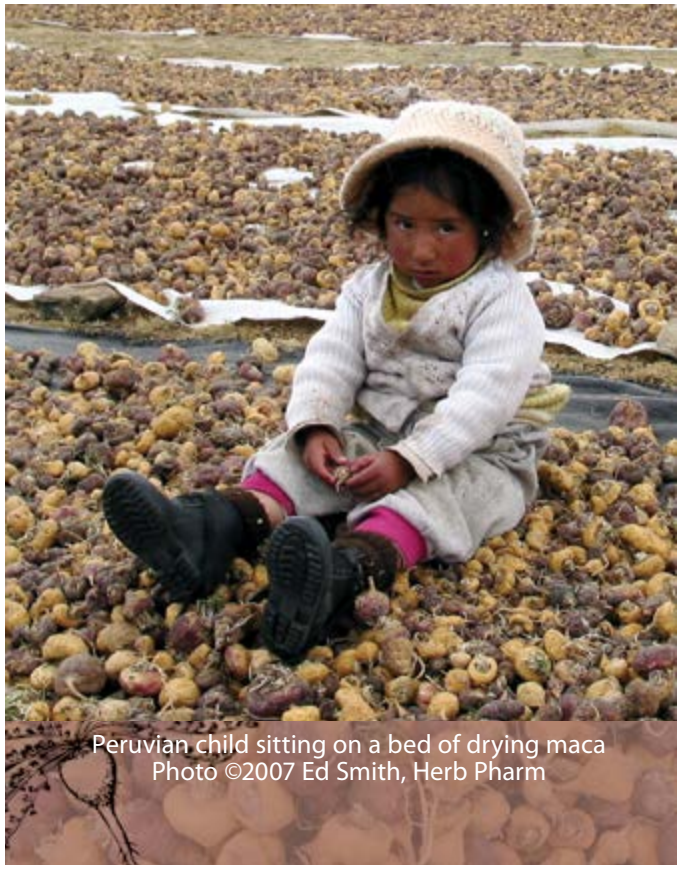
Related Documents, Publications, and Events

In March 2005, the delegation of Peru presented to the WTO a document titled "Article 27.e(B). Relationship between the TRIPS Agreement and the CBD and Protection of Traditional Knowledge and Folklore."[23] Later, in October 2005, the delegation of Peru presented to the WTO the document, "Analysis of Potential Cases of Biopiracy: The Case of Camu Camu (*Myrciaria dubia*)."[24] And in November 2005, a seminar on the topic was held titled "Nuevos Retos para el Perú: Biopiratería, ¿cómo enfrentarla?" ("New Threats for Peru: How to deal with biopiracy?"). Related documents submitted to WIPO include "Patents referring to *Lepidium meyenii* (Maca): Responses of Peru"[7] and "Patent system and the fight against biopiracy—The Peruvian experience."[25] Addition-

ally, in August 2005, INDECOPI published a report, "Analysis of potential cases of biopiracy in Peru."

Progress to Date

In relation to the validity of the patents related to maca, certain claims in the international patent application have been determined to not meet the novelty criteria, while other claims are not inventive. Additionally, certain claims found in US patents 6,267,995 and 6,428,824 have been analyzed by INDECOPI and determined that they do not meet the inventiveness level.[4] In a communication filed with WTO in November 2006, the delegation of Peru concludes, "Peru's position is clear: despite the existence of useful tools for improving the patent system and verifying compliance with existing patentability obligations, especially as regards the novelty and inventive step criteria—the inclusion of the requirements to disclose the source and/or origin of biological resources, as proposed in document IP/C/W.473, is essential if the patent system is to reflect adequately the obligations arising from the CBD, obligations which Peru and all Member States are required to fulfill."[26]



Peruvian child sitting on a bed of drying maca
Photo ©2007 Ed Smith, Herb Pharm

Challenges Ahead

Insufficient resources are available to challenge inappropriately granted patents, while there are new requests of maca patent cases to analyze. There are limitations and problems faced by countries like Peru in identifying, monitoring, and studying patent applications or granted patents that involved improperly granted rights or that weaken regimes for access to and/or protection of traditional knowledge.[26]

While there are innumerable pro and con arguments concerning the ethics of bioprospecting and patenting medicinal plant extracts and their uses, it is exceedingly clear that there exists an enormous North-South divide in perception between those seated at the source of the traditional knowledge, in this case the indigenous people of the high Andes, and those who believe that they are innovators of that knowledge, e.g., researchers and product developers at phytomedicine companies in the United States, Europe, and Japan. This huge gap in perception is evidenced by public statements that have been reported by a former executive from Pure World, Qun Yi Zheng, PhD: "We really enhanced the equity of maca itself...We shouldn't be blamed, we should be thanked."[27] More recently, Zheng was quoted as saying Peruvians "should not be so narrow-minded, but should instead be grateful. After we studied it, put money into the research, (maca) has become a useful commodity."[28] Based on such statements (Dr. Zheng has confirmed the accuracy of the quotes), it appears that the patent owners believe they themselves have created a market for maca products, one that did not exist prior to the patents. Although the patent owners may not have created the initial market for maca, it may be true that their efforts have likely *created an increase* in the market demand for maca extracts. This author can assure the reader, however, based on his communications with maca producers and representatives of the National Anti-Biopiracy Commission, that the thank-you cards are not in the mail. Peru is interested in benefit sharing. Nevertheless, according to Kilham, Pure World erred in not sharing the patent rights with Peruvian communities: "They didn't do anything illegal, but it really was the last days of a particular way of doing business."[29] Antoine Dauby, marketing manager for both companies, declared that, "We acknowledge that maca's beneficial properties were long ago discovered by indigenous Peruvians." He writes that the Pure World patent lets them grow, sell, and use maca as they have for centuries. "Our patent is for the extraction and isolation of maca's key ingredient—and nothing else" (e-mail to M. Finney, April 10, 2007). As a good faith gesture, he wrote, Naturex is offering to grant free licenses to Peruvian companies to use Pure World's MacaPure® in their products. Dauby also noted, "At Naturex, we believe in giving back to the communities where we do business. That is why we will open a corporate foundation in 2007 that will make social and economic development grants to these communities, including in Peru. In addition, Naturex is a member of the United Nations Global Compact, which means we believe in responsible corporate citizenship." In addition, according to Dr. Zheng, when Pure World was asked to help the Peruvians analyze the level of macamides and macaenes in their products,† Pure World offered its assistance. Further, when the Peruvian maca industry encountered a problem regarding authorization for sales of maca in European

† According to a peer reviewer of this article, maca clinical researcher Gustavo F. Gonzales, MD, PhD (Instituto de Investigaciones de la Altura, Universidad Peruana Cayetano Heredia, Lima, Peru), "It is my opinion that macamides and macaenes are not the [primary] active compounds in maca. This is based [on the fact] that these compounds are extracted in a lipidic fraction. However, most of the effect of maca is in the aqueous fraction, in which levels of macaenes and macamides probably are negligible. It is very strange that after publication of Zheng et al in 2000 (Urology) nobody has demonstrated biological properties for macamides" (e-mail to M. Blumenthal, May 28, 2007). Dr. Zheng responded to the above as follows: "We have always indicated that macamides and macaenes are unique but never said they are the only actives in Maca. As we all know, [the] herbal extract itself is the active and in some case it is not active enough when you isolate one single compound or single group of compounds. There are synergies [that] need to be studied in herbal medicine. I do not see the evidence that 'most of the effect of maca is in the aqueous fraction,' as the reviewer said. For what we studied, most [of the] chemical compounds are in the lipid fractions [i.e.,] the material used for our study published in Urology" (e-mail to C. Cavaliere, June 4, 2007).

Table 2: Summary of Prioritized US Patents

United States Patent	6,267,995
Zheng, et al.	July 31, 2001
Inventors:	Zheng; Bo Lin (Wayne, NJ), Kim; Calvin Hyungchan (Fort Lee, NJ), Wolthoff; Stephen (Fort Lee, NJ), He; Kan (River Edge, NJ), Rogers; Lingling (Parsipanny, NJ), Shao; Yu (River Edge, NJ), Zheng; Qun Yi (Wayne, NJ)
Assignee:	Pure World Botanicals, Inc.

Extract of *Lepidium meyenii* roots for pharmaceutical applications

Abstract

An isolated composition obtained by extracting *Lepidium meyenii* roots is provided. The composition is substantially free of cellulose and comprises between about 5% and about 9% of benzyl isothiocyanate, between about 1% and about 3% of *Lepidium* sterol component, between about 20% and about 30% of *Lepidium* fatty acid component, and about 10% or more of macamide component. The composition is prepared by a process which comprises contacting *Lepidium meyenii* roots with a first aqueous solvent of about 90% vol-% or more water, then separating the residual *Lepidium meyenii* root material from the first contacted aqueous solvent, then contacting the residual *Lepidium meyenii* root material with a second aqueous solvent which comprises a mixture of an alcohol and water having about 90 vol-% alcohol or more to form a liquor, and then finally concentrating the liquor to obtain the composition. The composition can be used for treating cancer and sexual dysfunction.

United States Patent	6,428,824
Zheng, et al.	August 6, 2002
Inventors:	Zheng; Bo Lin (Wayne, NJ), Kim; Calvin Hyungchan (Fort Lee, NJ), Wolthoff; Stephen (Fort Lee, NJ), He; Kan (River Edge, NJ), Rogers; Lingling (Parsipanny, NJ), Shao; Yu (River Edge, NJ), Zheng; Qun Yi (Wayne, NJ)
Assignee:	Pure World Botanicals, Inc. (South Hackensack, NJ)

Treatment of sexual dysfunction with an extract of *Lepidium meyenii* roots

Abstract

NOTE: The abstract provided for this patent is identical to the wording in the 2001 patent above.

United States Patent	6,552,206
Zheng, et al.	April 22, 2003
Inventors:	Zheng; Bo Lin (Aurora, CO), He; Kan (River Edge, NJ), Shao; Yu (Ledgewood, NJ), Zheng; Qun Yi (Wayne, NJ)
Assignee:	Pure World Botanicals, Inc. (South Hackensack, NJ)

Compositions and methods for their preparation from *Lepidium*

Abstract

The invention relates to compositions that can be isolated from *Lepidium* plant material and to methods for their isolation. The compositions are useful for treating and preventing cancer and sexual dysfunction.

countries, Pure World shared safety data with them to help them overcome regulatory barriers in the EU market (Q. Zheng, e-mail to M. Finney, March 14, 2007).

To the Peruvian National Anti-Biopiracy Commission, however, the aforementioned patents are just another attempt to expropriate their traditional knowledge—in their words, akin to another rip-off in a long line of thefts taking place ever since the Europeans conquered the region about 475 years ago. There is a context. The native origin of capsicum fruit (*Capsicum* spp., Solanaceae) is the "upper course" (source region of the Amazon river), which is in the Peruvian Andes.[30] (The source of the Amazon is lake Lauricocha in the Peruvian Andes. The river is still known as the Maranon in its "upper course" in the Andes.) Recent studies suggest that the ancestors of *Capsicum* may have evolved in the drier regions of the Peruvian and Bolivian Andes with subsequent migration north or east into tropical lowland regions.[31,32] Besides capsicum, other Solanaceae plants with origins in Peru, such as the potato (*Solanum tuberosum,* Solanaceae) and tomato (*Lycopersicon esculentum,* Solanaceae), among other economically important plants, are now cultivated worldwide. Another native plant, the cinchona tree (*Cinchona* spp., Rubiaceae) appears on Peru's national emblem, which serves as a constant reminder that the tree's bark was the original source of the antimalarial drug quinine. Jesuit priests first took the bark back to Spain in 1641. In the 19th century,

Is it just a matter of time before viable maca germplasm (seeds, cell-cultured plantlets, or tubers) is smuggled from the Andes and cultivation experiments begin in the mountains of Asia?

Preparing maca to dry
Photo ©2007 Ed Smith, Herb Pharm

the Dutch purchased seeds in order to plant cinchona trees in Java. Within 50 years Javanese plantations became the world's primary source of quinine.[33,34]

Is it just a matter of time before viable maca germplasm (seeds, cell-cultured plantlets, or tubers) is smuggled from the Andes and cultivation experiments begin in the mountains of Asia? This question is not merely academic. This author has been contacted in recent years by researchers in China asking for assistance in obtaining maca material from Peru for cultivation in China. The assistance to China was declined, colleagues in Peru were informed of the inquiry, and a strong suggestion was made that they do everything within their power to protect their national treasure, maca, from becoming a commodity like the potato, now cultivated worldwide.

More information on the current status of the maca biopiracy cases is available from the Instituto Nacional de Defensa de la Competencia y de la Protección de la Propiedad Intelectual (INDECOPI) at the following address: Calle de la Prosa 138 - San Borja, Peru; phone: (511) 224-7800 or (511) 224-7777; fax: (511) 224-0348; Web: http://www.indecopi.gob.pe.

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Grandmother and granddaughter maca growers
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WISCONSIN

Ginseng Farmers Fight to Protect Product Reputation

By Courtney Cavaliere and Mark Blumenthal

Above: Wisconsin ginseng farmer Kirk Baumann in his garden. Photo ©2007 Wisconsin Ginseng Board

Two decades ago, Wisconsin reigned as the world's leading producing area of cultivated North American ginseng (*Panax quinquefolius*, Araliaceae) roots. Ginseng sales generated about $125 million annually in gross income to the state's growers at that time,[1] and the state produced approximately 2.4 million pounds of ginseng back in 1992.[2] During the last 20 years, there have been two significant challenges to the Wisconsin ginseng Industry: (1) increased competition from Canada and China (where North American ginseng [NAG] seeds have been exported from Wisconsin and planted for commercial production), and (2) the misappropriation of the Wisconsin ginseng trademark by unscrupulous sellers passing off Asian ginseng (*P. ginseng*) or ginseng cultivated elsewhere as "Wisconsin-grown."

These developments have forced around 90% of Wisconsin's former 1500 ginseng farmers to abandon the market and cease cultivation.[1] The state's approximately 150 remaining ginseng farmers and the organizations representing them have now initiated efforts to revitalize the industry and protect the image and reputation of Wisconsin-grown ginseng from false and misleading marketing practices. Foremost among such efforts was a decision in December of 2006 by the Ginseng and Herb Co-op (GHC) and the Ginseng Board of Wisconsin (GBW), two nonprofit, tax-exempt organizations representing all Wisconsin ginseng farmers, to enter into a contract with Eu Yan Sang International Ltd (EYS), the venerable 128-year-old Singapore-based traditional Chinese medicine company. The contract guarantees that EYS will purchase a significant share of Wisconsin's ginseng crop each year and grants EYS exclusive rights to the Wisconsin Ginseng Seal®.[3]

The GBW operates under a state market order, which requires all members of the Wisconsin ginseng industry to contribute a percentage of their sales to a marketing fund (B. Weege, oral communication to C. Cavaliere, October 30, 2006). The GBW is responsible for using those funds to develop new market channels for Wisconsin ginseng and its products, support plant pathology research, and provide NAG products for medical research studies aimed at identifying the therapeutic benefits of using Wisconsin ginseng.

The GHC was created through the GBW for the purpose of selling pure Wisconsin ginseng throughout the world (K. Drath, oral communication to C. Cavaliere, January 26, 2007). All Wisconsin ginseng farmers are eligible to sell their ginseng through the GHC, but not all participate.

The GBW developed the Wisconsin Ginseng Seal Program in 1991 to officially identify ginseng and ginseng products that contain 100% pure, authentic Wisconsin-grown NAG roots. The seal (see Figure 1) is intended to be seen as an indication of the product's quality, as NAG grown in Wisconsin is internationally revered for its "potency," at least according to sources in Southeast Asia (R. Eu, e-mail to C. Cavaliere, February 28, 2007). During the early 1990s, there were at least 250 members of the Wisconsin Ginseng Seal Program, but this number had dwindled to around 50 by 2006 (B. Weege, oral communication to C. Cavaliere, October 30, 2006). The recent contract with EYS has now caused the membership of pre-existing companies to permanently expire and limited the program to only one member—EYS.

"There's been so much contaminated ginseng coming into the market and so much fakery out there," said Keary Drath, of the GHC. "We wanted to make sure that consumers are able to reach true Wisconsin ginseng." According to Drath, the new arrangement with EYS will provide stable working conditions for Wisconsin ginseng farmers and eliminate some of the competition from mislabeled ginseng falsely marketed as "Wisconsin-grown." Farmers will also have assurance that testing and quality standards are in place and being employed.

"We believe this is a great opportunity for the industry," said Merle "Butch" Weege, executive director of the GBW (oral communication to C. Cavaliere, January 30, 2007). "We've found a reputable long-established

Figure 1: Wisconsin Ginseng Board seal.

American Ginseng *Panax quinquefolius*
Photo ©2007 Ginseng Board of Wisconsin

firm that has a good reputation for product quality, and they promote to high-end clientele. I think our farmers, in the long term, should be happy with this."

The GHC has entered into a 3-year contract with EYS with an option to renew in 3-year blocks, which guarantees that EYS will purchase a certain minimum quantity of ginseng from the co-op each year. Through this contract, EYS will acquire a significant share of Wisconsin's ginseng crop but not the entire crop, since ginseng farmers do not necessarily have to sell their NAG roots through the GHC. "A grower still has the choice to market his product directly or through an older distributor that [the grower is] comfortable with," said Weege. Farmers that sell their ginseng through other distributors, however, will not be able to identify their product with the Wisconsin Ginseng Seal, as they had the option of doing in the past through contracts with GBW.

EYS has commented that the new arrangement should benefit both the company and Wisconsin ginseng farmers. "We've been trying to align ourselves with the most premium product in each category," said Richard Eu, group CEO of EYS (oral communication to C. Cavaliere, February 24, 2007). According to Eu, Wisconsin-grown American ginseng is widely considered the finest available NAG and is highly valued in Asia, so the exclusive distributorship of officially-recognized Wisconsin ginseng should help EYS fulfill its company mission and validate its role as a global healthcare player.

One of the reasons Wisconsin-grown ginseng is so highly prized in Asia is based on the Chinese concept of *didao* (meaning "genuine" or "of native origin"). "Didao is the idea that a plant that grows in its place of origin (where it is naturally found) is better in its quality—we would say, it has better *qi*—than if it were to be cultivated somewhere else where the conditions are different (soil, moisture, sunlight, weather patterns, etc.)," explained Subhuti Dharmananda, PhD, director of the Institute for Traditional Medicine in Portland, OR, and a widely recognized authority on traditional Chinese medicine (e-mail to C. Cavaliere, March 23, 2007). He noted that it is a common practice to transplant and cultivate plants for commercial production over a wide geographical area, including places that are not a plant's natural habitat. According to Dr. Dharmananda, some transplanted crops may be just as good as those grown in their native range, whereas other transplanted plants may grow poorly in a non-native environment and appear obviously inferior to herbs or crops grown in their native areas. He added that the concept of didao sometimes has practical implications in China, in that a didao herb may be sold for a higher price than the same herb grown in a non-native area. "Whether or not the more costly herb is medicinally better is another story. But, if it grows big, firm, and sweet (in the case of codonopsis [*Codonopsis pilosula,* Campanulaceae]), that would show that it grew in the 'right' place," he explained.

According to Clifford Eu, group managing director of EYS, research in China indicates that there are also chemical differences between didao-grown and non-didao-grown herbs, which can be verified with established and emerging analytical technologies (C. Eu, e-mail to C. Cavaliere, April 5, 2007). He stated that a major reason for the higher price of didao herbs is the idea that "traditional formulas and dosages are based on didao herbs, so using non-didao herbs would not have the same effect as documented in the classical texts." NAG grown in China, western Canada, or areas of the United States outside its native range—even if the ginseng seed originated from a native area such as Wisconsin—

American Ginseng *Panax quinquefolius*
Photo ©2007 Ginseng Board of Wisconsin

"The Chinese government has of late been more responsive to taking actions against fraudulent traders in China for many products, including fraudulent medicines and ginseng products."

could therefore be considered inferior to Wisconsin-grown ginseng by some consumers, under the concept of didao.

According to a press release from EYS, the company expects revenue in the first year arising from the distributorship to be in excess of $10 million (Singapore dollars, approximately $6.5 million USD), with the potential to grow to more than $40 million (approximately $26 million USD) in the next 3-5 years.[3] In March of 2007, the company celebrated the launch of new quality assurance and processing facilities in Hong Kong, specifically for the fingerprinting and testing of Wisconsin-grown American ginseng.[4]

Eu pointed out that the contract should be a boon for Wisconsin ginseng farmers as well. "The farmers in Wisconsin have been losing market share over the years. The reason is that other countries grow American ginseng and sell it at a lower price, and much of it is being passed off as 'Wisconsin ginseng'," he said. "By giving exclusivity to one distributor, they feel that they can better control the market and maintain their image and market share."

The relatively large membership of the Wisconsin Ginseng Seal Program in past years proved difficult to manage by GBW and was prone to abuse. According to Weege, there were at least 250 members of the program in the early- to mid-1990s, many of whom were root resellers and producers of NAG-based value-added products located outside the United States (B. Weege, oral communication to C. Cavaliere, October 30, 2006).

"We introduced the program in Hong Kong because China has always [been] and continues to be our primary market," said Weege, referring to ginseng's widespread use and popularity in China and Southeast Asia. The program, however, proved extremely difficult to monitor overseas. What Weege calls "unscrupulous" business people began to realize that they could profit by pirating the Wisconsin seal and that the GBW was largely incapable of policing them from abroad. Weege and GBW President Joe Heil served as delegation members on a mission to promote trade with China in March of 2004. "It was our first travel to China and it immediately became apparent that the abuse of our [trade]mark was blatant and rampant. In every town we went to, from Beijing south to Hong Kong, the Wisconsin seal was there. Ironically, we no longer had any international-based seal members at that time," Weege said.

American Ginseng *Panax quinquefolius*
Photo ©2007 Ginseng Board of Wisconsin

Before limiting the program to EYS, the GBW had around 50 domestically-based members in the program. The GBW would monitor these members through unannounced onsite visits and by purchasing and testing products bearing the seal to verify that they were accurately identified. GBW would test primarily for fungicide residues, which can be indicative of geographical origin, as regulations in various countries allow differing agricultural chemicals to be used on ginseng. Because ginseng is cultivated under 75% shade to simulate the natural forest canopy light conditions, and requires considerable moisture, these conditions produce an environment that is conducive to the occurrence of fungi that attack the roots, producing the common "root rot" that has historically decimated many cultivated ginseng fields.

The GBW would also embark upon investigations across the United States and in other countries to stop sellers without contracts from illegally marketing their products under the Wisconsin seal. The organization would issue cease-and-desist orders to violators and pursue further legal action if the abuse continued. In many cases, falsely-marketed ginseng is not even NAG but Asian ginseng, which is chemically different, claimed to produce different pharmacological effects, and historically has cost less than NAG.[5] According to Drath, because of rampant product mixing and mislabeling, many consumers were losing confidence in the ginseng being sold in Chinatown shops as well as in the old distributors that carried the Wisconsin seal.

The government of the People's Republic of China began to show some interest in stopping sales of imposter NAG and the piracy of the Wisconsin seal in China last year.[1] According to Weege, complaints of ginseng quality standards and piracy of the Wisconsin seal were raised by a Chinese citizen during an open government initiative on March 15, 2006, wherein citizens were encouraged to freely voice their concerns to government representatives (B. Weege, oral communication to C. Cavaliere, October 30, 2006). The government then began to assist the GBW in its efforts by seizing infringing products and issuing fines for illegal use of the Wisconsin ginseng seal.

"The Chinese government has of late been more responsive to taking actions against fraudulent traders in China for many products, including fraudulent medicines and ginseng products," said Eu (R. Eu, e-mail to C. Cavaliere, February 28, 2007). "No figures on seizures are available, but it is expected that complete misuse of the seal and [false] product labeling will take some years to eradicate. With our Eu Yan Sang's brand reputation to offer consumers nothing short of quality and authenticity of our products, we aim to offer consumers more assurance when purchasing these valuable roots with the seal-imprinted packaged products under our brand name." (See Figure 2.)

According to Weege, the now-restricted membership in the Wisconsin Ginseng Seal Program should improve the GBW's efforts to monitor officially recognized Wisconsin ginseng product and prevent seal piracy (B. Weege, oral communication to C. Cavaliere, January 30, 2007). Weege stated that the GBW will continue to be vigilant for illegal use of the seal and that it would have an ongoing obligation to monitor its seal member. The GBW

Figure 2: Packaged Wisconsin American Ginseng
Photo ©2007 Eu Yan Sang

American Ginseng *Panax quinquefolius*
Photo ©2007 Ginseng Board of Wisconsin

Illustration of **American Ginseng** *Panax quinquefolius* from *American Medicinal Plants; An Illustrated and Descriptive Guide to the American Plants Used as Homeopathic Remedies; Their History, Preparation, Chemistry and Physiological Effects* by Charles F. Millspaugh (1887). Image courtesy of Steven Foster

is also involved with multiple projects to enhance the production and image of Wisconsin ginseng. The GBW has been working with the US Environmental Protection Agency (EPA) in developing and testing safe pesticides for NAG crops as part of a 10-year strategic pest management program with the University of Michigan (B. Weege, oral communication to C. Cavaliere, October 30, 2006). In addition, the GBW has been collaborating with the United States Department of Agriculture (USDA) to develop grade standards for cultivated NAG. GBW is also working with the University of Wisconsin at Madison to develop a "fingerprinting" technique to assess and determine ginseng root origin (by testing for the medium in which the plant was grown, i.e., absorption of properties from soil that would indicate geographic origin, as opposed to DNA fingerprinting).

"As an industry, we've experienced some tough times of recent, some due to our own errors, others due to unfair trade practices, but there's now a very dedicated group of hardcore growers who want to right the ship."

The industry still faces major challenges, particularly in regards to foreign competition. In the early 1980s, growers in Canada (primarily in British Columbia and southern Ontario) began purchasing Wisconsin seeds and cultivating American ginseng. In Ontario, much of this ginseng cultivation is performed on former tobacco farmland, while much of the ginseng grown in British Columbia is cultivated on former hay fields. NAG seeds were later sold to China.[2] According to a 2006 article in the *Wall Street Journal,* Wisconsin has been producing around 500,000 pounds of ginseng a year, which is a sharp drop from the 2.4 million pounds it produced in 1992. Canada, on the other hand, now produces around 5 million pounds of ginseng each year. The Canadian public company Chai-Na-Ta Corp, based in British Columbia, has become the global leader in the production and export of NAG, with 1500 acres under cultivation and an annual harvest of up to 1 million pounds.[6]

Moreover, despite the long-standing reputation of Wisconsin ginseng as being of superior quality, evidence indicates that the NAG grown in Canada is chemically identical or very similar to that grown in Wisconsin.[5] "The British Columbia ginseng industry was developed from seed acquired from Wisconsin. We have always held that the chemical profiles of Wisconsin ginseng and that grown in British Columbia are very similar," explained Dennis V.C. Awang, PhD, president of MediPlant Consulting Inc. and a former member of Chai-Na-Ta's Board of Directors (oral communication to C. Cavaliere, November 7, 2006). Studies have demonstrated that Asian ginseng, on the other hand, is chemically different than NAG, as NAG contains different levels of certain ginsenosides than Asian ginseng and lacks the ginsenoside Rf.[7,8]

According to Harry HHS Fong, PhD, professor emeritus of pharmacognosy at the University of Illinois at Chicago, the Hong Kong Department of Health is developing standards of quality for herbs sold in Hong Kong (the "Hong Kong Chinese Materia Medica Standards" [HKCMMS]). Dr. Fong, who is a member of the HKCMMS International Advisory Board, said that the project plans to test samples of NAG from British Columbia, Ontario, Wisconsin, and China to develop the quality standard for this herb. After this analysis is concluded, the assay data may provide evidence as to whether there are chemical differences among them. However, this research could take up to a year, or longer, and will probably start later this year. Dr. Fong said that when this research is completed, researchers should have a better idea of the intrinsic chemical differences in the NAG grown in different geographical regions (H. Fong, oral communication to C. Cavaliere, December 7, 2006).

According to Weege, ginseng grown in the United States and Canada is still dissimilar for other reasons, particularly since pesticide residue standards are different for the two countries. The fungicide MAESTRO 80 DF (captan), for instance, received an emergency registration for use on ginseng in Ontario in July of 2006 from Canada's Pesticide Management Regulatory Agency, for use in combating *Phytophthora* root rot due to the year's extremely wet weather.[9] However, in a ginseng crop report released by the Ontario Ministry of Agriculture, Food and Rural Affairs, growers intending to export their ginseng were warned that there is no acceptable residue limit for captan on ginseng in the United States.[9]

"As an industry, we've experienced some tough times of recent, some due to our own errors, others due to unfair trade practices, but there's now a very dedicated group of hardcore growers who want to right the ship," said Weege (oral communication to C. Cavaliere, October 30, 2006). "Our objective is to restore profitability to the industry and respect in the marketplace. We want to assure demanding consumers that when they see our trademark, they know they're acquiring the best quality ginseng and that its origin is Wisconsin." HG

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Supreme Court Denies Appeal of Ephedra Ban

By Courtney Cavaliere

The US Supreme Court announced on May 14, 2007, that it would not consider an appeal by the company Nutraceutical Corporation, which sought to challenge a 2006 ruling by a federal appeals court upholding the US Food and Drug Administration's (FDA) ban of the controversial herb ephedra (*Ephedra sinica*, Ephedraceae) from dietary supplements.[1,2] According to Nutraceutical's legal counsel, Jonathan Emord, the court's refusal to hear the appeal ends the present litigation but does not foreclose the company from bringing new challenges to the ban either by petitioning for rulemaking or by raising new issues in the enforcement context (e-mail, June 4, 2007).

Nutraceutical Corporation and its wholly owned subsidiary Solaray® first brought a legal challenge against the FDA in May 2004, a month after an FDA regulation went into effect banning ephedrine alkaloids at every dose level from dietary supplements, but allowing ephedrine alkaloids to be sold in foods in common form (ephedra teas), in traditional Asian medicines, and in over-the-counter drugs.[3,4] Prior to the regulation, extracts of ephedra were common ingredients of dietary supplements marketed for performance enhancement or weight-loss, including a supplement produced and marketed by Solaray that contained a low dose (less than 10 mg per day) of ephedrine alkaloids.[4] The ban was largely inspired by the high profile deaths of several sports figures who used ephedra, albeit direct causality between the deaths and the use of ephedra was alleged but never established.

Nutraceutical challenged the FDA's use of a risk/benefit comparison extrapolated from the agency's new drug approval standard in determining an "unreasonable risk" of ephedra, as well as the regulation's ban on low-dose ephedra products. The US District Court for the District of Utah ruled in favor of Nutraceutical on both issues in April 2005. A 3-judge panel of the 10th Circuit US Court of Appeals, however, overturned those rulings in August 2006, siding with the FDA. Nutraceutical then approached the US Supreme Court, which recently denied its request for an appeal.

"I was not surprised by the [Supreme Court] decision because so few petitions for certiorari* are granted each term," said Emord. "The Court's denial of a petition for certiorari is not a decision on the merits of the appeal. It does not affirm or deny the 10th Circuit decision, albeit the effect of not hearing the case is to leave in place the 10th Circuit decision."

"Many people do not realize that we also pursued a case on remand before the US District Court in Utah while the appeal to the Supreme Court was pending," he continued. "In that case, the judge ruled that FDA's 'risk-benefit comparison' standard applied only to ephedrine alkaloids. The FDA did not appeal that decision and neither did we. While the decision upheld the regulation, it severely truncated it, effectively achieving a major Nutraceutical Corp. goal. Nutraceutical's primary objective in filing suit was to prevent FDA from reinterpreting the Dietary Supplement Health and Education Act (DSHEA) adulteration provision in a way that imposed a proof of benefit requirement on all dietary ingredients and removed the well-established dose dependency principle from adulteration law. The second decision by the district court holding the FDA Final Rule to apply only to ephedrine alkaloids and not to dietary supplements in general achieved that primary objective."

> **"As the law now stands, FDA may be loathe to extend the risk-benefit comparison to other supplements."**

In the 2006 article, "Appeals Court Sides with FDA in Ephedra Ban Case," published

* Certiorari—a Latin word meaning "to be informed of, or to be made certain in regard to"—is a term used by the US Supreme Court in the context of appeals. A party submits a "petition for certiorari" to the Supreme Court to ask for its review of a decision from a lower court.

in *HerbalGram* issue 72, Emord stated that the FDA's ban of ephedra, if upheld by the federal courts system, could have negative ramifications for the entire supplement industry.[4] He argued that the FDA banned ephedra at every dose level—even down to a molecule—without any scientific evidence of harm below 20 mg per daily dose. FDA failed to establish a precise dose at which toxicity arises. Moreover, Nutraceutical criticized the FDA's unprecedented use of a drug risk-benefit comparison, by which the FDA held that any evidence of even an infinitesimal risk at some dietary supplement dose level constituted proof of adulteration at all dose levels (unless the industry could prove based on generally accepted scientific evidence a substantial health benefit to FDA's satisfaction). Such measures and procedures were not authorized under DSHEA.

The Natural Products Association (NPA, formerly the National Nutritional Foods Association), a trade association representing the natural foods industry, filed an amicus brief with the Supreme Court on April 6 in support of Nutraceutical's appeal.[5] In its brief, the association argued that the failure to overturn the federal court ruling could cause the distinction between dietary supplements and drugs to "effectively evaporate" and force dietary supplement producers to conduct the same rigorous clinical tests required of the pharmaceutical industry. In a press release, NPA's Executive Director and CEO David Seckman stated, "We're not arguing with the decision, we're arguing that FDA used the wrong legal route to get there. And unless the court gets this right, there could be huge consequences for consumers, retailers, and manufacturers of dietary supplements."[5]

According to Emord, although the 10th Circuit Court upheld the FDA's reinterpretation of the dietary supplement adulteration provision and the US Supreme Court denied Nutraceutical's appeal, the recent ruling of the Utah district court has truncated the scope and effect of the FDA's Final Rule by declaring that rule only applies to ephedrine alkaloids and not to dietary supplements in general. "As the law now stands, FDA may be loathe to extend the risk-benefit comparison to other supplements," explained Emord. "If it makes that move, it would face a legal challenge based in part on that second Utah district court decision. Without FDA undertaking a new rulemaking, the Utah District Court decision stands in the way of an immediate application of the risk-benefit comparison to another dietary ingredient."

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FDA Creates New Agency Position for Food Safety and Defense

By Courtney Cavaliere

On May 1, 2007, the US Food and Drug Administration (FDA) announced the creation of a new agency position that will focus on food safety and food defense.[1] David Acheson, MD, formerly chief medical officer and director of the Office of Food Defense, Communication and Emergency Response of FDA's Center for Food Safety and Applied Nutrition (CFSAN), has assumed the new position of "Assistant Commissioner for Food Protection."

The creation of the new position appears to be a response to recent concerns about the quality and safety of ingredients in human and animal foods, as precipitated by the recent discovery of the intentional adulteration of wheat gluten and rice protein by Chinese manufacturers with the compound melamine (used to make plastics), as well as recent outbreaks of bacterial contamination in bagged spinach, lettuce in products sold by the food chain Taco Bell, and Peter Pan (ConAgra Foods, Inc., St. Paul, MN) peanut butter.[2]

The discovery of melamine in pet foods has been linked to the deaths of dogs and cats and led to a massive product recall of more than 150 brands of pet food. By late April, the FDA had received over 17,000 consumer complaints concerning pet food contamination, including reports of over 4,000 pet deaths.[3] According to news reports, government officials believe the melamine was added to artificially boost the appearance of the gluten's and resulting products' protein content, according to some laboratory assays, and thus sell for a higher price.[4,5,6] Melamine was also used in feed for hogs and more than 3 million chickens. FDA officials did not issue a recall for the pork or chicken since most of the product had already been processed and sold and because the potential for negative effects on humans through consumption was considered minimal.[4,5] The FDA issued an import alert on April 27, 2007, for all vegetable protein products from China for animal or human food use, which allows districts to detain these products without physical examination.[3]

"The protection of America's food supply and therefore the safety of Americans eating food of domestic or international origin is of utmost importance to me as a physician and to the mission of this agency," said FDA Commissioner Andrew C. von Eschenbach, MD, in an FDA press release.[1] "We've seen a rapid transformation of the food safety system due to advances in production technology, rapid methods of distribution, and the globalization of food sources. Dr. Acheson's wealth of experience and knowledge of the science behind food protection will help the agency keep pace with this transformation in order to ensure that the safety and nutritional value of our food supply is second to none."

In his new position at the FDA, Dr. Acheson will coordinate food safety measures and assignments with individual FDA product centers and the Office of Regulatory Affairs, and he will serve as the commissioner's direct liaison to various US departments and agencies on food safety and food defense related inter-agency initiatives. One of his first projects will be the development of an agency-wide strategy for food safety and defense, which will take into account historical changes related to global food safety and address current challenges, needs, and opportunities for food safety and defense.

Some members of Congress have criticized the FDA's new food safety office, dubbing the position "food safety czar" and arguing that this action by the FDA is insufficient in light of current threats to public health.[2,4] Senator Dick Durbin (D-IL) has argued that the FDA's food safety system is "broken down" and needs more dramatic changes. Rep. Rosa DeLauro (D-CT) and Sen. Durbin introduced a bill (The Safe Food Act, S. 654 and H.R. 1148) to strengthen food safety measures on May 1, 2007.[7] The Senate unanimously approved the legislation on May 2, 2007, as an amendment to a broad bill regarding the FDA (The FDA Reauthorization Bill, S. 1082).[8] The proposed legislation would allow the FDA to create an early-warning system for problems with human or pet food and broaden the agency's power over food labeling, importation, and record-keeping. Sen. Durbin has also argued that there is a need for greater FDA resources, including additional funding and inspectors. The FDA currently has enough inspectors to examine just 1% of imported foods.[2]

What is becoming increasingly clear is that *all* types of imported food ingredients will undergo increased scrutiny at US ports, and, in some cases, perhaps even at their points of manufacture and processing in foreign countries. This will inevitably lead to more inspections of ingredients used in dietary supplements (e.g., vitamins, amino acids, fine chemicals like inositol, niacin, CoenzymeQ10, etc.), as well as botanical raw materials and extracts, causing expected increased delays in the importation process and attendant higher prices.

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Functional Food Products and Phytotherapy for Chronic Diseases

By Undurti Das, MD, FAMS, and Mansouri Beiouk, MD, PhD

Each year since 2004, the Functional Foods Center at D&A Inc. has held an international conference under the series "Functional Foods for the Prevention and Treatment of Chronic Diseases." The third annual conference was held October 14-15, 2006, in Dallas, TX, and was entitled, "Functional Foods and Phytotherapy for the Prevention and Treatment of Chronic Diseases." The conference was organized by the Functional Foods Center at Richardson, TX, along with informational sponsors UNESCO Chair-Life Sciences International Education Center, Center for Obesity Research and Program Evaluation (CORPE), Texas A&M University, and the American Botanical Council (media sponsor). The 2005 conference dealt with "Functional Food Products for the Prevention and Treatment of Chronic Diseases."[1] The proceedings of that conference were published in the form of a book, titled *Functional Foods for Chronic Diseases*.[2]

The main goal of the 2006 conference was to bring together experts in phytotherapy, medicine, biology, and the food industry to discuss the contribution of functional food products based on natural ingredients in the prevention and treatment of chronic diseases. Main conference topics included the following:

1. The role of nutrition in the occurrence of chronic diseases such as cardiovascular diseases, cancer, diabetes, and obesity.
2. How functional food products are developed and used for the prevention and treatment of chronic diseases.
3. A description and various listings of non-traditional plants (i.e., plants that are not well known), which may be used as a source of functional food products.

The conference opened with an introductory speech by Danik M. Martirosyan, PhD, lead scientist at the Functional Foods Center and conference chairman. This speech underlined the many problems that remain unsolved in this area, despite various advances and achievements of modern approaches and the potential of pharmacotherapy. It is well established that chronic diseases such as cardiovascular diseases, diabetes, and cancer are global epidemics in developed countries, and there is an unprecedented level of interest in this area of research. The healthcare cost of cardiovascular diseases alone in the United States amounts to over $300 billion every year.[3] Dr. Martirosyan stressed that natural methods of therapy, especially phytotherapy and food therapy for chronic diseases, have fewer adverse side effects, are physiologically more effective, and more economically viable.

The conference scientific program consisted of invited lecturers in the form of oral and poster presentations. Representatives from over 50 organizations, including researchers, medical doctors, food specialists, and graduate students from around the world attended the 2006 conference. Numerous lecturers spoke about the prevention and treatment of different types of diseases. The following contributions have been selected as some of the best presentations of the 2006 conference:

1. *Quality Control and Prediction of Nutritional and Pharmacological Value in Herbal Dietary Supplements* by Moris L. Silber, MD, PhD, research professor, Natural Resource Sciences, Washington State University (Pullman, WA, USA)
2. *Prevention and Treatment of Cardiovascular Diseases by Nutritional Factors* by Undurti Das, MD, president and CEO, UND Life Sciences
3. *Diet and Nutrition for the Prevention of Diabetes* by Sharon Rabb, PhD, ND, naturopath and clinical nutritionist (Dallas, TX, USA)
4. *Nutrition and Cancer* by Parviz Ghadirian, PhD, director of the Epidemiology Research Unit, University of Montreal Health Center, Montreal, Canada
5. *Amaranth as a Good Source of Functional Food Products* by Danik M. Martirosyan, PhD, lead scientist at the Functional Foods Center at D&A Inc. (Dallas, TX, USA)
6. *Antidiabetic Potential of Nepalese Herbal and Food Plants* by Megh Bhandari, PhD, Laboratory of Food Biochemistry, Hokkaido University (Sapporo, Japan)
7. *Grapefruit and Carrot: Colon Cancer and Type II Diabetes Prevention* by Jairam Vanamala, PhD, research scientist, Center for Obesity Research and Program Evaluation Associate Member, Intercollegiate Faculty of Nutrition, Department of Nutrition and Food Science, and Peter S. Murano, PhD, director of Center for Obesity Research and Program Evaluation, Texas A&M University (College Station, TX, USA)

The full-length articles of these presentations will be published in 2007 in the form of a conference proceedings book, titled *Functional Foods and Phytotherapy for Chronic Diseases.* The following are some of the highlights from the conference:

In his presentation, "Anti-diabetic Potential of Nepalese Herbal and Food Plants," Dr. Bhandari noted that diabetes is becoming the third largest "killer" of humans, along with cancer and cardiovascular diseases, due to its high prevalence, morbidity, and mortality. Diabetes mellitus, in particular, is currently one of the most costly and burdensome chronic diseases and is a condition that is increasing in epidemic proportions throughout the world. Diabetes affects about 5% of the global population and management of diabetes without any side effects is still a challenge to the medical system. To treat diabetes, a number of synthetic drugs are in use, but unfortunately, the risk of severe hypoglycemia associated with the use of these medications can complicate other associated conditions such as congestive heart failure, renal insufficiency, or liver disease, or the medications may not be tolerated because of gastrointestinal adverse effects. Therefore, alternative therapeutic agents, such as alpha-glucosidase inhibitors, have been investigated. Food and herbs have a vital role in traditional Eastern medicine. The work of Dr. Bhandari revealed the anti-diabetic potential of the following plants: *Allium hypsistum*, Liliaceae; *Cassia fistula*, Fabaceae; *Cedrus deodara*, Pinaceae; *Centella asiatica*, Araliaceae; *Justicia adhatoda*, Acanthaceae; *Myrica esculenta,* Myricaceae; *Neopicrorhiza scrophulariiflora*, Plantaginaceae; *Nymphaea stellata*, Nymphaeaceae; *Rubia manjith*, Rubiaceae; *Sapindus mukorossi*, Sapindaceae; *Valeriana villosa*, Valerianaceae; and *Woodfordia fruticosa,* Lythraceae. Dr. Bhandari concluded that these herbs and food plants have significant anti-diabetic activity and can be considered potential sources of anti-diabetic agents. These findings serve as an opportunity towards finding active compounds for developing efficient functional foods for diabetes.

Dr. Ghadirian, who has been a consultant for the World Health Organization since 1969, provided information about the relationship between food and cancer in his presentation, "Nutrition and Cancer: Causes and Prevention." He emphasized that cancer is the second leading cause of death in North America, after cardiovascular disease. In North America, 1 out of 3 people will develop cancer during his or her lifetime and 1 in 4 individuals will die from it. Scientific investigations during the past few decades have shown that around 90% of cancers are due to environmental risk factors such as nutrition, occupation, lifestyle, etc., with nutrition playing a major etiologic role. In general, about 35% of cancer incidence and mortality are due to food habits and nutrition. Dr. Ghadirian provided several hypotheses regarding why and how diet and nutrition may cause cancer. They include carcinogens (cancer-causing agents) in natural foodstuffs, carcinogens produced by cooking, carcinogens produced by microorganisms in stored foods, formation of carcinogens in the body, and irregular consumptions of calories, fat, protein, carbohydrates, fiber, vitamins, and minerals. Dr. Ghadirian noted that a high intake of some nutrients, such as protein, caloric carbohydrates, and fat, might play a causative role in the etiology of some cancers. The protective effects of vitamin C and A on the occurrence of different cancers have been suggested. Among minerals, an inverse relationship between cancer and selenium, iron, iodine, and molybdenum has been reported from various parts of the world. Excess amounts of zinc, copper, and cadmium in food and water may also play an important role in the etiology of some cancers. Dr. Ghadirian and his co-investigators found that total dietary fiber might reduce the risk of colorectal cancer by 50%. Of all the types of fibers, it was observed that vegetable fiber was the most important type, reducing the risk by 43%. Although fruit fiber showed 26% risk reduction, it was not statistically significant, whereas cereal fiber seemed to exert no protective role in the etiology of this disease. Another promising hypothesis made by Dr. Ghadirian is that relatively high calcium intakes may reduce the risk of colorectal cancer, perhaps by forming complexes with secondary bile acids in the intestine. In other words, high dietary calcium intake can decrease the risk of colon cancer by about 31%. Dr. Ghadirian made some key recommendations for the prevention of cancer: (1) avoid obesity, (2) reduce total fat intake and increase calcium consumption, (3) eat more high-fiber foods such as fruits, vegetables, and whole grain cereals, (4) include foods rich in vitamins E, A, and C in the daily diet, and (5) be moderate in the consumption of salt-cured, smoked, and nitrite-cured foods and avoid alcoholic beverages.

Dr. Martirosyan presented a lecture entitled "Amaranth as a Good Source of Functional Food Products." Since 1991, a group of investigators under Dr. Martirosyan's supervision has been working on vegetable and grain amaranth (*Amaranthus* spp., Amaranthaceae) commercialization by formulating and producing new amaranth products, especially for the prevention and treatment of cardiovascular diseases such as coronary heart disease and hypertension. Dr. Martirosyan provided brief background information about the colorful history of amaranth. Various amaranth species were grown by the Aztecs and Incas 5,000 to 6,000 years ago in South America, prior to the disruption of the South American civilization by the Spanish conquistadors. Humans utilize both the grain amaranth and leaves. He reported that amaranth grain is high in fiber, calcium, and iron content and has a relatively high concentration of magnesium, phosphorus, copper, and manganese. Furthermore, the leaves of amaranth are a good source of nutrition, with high concentrations of vitamins A, B6, and C, as well as riboflavin. Moreover, grain amaranth has higher amounts of protein than many other cereal grains and has significantly higher lysine content. It has been proven that amaranth leaves are an excellent source of protein, with its maximal accumulation in the blossoming phase. Dr. Martirosyan and his colleagues have extensively examined the protein contents in leaves of various species of amaranth. The following species of amaranth were studied: *Amaranthus lividus* (k-57), *A. speciosa* (Mexico), *A. speciosa* (k-24), *A. cruentus* (k-25), and *A. cruentus* (k-218). The data obtained suggested that *A. lividus* (k-57) leaves contain the highest amount of protein amongst the investigated species. A correlation between the protein amount and pigment concentration in amaranth leaf was reported. Furthermore, the greater the amount of pigments in the leaves, the greater the amount of protein in the amaranth leaf. Dr. Martirosyan reported that amaranth has a very high concentration of magnesium, which is especially beneficial for people with hypertension, and it has significantly high amounts of manganese, which is important for the growth of healthy bones. Finally, samples of nutritional products with amaranth, formulated at the Functional Foods Center in Dallas, TX, with excellent nutritional values, were provided.

Scientists from countries including Armenia, Egypt, France, Greece, Japan, Lithuania, Nepal, Russia, Ukraine, United States, and Uzbekistan submitted their proposals to the conference organizers, and those manuscripts will also be included in the conference proceedings book, *Functional Foods and Phytotherapy for Chronic Diseases*.

The latest conference was historic for several reasons. It was open to the public, and people with various interests visited the conference to ask questions directly to medical doctors and functional food creators. It was also decided to formulate a new International Scientific Advisory Panel, which is now functioning under the supervision of Dr. Das and Dr. Martirosyan. Members of the International Scientific Advisory Panel are scientists who have sufficient professional qualifications, including training and experience, to be capable of providing expert comments as to the impact on functional food products and non-traditional plants. The panel will assist in identifying relevant practices and research and provide guidance on the scientific integrity of all functional food products.

A new scientific advisory board has been chosen for the next conference, which will be held on October 13-14, 2007, in Dallas, TX. The 2007 international conference will be entitled "Functional Foods for Cardiovascular Diseases, Diabetes, and Aging." More information regarding future conferences on this subject and new books can be accessed at www.functionalfoodscenter.net, or via e-mail at ffc_usa@sbcglobal.net, or by calling toll-free: (866) 464-6955 (from the United States) or (469) 441-8272 (for international calls).

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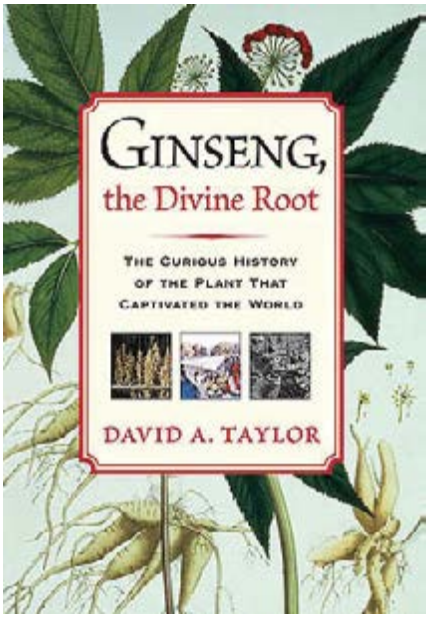
Ginseng, the Divine Root: The Curious History of the Plant that Captivated the World by David A. Taylor. Chapel Hill, NC: Algonquin Books; 2006. Hardcover; 308 pages. ISBN-13: 978-1-56512-401-1. $23.95.



David Taylor has written a fascinating account of ginseng, the "King of Herbs," tracing the American variety (*Panax quinquefolius*, Araliaceae) from the deciduous forests of the Southeast, extending into upstate New York, the streets of Hong Kong, and remote corners of China where it is so highly revered. His book also explores some of the history and folklore regarding the Asian ginseng species (*P. ginseng*), although not in nearly as much detail. Asian ginseng's history in China and Korea is at least as fascinating as the American and has far more political intrigue. Someday, someone will write a definitive history of Asian ginseng and I will be the first to buy it!

Ginseng is indeed a curious herb that has been an important component of Chinese medicine for thousands of years, but the purpose of this book is not to expound on its medicinal uses. This is not a textbook designed to teach anyone specifically how or why to use ginseng. Taylor touches on some of the controversy regarding its medical applications, from Western skepticism to well-designed clinical trials underway in Asia and elsewhere, but he is careful not to present himself as a proponent or critic. He does explain some of the difficulties in quantifying the effects of ginseng due to the uncertain nature of the sources that were being tested. As is the case with many of the reported negative effects of medicinal herbs, even a well-designed and properly executed study is only as good as the material being tested, and clearly this is the issue with many of the ginseng trials. The authenticity of the various ginseng products is confounded by a distantly related plant called Siberian ginseng (*Eleutherococcus senticosus*, Araliaceae), as well as a completely unrelated South American plant called "Brazilian ginseng" (i.e., *Pfaffia paniculata*, Amaranthaceae).

Taylor's primary goal is to expose some of the many interesting characters who, for one reason or another, have become almost obsessed with the plant from cultural, agricultural, historical, medical, and social perspectives. In this sense he succeeds very well, demonstrating an excellent storytelling ability that captures the personalities of "ginseng people" ranging from game wardens, international marketers, farmers, university researchers, and doctors to rural "sang diggers" from the deepest hollows of Appalachia. One of the most interesting aspects of the book is the fact that most of these widely separated individuals are remarkably well known to each other despite an amazing disparity in education, culture, and social status. Ginseng cuts a wide swath in the nature of people it attracts and Taylor communicates their eccentric nature effectively. This theme is the major strength of the book. Ginseng people are a pretty odd lot and Taylor's book begins with his account of an annual Catskill Mountain Ginseng Festival held each Columbus Day weekend in the Hudson River Village of Catskill, NY. The people who attend this festival are as intriguing as the complex botany of the plant itself.

Readers will be surprised to learn the American history of ginseng and the role it played in the years before there was a United States of America. The early ginseng trade from the United States and Canada was so important it was recorded by George Washington and Daniel Boone. Taylor recounts one of the many Daniel Boone stories in which the famous woodsman is said to have lost a shipment of tons of ginseng when the barge carrying it was swamped while crossing the Ohio River. In all likelihood the "tonnes" of ginseng he referenced were actually barrels (sometimes called "tonnes") and not "tons" defined as 2,000 pounds. As abundant as ginseng once was in the forests, it is not likely that 12 to 15 tons were gathered for that single barge trip. This episode was the only minor flaw I detected in the book. Taylor has done an excellent job in researching his data and lists his sources at the end of the book as well as including an excellent index.

In summary, I would highly recommend this book to anyone who enjoys a good, non-fiction story based on interesting characters. It is not necessary to be knowledgeable about herbs or herbal medicine at all to enjoy this book. It is aimed at a much broader audience and it succeeds quite well. David Taylor is an excellent writer whose style reminds me of Michael Pollan, author of *The Botany of Desire* and *The Omnivore's Dilemma*. If you are looking for a textbook on how ginseng is used or an herbal reference book with medical citations, this is not it, but you should read this book anyway for the background information.

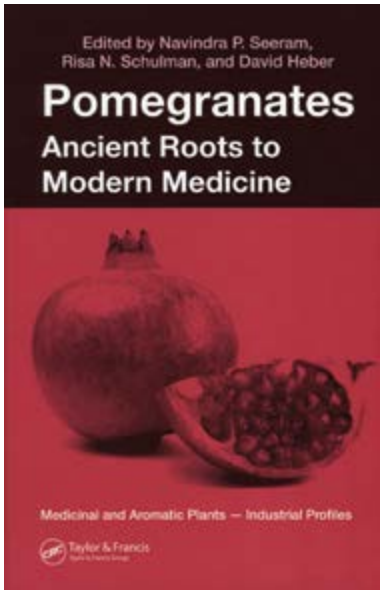
—Robert L. Beyfuss, Cornell University Cooperative Extension, American Ginseng Specialist, Acra, NY

Pomegranates: Ancient Roots to Modern Medicine by Navindra Seeram, Risa N. Schulman, and David Heber. Boca Raton, FL: CRC Press; 2006. Hardback; 244 pages. ISBN 0-8493-9812-6. $129.95.

Until recently, very little information was available regarding the chemistry, potential health benefits, and agricultural handling of pomegranates (*Punica granatum*, Lythraceae), although anecdotal reports of its cultivation and benefit have been propagated for millennia. The recent growing appreciation of the pomegranate as a functional fruit with many beneficial medicinal qualities has stimulated a significant level of research and public interest. Drs. Seeram, Schulman, and Heber have surveyed and presented the whole spectrum of interest surrounding the pomegranate in one precise and concise volume. This guide discusses in a wonderfully comprehensive and understandable manner the complex biochemistry of pomegranates and their varied health effects such as cardiovascular health, chemoprevention, and antimicrobial activity. The impact of the uniquely and naturally occurring estrogen (estrone) in pomegranate is also discussed, as well as

the effects of optimizing plant growth and improving post-harvest biology and quality.

The editors approached this book with the aim of exploring and comprehensively reporting on the biochemistry, health effects, and cultivation of this antioxidant polyphenol-rich fruit. Collectively, this handbook is a must-have reference for anyone interested in any aspect of pomegranate.



More than 100 different pomegranate phytochemicals are identified; however, the pomegranate is complex with thousands of phytochemicals including anthocyanins, ellagitannins and gallotannins, ellagic acid derivatives, catechins and procyanidins, flavonols, organic acids, fatty acids and triglycerides, sterols and terpenoids, and alkaloids, as well as many other compounds—all of which may be biologically active. The editors expertly and clearly describe, define, and lucidly illustrate how the different chemical groups are frequently composed of the same building blocks but in different combinations and numbers. For example, gallic acid occurs naturally but can dimerize to form ellagic acid. Ellagic acid can dimerize to form gallagic acid. Ellagic acid can combine with glucose to form the unique compounds punicalagin and punicalin. It is noteworthy that punicalagin is responsible for 50% of the antioxidant activity of pomegranate. The different combinations and polymers of the aforementioned form the large, diverse group of compounds known as polyphenols. The editors have enlisted numerous international experts to assist in clearly deciphering and conveying the complexity and beauty of pomegranate polyphenols in intellectually digestible fragments.

The antioxidant properties and bioavailability are also described to show that all parts of the pomegranate plant can exhibit antioxidant activity including the bark, stem, arils, whole fruit juice, and leaves. Dr. Micheal Aviram demonstrates that all pomegranate tree parts contain polyphenols and have relatively high antioxidant activity. In vitro laboratory, in vivo, and human studies are summarized to show that pomegranate polyphenols and their metabolites, including the urolithins, are in fact absorbed and can reach tissues to be protective against elements of many disease processes such as cardiovascular disease and cancer. Moreover, this work establishes the bioavailability and metabolism of pomegranate polyphenols in human studies, supporting a potentially potent protective role in human disease.

The health effects are clearly described with evidence supporting protection against myriad processes in cardiovascular disease and stroke, or cerebrovascular disease. In fact, dozens of mechanistic targets are identified from LDL to paraoxonase to macrophages to specific genes, etc. Collectively, this work extends the observations of Nobel Prize winner Dr. Louis Ignarro that pomegranate juice increases nitric oxide production in the endothelial cells of the vascular system, conferring protective effects against cardiovascular disease (e.g., having a slight vasodilating effect, thereby producing a slight hypotensive effect). Further information is given that clearly demonstrates the anticancer potential of pomegranate juice at many tissue sites and, in fact, specific mechanisms are also explored and reported for pomegranate juice and extract.

Regarding the extraordinary effort of Drs. Seeram, Schulman and Heber, it is indeed refreshing to read about the growing body of careful and in-depth scientific research being conducted on pomegranates to evaluate and confirm the beneficial effects. Probably the most compelling cancer study is the demonstration involving men with aggressive prostate cancer. When given 8 ounces of pomegranate juice (POM Wonderful, LLC) daily after treatment by surgery or radiation, there was a prolonged delay in prostate specific antigen (PSA) doubling time by over 4-fold. Moreover, pomegranate juice reduced the rate of PSA rise by 50% over only one year.

Chapters are also included to discuss the clear antimicrobial properties of pomegranate juice against bacteria and fungus, as well as extracts of the hull, fruit, pericarp, and seeds. A particularly interesting aspect of pomegranate is the presence of the unique fatty acid punicic acid in the seed. It also has the highest known botanical concentration of estrone, one of the three principal natural steroids.

Lastly, the commercialization of pomegranate as fresh fruit, beverages, and botanical extracts is discussed regarding the economic impact of all parts of the pomegranate. Discussion of the huge potential for use of pomegranate extracts in functional foods, cosmeceuticals, nutraceuticals, and botanical dietary supplements is discussed, outlining the global importance and interest by industry, academia, government, and the public. The need for commercial standardization is beautifully illustrated by the authors with an analysis of 7 commercial pomegranate botanical extracts demonstrating marked differences in composition and suggesting spiking with synthetic components.

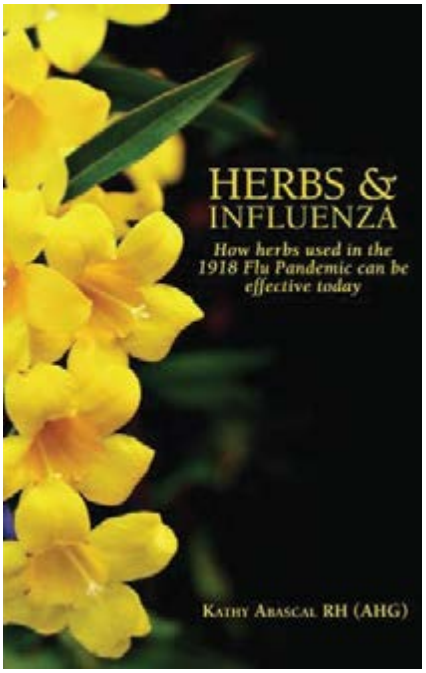
The botanical description, cultural conditions, and genetic diversity are nicely summarized and then followed by an in depth discussion of the compositional changes during maturation and ripening, maturity and quality indices, and multiple comprehensive facets of post-harvest physiology. This is particularly relevant and timely for botanicals since these influences can affect pomegranate fruit and product quality. The latter continues with the effects of temperature, humidity, chilling, scalding, pathogens, and handling systems. Preparation for market and optimal storage conditions are also presented as a well-rounded survey of pomegranate horticulture.

As popularity and research regarding pomegranate preparations continue to increase, both as "functional foods" and dietary supplements, this book will no doubt become one of the primary references on this compelling functional fruit. HG

—Keith R. Martin, PhD, MTox
Director, Nutrition Research
POM Wonderful, LLC
Los Angeles, CA

Herbs & Influenza: How herbs used in the 1918 Flu Pandemic can be effective today by Kathy Abascal. Vashon, WA: Tigana Press; 2006. Paperback, 194 pages, black and white historical photos, line drawings of main plants by author. ISBN 0-9788586-7-0. $18.00.

As the title suggests, this book addresses the potential of a modern worldwide influenza outbreak and some botanical options available for addressing such a crisis. The author is a trained herbalist and probably best known for her extensive series of journal articles on botanical medicine co-authored with Eric Yarnell, ND, published in the book *Clinical Botanical Medicine*. In the initial chapters she addresses the demonstrable lack of preparedness and likely catastrophic occurrence of what many believe is the next likely pandemic. Beginning with a discussion of influenza viruses, she distinguishes between the common seasonal outbreaks and the periodic fatal flu contagion that exceeds other acute illnesses, based on its widespread unmanageable consequences. In considering the inadequacies of vaccines for prevention and currently available conventional medical treatment for control of future outbreaks, she describes the need to evaluate herbal approaches as one vital means to maximize preparedness. In discussing the herbal means of treating an epidemic or pandemic outbreak, she examines historically empirical successes that address specific disease expressions.



In particular Ms. Abascal documents a mostly botanical approach to treatment applied to the flu pandemic that raged from 1918-1919. It is based on the American Eclectic medicine model of practice that employed an efficacious approach but emphasized using botanical remedies often prepared from fresh plants. Her discussion of the history of Eclectic medicine in America from the 19th to the early 20th century gives a valuable overview of its methodology and its problematic struggles in medical politics. She relied largely on a survey by the Eclectic-associated Lloyd Brothers Pharmacists that was mailed to doctors on January 1, 1919, requesting the names of the best and the top six remedies considered most essential for treating influenza. Also solicited were the names of the most necessary pneumonia remedies and topical applications to the chest. Finally, the physicians were asked to identify whether they followed the Eclectic practice of Specific Medication.

It is this last feature that distinguishes this book from other modern texts on botanical remedies. The Eclectic method of describing "specific indications" for each medicinal plant allowed prescribers to match the remedy that most exactly fit the presenting symptoms of each individual patient, rather than to prescribe treatment simply on the basis of a diagnostic category. In discussing the 15 major remedies employed by Eclectic physicians for the 1918 pandemic, the features or expressions that called for that particular remedy are carefully described. Ms. Abascal utilized both Eclectic materia medica texts and Eclectic journal articles published around this time to discuss each remedy in the context of influenza symptoms. Therefore, she relies on the authority of those who faced multiple clinical cases on a daily basis to evaluate the remedies deemed most appropriate for that disastrous pandemic. In reviewing these different remedies, it becomes evident that they can likewise be applied to the common flu or potential modern epidemics or pandemics as expressed in individual case presentations. To bear out this point, occasional reference is also made to treatments used in the pandemic of 1889 and the Australian epidemic of 1892. In addition, she quotes recent texts from German and American herbal authorities to augment and update information about these herbs, together with occasional modern journal references on pertinent research.

The responses to the Lloyd queries utilized in this text are from 222 Eclectic physicians published in February 1919. Not included in the book is a March 1919 summary list generated by Lloyd Brothers from answers by 1000 physicians. It provides the top 9 botanicals for influenza and pneumonia based on the survey results for the 6 most useful remedies, giving the following number of endorsements for each, respectively: *Aconitum napellus*, Ranunculaceae [788, 617]; *Gelsemium sempervirens*, Loganiaceae [772, 293]; *Bryonia alba*, Curcubitaceae [707, 723]; *Actaea racemosa*, syn: *Cimicifuga racemosa*, Ranunculaceae [384, –]; *Veratrum viride*, Liliaceae [353, 576]; *Eupatorium perfoliatum*, Asteraceae [328, –]; *Lobelia inflata*, Campanulaceae [324, 468]; *Asclepias tuberose*, Asclepiadaceae [268, 366]; *Cephalis ipecacuanha*, Rubiaceae [236, 411]; *Atropa belladonna*, Solanaceae [– , 169]; and *Sanguinaria canadensis*, Papaveraceae [– , 134]. The results from the prior month's 222 detailed responses mostly parallel this larger summary and form the core for the botanical discussions in the book.

The author notes that her book is intended for both the lay and professional reader. Due to their potential toxicity, 8 of the main 15 remedies are designated for professionals only, as are 8 of the 20 "honorable mentions." For example, top remedies for seasonal and pandemic influenza (*Eupatorium, Actaea, Asclepias*) can be safely used by the general public, while the chief sedatives (*Gelsemium, Aconitum, Veratrum*) are restricted to professional use only. For those low dosage professional remedies that present high risk with uninformed use, clinical information about toxicity and some empirical overdose treatment options are provided.

The summary list from 1000 physicians of most useful external chest applications included Libradol [618], Compound emetic powder [185], turpentine applications [110] and others that are discussed in the book. The author discusses the composition and preparation of 8 of these applications, but unfortunately provides little information about the Lloyd Brothers product Libradol that was by far the most popular topical application. Her final chapter on non-herbal remedies includes about a dozen mostly obsolete chemical preparations, along with several botanical deriva-

tives, that are less likely to be of modern general interest or utility. Though there is no summary chapter, she enhances the text with several appendices that include a summary chart of botanicals listed in descending order according to the number of responses given for each as the most useful (and among the top 6) by the 222 Eclectic respondents. Also included are a glossary of medical terms and short lists of resources for obtaining tinctures and finding trained practitioners of botanical medicine.

This book provides a unique perspective on therapeutic options in a potentially life-threatening condition that frequently challenges modern medical limitations. It emphasizes the importance of individual prescribing based on specific indications for each of the botanical remedies in the context of the Eclectic utilization of high-quality hydroalcoholic extracts as the preferred medication. One might wonder about the relative lack of attention paid to echinacea, since it is now considered a standard herbal remedy for the flu. This can be explained by the Eclectics' primary use of a hydroalcoholic extract of *Echinacea angustifolia* (Asteraceae) root to treat largely septic, i.e., bacterial, conditions. Modern research indicates extracts of *E. purpurea* root, whole plant, or aerial plant juice appear more effective in viral respiratory infections. As the author suggests, a combination of these species offers broader therapeutic effects. Clinical studies show this echinacea combination in a proprietary formula and *E. angustifolia* root with other herbs have been employed successfully for both preventing and treating colds and flu.

A few omissions are noteworthy. One is the remedy successfully utilized by native Americans and others in the Great Basin region of the West during the 1918 outbreak, the root of *Lomatium dissectum* (Apiaceae). It was probably bypassed due to its absence from the Eclectic armamentarium or possibly because of its limited availability. Also, a basic drawback is the failure to identify the medicinal plant part used to prepare a number of the professional Eclectic remedies, though standard preparations of these botanicals are typically purchased from a phytomedicinal manufacturer rather than self-extracted for clinical use. For many of the herbs the specific preparation solvents, strengths, and doses are described by citing the works of Michael Moore, an herbal authority of the American Southwest under whom the author studied; however, in discussing Moore's data in many examples, the author sometimes again fails to identify the plant part in question.

Though most of the clinical information can be extracted from still-available Eclectic medical texts, the compilation and organization of material here makes this book one that should be of interest to anyone who wants to be seriously prepared for the next seasonal, epidemic and/or pandemic outbreak of the flu that will inevitably occur. HG

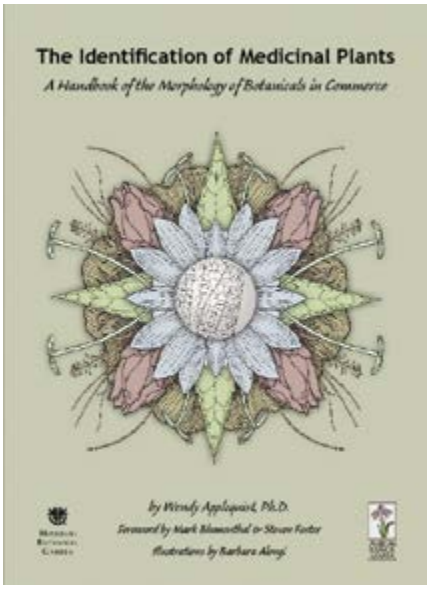
—Francis Brinker, ND
Clinical Assistant Professor
Department of Medicine
University of Arizona

The Identification of Medicinal Plants: A Handbook of the Morphology of Botanicals in Commerce by Wendy Applequist. Austin, TX: American Botanical Council; 2006. Hardback; 209 pages; black & white illustrations. ISBN-13: 978-0-9655555-1-7. $89.95 (20% discount for ABC members).

The Identification of Medicinal Plants represents a unique contribution to the modern herbal literature, continuing a long history of pharmacognostic studies with a focus on the macroscopic assessment of medicinal plants. This text was co-published by the American Botanical Council and Missouri Botanical Garden (MoBot). The macroscopic characterization of medicinal plants has always been integral to classical botanical pharmacognosy as a complementary and often stand-alone means of medicinal plant part identification. While botanical identification remains the primary form of plant identification, those in the trade of medicinal plant parts seldom have access to the whole plant and are thus unable to make such an identification.

The text is divided into three primary sections: basics of plant morphology, botanical characterizations, and appendices. Part 1 provides a brief but sufficiently detailed practical overview of the primary morphological characteristics associated with medicinal plant parts. This section is of value to all quality control personnel involved in the qualitative assessment of medicinal plants. Part 2 provides detailed macroscopic characterizations of 124 of the most common, and some uncommon, medicinal plants used in North America and Europe. Listed according to botanical nomenclature, each entry provides the standardized common name according to *Herbs of Commerce* (published by the American Herbal Products Association), along with additional common names, a brief taxonomic treatment of the plant, its morphological description, key morphological identification characteristics, organoleptic characteristics, characteristic fracture when appropriate, and specific details for the identification of potential adulterants. Each entry also contains original, beautifully rendered figures by MoBot botanical illustrator, Barbara Alongi. The appendices include the general references used, a glossary of terminology, and an extremely informative illustrative guide to leaf and flower morphology.

The use of macroscopic characterizations for the identification of plant parts was a prominent part of medicinal plant quality control in former centuries, and for many, mostly smaller herb companies, it remains so. Many herbalists believe that macroscopic assessment is one of the best evaluation techniques for determining medicinal plant quality. In relatively recent years, the trading of herbal powders has predominated in the American herbal products market. Once powdered, it is impossible to determine the identity of many medicinal plants with a high level of certainty; qualitative characteristics (e.g., size, shape, and form) are gone, color and texture are less prominent, contaminants can blend in and are unremovable, adulterants can go undetected, and the plant part's phytochemical constituents are subject to



relatively rapid degradation. In contrast, macroscopically, the identity of many plants can be accurately ascertained, many contaminants and adulterants can easily be detected and removed, and herbs in their crude macroscopic forms maintain their levels of phytochemicals, and thus their potency, longer than powders. For these reasons, maintaining herbs in as relatively whole condition as is possible will greatly increase the overall quality of medicinal raw materials. This text provides a valuable tool for those who depend on macroscopic assessment techniques and hopefully will encourage others to incorporate this simple, yet highly effective technique.

There are also minor limitations of this work that can be noted. An introductory chapter on the proper manner in which to perform a macroscopic assessment, as well as discussing some of the advantages of the technique, would have been valuable. The text would have benefited greatly from photographs, even if black and white (even though, admittedly, botanical illustrations allow for the potential emphasis of certain morphological characteristics which can be more useful than reliance solely on a photograph). Many of the entries could have benefited from either different (more specific) or additional illustrations, and more emphasis could have been given to organoleptic assessment and its value. Lastly, a few of the entries (e.g., *Adonis vernalis,* Ranunculaceae and *Fallopia japonica,* Polygonaceae) are not widely used in the North American or European herb market. Conversely, some industry staples such as cinnamon (*Cinnamomum verum,* Lauraceae), fo-ti (*Polygonum multiflorum,* Polygonaceae), and mullein (*Verbascum thapsus,* Scrophulariaceae), and new entries of economic importance, such as maca (*Lepidium meyenii,* Brassicaceae), rhodiola (*Rhodiola rosea,* Crassulaceae), and cat's claw (*Uncaria tomentosa,* Rubiaceae) are lacking. These should be considered as minor criticisms not detracting from the value or importance of this work whatsoever.

The Identification of Medicinal Plants is a must-have for anyone interested or involved in the quality assessment of medicinal plants, is especially valuable for small companies, and is uniquely suited for individual herbal practitioners who have their own herbal pharmacy and need to confirm the identity of the crude herbal materials they receive. Hopefully, this will be only the first of many such texts to focus on this important and often under-utilized quality assessment technique.

—Roy Upton
Executive Director, American Herbal Pharmacopoeia
Scotts Valley, CA

Human Impacts on Amazonia: The Role of Traditional Ecological Knowledge in Conservation and Development by Darrell Addison Posey and Michael J. Balick, editors. New York, NY: Colombia University Press; 2006. Paperback; 366 pages. ISBN 0-231-10589-4. $34.50.

This book is a labor of love and exists in many ways as a tribute to the life work and passion of the late Darrell Posey. The book presents many of the papers delivered at the First Oxford Amazon conference, which was held at Linacre College in early June 1998. The conference was organized for the University of Oxford Center for Brazilian Studies by Darrel Addison Posey, who was the director of the Traditional Resource Rights Programme, Oxford Centre for the Environment, Ethics and Society of Mansfield college. The co-editor of this book, Michael J. Balick, participated in this meeting and after Dr. Posey's untimely death in 2001, Dr. Balick agreed to become the co-editor and pull this volume together.

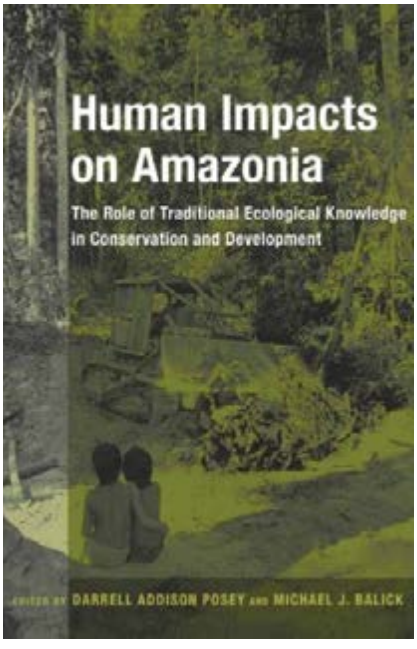
We are all fortunate this book was published. It contains 20 chapters authored by highly experienced scientists who collectively possess a great deal of expertise on human impacts in Amazonia. Many of the authors are luminaries in the area of Amazonian and tropical forest research. As an example, the first chapter is written by John Hemming and focuses on the colonial history of Amazonia and the horrific impact that period had on the native people of Amazonia. In chapter 3, the highly respected Amazonian agricultural expert Charles Clement proposes that the process of co-evolution between indigenous peoples and plants created one of the world's centers for crop domestication. There is also a discussion in chapter 4 of the 1998 fire in Roraima, an environmental disaster that might have been far less destructive if indigenous land management practices were embraced in that region.

In chapter 9 Philip Fearnside, another famous Amazonian scholar, makes the increasingly compelling case that standing forests, with all their biological diversity, are far more valuable to society than cut and burned landscapes. He outlines development strategies that focus on the benefits of standing forests, which provide environmental services and forest products.

In chapter 10 the highly respected tropical forest scholars and authors Christine Padoch and Miquel Pinedo-Vasquez provide insight on how local people in the Napo-Amazon floodplain have developed effective and sustainable commercial timber extraction.

I was especially intrigued by chapters 12 and 13 by Jan Salick and Claudio Pinheiro, which focus on collection and cultivation of two species used in the production of modern medicines in Brazil, ipecac (*Cephaelis ipecacuanha,* Rubiaceae) and jaborandi (*Pilocarpus microphyllus*, Rutaceae). These chapters focus on different aspects of managing these species. The chapter by Salick looks at the population ecology of ipecac and compares the process of collecting versus cultivating this understory neotropical herb of commerce. In the chapter by Pinheiro, the impact of the domestication and privatization of jaborandi by the pharmaceutical company Merck is analyzed. The author reveals that in this case, local people and communities did not benefit when the collection of jaborandi was converted to intensive, mechanized cultivation of the plant.

The chapter by Alcida Ramos on the "Commodification of the Indian" was also quite interesting and even more relevant



today than it was when she presented this paper in 1998. She questions the idea of indigenous knowledge as a "resource." She points out that the "link between indigenous knowledge and indigenous rights is paramount…" In this statement the reader is reminded of the life work, passion, and dedication of Dr. Posey to the fundamental human rights of indigenous people, their cultures, and their environments.

This book is a snapshot of highly experienced scientists who have lived and worked among the people, cultures, and forests of Amazonia for decades. The current and increasing focus on the global environment makes this volume of great value to anyone interested in the reality of people living in Amazonia. It will be invaluable as a teaching tool for academics, development specialists, anthropologists, environmentalists, and anyone with an interest in Amazonia.

In his co-editor note, Michael Balick speaks with great reverence, affection, and respect for the vision, dedication, accomplishments, and quest for truth that infused Darrel Posey's life. Darrel is loved and respected by people all over the world for his passion, compassion, leadership, and courage to fight on behalf of indigenous people. Dr. Balick mentions one of Darrel's mentors named Beptopoop, a Kayapo elder from the village of Gorotire, Brazil. As I write this review I am looking at a photograph of Beptopoop in my office that was given to me by another colleague who had the good fortune to know and work with this enchanted Kayapo elder. I believe Darrel would be pleased to know that this volume, birthed at his conference in 1998, is now part of the literature on Amazonia. I think Darrel would also be touched to know that one of his beloved indigenous colleagues is connected to this volume. Many thanks to Beptopoop, Darrel Posey, and Michael Balick for reconnecting the people of Amazonia with the rest of us through this book.

—Steven R. King, PhD
Napo Pharmaceuticals Inc.
South San Francisco, CA

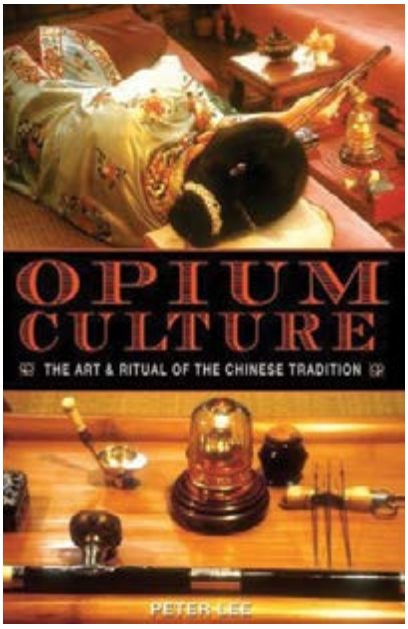
Opium Culture: The Art & Ritual of the Chinese Tradition **by Peter Lee. Rochester, VT: Inner Traditions International/Park Street Press; 2006. Paperback; 232 pages. ISBN: 1-59477-075-1. $16.95.**

This delightful book was written by the Chinese scholar Peter Lee as a historical monograph. Both Mr. Lee's grandfather and great-grandfather were opium smokers who lived beyond 90 years of age. The author points out in a note to the reader that the monograph was originally written in Chinese under the title "Da Yen: Jung Guo Ya Pien Yi yu Chiao Miao" (Opium: The Big Smoke, the Chinese Art and Craft of Opium) in 1996.

The book is presented in two sections with 16 pages of beautiful color photographs of many artifacts, tools, pipes, people, and plants. These images add an excellent depth and reality to this book, which is rich in detail and texture.

The first section, "Opium and Its Allure through Time," contains 9 chapters that focus on history, cultivation, pharmacology, psychology, addiction, withdrawal, opium poetry by Martin Matz, and a final section called "To Smoke or Not to Smoke: Reviewing the Evidence."

The second section is called "The Art and Craft of Smoking Opium," and it



New Book Profiles

The Healing Power of Celtic Plants. Angela Paine. Ropley, Winchester, UK: O Books; 2006. 285 pages, softcover, b&w illustrations. $29.95. ISBN 1-905047-62-2.

This book starts with an intriguing history of Celtic herbal medicine and medicinal plants, with multiple botanical descriptions, growing conditions, chemistry, and their practical uses. Discusses side-effects, toxicity, contraindications, and scientific evidence supporting their activity.

The Organ Pipe Cactus. David Yetman. Tucson, AZ: The University of Arizona Press; 2006. 70 pages, softcover, full-color photographs. $9.95. ISBN 0-8165-2541-2.

In this beautifully illustrated, large-format book, the author provides an in-depth and comprehensive look at the organ pipe cactus (*Stenocereus thurberi*, Cactaceae). Chapters explore the plant's ethnobotanical uses, habitat, distribution, and special conditions required for its germination, establishment, growth, and survival.

Beating the Flu: The Natural Prescription for Surviving Pandemic Influenza and Bird Flu. J.E. Williams. Charlottesville, VA: Hampton Roads Publishing Company; 2006. 193 pages, softcover, tables. $15.95. ISBN 1-57174-507-6.

Explains how to avoid the flu through a combination of good hygiene and super foods that offer quick boosts that the immune system needs to ward off the flu virus. It also offers a "natural medicine cabinet" of vitamins, herbs and minerals that reportedly work best against specific types of flu, and provides clinical evidence to support the use of the remedies.

Anadenanthera: Visionary Plant of Ancient South America. Constantino Manuel Torres and David B. Repke. Binghamton, NY: The Haworth Herbal Press; 2006. 256 pages, hardcover, tables, b&w illustrations and photographs. $59.95. ISBN 0-7890-2641-4.

This thorough book examines the ritual and cultural use of *Anadenanthera* from prehistory to the present, along with its botany, chemistry, pharmacology, anthropology, and archeology. Formal and iconographic studies of the artistic expressions in related ritual paraphernalia are presented in detail. The text is richly illustrated and reinforced with an extensive bibliography, clear displays of chemical structures, and detailed tables.

contains 3 chapters on Refining and Blending the Smoking Mixture, Chinese Opium Craft, and finally, the Art and Philosophy of Smoking Opium.

While many books have been written about opium, this volume covers many centuries from 5000 BCE to the present day. The first chapter describes Sumerian tablets excavated in Iraq that refer to opium as the "herb of joy." Opium became linked in ancient Greek mythology with Nyx, the goddess of night, with Morpheus, god of dreams, and with Thanatos, god of death, which as the author points out, nicely summarizes the primary properties of opium.

In fact, opium (produced by the opium poppy, *Papaver somniferum,* Papaveraceae) is probably the most well known and widely used traditional medicine throughout the history of medicine. Its virtues were described by Hippocrates (ca. 460–377 BCE), the father of medicine, and the Greek physician Galen (ca. 130–200 CE) for numerous ailments. It was fascinating to learn that opium was highly valued in Arabian traditional medicine, and it was the Arab culture that first introduced the use of opium to the ancient world, including the Chinese, in approximately 600 CE. The history of the British and Chinese opium wars in 1839 and 1865 is also fascinating, especially the link between the British obsession with tea from China, and some interesting parallels linking tea, China, and the United States' famous "Boston Tea Party."

The highly refined and destructive opium-derived drug heroin was first fully synthesized by a German scientist and was known as "Number 4 Heroin." The name 'heroin' was given to the drug by the pharmaceutical company Bayer, which produced and distributed the drug throughout the world. Ironically, it was initially believed that heroin was a non-addictive painkiller and an effective cure for morphine and codeine (both alkaloids derived from opium) addiction. The author does not dwell on heroin but does point out the extremely destructive effect of this highly refined drug on the health of addicts. He does, however, suggest that the spread of the epidemic of HIV/AIDS via shared needles among heroin addicts could be dramatically reduced if these opiate users were introduced to smoking opium in controlled settings. His description of the calm and relaxing opium smoking establishments in China, Southeast Asia, Europe, and the United States do sound far less destructive than the environments often associated with heroin addicts.

The author also makes an interesting case for re-exploring the use of inhaled opium extracts with some of the more toxic alkaloids removed to treat depression. His discussion of the current pharmaceuticals being marketed and used to treat depression and the potential role of opium-derived treatments is worthy of continued modern medical research.

I was also fascinated to learn that some of the artists, explorers, and great writers of the past two centuries did partake in the "Big Smoke." Among those people briefly mentioned are Sir Richard Burton, who discovered the origin of the headwaters of the Nile, Graham Greene, the famous novelist, and Pablo Picasso.

There is a tremendous amount of detail in this volume on the art and ritual of this Chinese tradition. It is carefully written and the chapters on the pharmacology and alkaloids present in *P. somniferum* are useful and well written. There is no doubt that people have used this powerful plant for medicine, health, relaxation, and at times as an escape from daily life. It is also clear that people who have been able to use opium in a positive, healthy way have to be careful, thoughtful, and in control of dosing and preparing their material. It is a powerful plant that must be respected and used with caution, even in the best of circumstances.

This book is among the best I have read on this powerful plant medicine that is so important in traditional and modern medicine. Any student, health professional, herbalist, ethnobotanist, lover of Chinese culture, or person interested in the history of medicine will want to own and read this book.

—Steven R. King, PhD
Napo Pharmaceuticals Inc.
South San Francisco, CA

Healthy Herbs: Your Everyday Guide to Medicinal Herbs and Their Use. Linda Woolven and Ted Snider. Markham, ON: Fitzhenry and Whiteside Limited; 2006. 245 pages, softcover, references, index. $17.95. ISBN 1-55041-329-5.

Covers over 100 herbs and discusses what each herb does, how herbs work for specific medical conditions, and the proper dosages, as well as information on safety and drug interactions. Contains an index cross-referencing medicinal herbs with common health issues.

Thieme Almanac 2007: Acupuncture and Chinese Medicine. Michael McCarthy and Stephen Birch (Editors-in-chief). Stuttgart, Germany: Georg Thieme Verlag; 2007. 366 pages, softcover, color photographs and illustrations, references. $59.95. ISBN 978-1-58890-425-6.

This book is a concise summation of the state of the study, teaching, practice, and development of acupuncture and Chinese medicine around the world. It provides information on many aspects of related arts and sciences as well as clinical articles, historical tidbits, research findings, an international survey of educational programs, listings of societies and organizations, and the latest laws and regulations related to the field.

Integrating Therapeutic and Complementary Nutrition. Mary J. Marian, Pamela Williams-Mullen, and Jennifer Muir Bowers. Boca Raton, FL: CRC Press; 2007. 634 pages, hardcover, tables. $80.96. ISBN 9-780849-316128.

Provides detailed information for each organ system, comparing both conventional and alternative therapies. Includes case studies, research data, and expert opinions, giving one of the most complete accounts of the field to date. Also offers specific information regarding supplements, dosage, and manufacturer quality standards.

Textbook of Integrative Mental Health Care. James Lake, MD. New York: Thieme Medical Publishers; 2007. 374 pages, hardcover, tables. $129.95. ISBN 3-13-136671-0.

Presents an integrative approach to mental health care that combines biomedical and nonconventional assessment and treatment techniques. Covers the conceptual foundations of integrative mental health care, and provides a comprehensive review of the evidence of nonconventional assessment and treatment approaches. Clearly presented algorithms and evidence tables provide step-by-step guidance for all aspects of assessment and treatment planning.

Bent Skovmand
1945–2007

Sir Bent Skovmand, PhD, the Knight of Denmark, fought for the good of humanity up until his passing due to complications from a brain tumor on February 6, 2007, in Kävlinge, Sweden.[1] He was 61 years old. Whether he was protesting against the patenting of genes or preparing for the replanting of crucial seeds at the 'doomsday vault,'[2] he was preoccupied with making the future a better place for humankind. Richard Zeyen, PhD, a professor at the University of Minnesota (U of M) Department of Plant Pathology and friend of almost 40 years, said Dr. Skovmand's devotion to humanity was easy to explain: "Simple, he was a preacher's son" (oral communication, April 18, 2007).

Skovmand was born on January 25, 1945, in Copenhagen, Denmark. He came to the U of M through a student agricultural training program in 1966. There he earned his BS, MS, and PhD degrees from the university in plant pathology.

Dr. Zeyen and Dr. Skovmand first met when Skovmand responded to Zeyen's flier requesting an assistant for a research project in the campus greenhouse. He was impressed with Skovmand's "European charm" and maturity from the beginning: "He wasn't your typical 19-year-old," Dr. Zeyen said. "He knew his goal was international agriculture," and like other leaders in the field, such as George Harrar and Norman Borlaug, he came out of what Zeyen calls "that tiny little department" in plant pathology.

After earning his doctorate, Dr. Skovmand moved to El Batan, Mexico, and for the next 20 years he worked for the International Maize and Wheat Improvement Center (CIMMYT) under Nobel Peace Prize Laureate Norman Borlaug. Dr. Skovmand participated in research attempting to make wheat more resistant to disease and eventually headed the center's Wheat Genetic Resources Program. It was then that he was noticed by Queen Margarethe II of Denmark, who in 2003 knighted him for his achievements in wheat research. However, because of his opinions on gene patenting, his position there was abruptly terminated. He told the *The New York Times* that patenting genes was "like copyrighting each and every word in Hamlet, and saying no one can use [any of them] without paying the author."[3]

"In a 10-day period, his position was terminated by CIMMYT, he was knighted by the Queen of Denmark, and he began negotiations leading to his appointment as director of the Nordic Gene Bank," said Dr. Zeyen. "It was the gene patenting that did it. That was the straw that broke the camel's back."

As director of the Nordic Gene Bank, Dr. Skovmand led the Swedish effort to collect and conserve the seeds of Norway, Sweden, Finland, Denmark, and Iceland for the international vault that has been nicknamed the 'doomsday vault.'[2] The Svalbard International Seed Vault is currently being built into the side of a mountain in the Norwegian Spitsbergen Island in the Arctic Ocean. It will be the world's largest when it opens in September 2007.[4] Reminiscent of a concrete bomb shelter, the vault will refrigerate 3 million kinds of seeds and help to repopulate certain crucial plant species in the happenstance of nuclear war, global warming, or any catastrophe that could obliterate the world's crops. For more information on the Svalbard International Seed Vault, see the sidebar on page 37.

"But he wasn't the starry-eyed 'save the world' type," said Dr. Zeyen. "He saw the world through the lens of a pragmatist. He knew if he didn't collect these things now, they'd be lost."

Despite his practical streak and scientific mind, Dr. Skovmand often sprinkled his scientific jargon with literary analogies from Shakespeare and other authors. Hamlet probably appealed to him most of all. "What can I say?" Dr. Zeyen said. "He was a Dane."

Bent Skovmand is survived by his wife Eugenia, his three daughters Kirsten, Annelise, and Astrid, and his son Francisco. The Skovmand family created a fellowship in his name for a graduate student in the Department of Plant Pathology at U of M. Donations for the Bent Skovmand Fellowship can be made online at www.umn.edu by selecting "make a gift" and typing in "Bent Skovmand Fellowship."

—Kelly E. Saxton

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Robert Garrison, Jr.
1942–2007

Robert Henry Garrison, Jr., RPh, MA, president, co-founder, and CEO of Next Pharmaceuticals (Carlsbad, CA), and an influential entrepreneur and figure within the natural products industry, passed away on March 1, 2007, at the age of 64.[1] Mr. Garrison founded multiple health-related companies, authored several books on nutrition, and was involved in the development of many popular herbal products.

"The industry has lost a true leader, a man who walked quietly but cast a big shadow on the way we embrace natural products in the United States and all over the world," said Jim LaValle, RPh, ND, founder of the LaValle Metabolic Institute (e-mail, April 9, 2007). "Bob will be missed, but if any of you knew him, his smile will never leave you!"

Mr. Garrison was born on October 16, 1942, in Chehalis, WA.[2] He earned his bachelor of science in pharmacy in 1967 from the University of Washington in Seattle, then obtained his master of arts in adult education in 1980 from San Diego State University. He also attended United States International University in San Diego from 1980 to 1982, as part of a doctoral program (J. Garrison, e-mail, March 18, 2007).

Mr. Garrison founded the company Health Media of America Inc. (San Diego, CA) in 1980 and served as its president and CEO until 1993. This company provided accredited continuing pharmacy education materials, particularly concerning nutrition and the value of herbs and other dietary supplements, to major pharmaceutical companies. Mr. Garrison then co-founded the herbal company Botalia Pharmaceuticals, Inc. (Grass Valley, CA), serving as its president from 1993 to 1996. This company, which was sold to Celestial Seasonings in 1995, developed an extensive line of standardized herbal extracts and introduced the first line of standardized herbal extracts into national drug store chains. Finally, Mr. Garrison co-founded the company Next Pharmaceuticals in 1997, which develops new patented, natural ingredients for health products in the dietary supplement, food, and beverage industries. He served as the company's president and CEO until the time of his death. Mr. Garrison also published, packaged, or co-authored 14 books in the field of nutrition during his lifetime, including *The Nutrition Desk Reference* (Keats Publishing, 1985) and *The Essential Guide to Vitamins and Minerals* (Harper Collins, 1992).

"It is difficult for me to speak from my heart with words about my wonderful husband at this time, but I believe his passion for his work was inspired by his sincere desire to help people make natural choices for wellness," explained Mr. Garrison's wife Janice Garrison. "A pioneer always ahead of his time, his legacy may be defined by his favorite quote, from the man who discovered vitamin C in 1937, Albert Szent-Gyorgi: 'Discovery consists in seeing what everybody else has seen and thinking what nobody else has thought'" (e-mail, March 18, 2007).

Mr. Garrison's friends and colleagues likewise praised his strength of character and commented on his professional contributions to the natural products industry. "Bob was driven by the passion of helping people to improve their lives," said Dr. LaValle. "Whether it was pioneering education programs for pharmacists on natural therapies, writing books, or developing innovative products that were science-based, Bob poured his heart into the project, everyday. He was instrumental in developing the standardized herb botanical marketplace by creating Botalia Herbs, and later on as he co-founded Next Pharmaceuticals, which took herbal extraction and scientific application for product development to a new level of expertise in the US market. Bob had insight in what the market needed and what people needed as individuals.

"Over the last 10 years, Bob played an instrumental role in my life," Dr. LaValle continued. "As I seemingly followed many of the similar footsteps he had trekked before, Bob was always available to humbly give his advice based on his experiences and was always a pillar of support for me. He always had a positive spin on the situation, knew how to get a good laugh out of you, and most of all, knew the right bottle of wine to get the highest antioxidant value!"

"Bob was a pioneer in the herb industry, especially on the health professional side," said Mark Blumenthal, founder and executive director of the American Botanical Council. "Being a pharmacist who studied pharmacognosy under the late, great Prof. Varro E. Tyler when Tyler was still at the University of Washington, Bob had a deep sense of trust in the healing power of medicinal plants. He was also highly devoted to proper quality control, clinical research, and professional education, and his several herb-based businesses reflected this philosophical commitment." Blumenthal added, "I too was most fortunate to have 'tested' the antioxidant activity of some really robust red wines with him over some highly memorable dinners!"

Charles Kosmont, chairman and co-founder of Next Pharmaceuticals, released the following statement in a company press release: "Bob Garrison created a dynamic company and will be sorely missed by all of us at Next Pharmaceuticals. He was one of those rare human beings who combined an entrepreneurial spirit with excellent business sense. He lived a life filled with insight, humor, kindness, and integrity."[1]

Mr. Garrison is survived by his wife Janice, four children, and six grandchildren.

—Courtney Cavaliere

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2. Robert Garrison, 64. *North County Times*. March 6, 2007.

Elizabeth Tashjian
1912–2007

Elizabeth Tashjian, nut culturist, artist, and eccentric pop icon, passed away January 28, 2007, at Gladeview nursing home in Old Saybrook, Connecticut.[1] She was 94 years old.

Tashjian was most famous for her obsession with nuts—her Nut Museum, her nut songs, and her many appearances on late-night television with media personalities such as Johnny Carson, David Letterman, Jay Leno, and Howard Stern.[2] She often performed her original song about the beauty of nuts, the Nut Anthem, and carried a 35-pound coco de mer nut (*Lodoicea maldivica,* Palmae) from the Seychelles islands in the Indian Ocean. She also spoke of creating a nut theme park on par with Disneyland, but Tashjian was no nut herself (though she has often been labeled as such)—she was an innovative artist willing to do anything necessary to spread the beauty of nuts.

Oil on canvas painting by Tashjian, titled "Nutcracker Suite," completed in 1941. ©2007 Elizabeth Tashjian, courtesy of Connecticut College

"I think her pop celebrity [status] started out as her own desire to be 'discovered,'" said Christopher B. Steiner, PhD, a professor of art history and museum studies at Connecticut College (e-mail, May 9, 2007). "No one ever really knew if she was serious or 'putting you on.' That was part of her charm."

Don Bernier, the director of her documentary titled, *In a Nutshell: A Portrait of Elizabeth Tashjian,* had a similar opinion of Tashjian: "Her humor was quite sophisticated, going well beyond the tired nut jokes that the media focused on," said Bernier (e-mail, May 15, 2007). In fact, he said that her obsession with the nut can all be traced back to a "basic, aesthetic appreciation for the nut as a physical object" and not because she was of the "two-legged variety."

"She was always striving to be 'original' and I think her passion for nuts was one way to create original works," said Dr. Steiner. "The nut was an antistatic vehicle for her to explore aesthetic and philosophical ideas about humanity, religion, and life."

Born in Manhattan in 1912, she collected and painted nuts at an early age.[1] She continued this passion at the New York School of Applied Design for Women and the National Academy of Design. Art critics tend to speak respectfully of her inventions:

> Her paintings, sculptures, and assemblages display a familiarity with modernist art techniques and history. She worked in traditional genres: landscapes, portraiture, and especially the still life, many of which featured nuts as their subject. But late in her life, her aesthetic changed dramatically. Her paintings became visceral, her images grotesque, her colors garish, and her brush stroke expressive. Her works became increasingly whimsical, sexual, and ironic.[3]

For 30 years she ran a museum devoted to her nut paintings and sculptures out of her Gothic revival mansion.[1] Her entry fee changed over time from 1 nut to $3 and a nut.

An admirer of her work, Dr. Steiner taught about her Nut Museum in his classes starting in 1997. When Tashjian slipped into a 2-week coma, Dr. Steiner saved her nut-inspired collection. He installed one exhibition of her work at Connecticut College and another at the Lyman Allyn Art Museum.

"When she regained consciousness she was relieved to learn that her art was safe," Dr. Steiner said. Currently, her house has been sold and the museum dismantled, though Tashjian's art and papers are kept in storage at Connecticut College. Dr. Steiner said he someday hopes to bring the collection back as a traveling exhibit as well as find a permanent home for the museum.

Tashjian is survived by several paintings she often referred to as her children and many admirers who saw her as much more than merely the Nut Lady.

—Kelly E. Saxton

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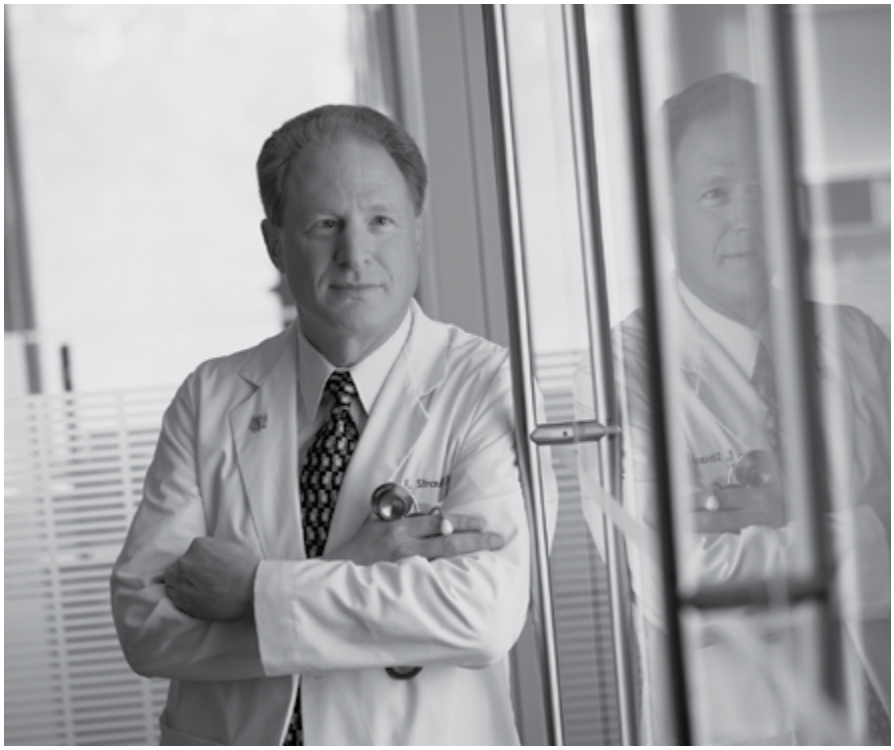

Stephen E. Straus
1946–2007

Stephen E. Straus, MD, the first director of the National Center for Complementary and Alternative Medicine (NCCAM) at the National Institutes of Health (NIH), died of brain cancer on May 14, 2007, in Potomac, MD.[1] He was 60 years old. According to many friends and colleagues, he left behind a long tradition of unwavering devotion to his patients and great advances in the treatment of herpes, shingles, hepatitis B, Lyme disease, chronic fatigue syndrome, and AIDS.

"His success stemmed from the fact that he understood that the commitment to help patients had to be constantly evolving in order to meet their needs," said Elias A. Zerhouni, MD, NIH director, in a recent press release.[1] "The NIH has lost a great leader and an outstanding scientist. Most of all, we have lost a dear friend."

Dr. Straus was born in Brooklyn, NY, in 1946. He received a bachelor's degree in life sciences from the Massachusetts Institute of Technology in 1968, an MD from Columbia University College of Physicians and Surgeons in 1972, and soon after completed a fellowship in infectious diseases at Washington University.

His research in chronic fatigue syndrome, Lyme disease, AIDS, and genital and oral herpes have paved the way for other scientists in these fields.[1] However, his most earth-shattering endeavor involved his contribution to the development of a vaccine for the virus varicella-zoster, which causes chickenpox and shingles (herpes zoster). This vaccine, targeted for people over 60, has recently been approved by the Food and Drug Administration and is estimated to prevent half a million cases of shingles in older Americans yearly.[2]

As the first director of NCCAM, Dr. Straus helped to initiate important scientific research into the efficacy of CAM modalities.[3] Research at NIH into CAM grew threefold during Straus' term of leadership, from 1999-2006. Furthermore, NCCAM supported more than 1500 projects in research, training, and career development at over 260 US institutions during Straus' directorship.

Dr. Straus also contributed to the medical community through lectures, medical textbooks, and over 400 original research articles. However, he was most commended by friends and colleagues for his strong interest in the welfare of his patients.

"He was a superb bench scientist as well as a clinician and clinical researcher," said Ruth L. Kirschstein, MD, who was appointed NCCAM acting director in his place. Dr. Kirschstein expressed that she always admired his "deep concern" for his patients and his integrity and devotion to science (e-mail, May 30, 2007).

"Dr. Straus was a superb physician-scientist who constantly sought new answers to improve the health of patients," said Anthony S. Fauci, MD, director of the National Institute of Allergy and Infectious Diseases (NIAID), in an NCCAM press release.[1] "Steve also was one of the kindest and most compassionate clinicians I have known."

Dr. Straus stepped down from his leadership role at NCCAM last November due to his illness.[3] In an article published in *HerbalGram* issue 74, several of Dr. Straus' colleagues and associates praised his influential career at NCCAM and his contributions to the study and validation of CAM modalities.

Dr. Straus is survived by his wife Barbara, his daughters Kate and Julie, his son Benjamin, his mother Dora, his sister Miriam, and his brother Marc. Many reflections on Dr. Straus and his work have been posted and may be accessed on John Weeks' *Integrator Blog*.[4]

—Kelly E. Saxton

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2007

August 16-20: International Conference and Exhibition of the Modernization of Chinese Medicine and Health Products. Wanchai, Hong Kong. The ICMCM Conference on "The Integration of Scientific Research and Development in Novel Chinese Medicines" will be held at the Hong Kong Convention and Exhibition Center. This event is organized by the Hong Kong Trade Development Council and the Modernized Chinese Medicine International Association. The conference is trade only the first two days and is thereafter open to the public. The admission is free for traders and HK$20 for the public. For more information please visit the Web site: http://icmcm.com/conference/main.htm.

August 22-24: 1st World Conference on Life Sciences and Traditional Medicines. Espoo, Finland. Held at Dipoli Congress Centre, this new series of world conferences will explore the possibilities for new therapeutic strategies and product innovations from convergence of life science and traditional medicines. It will also present leading edge research applying new scientific methods to traditional herbal medicines, and provide a forum for researchers to present ideas for new products to the industry and investors. For more information or to register visit the Web site: www.bhbiotech-conference.com.

August 31-September 3: Aromatic Medicine Seminar. Sebastopol, CA. The California School of Herbal Studies and Integrative Aromatic Botanical Venture present an Advanced Aromatic Medicine Weekend Intensive. Spanning over Labor Day weekend, this program features the teachings of Mandy Aftel, Carole Addison-Goyne, Robin Lander, Adaniel Lepe-Camacho, and Dan Kenner. The world of essential oils and "aromatherapy" are often a misunderstood aspect of herbalism. In this 3 and 1/2 day intensive, the herbalist and essential oil enthusiast will be guided to better understand the world of aromatic medicine. The goal is to deepen perception and understanding of the world of essential oils and their many applications. For more information visit the Web Site: www.aromaticmedicineseminar.com.

September 1-October 14: United Plant Savers' Intern Program. Meigs County, Southeastern Ohio**.** This program plans to accept six to eight interns to work 30 hours/week doing a variety of medicinal plant conservation and cultivation projects. Each intern will have an opportunity to work with staff teachers and Chip Carroll, Program Manager. Interns will learn general plant propagation techniques working with at-risk and endangered species, general farm upkeep and maintenance, landscape care, greenhouse work, medicinal plant identification, sustainable wild harvesting principles and practices, and medicine making. In this session interns have the unique opportunity to help in the development of Paul Strauss' Talking Forest: trail building project. For more information contact Betzy at 802-476-6467 or plantsaversmail@earthlink.net or Lynda at 707-824-0731 or Lynda@unitedplantsavers.org or visit the Web site: www.unitedplantsavers.org.

September 2-6: 55th International Congress and Annual Meeting of the Society for Medicinal Plant Research. Graz, Austria. This event will draw experts and scientists in medicinal plant research from all over the world to present their most recent research and describe scientific trends. Scientific topics include anti-inflammatory and immunomodulatory active natural products, natural products with antimicrobial activity, analysis and biopharmacy of herbal medicinal products, and medicinal plants in animal healthcare. For more information visit the Web site: www.ga2007.org.

September 5-8: Materia Medica-Linnaeus and Medicinal Products. Uppsala, Sweden. This international conference on drugs of natural origin is in honor of Carl Linnaeus. For more information visit www.lakemedelsakademin.se. English version of Web page available.

September 7-9: Breitenbush Herbal Conference. Portland, OR. Three days of workshops, demonstration, and herb walks for beginning through advanced herbalists, amidst the healing water and ancient forest of Breitenbush. This year's teachers include: Cascade Anderson Geller, Paul Bergner, Jane Bothewell, Howie Brounstein, Christopher Hobbs, Glen Nagel, Michele Palazzo, Deb Soule, Jonathan Treasure, and more. For more information call 503-236-2220 or visit http://www.trilliumbotanicals.net.

September 7-9: The 2nd International Exhibition "Tea & Coffee." Tashkent, Uzbekistan. This unique worldwide event will be held in UzExpoCentre in Central Asia. It is a three day comprehensive marketplace for tea, coffee, confectionary, and other products as well as an exclusive opportunity to meet tea and coffee specialists. For more information call (998 71) 138 57 82 or visit www.ieguzexpo.com.

September 12-13: United Natural Products Association Seminar on GMP's. Salt Lake City, UT. The United Natural Products Alliance (UNPA) presents a seminar on GMP's. An outstanding faculty of experts will provide detailed analysis of the regulation, interpretation of how the rule will be implemented, implications of pending federal legislation on food safety, how this will affect the international supply marketplace, and much more. This event will be held at the Grand America in Salt Lake City. For more information contact Lindsay Wright via phone: 801-474-2572 or e-mail: lindsay@unpa.com. To view a copy of the program, visit the Web site: www.unpa.com.

September 14-17: Sixth Annual Intensive Seminar on Botanical Medicine. Laurel and Fulton, MD. The University of Maryland School of Medicine, Center for Integrative Medicine and the Botanical Medicine Academy jointly sponsor this intensive seminar on botanical medicine. Speakers at the event will include Kathy Abascal, RH, AHG; James Duke, PhD; Sharon Montes, MD; Holly Shull; Agatha Thrash, MD; and Eric Yarnell, RH, ND. In this seminar, experienced teachers will present specific, detailed information on how they use botanicals in a variety of common clinical ailments. The seminar spans four days over a weekend, and registration will be limited to encourage substantive interaction as well as a meaningful opportunity to network with the teachers and the participants. CME credits are available. For more information call 301-854-3951, email greenfarmacygarden@yahoo.com or visit the Web site: www.herbalseminars.com.

September 16-17: The Canadian Coffee & Tea Show. Toronto, ON, Canada. A 2-day comprehensive trade show for the coffee and tea industry that attracts a loyal and expanding group of industry stakeholders. Each day begins with innovative workshops and educational sessions designed to quickly impact and improve the operator's overall business. The sessions are followed by a trade show, showcasing new products, services, and innovations. For more information contact Michael Cronin at 1-866-688-0504 ext. 114 or mcronin@fulcrum.ca or visit http://www.coffeeteashow.ca.

October 3-6: The Council for Responsible Nutrition (CRN) Annual Symposium on Dietary Supplements. Scottsdale, AZ. This conference, which is the industry's longest-running executive conference, is known to bring in top speakers covering timely issues relevant to dietary supplement industry professionals. The 2007 event will feature a well rounded program of business-oriented, scientific, regulatory, and legislative speakers and sessions combined with networking opportunities for dietary supplement leaders and managers. For more information visit the Web site: www.crnusa.org.

October 6-7: Green Festival. Washington, DC. A joint project of Co-op America and Global Exchange, the Green Festival provides a chance to connect with like-minded business visionaries, and learn from successful green businesses. It offers keynote speeches by green entrepreneurs as well as organic meals and beverages. For more information call 1-877-727-2179, e-mail exhibit@greenfestivals.org or visit the Web site: www.greenfestivals.org.

October 13: United Plant Savers (UpS) Presents "Planting the Future." Flat Rock, NC. The subject of this conference is the cultivation, preservation, and use of native medicinal plants. Seminars will include Sustainable Harvest Study of Black Cohosh; The Worst Weeds are our Best Medicine; Adaptogens: Herbs for Strength, Stamina and Stress Relief; Medicinal Plants of the S. East; and much more. For more information call 802-476-6467 or visit the Web site: http://www.unitedplantsavers.org.

October 13-14: Functional Foods Conference. Dallas, TX. The 4th International Conference is titled "Functional Food Products for Chronic Diseases: Cardiovas-

cular Diseases, Diabetes, and Aging." Main conference topics will include the role of nutrition in chronic disease occurrence, the creation of functional and medicinal products for the prevention and treatment of chronic diseases, and non-traditional plants as sources of functional and medicinal food products. For more information visit the Web site: www.functionalfoodscenter.net

October 19-21: Sacred Plant Medicine with Stephen Harrod Buhner. Charlottesville, VA. This three-day intensive course is designed for practitioners and anyone else who wishes to learn more about plant medicines. Stephen Buhner, poet, author, and herbalist, will teach with both traditional and experimental styles. The price of $450 includes meals, materials, and the cost of camping. Those who do not wish to camp can make other arrangements. For more information, call 434-295-3820 or visit the Web site: http://www.sacredplanttraditions.com.

October 21–24. Fourth International Conference on Mechanisms of Action of Nutraceuticals. Tel-Aviv, Israel. This conference, titled "The Science Behind Nutraceuticals: Medical and Dietary Opportunities," will bring together leading international researchers, clinicians, and other industry and regulatory figures to discuss the role of nutraceuticals in areas of basic medical science and their applications in nutrition, diet, and health/beauty care. This biennial conference deals with the latest developments in cellular, molecular, proteomic/genomic animal and human studies, outcomes, therapies, and prevention activities relevant to the prospect for nutraceuticals impacting a range of chronic diseases and conditions, and the consequences of aging. For more information visit the Web site: www.evetopf.org/icman4.

October 26-28: American Herbalists Guild Annual Symposium. Beyond the Basics, Beyond the Books: Clinical Botanical Medicine in Real Life. Columbia, Maryland. The AHG Annual Symposium is widely regarded as one of the preeminent conferences on botanical medicine, offering over 35 workshops by leading practitioners and researchers. AHG expects to offer continuing education credits for nurses, pharmacists, acupuncturists, and naturopathic physicians. Pre-conference intensives will be held on October 25. Phone: 203-272-6731; E-mail: ahgoffice@earthlink.net; Web site: http://www.americanherbalistsguild.com.

October 27: 35th Annual Herb Fair. Houston, TX. This no admission open-to-the-public event offers a large selection of herbs that are suitable for growing in Houston as well as advice on how to grow them. There will also be a wide variety of foods derived from plant sources, herbal books, fragrant items such as potpourri, and other herbal snacks. For more information call 713-513-7808 or visit the Web site: www.herbsociety-stu.org.

November 8-11: The 2nd Busan International Tea and Craft Fair 2007. Busan, Korea. The second International Tea and Craft Fair 2007 will be held at Busan Exhibition Center. The purpose of this event is to develop and popularize the Korean Tea culture. Participants will include 150 domestic and overseas companies, 500 tea associations, and an estimated 50,000 visitors. For more information call +82-51-740-7705 or visit the Web site: http://www.teafair.co.kr/eng.

January 7-18, 2008: Plants in Human Affairs. Hawaii's Big Island. This 4 credit 12-day intensive course will introduce students to ethnobotany and ethnopharmacology. This course is taught by renowned ethnobotanist Kathleen Harrison and ethnopharmacologist Dennis McKenna. Knowledge will be gained through field trips, classroom presentations, and guest lectures by local experts. This course will study humanity's age-old relationships with plants, drugs, and toxins. The course is sponsored by the Center for Spirituality and Healing at the University of Minnesota and is open to the public. Course fee of $2200 includes lodging, meals, and field trips. For information or to register, contact Carla Mantel at cmantel@umn.edu or (612) 624-5166.

More calendar listings at
www.HerbalGram.org

In this department of *HerbalGram*, we list resources such as publications, organizations, seminars, and networking for our readers. A listing in this section does not constitute any endorsement or approval by *HerbalGram*, ABC, or its Advisory Board.

The International Society for Ethnopharmacology (ISE) is an organization of researchers that studies, preserves, and conserves the pharmacological uses of plants, animals, insects, and other organisms of past and present cultures. ISE strives to promote ethnopharmacology as a scientific field of research. The *Journal of Ethnopharmacology*, its official journal since 1996, communicates information about the use of plants, fungi, animals, microogranisms, and minerals and their biological and pharmacological effects. Members receive a discount on the journal, possible travel grants for students and young scientists to attend their biannual congress, and other benefits. More information at www.ethnopharmacology.org.

The Global Organization of EPA and DHA Omega-3 (GOED Omega-3), a new international trade association, has launched a new Web site: www.goedomega3.com. This resource is intended to inform media, health professionals, trade marketers, and retailers about the organization, its mission, and benefits for its members. This Web site also provides downloadable monographs and links to abstracts of some of its research studies. GOED is dedicated to promoting eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) awareness through consumer education, marketing strategies, government lobby, and open communication with the public and the healthcare industry. GOED is also committed to integrity, ethical corporate behavior, public safety, and quality assurance.

The PSK Information Foundation is an organization that communicates with health professionals regarding the use of PSK, a proteoglycan found in the mushroom *Trametes versicolor,* syn. *Coriolus versicolor,* Polyporaceae. Published scientific studies and clinical trials have shown that PSK is a powerful immunomodulator capable of stimulating diverse immunological functions. PSK can restore and enhance cellular immune functions in patients with depressed immunity associated with profound immunosuppression due to radiation and/or chemotherapy or surgical stress after curative resection of cancer. Randomized controlled clinical trials and meta-analysis have shown that overall survival and disease-free survival are improved in patients treated with adjuvant immunotherapy plus PSK. PSK is also reported to support general immune health with no reported adverse side effects. More information on PSK and the PSK foundation is available at www.pskinformationfoundation.org.

The UCSC Farm & Garden is hosting an Apprenticeship in Ecological Horticulture. It is a full-time 6-month course in organic gardening and small-scale sustainable farming held at the 25-acre farm and 3-acre garden on the University of California Santa Cruz campus. The deadline for applications is October 15, 2007, and the program spans from mid-April to mid-October, 2008. This apprenticeship will use both hands-on and traditional classroom learning to communicate knowledge in soil management, composting, pest control, crop planning, irrigation, farm equipment, and direct marketing techniques. Graduates of prior apprenticeships have succeeded in commercial and market farms, as well as community gardens, and some have gone on to work on international development projects. 35-40 apprentices are selected yearly from various backgrounds. The cost is $3750 and scholarships are available. More information is available at www.ucsc.edu/casfs or via e-mail at apprenticeship@ucsc.edu.

Employment

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If you are intuitively motivated, environmentally aware, and committed to a healthy lifestyle, we would like to speak with you.

Please e-mail your resume with salary requirements to scott@blessedherbs.com.

We are located in Central Massachusetts.

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 studies, and medicinal plant reviews. 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 2 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. E-mail 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.

Other

Legitimately Accredited Online Master Herbalist & Holistic Health Practitioner Programs. ACHS.edu is where new careers begin and your dreams become a reality. Australasian College of Health Sciences provides dynamic, relevant, and current, scientific based holistic health programs & CEU's for professionals. We also offer general interest programs for those looking to nourish their body, mind and enhance their lifestyle. ACHS.edu has a fully trained admissions department to guide your education training, leading to your success and personal fulfillment. Call us today for free career training guidance 800-487-8839 or visit us online at www.achs.edu.

Get Certified with ABC's Herbal Information Course. This self-paced online course is designed to help retail employees and multi-level distributors communicate knowledgeably with customers about herbs and dietary supplements. After successfully completing the course, you'll receive an Herbal Information Specialist Certificate and a window decal announcing "Herbal Information Specialist On Staff." Renewable annually. $69.95 Bulk pricing available. www.herbtraining.com.

Interns, Get hands-on experience before you graduate! If you're a future pharmacist or dietitian, you can choose a rotation through ABC's internship program. You'll get a comprehensive introduction to phytomedicines, researching the medicinal, culinary and cosmetic uses of herbs, answering ABC members' questions, working with medicinal plants in ABC's 2.5 acres of herbal gardens, and preparing herbal salves, tinctures or meals. For more information, call Gayle at 512-926-4900 or email Gayle@herbalgram.org.

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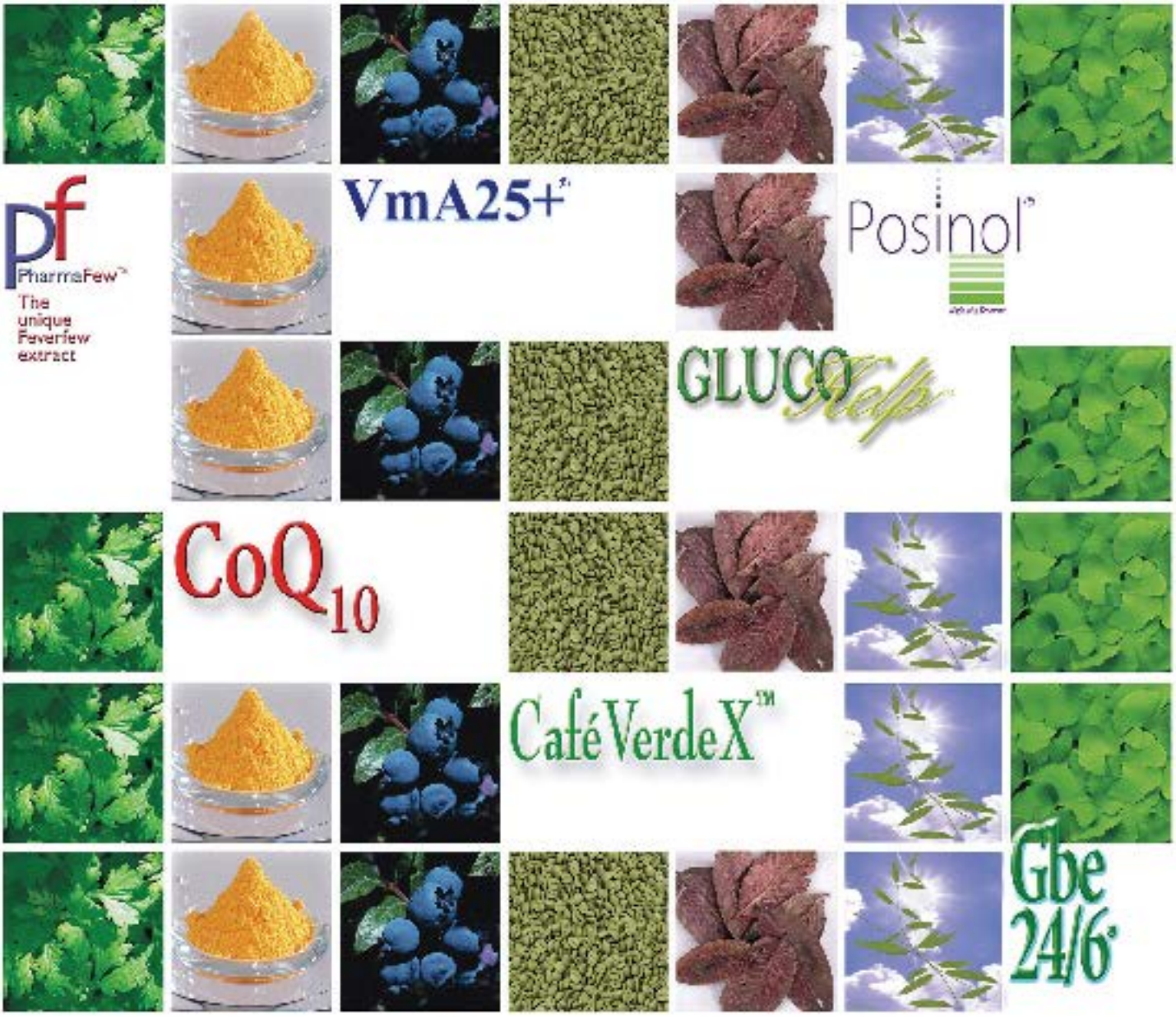

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