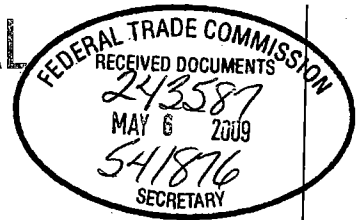


ORIGINAL



IN THE UNITED STATES OF AMERICA  
BEFORE THE FEDERAL TRADE COMMISSION  
OFFICE OF ADMINISTRATIVE LAW JUDGES

In the Matter of

DANIEL CHAPTER ONE,  
a corporation, and

JAMES FEIJO,  
individually, and as an officer of  
Daniel Chapter One

) Docket No.: 9329

) PUBLIC DOCUMENT

RESPONDENTS' STIPULATED MOTION TO INCLUDE EXHIBIT  
IN HEARING RECORD

On May 5, 2009, Complaint Counsel and Respondents' Counsel agreed – pending approval by the hearing officer – that the attached THE JOURNAL OF THE AMERICAN BOTANICAL COUNCIL, "HerbalGram," No. 81 (Feb-Apr 2009) constitutes the correct and complete Exhibit 1 to Exhibit R18 (Deposition Transcript of James A. Duke), which was provided to the reporter at the deposition but may not have been included in the final hearing record.

Respectfully submitted,

Dated: May 6, 2009

Dated: May 6, 2009

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Complaint Counsel

Counsel for Respondents

1  
2 **[PROPOSED] ORDER**

3 The parties having agreed that Exhibit 1 to Exhibit R18 consists of THE JOURNAL OF THE  
4 AMERICAN BOTANICAL COUNCIL, "HerbalGram," No. 81 (Feb-Apr 2009),  
5

6 IT IS ORDERED that

7 To the extent it is necessary to change the hearing record such that Exhibit 1 to Exhibit  
8 R18 shall consist of THE JOURNAL OF THE AMERICAN BOTANICAL COUNCIL, "HerbalGram," No.  
9 81 (Feb-Apr 2009), the hearing record shall be so changed.  
10

11 **ORDERED:**

12  
13 \_\_\_\_\_  
14 D. Michael Chappell  
15 Administrative Law Judge

16 Dated: May \_\_\_\_, 2009  
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**CERTIFICATE OF SERVICE**

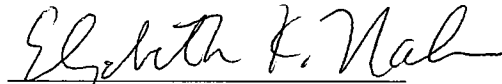
**I HEREBY CERTIFY** that on May 6, 2009, I served the attached **RESPONDENTS' STIPULATED MOTION TO INCLUDE EXHIBIT IN HEARING RECORD** upon the following:

The original and two paper copies via hand delivery to:

Donald S. Clark, Secretary  
Federal Trade Commission  
600 Pennsylvania Ave., N.W., Room H-159  
Washington, DC 20580

Two paper copies via hand delivery to:

The Honorable D. Michael Chappell  
Administrative Law Judge  
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Washington, DC 20580

  
Elizabeth K. Nach

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# HERBALGRAM

The Journal of the American Botanical Council

Number 81 | February – April 2009



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bilberry extracts to treat diabetic retinopathy, blindness, cataracts, glaucoma, and macular degeneration, with retinopathy showing the most promise.<sup>13</sup> In a meta-analysis of 30 clinical trials on bilberry extract for vision in reduced light, the 4 most recent randomized controlled trials (RCTs) had negative outcomes. However, one RCT and 7 non-randomized controlled trials reported positive effects on outcome measures relevant to night vision.<sup>17</sup> However, the use of bilberry extract for vision in reduced light has been based mainly on anecdotal experience during the Second World War and today is generally dismissed.

The primary application of anthocyanoside-enriched bilberry extracts in ophthalmology focuses on diabetic retinopathy, where bilberry can be used as an adjuvant in combination with conventional pharmaceutical therapies. Bilberry extract improves capillary fragility, reducing vessel proliferation through an anti-angiogenic mechanism related to the high content of delphinidin. This appears to be a unique property of bilberry compared to most other anthocyanoside-containing, fruit-derived extracts. In diabetic patients bilberry extract improves cicatrization (healing of a wound by producing scar tissue) of leg ulcers, combining a proteases inhibitory effect with anti-edema (anti-inflammatory) properties.

A recent uncontrolled trial found that a standardized bilberry extract (Myrtoselect®, Indena, Milan, Italy) combined with a patented French maritime pine bark extract (Pycnogenol®, Horphag Research, Geneva, Switzerland) called Mirtogenol® was able to lower ocular pressure in non-glaucoma patients with ocular hypertension.<sup>18</sup> Additional clinical trials have documented the benefits of bilberry extracts in treating venous insufficiency.<sup>13</sup> The concentrated extract also has been evaluated for its possible effects in treating inflamed oral and pharyngeal membranes<sup>12</sup> as well as on painful menstruation.<sup>19</sup>

## FUTURE OUTLOOK

Bilberry is currently commercially harvested in several countries including the Russian Federation, Bulgaria, Romania, Sweden, Poland, Ukraine, Finland, Bosnia and Herzegovina, Croatia, Serbia and Montenegro, and Kosovo, among other eastern European countries.<sup>20</sup> Most bilberry (fruit and leaf) is still collected via wild harvest, much of it under organic wild certification (J. Brinckmann, e-mail to M. Blumenthal, November 21, 2008). Some attempts are being made to commercially cultivate the crop in the Northwestern United States; however, most have been unsuccessful thus far.<sup>21</sup> Large-scale efforts to grow bilberry are considered risky and are not recommended; small-scale agricultural trials are appropriate depending on the site.<sup>21</sup>

Owing to the relatively high commercial value of bilberry extracts, intentional adulteration has been detected, not only with anthocyanosides obtained from other plant sources, but even with synthetic dyes, e.g., amaranth dye, a synthetic dye used in foods (not related to what is often called “grain amaranth” [*Amaranthus* spp., Amaranthaceae], the increasingly popular food cultivated and marketed for its relatively high protein content.) Analytical methods have been developed to determine such adulteration for use by responsible manufacturers.<sup>22</sup>

—Gayle Engels

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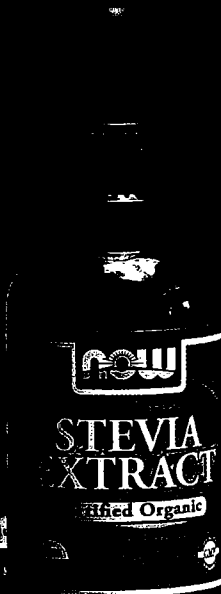
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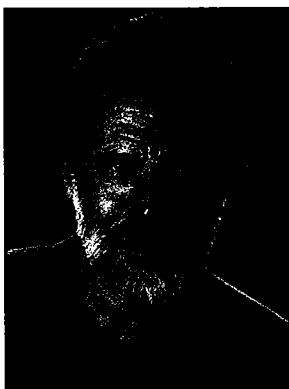
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# dear reader



In recent years much has been written and said about the effects of climate change and global warming. Much of this discussion has been characterized by controversy, criticism, and denial. Despite the length and breadth of articles on this vitally significant subject, little has been written about the effects of climate change on the future sustainability of medicinal and aromatic plants. In our cover story, ABC's Courtney Cavaliere covers many geographic regions and consults numerous experts to present possibly the most cogent assessment of this situation to date.

On the clinical research front, there has been controversy in the past decade about the pros and cons of evidence-based medicine (EBM). While not wanting to get into the polemics of this issue (there's simply not space), it is worth noting that numerous systematic reviews and meta-analyses of randomized controlled clinical trials (RCTs) continue to support the safety and clinical benefits of select herbs and phytomedicines.

In our Research Review section, we present two summaries of recent meta-analyses supporting clinical uses of two perennial favorites: garlic for lowering blood pressure and Asian ginseng—in this case, Korean red ginseng—for treating erectile dysfunction. Unfortunately, there was not enough space to include our review of the latest meta-analysis of RCTs on St. John's wort for treating symptoms associated with mild-to-moderate depression. (An HerbClip covering this trial is accessible on the ABC Web site, [www.herbalgram.org](http://www.herbalgram.org).) According to all 3 reviews, the bulk of the RCTs support the judicious use of preparations made from these herbs for the respective indications.

The November publication of the Ginkgo Evaluation of Memory trial in the *Journal of the American Medical Association* received predictably widespread media coverage. In this trial on over 3000 subjects (median age about 79 yrs), most of whom were cognitively intact, the administration of 240 mg per day of the world's leading ginkgo extract (EGb 761®, W. Schwabe, Karlsruhe, Germany) did not prevent the onset of dementia or Alzheimer's dementia after 6 years of use. Unfortunately, but predictably, much of the media overlooked the fact that *no* conventional pharmaceutical drug has shown efficacy in preventing these conditions, and that there *are* clinically documented benefits for using ginkgo extract, e.g., *treating* (not preventing) dementia (as well as treating peripheral arterial occlusive disease). In addition, the media did not report that controlled trials have shown that ginkgo extract has been as effective, and safer, as pharmaceutical drugs for such treatment.

This issue of *HerbalGram* also addresses big news on the regulatory front. In late December, the US Food and Drug Administration sent "no objection" letters regarding the GRAS (generally recognized as safe) affirmations of two proprietary stevia extracts produced by Cargill and Whole Earth Sweetener Co., respectively (the latter being a joint venture between Pepsi and Merisant, maker of Equal® brand aspartame). The result will be widespread availability of these, and eventually other, stevia-derived extracts as sweeteners in numerous consumer products. As discussed in the "Dear Reader" column of our previous issue, the safety of many sweeteners made from the South American stevia plant is impressive, and it was high time for the FDA to help millions of consumers gain further access to this safe, low-cost, natural, non-caloric sweetener by approving its use as a food additive. Stevia can become one of the best tools in the so-called war against obesity and its associated complications such as diabetes and related health problems.

*Mark Blumenthal*

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Number 81 • February – April 2009

## features

32

### Medicinal Trees of the US Virgin Islands and Neighboring Islands

By Robert W. Nicholls, PhD

The US Virgin Islands are home to many useful trees, some of which are currently being affected by environmental degradation and a loss of local knowledge of traditional use. This pictorial essay describes 10 trees of the Virgin Islands that have been identified as having traditional medicinal uses. The author recounts some of the decoctions, poultices, and other medicinal treatments derived from the trees and used by inhabitants of the Virgin Islands and neighboring islands. Numerous photographs, meanwhile, illustrate these beautiful natural resources of the islands.

### 44 The Effects of Climate Change on Medicinal and Aromatic Plants

By Courtney Cavaliere

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### 58 Comparison of Herbal Product Use in the Two Largest Border Communities between the US and Mexico

By Armando González-Stuart, PhD, and José O. Rivera, PharmD

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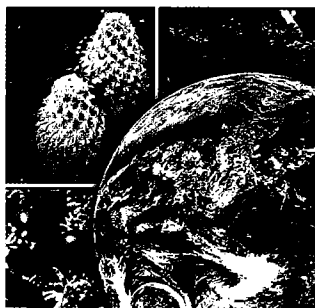
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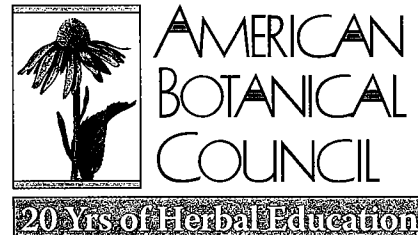
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## American Botanical Council Reaches 20th Birthday

On November 1, 2008, the American Botanical Council (ABC) observed its 20th anniversary. The independent nonprofit research and education organization was established in 1988 by Founder and Executive Director Mark Blumenthal, along with noted ethnobotanist James A. Duke, PhD, and renowned pharmacognosist Norman R. Farnsworth, PhD.



Dr. Duke is retired from a 30-year career at the United States Department of Agriculture, and Dr. Farnsworth is still research professor of pharmacognosy and senior university scholar at the College of Pharmacy at the University of Illinois at Chicago.

According to Dr. Duke, "Respect for herbal medicine has grown geometrically, thanks in large part to ABC and its peer-reviewed journal *HerbalGram*. Twenty years of ABC have markedly improved public perception of some of the world's best medicines—herbal medicines."

Prof. Farnsworth said, "ABC may be *the* primary force promoting a reasonable and responsible perspective on the emerging science on herbs and medicinal plants. There is no way to adequately measure the significant contribution ABC has made to the health of American consumers."

"ABC was initially created as a vehicle to take *HerbalGram*, then a newsletter, to another level of publication—a full-color magazine-journal format," noted ABC's Blumenthal.

Since those early days, ABC has been at the forefront of herbal educational publications and projects. Some of these include the publication of four volumes of "Classic Botanical Reprints"; the

Botanical Booklet Series on individual herbs by botanist Steven Foster (with contributions from Alicia Goldberg and Roy Upton); routine publication of HerbClips, the twice-monthly summaries and critical reviews of recently published scientific and clinical literature; and hosting of the "Pharmacy from the Rainforest" ethnobotany ecotours to the Peruvian Amazon and Andes (with additional trips to Belize, Costa Rica, Kenya, and South Africa), which are continuing education accredited for pharmacists and other health professionals.

Additional projects have included the Ginseng Evaluation Program, the first-of-its-kind large-scale laboratory testing of commercial herbal products for proper identity; ABC's Media Education Program; ABC's Safety Assessment Program, providing safety evaluations of popular herbs for inclusion on commercial herb product labels; ABC's Herbal Information Course for retailers; and ABC's recent acquisition of HerbMedPro, one of the most powerful Internet-based databases on herbal research.

ABC has also published seminal reference books for health professionals and researchers that are often cited and considered highly reliable. These are the extensive, award-winning *The Complete German Commission E Monographs: Therapeutic Guide to Herbal Medicines* (Integrative Medicine Communications, 1998), *Herbal Medicines: Expanded Commission E Monographs* (Integrative Medicine Communications, 2000), *The ABC Clinical Guide to Herbs* (ABC, 2003), and ABC's contribution to enhanced quality control in the herb industry, *The Identification of Medicinal Plants: A Handbook of the Morphology of Botanicals in Commerce* (ABC, 2006; in cooperation with the Missouri Botanical Garden).

"We believe that ABC has reached many of its goals," said Blumenthal. "The use of herbs and botanical products for self-care and in alternative and conventional healthcare has increased tremendously in the past 20 years. We are grateful for the opportunity to have contributed to this growing public recognition and acceptance of herbs as part of everyone's birthright, part of our collective planetary heritage."

"At the same time," he added, "there is much more work to be done. There are many scientific and clinical studies that continue to underscore the traditional uses and health benefits of hundreds of herbs. And modern research and technology are finding new, previously unrecognized health benefits for many traditional herbal medicines."

Blumenthal is optimistic about the future of herbs and the future of ABC. "With the growth of public acceptance and use of herbs and other natural plant-based preparations, ABC will have a busy agenda and many more challenges for many years to come." HG

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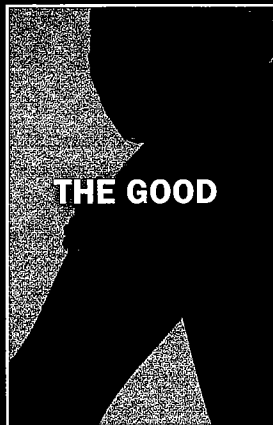
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† Belcaro et al., (2008) Redox Report, 13(6): 271-276.

† Cisar et al., (2008) Phytother Res, 22(8): 1087-1092.

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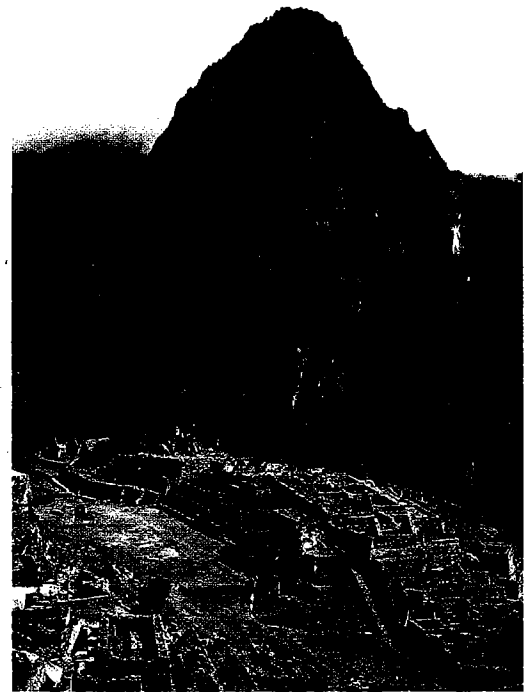
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# Date set for ABC's 2009 Peruvian Amazonia and Andes Botanical Medicine Trip

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By Steven Foster

Each year since 1994, the American Botanical Council (ABC) and the Amazon Center for Education and Environmental Research (ACEER) have co-sponsored ethnobotanical ecotours to the Peruvian Amazon and Andes, introducing hundreds of travelers to the medicinal plants and varied cultures of Peru. Now it's your turn. From October 1–10, 2009, join noted herbalists and authors Rosemary Gladstar, Mindy Green, and Steven Foster for an unforgettable Peruvian adventure. We begin in the southern Peru rainforest, near the Bolivian border—Inkaterra Reserva Amazonica, a 17,000-hectare (42,000 acre) private ecological research reserve adjacent to the lush Tambopata National Reserve. This remote, yet easily accessible venue on the Madre de Dios River, a large tributary of the Amazon, is where famed Harvard biologist E.O. Wilson conducted seminal research on ant ecology. Our “home” in Amazonia, Inkaterra Lodge, located on the banks of the Madre de Dios, is about a 45-minute boat trip from the southern Peruvian city of Puerto Maldonado. One might describe Inkaterra Lodge as a cross between a scout camp and a 4-star luxury hotel. Thirty private cabanas, modeled on traditional Amazon housing, feature low-impact electricity, kerosene lanterns, and hot showers. Any preconceived anxieties of “camping” in the Amazon rainforest are quickly dissipated after a complimentary pisco sour—the national drink of Peru—then slipping between crisp cotton sheets for a good night's rest. We will explore local markets, visit the Inkaterra Canopy Walkway (a series of 7 suspended walkways 100 feet above the forest floor, providing an unparalleled opportunity to view and study plants, birds, and primates in the forest canopy), hike to the oxbow Sandoval Lake with a chance to see the endangered Amazon giant otter, and explore medicinal plants at the Jardín de Plantas Medicinales with traditional Amazonian Shaman Antonio Montero Pisco. After 4 nights in Amazonia, we take a short 30-minute flight to the Andean city of Cusco, possibly the longest-inhabited city in the Western Hemisphere and the heart of the Inca Empire. From Cusco we head to the Urubamba Valley on the way to Machu Picchu. The must-see extraordinary ruins of plazas, palaces, and temples are nestled at 8,000 feet, surrounded by a wide diversity of flora and fauna. More than 1000 species of orchids are found within the Machu Picchu Sanctuary, as well as a wide variety of ferns, begonias, palms, and bromeliads. After several unforgettable days in the Sacred Valley at Aguas Calientes, we take the train back to Ollantaytambo to explore the traditional healing practice of the Andes, led by our guide and a *curandero* from the Sacred Valley. The Andes segment concludes with a day in Cusco, then back to the capital city Lima for the return home. The approximate cost is \$3,309 plus airfare to Lima. For more information and a complete itinerary, contact: Mary Ann Robinson, ACEER program coordinator: MRobinson@WCUFoundation.org. HG



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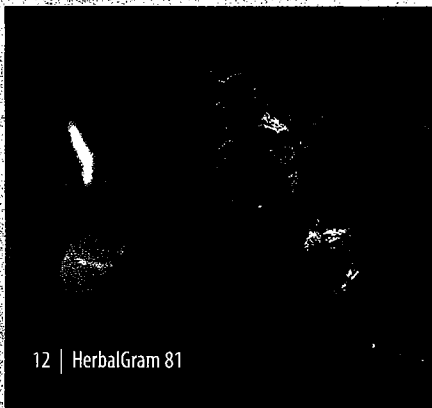
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## Employee Profile: Tamarind Reaves



Reaves

Tamarind Reaves, whose first name is derived from a beautiful tropical tree, is a welcome recent addition to the ABC staff. Tamarind is ABC's receptionist. Here at ABC, we could let our phones default to a voicemail system, like so many other nonprofits and businesses have done for over a decade. Not here. During our normal business hours we want a real, live person to answer calls from ABC's members—researchers, educators, healthcare providers, journalists, industry members—and many other members of the public who call ABC each day. Tamarind performs this function beautifully, with a genuinely friendly and inviting personality.

She further provides many other critically important services for ABC. While Tamarind spends most of her time answering the phone, fielding ABC member questions and problems, helping callers with information, and routing calls to other ABC staff members, she also spends her day opening incoming mail and distributing it to various ABC staff members, greeting visitors, processing membership benefits, mailing out membership pack-

ets to new and renewing ABC members, updating member contact information into ABC's databases, and maintaining ABC's extensive Web calendar of professional education and industry events around the world.

Tamarind also assists in the copy-editing of ABC's HerbClips, and she copies and scans articles from incoming magazines and scientific journals for HerbClip and ABC's literature database, among even more administrative duties. One of the "fun" aspects of her job is that she gets to digitally scan recently published cartoons for use in some of my forthcoming presentations!

Tamarind comes to ABC with a varied background. She has worked at a biotech company, a private investigation business, and a nonprofit organization. As a college student studying English, she assisted disabled students by taking notes for students in classes, helping them prepare for tests and exams, and assisting them in various extracurricular activities.

She notes the synchronicity of her profile's being published in this issue: "I am thrilled that ABC is publishing the employee profile on me in the same issue of *HerbalGram* that contains the article on trees of the Virgin Islands. I was born in St. Thomas, USVI, and that is where my mom fell in love with the tamarind trees and fruit." HG

—Mark Blumenthal

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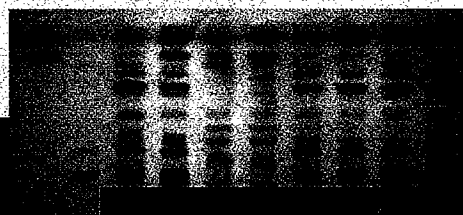
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## Noted Herbal Author/Photographer Steven Foster Elected Chair of ABC Board of Trustees

### Drs. Roberta Lee and Bernadette Marriott Named New Board Members

The Board of Trustees of the American Botanical Council (ABC) has elected Steven Foster as its new chair. Foster, a member of the ABC Board for 10 years, is the author of 15 herb-related books and hundreds of magazine articles, and he is widely known for his stunning botanical photography. The Board made its selection at a recent onsite meeting at the ABC headquarters in Austin, Texas. Foster succeeds former chair Peggy Brevoort, who is remaining on the ABC Board.

“Steven Foster has made many significant contributions to ABC, since the time of its founding 20 years ago,” said ABC Founder and Executive Director Mark Blumenthal. In addition to acting as the associate editor of ABC’s flagship publication *HerbalGram* for two decades, his articles and photography have helped to make it one of the leading publications on herbs in North America, and beyond. In addition, Steven was the editor of ABC’s Classic Botanical Reprint series in its early years, as well as the author of more than a dozen titles in ABC’s Botanical series, which consisted of in-depth profiles on many of the most popular herbs in the North American market. (An extensive profile on Foster was published in *HerbalGram* #80.)

“It’s an honor to serve as the chair of the ABC Board of Trustees, especially given the high level of experience and diverse organizational, academic, and business expertise, represented by the Board’s members,” said Foster. “This is an exciting time for ABC, with the launch of our new Web site and recent

staff additions of energetic and talented people who can enhance service to our most important constituency—the ABC membership. These changing and challenging times require a renewed focus in optimizing the success of herbs in contributing to healthcare, and bringing that message to the public, media, academia, and the greater herbal community.”

The ABC Board also selected Roberta A. Lee, MD, and Bernadette M.



Steven Foster

Marriott, PhD, to serve as new Board members. Both have extensive experience with herbs and dietary supplements.

Dr. Lee is medical director for the Continuum Center for Health and Healing at the Beth Israel Medical Center in New York City. She was among the first 3 fellows at the University of Arizona Medical School’s Program in Integrative Medicine under the direction of the famous author and integrative medicine expert, Andrew Weil, MD (who is also a member of the ABC Advisory Board). Dr. Lee has been interviewed in print and on the Internet and has appeared on the *Today* show, Fox news, CBS, and CNN.

In addition to her clinical experience, Dr. Lee has also been involved with ethnobotanical field work, particularly in the South Pacific islands of Micronesia with noted ethnobotanist Michael J. Balick, PhD, of the New York Botanical Garden (also a member of the ABC Board of Trustees). Drs. Lee and Balick have collaborated on numerous ethnobotanically-oriented articles for peer-reviewed journals (e.g., *Alternative Therapies* and *Explore!*). Dr. Lee is currently developing



Dr. Roberta Lee

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new strategies for stress management that incorporate a unique blend of mind/body exercises, lifestyle changes, and botanical supplements. Her book, *The SuperStress Solution*, will be published by Random House in the fall of 2009.

"It's truly a privilege to join the ABC Board of Trustees," said Dr. Lee. "I am looking forward to contributing to ABC's mission of expanding awareness of botanical medicines. There are so many new scientific studies being released about botanical medicines, suggesting that plants can continue to serve as a great pharmaceutical reservoir for unanticipated diseases of the future and to provide new remedies for complex medical syndromes."

A nutritional biochemist and psychologist, Dr. Marriott was the first director of the Office of Dietary Supplements (ODS) at the National Institutes of Health, mandated under the Dietary Supplement Health and Education Act of 1994. As the first director of ODS, Dr. Marriott was responsible for surveying and collecting information on all US federal government-funded research on dietary supplements (vitamins, minerals, amino acids, herbs, and related substances), as well as coordinating and stimulating future research in this area. Prior to her work at the ODS, Dr. Marriott

was deputy director of the Food and Nutrition Board at the Institute of Medicine, where she contributed to the initial development of the Dietary Reference Intakes for Americans.

Dr. Marriott is currently a principal scientist with Abt Associates Inc. in Durham, North Carolina, where she focuses on domestic health, developing an area of expertise for the company in nutrition, diet, and chronic disease. She serves on the boards of scientific advisors for several universities and is also an adjunct professor at the University of North



Dr. Bernadette Marriott

Carolina at Chapel Hill Department of Nutrition. Dr. Marriott has published numerous articles in journals like the *American Journal of Clinical Nutrition* and *Advances in Experimental Medicine and Biology*, as well as written chapters in books like *Examining the Science Behind Nutraceuticals* (Springer, 2001) and *Dietary Supplements of Plant Origin: A Nutrition and Health Approach* (Taylor and Francis, 2003). "I am very honored and enthusiastic about the opportunity to work with Mark Blumenthal and the Board members," said Dr. Marriott. "The American Botanical Council has been an important educational leader in the United States for the last two decades and was instrumental in first awakening American scientists to the wealth of herbal research in other parts of the world. I look forward to the chance to support the excellent activities of ABC as a member of the Board." HG

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## AHPA Issues New Trade Recommendation on the Definition of “Extract” and Guidance on Heavy Metal and Microbiological Limits

The American Herbal Products Association (AHPA) issued a new trade recommendation regarding the definition of “extract” in October 2008, as well as guidance on establishing heavy metal and microbiological limits for herbal products.<sup>1</sup>

“These measures were developed at the committee level and represent the community’s commitment to self-regulation and the association’s dedication to providing industry with tools to meet current good manufacturing practices and conduct responsible commerce in herbal products,” said AHPA President Michael McGuffin, in an AHPA press release.<sup>1</sup> “We are proud to support industry with this good work.”

According to the new trade recommendation, use of the word “extract” in the labeling of herbal ingredients should not be used to describe dehydrated plant materials that have not undergone additional processing (beyond size reduction). AHPA explained that an extract is the result of some processing of a raw agricultural commodity, such as maceration, distillation, or steeping.

This new recommendation, like all AHPA trade recommendations, is considered an amendment to AHPA’s Code of Ethics and Business Conduct. All AHPA members are required to conform to the organization’s Code in order to maintain their membership in good standing.

In addition to the new trade recommendation, AHPA has adopted an interim guidance with quantitative limits of certain heavy metals that may be present in herbal supplements. AHPA has recommended the following limits for botanical-containing finished products consumed at a total daily amount of 5 grams or less: 10 µg per day of inorganic arsenic, 4.1 µg per day of cadmium, 10 µg per day of lead, and 2 µg per day of methylmercury. If the highest labeled dose of a supplement is over 5 grams, heavy metal limits should be established at appropriate levels under current good manufacturing practices (cGMPs), according to AHPA.

AHPA further adopted as guidance a recommendation that manufacturers and marketers of non-liquid dietary supplements establish specifications under cGMPs for microbiological limits of certain substances, such as yeasts and molds, salmonella, *Escherichia coli*, and others. AHPA has provided a few suggested limits for these substances, although the organization has also stipulated some limitations and conditions that manufacturers can apply when referring to the guidance.

More information about the trade recommendation and guidance, as well as AHPA’s Code of Ethics and Business Conduct, is available from AHPA’s Web site. HG

—Courtney Cavaliere

### Reference

1. AHPA adopts new trade recommendation; guidance on heavy metal, microbiological limits [press release]. Silver Spring, MD: American Herbal Products Association; October 24, 2008.



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### CRN Appoints Duffy MacKay, ND, to Scientific Staff

The Council for Responsible Nutrition (CRN), a leading trade association for the dietary supplement industry, announced the addition of a new member to its team of scientists in September 2008.<sup>1</sup> Douglas (Duffy) MacKay, ND, now serves as a new vice president of regulatory and scientific affairs for CRN.

"We are extremely excited to welcome Dr. MacKay to our staff," said CRN President and CEO Steve Mister, according to a CRN press release.<sup>1</sup> "As a licensed naturopathic doctor, he adds an impressive combination of theoretical and practical expertise to our scientific team."

Prior to joining CRN, Dr. MacKay served for 4 years as the vice president of clinical research at Nordic Naturals, a respected producer of fish oil-based dietary supplements. In that position, he was responsible for product formulation, coordinating clinical trial research, serving as a technical/medical advisor, and managing the company's Adverse Event Reporting (AER) system, among other duties. Other previous work experiences include serving as senior technical advisor for Thorne Research (a manufacturer of dietary supplements for health professionals) and senior editor of the journal



Dr. Duffy MacKay

*Alternative Medicine Review*. He also co-owned and practiced naturopathic medicine at the Makai Naturopathic Center in New Hampshire for 7 years. He has a bachelor's degree in marine sciences from the University of California at Santa Cruz and a degree in naturopathic medicine from the National College of Naturopathic Medicine in Portland, Oregon.

"My career path thus far has included facilitating research, formulating products, writing [Dietary Supplement Health and Education Act] compliant marketing material, and working with manufacturers," said Dr. MacKay (e-mail, September 29, 2008). "All of this was done at the same time I was working directly with patients and getting a first-hand perspective on how they are impacted by the dietary supplement industry. I have observed the whole spectrum of the industry on consumers. I have seen supplements dramatically improve the health and lives of hundreds, but also have observed consumers fall prey to false and misleading advertising claims."

He continued: "As a naturopathic doctor, I felt a duty to take my next career step and to attempt to influence the future of health as we know it. My role at CRN will allow me to indirectly support my many colleagues that practice integrative medicine, as well as the millions of Americans that take dietary supplements. In addition, my first hand experience within supplement companies and in patient care will bring a new perspective and energy to CRN."

Dr. MacKay is to serve as CRN's resident expert on botanicals. He will assist other key CRN staff members in interpreting and contributing to the science surrounding dietary supplements and nutrition, as well as advising, educating, and representing CRN's members on regulatory matters that impact the industry.

"I have many goals to accomplish while at CRN," said Dr. MacKay. "I have a particular interest in the area of botanical medicine. Herbs are complex entities and our scientific understanding of how they influence human health is in its infancy stage. My goal is to continue to promote and shape guidelines that facilitate the safety and efficacy of botanical products. At the same time, I would like to be a voice of reason that helps to preserve the many time-honored and widely varied approaches to using herbal products. There is danger in over-emphasizing randomized placebo-controlled trials as the only means to establishing efficacy. Herbs are far too complex to solely rely on the reductionist models and thinking of conventional medicine to validate efficacy."

He added that he would also like to help researchers establish more validated risk biomarkers. Dr. MacKay explained that the availability of additional risk biomarkers would eliminate the need to continue some research studies until a disease endpoint has been reached. For instance, if a study were to show that a product increases bone density, the researcher could profess that the product decreases the risk for osteoporosis. It would eliminate the need to continue the clinical trial until osteoporosis sets in. According to Dr. MacKay, this would significantly reduce research costs and could help to quickly expand understanding of natural products on human health.

"Medicine is clearly moving toward an integrated model that includes dietary supplements as a key tool to staying healthy," said Dr. MacKay. "Change is happening—the research and science supporting natural products is prolific, [complementary and alternative medicine] is being taught at most conventional medical schools, and the public is demanding more options. As a licensed naturopathic doctor with my unique and various experiences, I felt a duty to get involved on a deeper level. I was thrilled that CRN acknowledged my training and experience by extending me a job offer." HG

—Courtney Cavaliere

#### Reference

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### New Naturex Foundation Assisting Local Communities in Morocco and Peru

The botanical extraction company Naturex, based in Avignon, France, announced the opening of its new corporate foundation in September 2008.<sup>1</sup> The Naturex Foundation, created in March 2008, will support projects in countries from which Naturex derives its plant materials.<sup>2</sup>

“Our corporate foundation is a long-term engagement and an extension of our long-standing commitment to responsible corporate citizenship and sustainable development,” said Jacques Dikan-sky, president and CEO of Naturex and president of the Naturex Foundation, according to a Naturex press release.<sup>1</sup> “Although Naturex has already been involved in several sustainable initiatives since its creation, we upgrade to an upper level with the opening of our corporate foundation.”

“For Naturex, the foundation is a line in the sand,” said Chris Kilham, founder of Medicine Hunter Inc. and member of the foundation’s consulting committee (e-mail, November 3, 2008). “It shows a real and practical commitment to communities from whom it derives botanicals and demonstrates real leadership in benefit

sharing. Basically, Naturex is voluntarily upholding practices and principles outlined in the international Convention of Biological Diversity. I admire Naturex for stepping up and putting resources into this foundation.”

The foundation has already made a commitment to support 2 community projects. In partnership with the France-based charitable association AgriSud International, it will help fund a project to set up farms to facilitate social and economic advancements for disabled young persons of the Moroccan countryside. The foundation has also partnered with the nonprofit Peruvian association Kalisayas Out Reach to upgrade and improve the dental office and school within the Peruvian town of Ninacaca, as well as provide the town with an Internet center.

“Morocco and the Peruvian

**“Although Naturex has already been involved in several sustainable initiatives since its creation, we upgrade to an upper level with the opening of our corporate foundation.”**

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## Organization News

highlands are areas from which Naturex derives significant quantities of beneficial botanicals, and in which the company also has excellent community relations,” said Kilham. “Starting out funding projects in these areas makes good practical sense and honors the contribution that these areas make to the global Naturex business.”

Naturex sources several botanical extracts from Morocco, including such wild-harvested culinary and medicinal botanicals as rosemary (*Rosmarinus officinalis*, Lamiaceae), thyme (*Thymus vulgaris*, Lamiaceae), hawthorn (*Crataegus* spp., Rosaceae), and chasteberry (*Vitex agnus-castus*, Verbenaceae), and such cultivated botanicals as olive (*Olea europaea*, Oleaceae), artichoke (*Cynara scolymus*, Asteraceae), and pomegranate (*Punica granatum*, Punicaceae). “Naturex has a large extraction facility in Casablanca, on the main prolific plain of Morocco, which provides privileged access to abundant raw materials of great quality,” said Antoine Dauby, secretary of the Naturex Foundation (e-mail, October 10, 2008). “This location has strengthened Naturex’s relationship with the Berber and other people who harvest and prepare these herbs.”

The main botanical that Naturex obtains from Peru is maca (*Lepidium meyenii*, Brassicaceae). “Naturex sources maca in the central Peruvian highlands, relying on partnerships with local growers,” said Dauby. “Work conducted by Naturex over the past 10 years has helped to transform maca from an unknown herbal product to a well established herbal product in the United States and other countries. This has resulted in economic benefits to the people of the Peruvian highlands.”

According to Dauby, Naturex has allocated a total budget of 150,000 euros (approximately \$192,800 USD) to fund projects during the foundation’s first 5 years. Kilham explained, “These projects and others will go on for 5 years. Then the foundation’s activities will be formally scrutinized by government agencies. If Naturex has fulfilled its commitments by law, then the foundation will carry on.” He added, “It will definitely carry on.”

Persons who represent a project in line with the foundation’s values and intervention fields are encouraged to fill out a project submission form from the foundation’s Web site ([www.foundation.naturex.com](http://www.foundation.naturex.com)).<sup>3</sup> The foundation may choose to support submitted project proposals, pending approval by the executive board and subject to a partnership agreement.

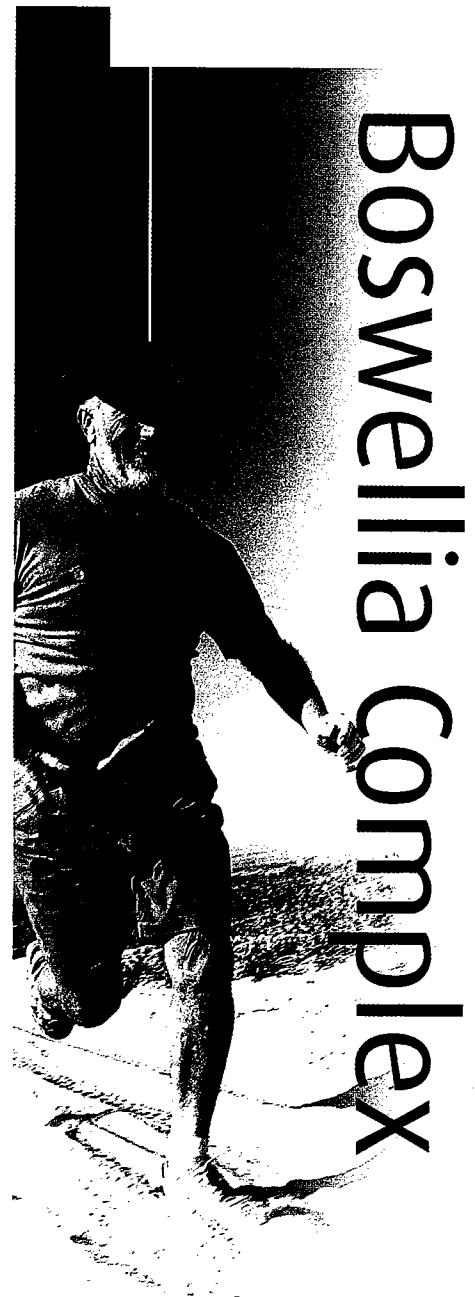
“The Naturex Foundation is a good start,” said Kilham. “It will be successful not only for its projects, but hopefully for influencing other profitable companies to do the right thing and share benefits with communities from which resources are derived. Benefit sharing is not gift-giving. It is an essential component of honest business.”

Naturex was founded in 1992 in France, and it purchased the US botanical company PureWorld Inc., in 2005. More information about Naturex is available at [www.naturex.com](http://www.naturex.com). HG

—Courtney Cavaliere

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1. Naturex opens its corporate foundation [press release]. Avignon, France: Naturex; September 16, 2008.
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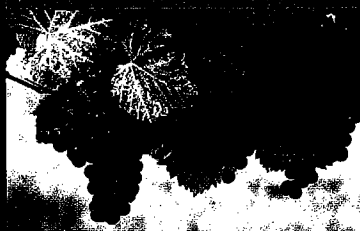
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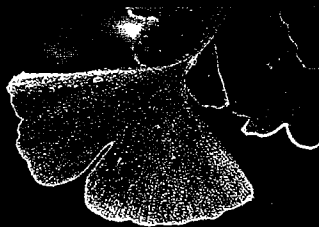
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**A Century of Herbal Innovation: Indiana Botanic Gardens Celebrates 100 Years**

By Deborah S. Ramstorf

The year was 1910. The first yellow cab rolled onto the street, a quart of milk cost only 8 cents, and the first live musical radio performance hit the airwaves. This was also the year that Joseph E. Meyer established Indiana Herb Gardens, now known as Indiana Botanic Gardens, Inc, in a small shed behind his home.

**From Tragedy to Triumph**

The seed that would later flower into the Indiana Botanic Gardens was planted early in Joseph's life. Born in Kenosha, Wisconsin, on September 5, 1878, Joseph used to accompany his father, a photographer, on excursions into the country. While his father took pictures, Joseph wandered the forests and fields, fascinated by the enormous variety of grasses, plants, trees, and flowers.

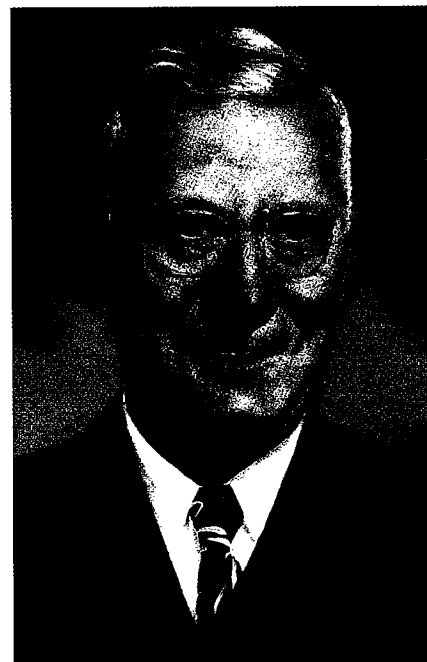
After a series of family tragedies, including the death of his father, Joseph landed in an orphanage. There he passed lonely hours reading and re-reading a single medical book, especially intrigued by the section on herbal remedies. He was surprised to learn that those plants that many people considered to be worthless weeds had been used throughout all of time for the treatment of various diseases. He soon dreamed of starting an herbal company. But it wasn't until decades later, after starting a family and spending years in the printing business, that the dream was able to come to fruition. Funding for the company was obtained through the sale of his first literary effort, *The Sealed Book*, an exposé on popular gambling schemes.

In time Joseph purchased land along the Little Calumet River in Hammond, Indiana. It was an herbalist's dream with a profusion of medicinal plants, native flowers, and virgin forests. It also appeared to have been an ancient Native American burial site, as several relics were found. This fact, coupled with Joseph's admiration of Native American natural remedies, directly influenced the company's early logos and artwork.

**The Early Herb Market**

Until the early 20<sup>th</sup> century, major drug companies (companies that would eventually evolve into some of today's large pharmaceutical companies) supplied roots, bark, flowers, or leaves of dried plants and trees, in cut or powdered forms, to be dispensed by doctors and pharmacists. After that point, many medicines from nature, once considered "official," began to be supplanted by drugs made with synthetic chemicals that could be produced under laboratory conditions and for increasingly specific uses and controlled dosages. Traditional botanical medicines, often more general in effect and taking longer to act, were steadily falling into disuse.

According to Tim Cleland, great-grandson of Joseph Meyer and current president of Indiana Botanic Gardens, from its very beginning the company carried over 400 different herbs—from alder (*Alnus serrulata*, Betulaceae) to yohimbe (*Pausinystalia johimbe*, Rubiaceae)—that were available in 25-cent boxes or sold in bulk.

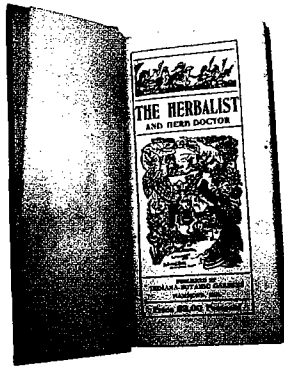


Joseph E. Meyer, Founder Indiana Botanic Gardens, 1878-1950. Image ©2009 Indiana Botanic Gardens

## World News

Originally published in 1918, *The Herbalist* is now in its tenth reprinting.  
Image ©2009 Indiana Botanic Gardens

The herbs were listed according to their therapeutic properties under various general headings: “digestants, intestines, vermifuges, ulcers, diarrhea, liver, Bright’s disease, hemorrhage, tonics,” etc. Recipes were included for making shampoos, lotions, pomades, liniments, creams, ointments and salves. Any requested mixtures could be provided to resellers for orders “of not less than 10 pounds of any kind desired.”



At first, the business barely made living expenses. Meyer’s 7 sons and 1 daughter helped gather herbs, pack boxes, fill orders, feed the printing press, and fold circulars. Many evenings the family put catalogs together with needle and thread. With the publication of the over 400-page book *The Herbalist and Herb Doctor* in 1918, the business expanded.

### The First-Ever *Herbalist* and *Almanac*

*The Herbalist and Herb Doctor*, which is now in its 10<sup>th</sup> reprinting, details plants from *Aloe vera* (Liliaceae) to zedoary (*Curcuma zedoaria*, Zingiberaceae), explaining their common names, botanical descriptions, medicinal parts, and uses and doses. It contains illustrations and color plates for many of the described plants. This popular herb book is largely based on Dr. O. Phelps Brown’s *The Complete Herbalist; or, the People Their Own Physicians*, published by the author in Jersey City, New Jersey, in 1865 (with editions continuing to at least 1907).

In 1925 Indiana Botanic Gardens began producing an annual publication, *The Herbalist Almanac*, a condensed and updated version of *The Herbalist and Herb Doctor*, which also served as the first-ever product catalog. By this time, retail customers, more than agents, had become the heart of the business and the leading force behind the company’s growth. In an age where medical expertise was not always readily available or affordable, *The Herbalist Almanac* offered the public valuable medical information on most of the common ailments of the day—including malaria, tape worms, rheumatism and more—along with herb descriptions, remedies, recipes, and customer testimonials.

Over the next few years, Joseph traveled to all parts of Europe and North America gathering samples and information on many types of medicinal plants, many from Native Americans. *The Herbalist Almanac* gained in popularity and mail poured in from all over the world, including from universities, libraries, botanists, and people from all walks of life, both contributing to and seeking information. Today Indiana Botanic Gardens, Inc. is still a source of information on herbal matters for thousands of people.

### A Tradition of Loyal Customers

In 1910 self-treatment with herbs was commonly practiced and often necessary due to economic conditions and the scarcity of professional medical help. Indiana Botanic Gardens’ early customers included a variety of ethnic minorities, including newly-arrived European and South American immigrants as well as African Americans, Amish, rural inhabitants who did not have easy access to medical doctors or clinics, and those who sought traditional ways of self-medication used by earlier generations. Today, some of the company’s current customer base includes the sons and



Cover of *The Herbalist Almanac* first printed in 1925.  
Image ©2009 Indiana Botanic Gardens

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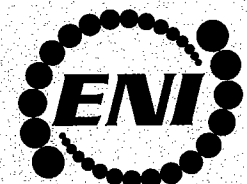
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grandsons, daughters and granddaughters of past customers. This is a significant reason why Indiana Botanic Gardens has reached the 100-year milestone.

## The Legacy Continues

Very few businesses reach their 100-year anniversary. When asked about their key to success, Tim Cleland says, "Our family practices what we preach—we believe in a natural approach to health. We think this is the reason we have so many family members living actively and enjoying life well into their 80s and 90s."

The family's commitment to a natural lifestyle is one they share with the public as well. The Joseph E. Meyer Memorial Pavilion, located in the Taltree Arboretum & Gardens on the southern shores of Lake Michigan, was a gift from the Florence Melton family. Florence Melton was the sole daughter of Joseph E. Meyer. Dedicated in 2002, the Pavilion was the first building erected in Taltree. Its serene lakeside setting surrounded by native trees, plants, and herbs, is a popular site for summertime concerts, classroom field trips, seminars, retreats, weddings, and other events. The arboretum itself is a 300-acre preservation of wood plant collections, gardens, wetlands, woodlands, and prairies for educa-



Built in 1925 specifically for Indiana Botanic Gardens, this English-gabled structure known as the "Hammond building" was home to the company until 1990. Image ©2009 Indiana Botanic Gardens

tion, research, and enjoyment.

While the herbal industry itself has changed in the past 100 years, some aspects of the business have not, nor does Tim Cleland expect them to change. He predicts, "Just like in 1910, we'll continue to focus developing state-of-the-art herbal remedies that improve the health and lives of those who seek a natural approach." HG

*Deborah S. Ramstorf is the copywriter for Indiana Botanic Gardens, Inc., Hobart, Indiana, [www.botanicchoice.com](http://www.botanicchoice.com)*

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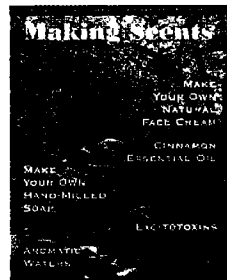
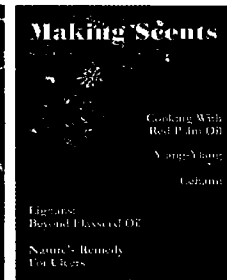
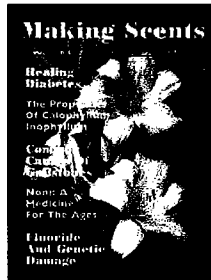
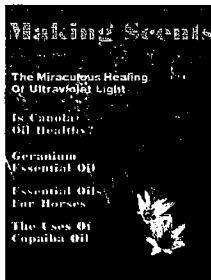
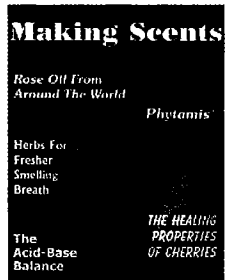
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# Biological Activity of Curcuminoids from Turmeric Assessed in Patients with Advanced Pancreatic Cancer

Reviewed: Dhillon N, Aggarwal BB, Newman RA, et al. Phase II trial of curcumin in patients with advanced pancreatic cancer. *Clin Cancer Res.* 2008;14(14):4491-4499.

Pancreatic cancer is almost always lethal, and most patients die within 1 year of diagnosis. The only drugs approved by the Food and Drug Administration that are currently available for treatment are gemcitabine and erlotinib. Both of these drugs elicit responses in only a small percentage of patients (less than 10%), and their effect on survival is measured in weeks. Thus, effective treatments are urgently needed. Many studies have shown that nuclear transcription factor- $\kappa$ B (NF- $\kappa$ B) is activated in patients with pancreatic cancer; therefore, an agent that targets NF- $\kappa$ B may prove effective in the treatment of this disease.

Previous laboratory research has shown that curcuminoids, a group of compounds derived from the traditional herb and spice turmeric (*Curcuma longa*, Zingiberaceae), suppress NF- $\kappa$ B activation, cell growth associated with apoptosis (programmed cell death), and the growth of human pancreatic cancer xenografts in mice. These curcuminoids are curcumin, desmethoxycurcumin, and bisdesmethoxycurcumin. Phase I human clinical trials of curcuminoids have shown that they are safe at doses up to 8 g/day but that their oral bioavailability may be poor. Thus, this phase II clinical trial was undertaken to determine whether orally administered curcuminoids have biological activity in patients with advanced pancreatic cancer.

Twenty-five patients (13 men, 12 women; aged 43-77) with histologically confirmed pancreatic cancer and a Karnofsky performance score greater than 60 were enrolled in this nonrandomized, open-label, phase II trial, which was conducted at the University of Texas M.D. Anderson Cancer Center in Houston, Texas. As controls, cytokine levels were measured in 48-62 healthy volunteers depending on the cytokine assessed. The patients ingested a daily dose of 8 g of curcuminoids in capsule form (1 capsule = 1 g curcuminoids [900 mg curcumin, 80 mg desmethoxycurcumin, and 20 mg bisdesmethoxycurcumin]; Sabinsa Corp., Piscataway, NJ). Concomitant chemotherapy or radiotherapy was prohibited, but supportive care was allowed. Disease staging, a physical examination, and blood sampling were performed at baseline and at 4 and 8 weeks. Blood samples were used to measure the following values: cytokine concentrations (interleukin-6, -8, -10, and interleukin-1 receptor antagonist), carcinoembryonic antigen concentrations, and peripheral blood mononuclear cell expression of NF- $\kappa$ B and cyclooxygenase-2 (COX-2). The adverse events were assessed on the basis of the National Cancer Institute Expanded Common Toxicity Criteria (<http://ctep.cancer.gov/forms/CTCAEv3.pdf>), and tumor response was evaluated on the basis of the Response Evaluation Criteria in Solid Tumors.


Twenty-four patients were available for the toxicity evaluation, and 21 patients were available for evaluation of the response to treatment with curcuminoids. Circulating concentrations of curcumin in blood serum were low, which indicated poor oral bioavailability. However, 2 patients exhibited a favorable response to curcuminoids. Pancreatic cancer remained stable in 1 of these patients for greater than 18 months. "Marked" tumor regression (73%) and significant ( $P < 0.05$ ) increases in serum interleukin-6, -8, and -10 and in interleukin-1 receptor agonist were observed in the other patient.

NF- $\kappa$ B activation decreased with curcuminoids treatment, but not significantly compared with the healthy controls. COX-2 expression decreased significantly ( $P < 0.03$ ) with curcumin treatment. Blood concentrations of curcumin peaked at 22-41 ng/mL and remained relatively constant over the first 4 weeks of the study. Carcinoembryonic antigen concentrations decreased gradually over 1 year in 1 patient, which indicated an improvement in cancer status. No treatment-related toxicity was observed.

The results of this study indicate that orally administered curcuminoids are tolerated well at doses of 8 g/day for up to 18 months and have "biological activity in some patients with pancreatic cancer." Although curcumin was poorly absorbed, biological activity (i.e., tumor regression and increase in cytokine concentrations) was evident at steady-state. Because curcumin is hydrophobic (i.e., not water soluble), it cannot be administered intravenously unless encapsulated in a liposome, which would presumably result in higher circulating concentrations of curcumin in the blood. The authors intend to conduct clinical trials in pancreatic cancer patients with the use of liposomal curcuminoids, which they hope will result in more consistent blood concentrations of curcumin and a better pharmacologic effect. HG

—Brenda Milot, ELS

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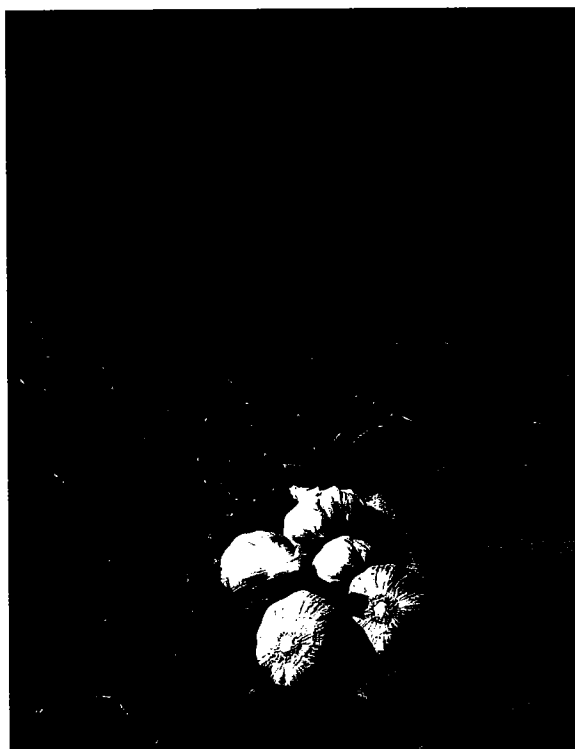
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## Garlic Preparations Show Benefit in Reducing Blood Pressure

Reviewed: Ried K, Frank OR, Stocks NP, Fakler P, Sullivan T. Effect of garlic on blood pressure: a systematic review and meta-analysis. *BMC Cardiovasc Disord.* 2008;8:13. doi:10.1186/1471-2261-8-13.

Hypertension (high blood pressure) affects about 1 billion persons worldwide. Clinically, hypertension is defined as systolic blood pressure (SBP) equal to or greater than ( $\geq$ ) 140 mm Hg (millimeters of mercury) and diastolic blood pressure (DBP)  $\geq$  90 mm Hg. Recent guidelines extend the management of blood pressure to include prehypertensive persons with SBP of 120-139 mm Hg and DBP of 80-89 mm Hg. In research studies, animal results have suggested that garlic (*Allium sativum*, Liliaceae) preparations produce moderate reductions in blood pressure while primary studies in humans and nonsystematic reviews have reported mixed results. Because of the increased use of alternative and complementary therapies for hypertension, these authors, from the Discipline of General Practice, The University of Adelaide, Adelaide, South Australia, conducted a systematic review and meta-analysis of trials investigating the effect of garlic preparations on blood pressure.



Garlic *Allium sativum* Photo ©2009 Steven Foster

The authors searched the Medline, Embase, and Cochrane databases for studies published between 1955 and October 2007, and they checked reference lists of previously published systematic reviews and meta-analyses for more primary studies. For the systematic review, they included published intervention studies (including randomized controlled trials and non-placebo-controlled trials) in English and German that reported effects of garlic preparations on blood pressure. For the meta-analyses, they included only studies with placebo control groups, using garlic-only supplements, and reporting mean SBP and/or DBP and standard deviation (SD).

The number of subjects in intervention and control groups, mean SBP and DBP at start and end of intervention, and SD were collated from text, tables, or figures. Methodological quality was assessed independently by two of the investigators using guidelines of the Cochrane Collaboration.

The authors also conducted a subgroup meta-analysis by baseline blood pressure (hypertensive/normotensive) for the first time and a meta-regression analysis to test the associations between blood pressure outcomes and duration of treatment, dosage, and blood pressure at the start of treatment.

Eleven of 25 studies included in the systematic review and investigating the effect of garlic preparations on blood pressure met the inclusion criteria for meta-analysis. Fourteen studies were excluded from meta-analysis: 6 trials had no placebo control group, another 6 reported incomplete data for mean SBP, DBP, or SD, and 2 studies used garlic combination supplements containing other potentially hypotensive agents.

Nine studies compared garlic preparations to placebo, and 2 studies compared the effect of garlic on blood pressure in addition to a drug compared to drug plus placebo. Nine studies used garlic powder (the commercial standardized garlic product Kwai<sup>®</sup>, Lichtwer Pharma AG, Berlin, Germany), one study used aged garlic extract (Kyolic<sup>®</sup>, Wakunaga, Japan), and another used distilled garlic oil. Dosage of garlic powder ranged between 600 and 900 mg per day (providing potentially 3.6 to 5.4 mg of allicin, an active compound produced in fresh garlic but not in the aged garlic extract), and duration of intervention ranged from 12 to 23 weeks. A total of 252

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subjects allocated to a garlic intervention group and 251 subjects allocated to a control group were included in the meta-analysis on SBP from 10 studies, and 283 (garlic) versus 282 (control) on DBP. Mean blood pressure at start of intervention varied markedly, with 4 studies reporting mean SBP in the hypertensive range ( $\geq 140$  mm Hg) and 3 studies reporting mean DBP in the hypertensive range ( $\geq 90$  mm Hg) before treatment.

The authors report that their meta-analysis suggests that garlic supplements exert a hypotensive effect compared with placebo, particularly in subjects with high blood pressure. Meta-analysis of 10 studies of the effect of garlic on SBP showed a significant difference between garlic and control groups, with garlic having a greater effect in reducing SBP than placebo by 4.56 (95% CI, -7.36, -1.77) mm Hg compared with placebo ( $P < 0.001$ ). Subgroup analysis of studies with mean SBP in the hypertensive range at start of intervention revealed a greater SBP reduction in the garlic group than in the placebo group by 8.38 (95% CI, -11.13, -5.62) mm Hg ( $P < 0.001$ ). Subgroup analysis of the remaining studies with mean SBP in the normotensive range ( $< 140$  mm Hg) at start of intervention showed no significant difference between the garlic and placebo groups.

The meta-analysis of the effect of garlic on DBP did not show a significant difference between garlic and placebo groups (-2.44

[95% CI, -4.97, 0.09] mm Hg,  $P = 0.06$ ). However, subgroup analysis of studies with mean DBP in the hypertensive range at the start of treatment revealed a significant difference between garlic and control groups. The results indicate that garlic was more effective in reducing DBP than placebo in hypertensive subjects by 7.27 (95% CI, -8.77, -5.76) mm Hg ( $P < 0.001$ ). In contrast, subgroup meta-analysis of normotensive subjects was not significant.

Regression analysis revealed a significant association between blood pressure at the start of the intervention and the level of blood pressure reduction (SBP:  $R = 0.057$ ;  $P = 0.03$ ; DBP:  $R = 0.351$ ;  $P = 0.02$ ).

The authors report that their findings on the effects of garlic preparations on SBP/DBP are comparable to the hypotensive effects of commonly prescribed blood pressure drugs.

"This systematic review and meta-analysis suggest that garlic preparations are superior to placebo in reducing blood pressure in individuals with hypertension. Future large-scale long-term trials are needed to investigate whether standardized garlic preparations could provide a safe alternative or complementary treatment option for hypertension in clinical practice," say the authors. HG

—Shari Henson

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## Research Reviews

### Ginkgo Extract Does Not Prevent Dementia or Alzheimer's Disease in Large 6-year Clinical Trial—The GEM Study

Reviewed: DeKosky ST, Williamson JD, Fitzpatrick AL, et al. Ginkgo biloba for prevention of dementia. A randomized controlled trial. *JAMA*. 2008; 300(19):2253-2262.

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Standardized extracts made from the leaves of the ginkgo (*Ginkgo biloba*, Ginkgoaceae) tree are used worldwide to enhance numerous cognitive and circulatory functions and to treat symptoms associated with cognitive decline and impaired circulation. Currently no medications—conventional or alternative—have been shown to be effective and thus approved by regulatory bodies for the primary prevention of dementia. And no studies have been published with an adequate design or power to sufficiently evaluate the efficacy and safety of ginkgo extracts for preventing dementia. During the past decade 2 well-powered long-term clinical trials have been initiated to assess the efficacy of ginkgo in preventing dementia. The results of one of these studies—the Ginkgo Evaluation of Memory (GEM) Study—is presented here. The Guidage trial is still underway and its results will not be known for another year or two.<sup>1</sup>

The GEM study is a randomized, double-blind, placebo-controlled study sponsored by the National Center for Complementary and Alternative Medicine and the National Institute on Aging of the National Institutes of Health (NIH). Volunteers (N = 3069) aged 75 years or older were recruited using voter registration and other purchased mailing lists from 4 US communities with academic medical centers: Hagerstown, Maryland (Johns Hopkins); Pittsburgh, Pennsylvania (University of Pittsburgh); Sacramento, California (University of California–Davis); and Winston-Salem and Greensboro, North Carolina (Wake Forest University). All participants had a proxy (representative) willing to be interviewed every 6 months.

Individuals with prevalent dementia (meeting *Diagnostic and Statistical Manual of Mental Disorders Fourth Edition* [DSM-IV] criteria for dementia or a score > 0.5 on the Clinical Dementia Rating scale) were excluded from the study. However, participants with mild cognitive impairment were not excluded. Participants were

randomized to twice-daily doses of either 120 mg ginkgo (EGb 761®, W. Schwabe Pharmaceuticals, Karlsruhe, Germany; n = 1545) or an identically appearing placebo (n = 1524). The 240 mg per day dose of EGb 761 was chosen based on information from prior clinical studies. It is also the upward dose approved by the German Commission E and is a standard dosage used in more cognitively impaired adults.<sup>2</sup> The primary hypothesis was that 240 mg/day of ginkgo extract would decrease the incidence of all-cause dementia and specifically reduce the incidence of Alzheimer's disease (AD). The secondary objectives were to evaluate the effect of ginkgo extract on the following end points: overall cognitive decline, functional disability, total mortality, and incidence of cardiovascular disease. The primary efficacy endpoint was the diagnosis of dementia by DSM-IV criteria. When a participant's dementia scores declined by a pre-specified number of points from his or her study entry scores, or there was onset of new memory or other cognitive problems, the participant underwent the full GEM study neuropsychological battery, which included 12 tests.

The ginkgo and placebo groups were similar in their baseline characteristics. The mean age at entry was 79.1 years and 46% of the participants were women. The median follow-up time was 6.1 years (maximum 7.3 years). The dementia rate was extremely low (< 1%) during the first year in both groups. Approximately 61% of those taking placebo and 40% of those taking ginkgo guessed their actual drug assignment correctly. During the intervention period, 246 (16.1%) of the participants in the placebo group and 277 (17.9%) in the ginkgo group were diagnosed with dementia. The rate of total dementia did not differ between participants assigned to ginkgo or placebo (P = 0.21, 3.3/100 person-years and 2.9/100 person-years, respectively). The rate of Alzheimer-type dementia also did not differ between the 2 treatment groups (P = 0.11, 3.0/100

person-years and 2.6/100 person-years, respectively). The results were similar when the endpoint was AD only versus AD with evidence of vascular disease of the brain. The number of participants with cardiovascular disease, pure vascular dementia, myocardial infarction, or stroke was too small to draw any firm conclusions.

The adverse event (AE) profiles for ginkgo and placebo were similar. There were no statistically significant differences in the rate of serious AEs. The mortality rate was similar in the 2 treatment groups. There were no differences between treatment groups in the incidence of coronary heart disease or stroke. The rates of major bleeding did not differ between the treatment groups. Also, for participants taking aspirin, the bleeding incidence did not differ between treatment groups.

The authors conclude that in this study ginkgo was not effective in preventing or delaying the onset of all-cause dementia in participants older than 75 years. Also, ginkgo had no effect on the risk for developing AD in this population.

It should be noted that at study end, only 60.3% of the active participants were taking their assigned study medications. There is the possibility that this poor adherence to the assigned treatment might have had a negative effect on the trial's results. An NIH-sponsored study in the United States in 2008 demonstrated a beneficial effect of a standardized ginkgo extract on the risk of developing dementia in only the trial subjects taking the ginkgo on a regular basis.<sup>3</sup> In the present study it does not appear that any statistics were done on the population having good compliance (i.e., excluding the participants who were not in compliance). It would be interesting to

see the results of the compliant population. Also, there is no conventional pharmaceutical drug that has the ability to prevent the onset of dementia or diminish its progression, so there is no drug to act as a positive control. Hence, it is unknown to what extent the particular population being tested would respond to any treatment.

According to Mark Blumenthal, the founder and executive director of the American Botanical Council, "Ginkgo's benefits must be viewed in the context of the entirety of the published clinical data. There is a significant body of scientific and clinical evidence supporting the safety and efficacy of ginkgo extract for both cognitive function and improved circulation."<sup>4</sup> In fact, a randomized controlled clinical trial (RCT) published in *JAMA* in 1997 demonstrated efficacy of EGb 761 versus placebo, producing positive results in treating symptoms associated with early stages of Alzheimer's dementia.<sup>5</sup> Numerous subsequent RCTs have also shown beneficial effects. In addition, an RCT comparing EGb 761 versus the pharmaceutical drug donepezil (Aricept®, Pfizer) showed the ginkgo extract to have similar efficacy in treating dementia symptoms with less AEs,<sup>6</sup> while a review article in 2000 showed that EGb 761 had a similar effect of 4 pharmaceutical cholinesterase-inhibiting drugs, with fewer adverse effects for ginkgo.<sup>7</sup>

A large (n=400) multicenter RCT in Russia using 240 mg/day of EGb 761 on patients with clinically evaluated mild to moderate dementia and moderate neuropsychiatric symptoms for 22 weeks resulted in improvement in the ginkgo patients with respect to the neuropsychiatric symptoms and activities of daily living.<sup>8</sup> In contrast, those who received

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Ginkgo *Ginkgo biloba*  
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placebo deteriorated slightly or remained unchanged. EGb 761 was significantly superior to placebo with respect to all efficacy variables ( $P < 0.001$ ). And in a yet-to-be published RCT, one daily dose of 240mg EGb used in the treatment of dementia was significantly superior to placebo.<sup>9</sup> This trial was presented at the International Congress on Alzheimer's Disease in Chicago in July 2008.

In addition to being tested for cognitive impairment, at least 16 RCTs have evaluated various ginkgo extracts for healthy, non-cognitively impaired adults. A comprehensive review has shown that in 11 of these trials, the ginkgo extract increased short-term memory, concentration, and time to process mental tasks.<sup>10</sup> Finally, as noted by ABC in its press release, numerous RCTs demonstrate the efficacy of ginkgo extract in treating symptoms associated with peripheral arterial occlusive disease (a.k.a. intermittent claudication, a condition experienced by many elderly adults, characterized by pain and difficulty in walking, due to poor circulation).<sup>11</sup> HG

—Heather S. Oliff, PhD

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## Korean Red Ginseng May Aid in Erectile Dysfunction According to Systematic Review

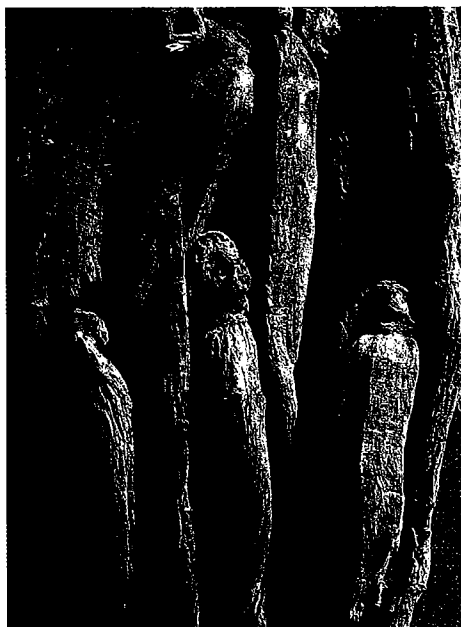
Reviewed: Jang D-J, Lee MS, Shin B-C, Lee Y-C, Ernst E. Red ginseng for treating erectile dysfunction: a systematic review. *Br J Clin Pharmacol*. October 2008;66(4):444-450.

Erectile dysfunction (ED) affects 30-50% of men over the age of 40. Current medical interventions for the management of ED include drugs, intrapenile therapies, and penile prosthetic implants. Korean red ginseng (*Panax ginseng*, Araliaceae) is the steamed and dried roots of plants that are harvested 6 years after planting. One of the popular traditional uses of red ginseng is the enhancement of sexual function. Few clinical trials have evaluated the effect of red ginseng on ED, and recent reviews of ED therapies did not include studies published in languages other than English. The purpose of this systematic review was to critically evaluate the evidence from all randomized controlled trials (RCTs) of red ginseng in men with ED.

Researchers at the Korea Institute of Oriental Medicine searched electronic databases from their inception until January 2008. The databases included MEDLINE, AMED (Allied and Complementary Medicine Database), British Nursing Index, CINAHL (Cumulative Index to Nursing and Allied Health Literature), EMBASE (Excerpta Medica Database), PsycInfo, The Cochrane Library, 6 Korean medical databases, 4 Chinese medical databases, and 3 Japanese medical databases. The researchers also manually searched relevant journals and checked the references of all articles identified in the search. The analysis included all articles that reported on an RCT in which human subjects with any type of ED were treated with any type of red ginseng, regardless of language of publication. Three independent reviewers read, extracted, and rated each article.

The researchers identified 28 potentially relevant trials, and 7 of these trials met the criteria for inclusion in the analysis.<sup>1-7</sup> A total of 363 men, ranging in age from 24 to 70 years, were studied in these 7 trials. The duration of treatment with red ginseng ranged from 4 to 12 weeks. The doses of red ginseng ranged from a daily total of 1800 mg to 3000 mg. (Presumably, this dosage range refers to the dried root powder as extracts would probably be expressed in lower daily doses. The trade names of any commercial ginseng products that may have been used in the RCTs were not given.) Outcome measures included scores on the International Index of Erectile Function, the Watts sexual function questionnaire, global efficacy questions, and study-specific structured interview questionnaires related to ED.

Six of the trials reported an improvement in erectile function in subjects taking red ginseng compared to subjects taking placebo. A meta-analysis of data from the 7 trials suggests that red ginseng is superior to placebo in improving erectile function ( $P < 0.0001$ ). The methodological quality of the trials was variable, ranging from



Korean Ginseng *Panax ginseng*  
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scores of 1 to 5 on the Jadad scale. The majority of the articles failed to report the method of randomization, the method of double-blinding, and details about subject withdrawals and drop-outs. Other shortcomings included failure to report a power calculation for statistical analysis and failure to report approval of the study by a research ethics board. (The use of red ginseng in Korea particularly, as well as in China, is widespread, even ubiquitous; it is sold and consumed as a food, similar to coffee and tea in Western countries; thus the usual requirement to have an institutional review board approve the design of a proposed RCT may not have been seen as necessary.)

The authors explain that this is the first systematic review and meta-analysis of RCTs of the effectiveness of Korean red ginseng in men with ED. They conclude that these trials provide evidence suggesting such effectiveness. However, the number of trials that could be included in the analysis, the total sample size (363 men), and the typical methodological quality of the studies were too low to allow firm conclusions to be drawn. The authors recommend that additional studies with better methodological quality are needed to establish whether or not Korean red ginseng has a place in the treatment of ED. HG

—Heather S. Oliff, PhD

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# COLD-fX® Special Extract from American Ginseng Root Shown Safe for Children with Upper Respiratory Tract Infections

Reviewed: Vohra S, Johnston BC, Laycock KL, et al. Safety and tolerability of North American ginseng extract in the treatment of pediatric upper respiratory tract infection: a phase II randomized, controlled trial of 2 dosing schedules. *Pediatrics*. Aug 2008;122(2):e402-e410.

Upper respiratory tract infections (URIs) are more common in children than in adults, and parents often treat their children's symptoms with herbs and other natural health products (NHPs, the regulatory term used in Canada for vitamins, minerals, herbs, homeopathic remedies, etc.). One of the most popular products used for enhancing immunity and preventing and treating URIs in Canada is a special, patented extract of American ginseng root (*Panax quinquefolius*, Araliaceae) called COLD-fX® (CV Technologies, Inc., Edmonton, Alberta, Canada) consisting of only the saccharide fraction of the root (i.e., furanyl-, oligo- and polysaccharides). Unlike conventional ginseng extracts, this preparation does not contain ginsenosides, the characteristic active triterpene glycosides in various species of the genus *Panax* that are the subject of most chemical and pharmacological research on this highly-researched genus.

In Canada, COLD-fX is approved by the Natural Health Products Directorate of Health Canada for the prevention and treatment of URIs related to cold and flu, based on a previous review of published clinical trials and laboratory research. Although the safety and efficacy of COLD-fX has been studied for the treat-

ment and prevention of URIs in adults, the authors of this phase II randomized, double-blind, dose-finding, 3-arm clinical trial claim that it is the first to examine safety, dose, and efficacy in children.

There were 2 dosing arms and a placebo arm. The objectives were to document the safety and efficacy of weight-based dosing schedules and to determine the treatment effect of COLD-fX on the severity and duration of pediatric URIs. Children aged 3-12 years old were recruited between November 2005 and February 2006 from 2 teaching hospitals at the University of Alberta (Edmonton, Alberta, Canada). A computerized random number generator was used for randomization.

Parents of the subjects contacted the study nurse upon the onset of symptoms. If the study nurse determined that the symptoms were those of a URI, then the pharmacy was contacted and the study medications (COLD-fX or placebo) were dispensed and sent by courier. The weight-based COLD-fX standard dose (n=13) was 26 mg/kg on day 1, 17 mg/kg on day 2, and 9 mg/kg on day 3. Children who received the standard adult dose (600 mg on day 1, 400 mg on day 2, and 200 mg on day 3) weighed over 45 kg. The

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weight-based COLD-fX low-dose group (n=14) received 13 mg/kg on day 1, 8.5 mg/kg on day 2, and 4.5 mg/kg on day 3. Children in the low dose group also weighed less than 45 kg. The placebo group (n=15) received a liquid solution similar in appearance to the COLD-fX formulation. The placebo or COLD-fX formulations were dispensed into 3 equal portions to be taken 3 times daily for 3 days. The children received other medications and tests as determined by their physicians. The severity and duration of the URIs were measured using the Canadian Acute Respiratory Infection Flu Scale (CARIFS) score, a validated 18-item scale that covers 3 domains: symptoms, function, and parental impact. The severity and duration of the treatment effect was measured as the average length of time in days from treatment onset to resolution of symptoms, defined as a 25% decrease from the baseline CARIFS score.

No serious adverse events were reported. A total of 31 subjects reported 51 adverse events. Out of these, 8 were classified as moderate: 2 in the low-dose group (fever and secondary bacterial throat infection), 6 in the placebo group, and none in the standard dose group. In addition, 11 adverse events were classified as possibly related to the intervention. Those receiving the standard dose had fewer of these adverse events than either those receiving low-dose or placebo, but there was no statistically significant between-group difference.

The severity and duration of treatment effect was 1.5 days for the standard dose group, 1.9 days for the low dose group, and 1.9 days for the placebo group. This is all-the-more impressive given that those in the standard dose group were the sickest group at the outset. Nevertheless, the study group was too small for this trend to reach statistical significance. From this information, however, the authors were able to calculate that repeating the study with 48 children in each treatment arm could confirm whether COLD-fX shortens the duration of colds in children. The use of antipyretics (fever-reducing medications) was highest in the low-dose group (P=0.48). Otherwise, there was no significant difference in the use of cold and flu remedies, antibiotics, or asthma medications among the groups.

The authors conclude that the standard weight-based dose of COLD-fX used in this study is safe and well-tolerated in children and appropriate for larger, phase III clinical trials. The difference in the use of NHPs and asthma medication was not significant among the treatment arms, but the authors recommend that future investigators caution subjects not to use other NHPs during the study and to include a specific measure of asthma status. The authors also recommend rigorous stepwise clinical trials from phase I to phase III on NHPs, which could help to avoid expensive negative phase III trials. Future research on the efficacy of COLD-fX in the treatment of pediatric URIs is warranted. In addition, the authors recommend studies evaluating daily use of COLD-fX in children for preventing URIs.

In February 2007 the American Botanical Council published an extensive clinical monograph on COLD-fX (also known by the name of its extract, CVT-E002), available on the ABC Web site at <http://cms.herbalgram.org/herbclip/306/review44663.html>. HG

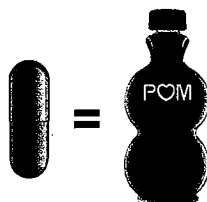
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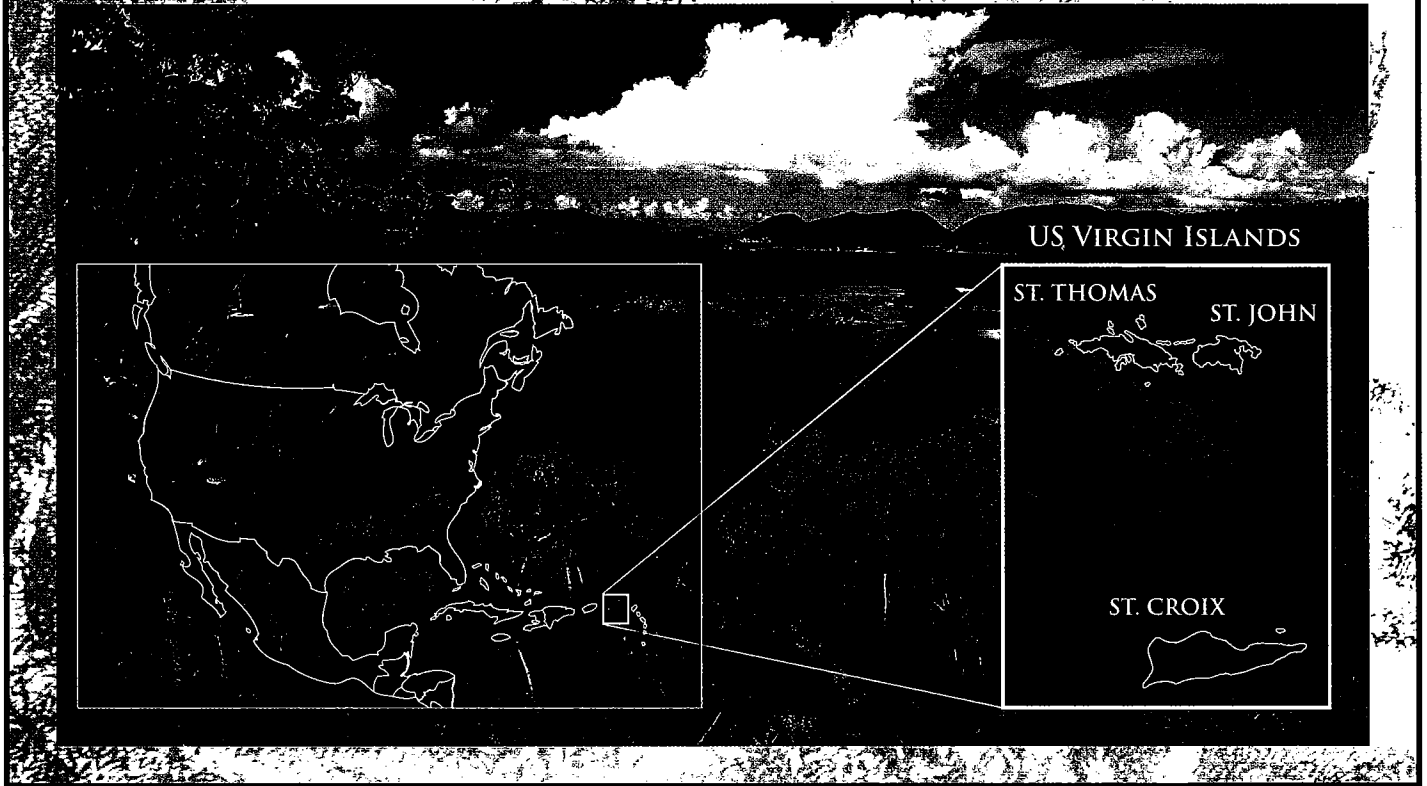


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# MEDICINAL TREES OF THE US VIRGIN ISLANDS AND NEIGHBORING ISLANDS

By Robert W. Nicholls, PhD  
All photos © 2009 Robert W. Nicholls, PhD



## I N T R O D U C T I O N

Trees of the US Virgin Islands (USVI) and neighboring islands have traditionally been used for their timber and fruit, as well as for their medicinal properties. Research shows that medicinal treatments in the form of gargles, poultices, compresses, teas, inhalants, and lotions have long been prepared from the roots, leaves, flowers, seeds, fruit, resin, and bark of native USVI trees and introduced species.

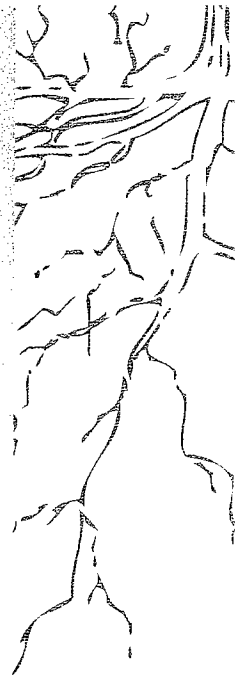
Local healers—variously described as medicine men and women, bush doctors, or weed people—have been an important fixture in the lives of common folk of the USVI, as in other agrarian societies. As is common with traditional folk healing elsewhere in the world, “cures” have often blended the sacred and the secular, wherein the “patient” has been required to seek spiritual well-being as a prelude to restoring physical health. Trees often have been viewed as mediators between human society and spiritual realms.

\* A “big tree” is typically defined as one that has at least a 3-foot diameter trunk and is over 60 feet tall. For the author’s research, the definition of a “big tree” was more flexible. Some trees of the Virgin Islands were considered to be deserving of inclusion in the author’s research due to their cultural significance but did not have sufficient size to technically meet the requirements of the “big tree” definition. Some medium-sized trees were therefore included, such as large specimens of the bay rum tree and *lignum vitae*.

Some trees have even served as sites of spiritual transactions, with offerings made at special tree shrines.

I acquired information about the medicinal functions of some of these trees during my research on the big trees\* of the USVI from 2001 to 2006. Information about the medicinal uses of these trees was so extensive that I deliberately excluded much of it from the book I published in 2006, titled *Remarkable Big Trees in the US Virgin Islands*—feeling that a description of such myriad medicinal uses would have overwhelmed the publication.<sup>1</sup>

This pictorial essay introduces the reader to 10 trees of the USVI and neighboring islands by reporting on some of the traditional and current folk-medicinal uses that have been attributed to them, though I am not vouching for their efficacy from a scientific or clinical perspective.



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Croix Island.

# SILK COTTON

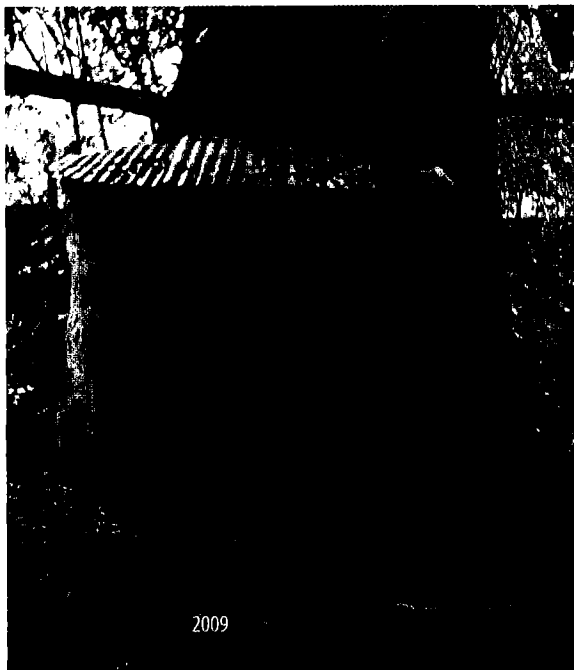
*Ceiba pentandra*,  
Malvaceae

The silk cotton tree is indigenous to tropical America and the West Indies and can grow extremely large — to over a hundred feet high with spreading buttress roots. It has many names in the Caribbean, including “jumbie tree.” (A jumbie is a ghost in local parlance.) Some Creolians (i.e., people from the island of St. Croix) remember a silk cotton tree shrine at Estate Mount Victory that was tended by local medicine man John Dubois from the 1940s and 1950s. Dubois would dispense herbs and enact cures there. The shrine later fell into disrepair but was rehabilitated in the 1990s. Nowadays, it contains Christian and other elements, including a figurine of the Biblical character Lazarus (S. Rodrigues, personal communication, September 3, 2003).

The silk cotton tree has a multitude of medicinal uses. People in St. Croix and Trinidad have used silk cotton leaves in baths to relieve fatigue and as a poultice for sore or sprained feet.<sup>2</sup> In Trinidad, the leaves are also used as a poultice for erysipelas (a streptococcus infection of the skin). In Haiti, a leaf decoction administered through a bath or as a poultice is used to treat various skin maladies, including insect bites and boils. For dizziness, Haitians apply a fresh leaf compress or lotion, and for edema-like swellings they apply a boiled root decoction. For diabetes, Haitians use a root infusion, taken orally. For cough or hoarse throat a leaf infusion is taken orally, while the fruit rind is used for placenta expulsion.<sup>3</sup> Haitians also eat gum from the silk cotton tree for upset stomach and ingest a root infusion to relieve constipation.



Above photo: Bassin Triangle Silk Cotton, St. Croix Island.



Left photo: Silk Cotton shrine at Estate Mount Victory, St. Croix Island.

Lignum vitae is a slow-growing tree native to the USVI. Its name means "Wood of Life," and it is renowned for its medicinal qualities. The wood of this tree is among the densest in the world.

A lignum vitae leaf decoction has reportedly been used in the USVI and Curacao to treat diabetes and asthma.<sup>4</sup> The leaf juice has also been used to treat biliousness (digestive complaints) in the USVI. A poultice made from the leaves has sometimes been used to treat rheumatism in the USVI and Barbados.<sup>4,5</sup> Leaves are boiled and ingested as a diuretic tea

on Middle Caicos in the West Indies, and a mash of the leaves is also used there for treating swollen areas or small wounds on the body.<sup>6</sup>

Decoctions of the tree's resin or bark, meanwhile, have been used to treat venereal diseases.<sup>5</sup> The tree achieved great recognition for this use in Puerto Rico. Lignum vitae resin has also been used to alleviate skin disorders and gout and to treat cuts and bruises in the USVI.<sup>4,5</sup> Haitians have sometimes applied the resin to toothaches.<sup>3</sup> A bark decoction has been taken orally for fish poisonings in the USVI and Puerto Rico.<sup>4</sup>

# LIGNUM VITAE

## *Guaiacum officinale*, Zygophyllaceae

Lignum vitae at Estate Eden, Coral Bay, St. John Island.



# WEST INDIAN MAHOGANY

*Swietenia mahagoni*, Meliaceae

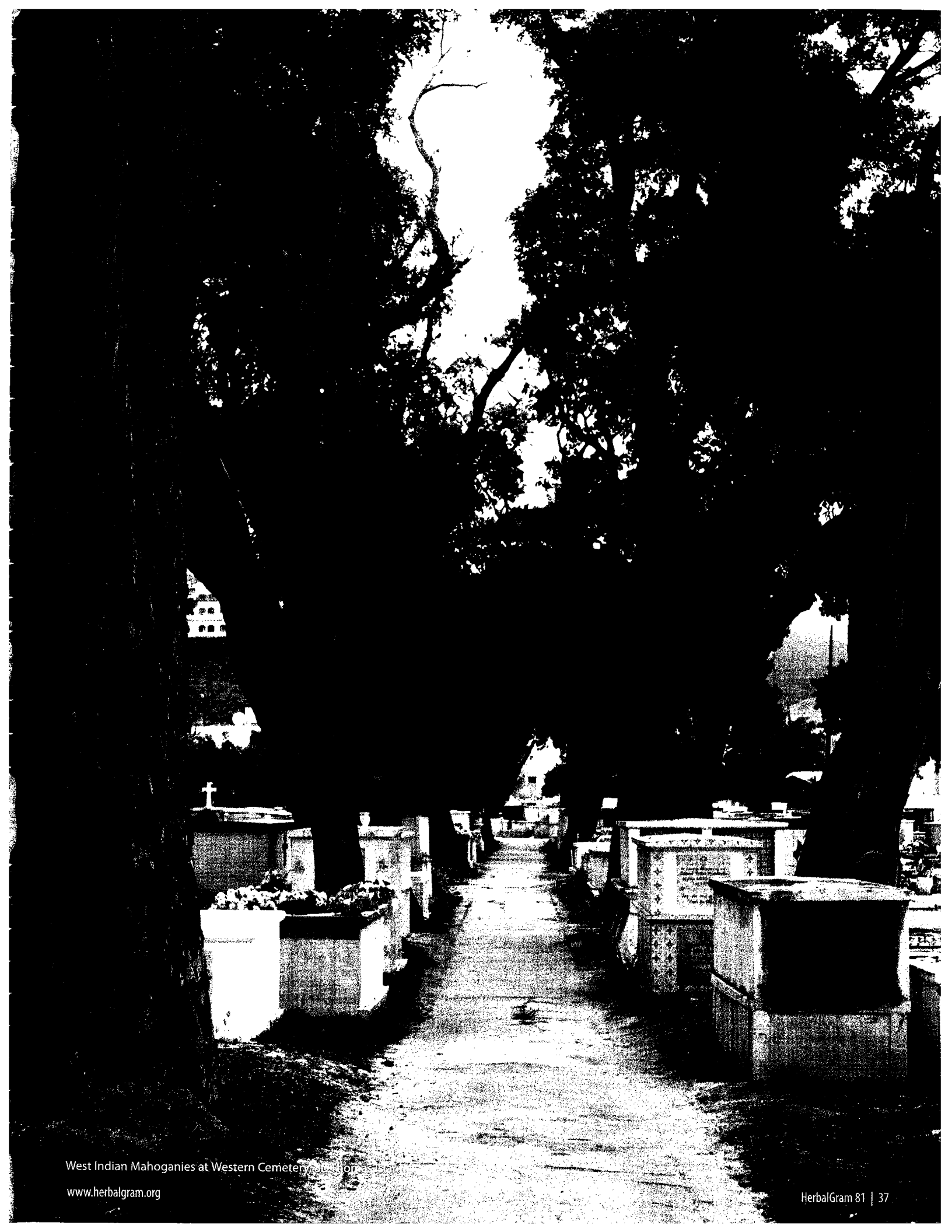
The West Indian mahogany is native to the Bahamas, southern Florida, Cuba, Jamaica, and Hispaniola. It was introduced into the USVI before or during the 17<sup>th</sup> century and became well established after that time. It is now considered borderline naturalized in the USVI.

In Haiti, West Indian mahogany bark, either macerated or in a decoction, is taken orally with salt to relieve fever.<sup>3</sup> The bark is similarly used to alleviate diarrhea and dysentery in Haiti, and steeped mahogany bark is drunk to combat loss of appetite. In cases of toothache, Haitians will sometimes apply the tree's resin, or a resin or bark decoction, as a treatment. Haitians have further ingested teas of steeped West Indian mahogany bark and roots to improve vitality (due to the tree's vitamin and iron content).

Jamaicans, meanwhile, use a leaf decoction of West Indian mahogany as a tea or bath to combat colds and fever.<sup>5</sup> Jamaicans have also used a mahogany bark decoction to halt diarrhea. In Cuba, a bark decoction is used to relieve catarrh.



Right photo: Mahogany tree, VI Legislature, St. Thomas Island.





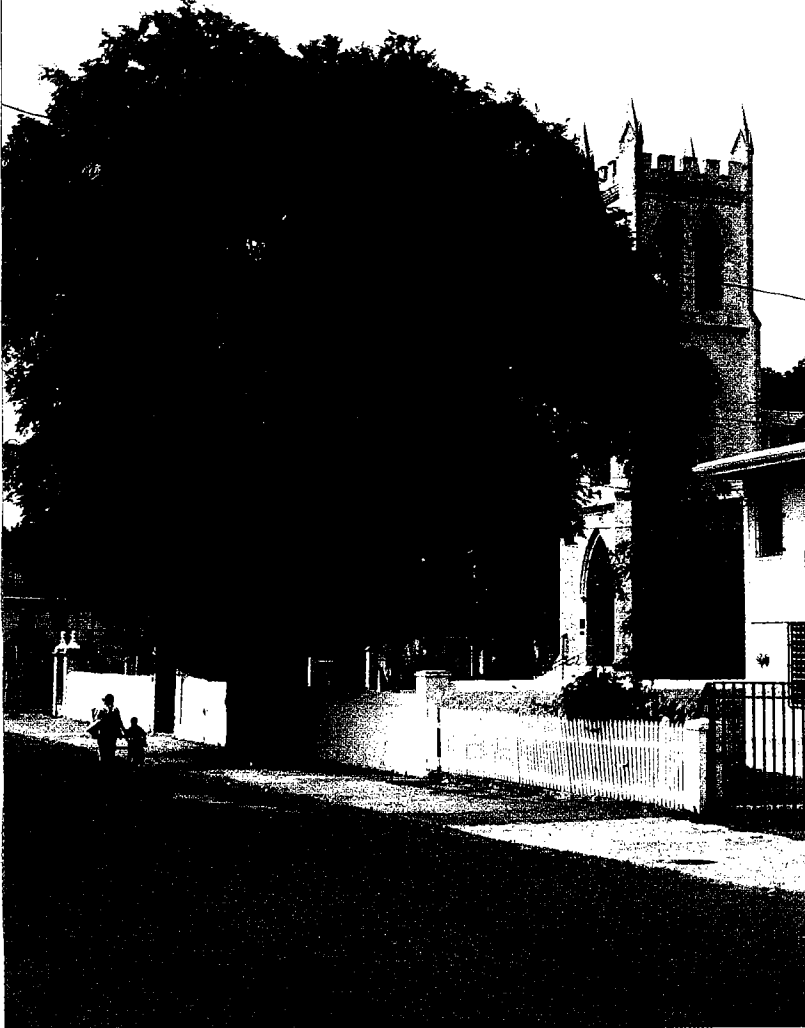
# TAMARIND

*Tamarindus indica*, Fabaceae

The tamarind is an African tree that was introduced into the Caribbean in the 17<sup>th</sup> century. Although it is an introduced species in the USVI, it has been part of the islands' ecosystems for 3 ½ centuries and is today considered to be borderline naturalized.

The tamarind is used medicinally for multiple conditions throughout the Caribbean. In Haiti, a compress of young tamarind leaves is used for sprains, as well as for eye infections.<sup>3</sup> A decoction made from tamarind fruit has been used to treat malarial fever in Haiti, and macerated tamarind fruit mixed with water is sometimes drunk as a laxative in Haiti. Haitians also take a tamarind leaf, bark, or root decoction with salt for asthma and a tamarind leaf decoction with salt for throat infections.

Tamarind fruit and/or leaf decoctions are used to relieve colds and coughing in Curacao and Aruba.<sup>5</sup> Tamarind is also used to relieve fever and pain via a leaf decoction administered through baths in Jamaica, a leaf decoction that is drunk in the Bahamas, and by ingesting the ripe fruit in Curacao. In Jamaica, a tamarind leaf decoction is given as a remedy for measles. Tamarind leaf extracts have also exhibited antioxidant activity in the liver, and a tamarind root decoction is used as a remedy for jaundice in Cuba.



Jumbie Tamarind tree at St. Paul's Church, Frederiksted, St. Croix




White Cedar at Caneel Bay, St. John Island.

# WHITE CEDAR

*Tabebuia heterophylla*, Bignoniaceae

The white cedar is native to the USVI, and despite heavy logging, it is widely spread throughout the islands. It is a hardy and profusely blooming tree with masses of trumpet-shaped flowers. It has been used for multiple purposes throughout the Caribbean, including as a medicinal agent.

Tea made from the leaves has been used in the USVI and Bahamas to relieve gonorrhea.<sup>2</sup> It has been written that a decoction of the leaves can act as a diuretic and alleviate pain in urination.<sup>5</sup> Leaf decoctions of white cedar have also been used to treat fish poisoning in St. Croix and Curacao and to treat toothache in St. Croix and the Bahamas.<sup>2,5</sup>



West Indian Locust tree, Bordeaux Mountain Road, St. John Island.

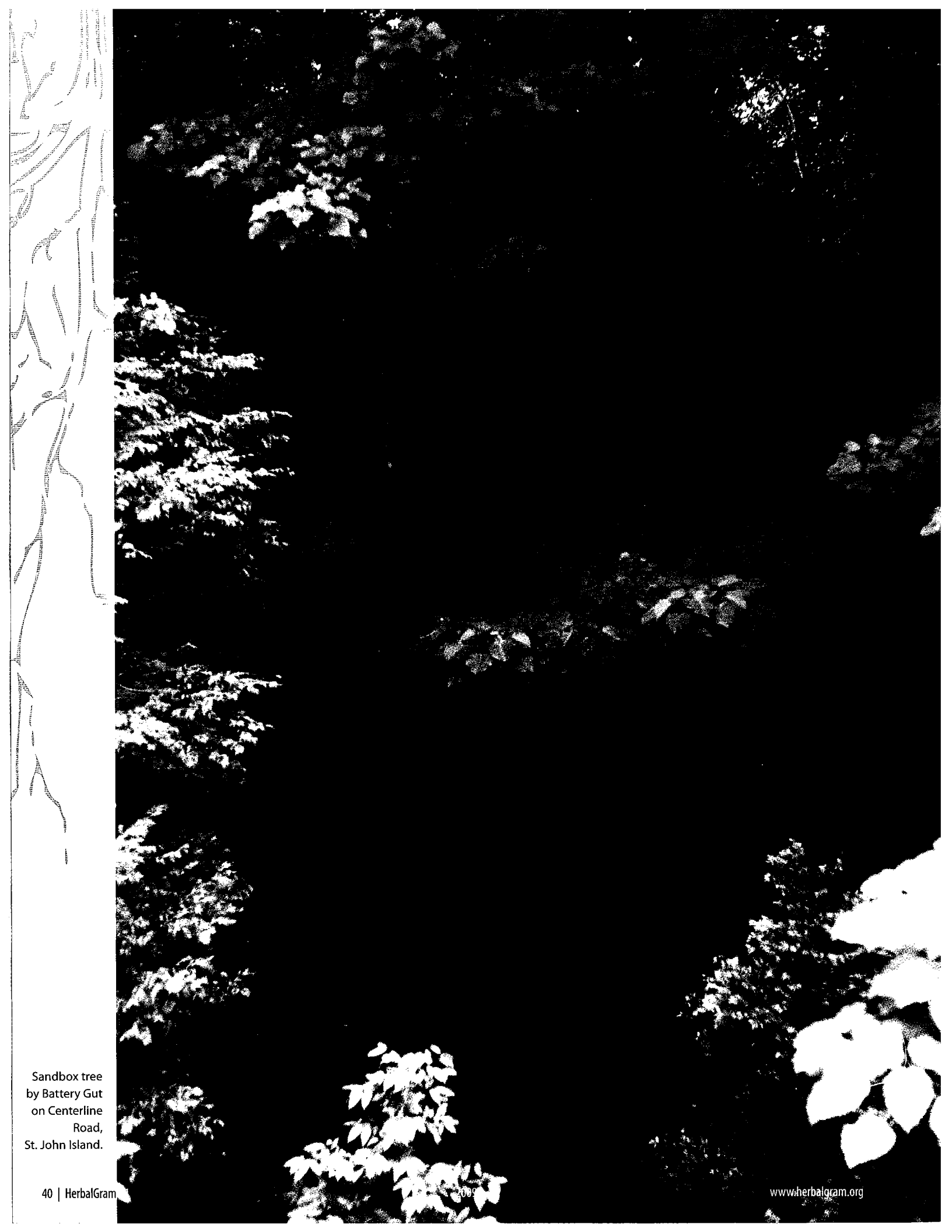
# WEST INDIAN LOCUST

*Hymenaea courbaril*, Fabaceae

The West Indian locust, a native of the USVI, is sometimes referred to as “Stinking Toe Tree.” It produces shiny, brown, thick-walled seed pods that contain a pale-yellow powdery pulp with a sweet taste but an unpleasant odor. The tree’s bark and leaves are rich in tannin, which exhibits antibacterial properties. Because of their tannin content, locust leaves have shown activity against Lewis lung carcinoma in an experimental trial with mice.<sup>5</sup>

West Indian locust bark has sometimes been ingested

to treat constipation and intestinal gas, while an inner bark decoction has sometimes been used to combat intestinal worms.<sup>3</sup> In Haiti, the scalded resin of West Indian locust has been used as an inhalant for emphysema, asthma, and coughs. Haitians have also applied powdered locust resin to wounds, sores, and ulcers, and they have used resin liniment to treat muscle cramps, rheumatism, arthritis, and bruises. Crucians have reportedly used West Indian locust bark in home remedies to purify the blood.<sup>2</sup>



Sandbox tree  
by Battery Gut  
on Centerline  
Road,  
St. John Island.

# SANDBOX *Hura crepitans*, Euphorbiaceae

The sandbox tree, native to the USVI, is popularly known as “monkey-no-climb” due to the large protruding thorns that cover its trunk. Like the silk cotton, the sandbox is sometimes considered a jumbie tree. According to Crucian weed woman Veronica Gordon, “It provides housing for spirits, but they don’t want people. That’s why the tree has prickles; you can’t touch it” (personal communication, August 6, 2001). Gordon has claimed that sandbox seeds can be used sparingly for constipation and that they taste like almonds. It has been written, however, that

ingestion of raw sandbox seeds may cause violent vomiting and diarrhea.<sup>5</sup>

In some areas of the Caribbean, the leaves of sandbox are pressed and mixed with salt, then used as a poultice on boils and swellings.<sup>2</sup> In Cuba, a leaf decoction of sandbox has reportedly been used in baths, and fresh leaves have been placed on the temples to allay headaches or to other parts of the body to relieve pains.<sup>5</sup> A bark decoction, meanwhile, has been used to treat leprosy. In Haiti, boiled leaves are applied externally to treat abscesses.<sup>3</sup>

Bay Rum tree at residence near Hawksnest Bay, St. John Island.

## BAY RUM

### *Pimenta racemosa*, Myrtaceae

The bay rum tree, which is indigenous to the USVI, has an attractive pale, mottled bark with a cinnamon taste. The tree is especially prevalent on St. John, where the manufacture of bay rum represented a major historical industry. Bay rum trees have been traditionally used for aromatic, cosmetic, medicinal, and culinary purposes.

The tree has been used in many areas of the Caribbean to address digestive complaints. Virgin Islanders take bay rum leaves orally as a treatment for upset stomach and as an appetite stimulant.<sup>4</sup> People in Curacao take a decoction made from bay rum leaves to dispel flatulence, whereas in the Grenadines (and Haiti) a bay rum leaf decoction is drunk to remedy diarrhea.<sup>5</sup> Haitians also take bay rum oil with sugar to relieve nausea.<sup>3</sup> There has been some concern expressed, however, that internal use of bay rum might cause or irritate ulcers.<sup>4</sup>

Bay rum leaves placed over the body or under the bed covers are used as a treatment for colds and fever in the USVI,<sup>4</sup> and a tea made from bay rum leaves has reportedly been used to overcome chills on St. Croix.<sup>2</sup> In Trinidad, a bay leaf decoction is taken as a remedy for chest colds, pneumonia, and influenza. People in Curacao also use it to relieve colds.<sup>2</sup>

The tree is popularly used to treat skin conditions and for pain relief. Virgin Islanders sometimes use bay rum leaves as a rubbing compound for the skin. In the Bahamas parched bay leaves are rubbed on skin irritations, while Puerto Ricans use the leaves as an analgesic rub on the body to alleviate discomforts of grippe, rheumatism or muscular pains.<sup>5</sup> In Haiti, a leaf and seed decoction can be applied to insect bites, bruises, varicose veins, and edema swellings. A leaf bath is recommended for elephantiasis.<sup>3</sup>



# WEST INDIAN CEDAR

*Cedrela odorata*, Meliaceae

West Indian Cedar at Trunk Bay, St. John Island.



The West Indian cedar, a native tree of the USVI, is sometimes also called "Cigar Box Cedar Tree." It can grow to 100 feet tall; however, it is rare to find large West Indian cedars in the USVI since their durable wood is considered one of the most valuable timbers in tropical America.

The leaves and twigs of the West Indian cedar have been used by Crucians and Jamaicans in baths for aches and fever.<sup>2</sup> The

tree's root-bark, and a leaf or twig decoction, taken orally, have been used as a remedy for malarial fever in Haiti.<sup>3</sup> Haitians also use a bark decoction of West Indian cedar as a gargle for toothache. In some areas, an infusion of the bark can be taken to improve the appetite and dispel chronic headaches associated with menstrual periods.

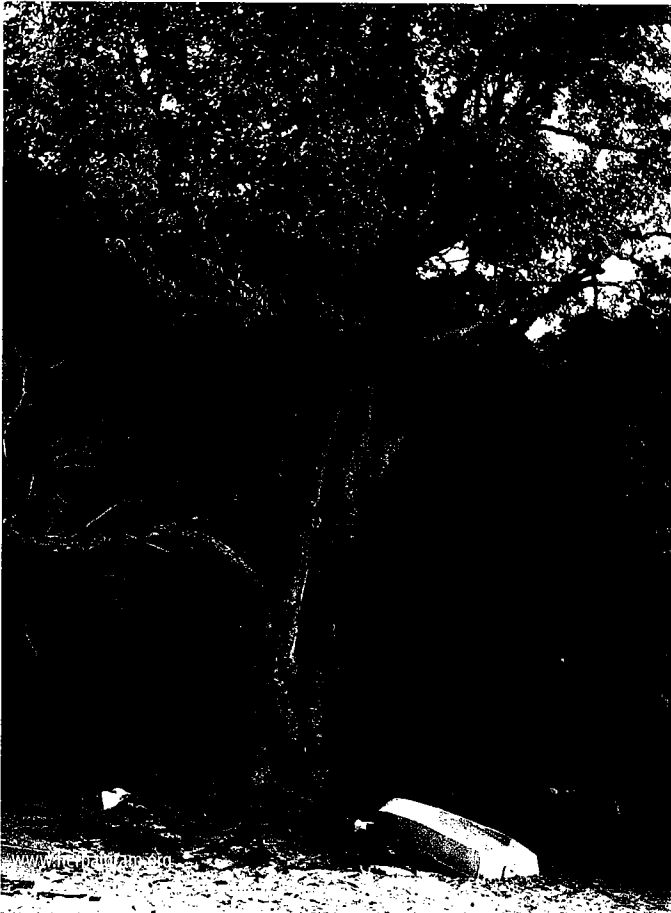
## GENIP OR KENIP

### *Melicoccus bijugatus*, Sapindaceae

The genip or kenip tree is native to Guyana, Venezuela, and Margarita Island. It was introduced to the USVI many years ago, later escaped, and is now naturalized and ubiquitous throughout the USVI. Its fruit, which contains a high level of carbohydrates, is borne in clusters that are easily accessible and popular to eat.

Virgin Islanders sometimes eat genip or kenip fruit to alleviate diarrhea,<sup>4</sup> and Haitians sometimes consume powdered roasted genip seed syrup or tea for the same purpose.<sup>3</sup> Virgin Islanders have also been known to take a decoction of genip leaves and stems orally for coughs and fever.<sup>4</sup> In Haiti, the macerated juice of genip leaves is gargled to relieve sore throat, thrush, and tonsillitis.<sup>3</sup> A decoction of genip leaves is also drunk in the Bahamas to lower blood pressure.<sup>2</sup>

Genip at Hull Bay, St. Thomas Island.



## CONCLUSION

The 10 trees pictured and described in this essay are just a few of the many important trees endemic to or widespread throughout the USVI. Several other USVI trees are also known to have medicinal uses. Unfortunately, the lore and respect formerly attributed to many USVI trees has begun to fade, and the islands' trees are also increasingly threatened by environmental degradation. Better integration of both native and introduced ornamental trees is needed in the USVI's current urban environment.

To enhance attitudes toward conservation of these natural landmarks, the US Virgin Islands Remarkable Big Trees Project was recently initiated, sponsored jointly by the University of the Virgin Islands and the VI Department of Agriculture's Urban and Community Forestry Assistance Program, with assistance from the Virgin Islands Experimental Program to Stimulate Competitive Research. The project stresses the need for protective measures and strategic planning to preserve trees as a cultural resource and supports initiatives that encourage education and conservation of USVI trees. Because of their intrinsic historic value—and, in some cases, their economic, medicinal, and aesthetic values—remarkable trees of the USVI should be extolled, and it is of utmost importance that conservation and educational activities be implemented to rekindle an appreciation of trees within the USVI and surrounding islands. HG

*Robert W. Nicholls, PhD, is project director of the US Virgin Islands Remarkable Big Trees Project, which launched a Register of US Virgin Islands Big Trees in 2002 ([www.bigtrees.net](http://www.bigtrees.net)). Dr. Nicholls obtained a BA in Art & Design from The Central School of Art & Design, London; an MEd in Curriculum & Teaching, and a PhD in African Studies from Howard University, Washington, DC. He spent 7 years in Nigeria with Ahmadu Bello University, where he conducted his initial tree research. He is currently an associate professor of social science at the University of the Virgin Islands.*

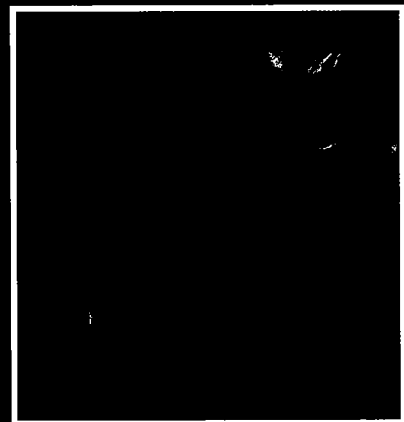
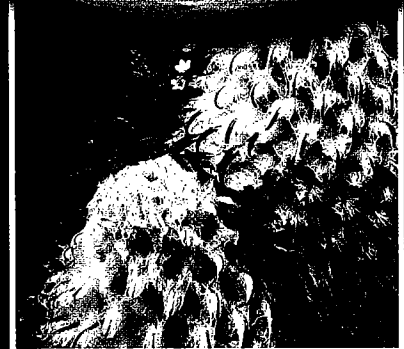
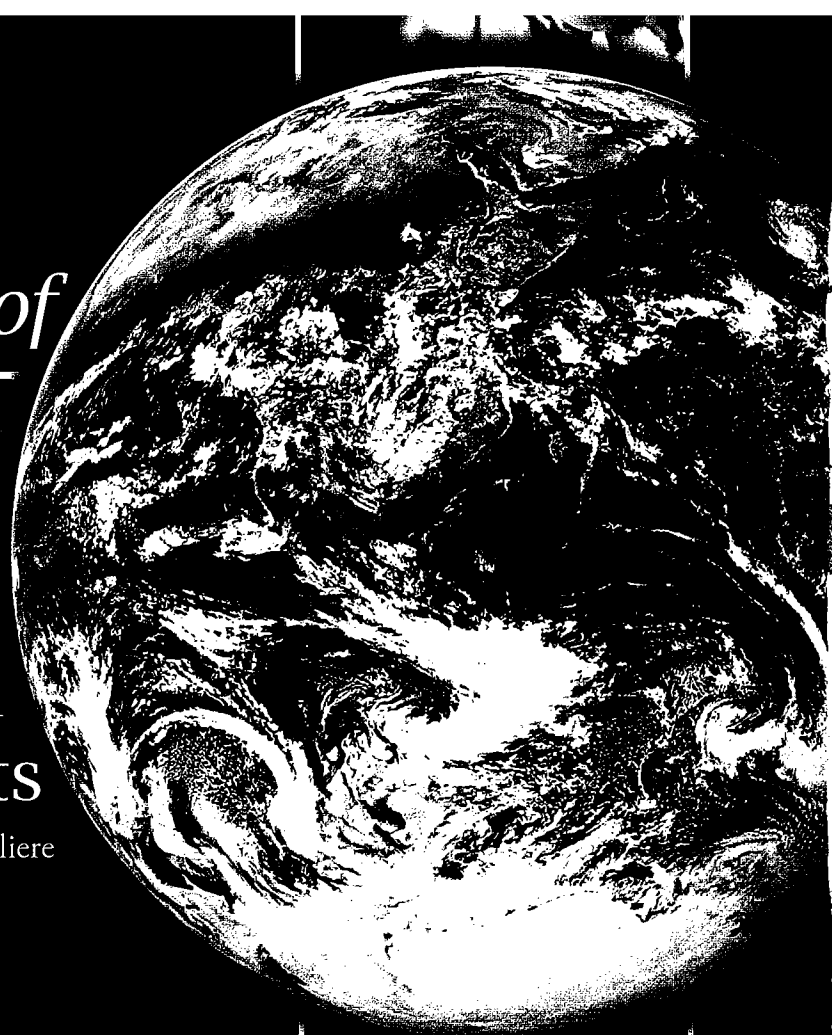
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*The Effects of*  
**CLIMATE**

on Medicinal and  
Aromatic Plants

By Courtney Cavaliere



Climate change\* has become increasingly recognized as one of the greatest challenges to humankind and all other life on Earth. Worldwide changes in seasonal patterns, weather events, temperature ranges, and other related phenomena have all been reported and attributed to global climate change. Numerous experts in a wide range of scientific disciplines have warned that the negative impacts of climate change will become much more intense and frequent in the future—particularly if environmentally destructive human activities continue unabated.

Like all living members of the biosphere, medicinal and aromatic plants (MAPs†) are not immune to the effects of climate change. Climate change is causing noticeable effects on the life cycles and distributions of the world's vegetation, including wild MAPs. Some MAPs are endemic to geographic regions or ecosystems particularly vulnerable to climate change, which could put them at risk. Concerns regarding the survival and genetic integrity of some MAPs in the face of such challenges are increasingly being discussed within various forums.

Although scientists do not know whether climate change poses a more prominent or immediate threat to MAP species than other threats, it does have the potential to exert increasing pressures upon MAP species and populations in the coming years. The possible effects on MAPs may be particularly significant due to their value within traditional systems of medicine and as economically useful plants. The future effects of climate change are largely uncertain, but current evidence suggests that these phenomena are having an impact on MAPs and that there are some potential threats worthy of concern and discussion.

\* Although the terms "global warming" and "climate change" are often used interchangeably, "climate change" is often the preferred term of many environmental organizations and government agencies. Climate change refers to any significant change in measures of climate (such as temperature, precipitation, or wind) over an extended period of time (decades or longer). Global warming refers to an increase in the temperature of the atmosphere that can contribute to change in global climate patterns. The Intergovernmental Panel on Climate Change considers "climate change" to mean any change in climate over time, whether due to natural variability or as a result of human activity. The United Nations Framework Convention on Climate Change defines "climate change" as a change in climate that is attributable directly or indirectly to human activity that alters atmospheric composition.

† Although the primary focus of this article concerns medicinal plants, much of the threat to these plants includes aromatic plants harvested for their essential oils, which could be used for medicinal, fragrance, culinary, and/or other purposes. This article therefore refers to all such plants under the widely-used acronym MAPs.

## Medicinal and Aromatic Plants in the Arctic

Warming is occurring more rapidly in the Arctic than anywhere else in the world.<sup>1,2</sup> Changes in snow patterns, ice cover, and temperatures are already affecting the distribution of some Arctic vegetation. Some experts postulate that climate change could affect the chemical composition and, ultimately, the survival of some MAPs in Arctic regions.

Alain Cuerrier, PhD, associate professor at the University of Montreal and a botanist at the Montreal Botanical Garden, has studied medicinal plants of the Canadian Arctic. According to Dr. Cuerrier, aerial photographs of the Canadian Arctic have indicated that tree and shrub lines have been changing over the past few decades (oral communication, April 9, 2008). The dry Arctic snow has traditionally stripped or otherwise harshly impacted tall trees or shrubs, in a manner Dr. Cuerrier compared to sandblasting. As a result, some species and populations have grown only in areas where they would be shielded from such harsh environmental conditions. The changing temperatures and wind patterns associated with climate change are affecting precipitation factors and giving some trees and shrubs the ability to grow taller and in more open areas. These taller plants then become barriers to snow, fencing it in and changing the surrounding biodiversity.

Dr. Cuerrier noted that many of the plants that thrive in the Arctic are able to do so because there is little competition from other species. With increased warming, more plants (such as those from the Boreal forest) will encroach into Arctic territories and compete for resources with preexisting flora. The preexisting flora, meanwhile, often do not have the option of migrating any farther north, as other plants typically do when threatened by warming temperatures and increased competition.

In addition to the potential challenges posed by the changing landscape and biodiversity, MAPs may face a more specific challenge from climate change in the Arctic. It is possible that climate change could affect the chemical compositions and, therefore, activity of wild MAPs. Dr. Cuerrier noted that Inuit communities of Quebec have raised concerns about how climate change may affect the efficacy of the local medicinal plants they use. Plants that grow in such extreme climates as the Arctic, where temperatures are often exceedingly low during the night and the sun shines brightly all day, often produce chemical compounds (generally referred to as secondary metabolites) to protect themselves against elements like cold and UV radiation.<sup>‡</sup> Changing temperatures and environments may conceivably lead these plants to produce lesser quantities of these compounds, which could also affect their therapeutic activity.

‡ Arctic plants typically produce phenolic compounds that protect plant cells from free radicals resulting from photoinhibition (a mechanism that can be caused by a high light regimen and low temperatures). Also, anthocyanins are known to pigment Arctic plants in reddish color and have been shown to attenuate the amount of light reaching photosynthetic cells and therefore reduce the risk of photoinhibition. Flavonoids are also common in Arctic plants, and they protect against UV damage such as cell apoptosis related to DNA breakage. If Arctic plants begin to produce less of these compounds as a result of higher temperatures, they may partly lose their ability to serve as antioxidants for human health benefit.



Some studies have demonstrated that temperature stress can affect the secondary metabolites and other compounds that plants produce,<sup>3,4</sup> which are usually the basis for their medicinal activity. But few studies have been conducted in situ (in natural settings) or ex situ (in a controlled non-natural setting) to mimic conditions of global warming. Dr. Cuerrier is currently involved in such a study, which should help analyze how increased global temperatures might affect berry-producing shrubs of the Canadian Arctic. Dr. Cuerrier and his team have developed experimental plots with open-top chambers and are simulating higher temperature levels to determine how warming might affect the plants' production of berries, as well as the berries' nutrient and antioxidant levels. These berry-producing shrubs, which include blueberry (*Vaccinium* spp., Ericaceae), cloudberry (*Rubus chamaemorus*, Rosaceae), and crowberry (*Empetrum nigrum*, Ericaceae), are important to the diets and traditional medicinal practices of Inuit communities.

Louise Bondo, director of the consulting company KULUK Consult and former section leader for Nordic Genetic Resource Center's (NordGen) agricultural department, likewise stated that the taste and medicinal effectiveness of some Arctic plants could possibly be affected by climate change (e-mail, April 22, 2008). She noted that such changes could either be positive or negative, although she said it seems more likely that the effects would be negative since secondary metabolites are produced in larger quantities under stressed conditions and—for Arctic plants—warmer

temperatures would likely alleviate environmental stress. She added, however, that the production of plants' secondary metabolites are influenced by multiple factors—including diseases, competition between plants, animal grazing, light exposure, soil moisture, etc—and that these other factors may mitigate the effects of climate change on plants' secondary metabolites.

NordGen, an organization based in Alnarp, Sweden, that collects and conserves samples of genetic plant material from the Nordic countries, recently collected samples of 4 medicinal plant species from Greenland for preservation and evaluation: angelica (*Angelica archangelica*, Apiaceae), yarrow (*Achillea millefolium*, Asteraceae), *Rhodiola rosea* (aka golden root, Crassulaceae), and thyme (*Thymus vulgaris*, Lamiaceae).<sup>5</sup> According to Bondo, these 4 MAPs are not currently endangered in Greenland, nor are they currently listed on the Convention in Trade in Endangered Species (CITES) appendices. However, collectors interested in preserving current plant genotypes from rapidly warming areas, such as Greenland, must do so before new genotypes arrive in response to climate change. Moreover, plant populations in Greenland are often isolated by the territory's many huge ice sheets, and this can limit the populations' available gene pools and subsequent abilities for genetically adapting to new climatic conditions. Capturing genetic diversity becomes increasingly important since it is possible that populations will lose genetic diversity in response to the changing environment.



Picture taken of a site at the Old George River (or "Illutaliviniq") in Kangiqsualujjuaq, Northern Quebec, Canada, by Max Dunbar in 1949. Photo ©2009 Avataq.



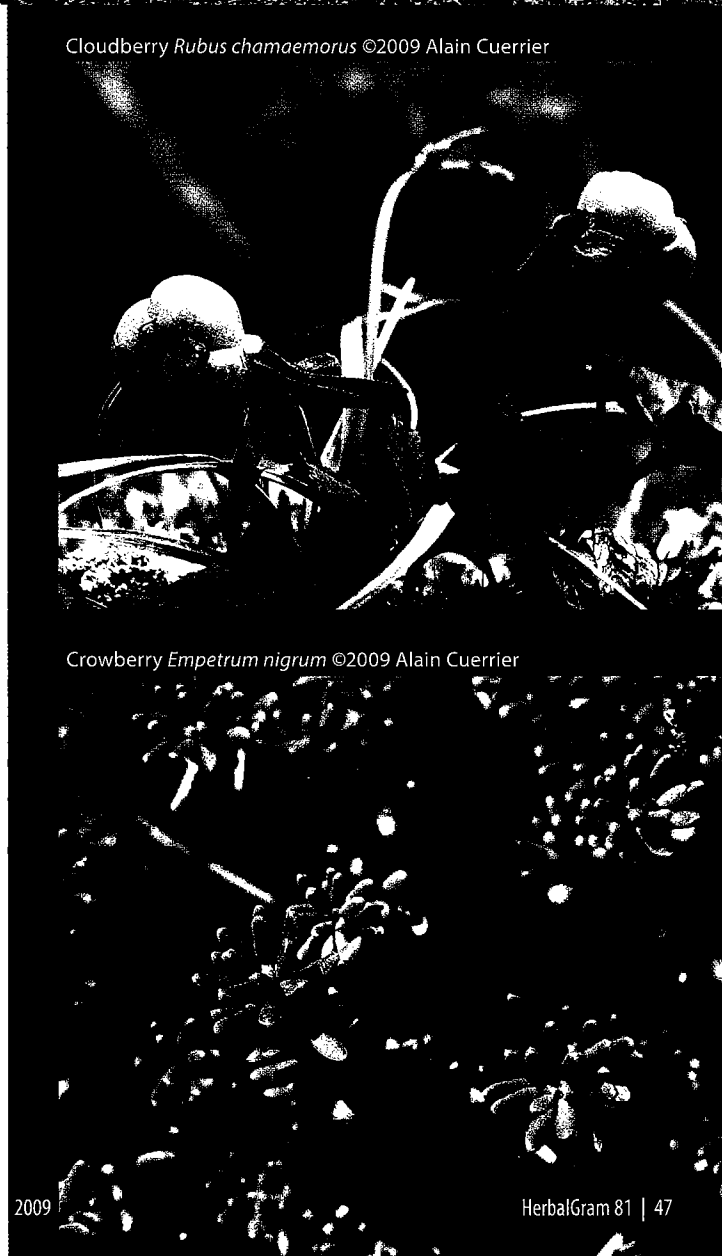
Picture taken of the same site by Alain Cuerrier in 2007. As seen in the photo, trees and shrubs are much more numerous in 2007. The site is also now filled with very tall grasses that have overtaken berry-producing shrubs such as blueberry (*Vaccinium* spp.), crowberry (*Empetrum nigrum*), and cloudberry (*Rubus chamaemorus*). Photo ©2009 Alain Cuerrier.

Charlène Lavallée and Philip Roy take measurements in open top chambers that mimic global warming and in control plots as part of a study being led by Alain Cuerrier. The study is to assess effects of climate change on berry producing shrubs of the Canadian Arctic.  
©2009 Alain Cuerrier



Dr. Cuerrier pointed out that the traditional medicinal plant *R. rosea* is one plant species that could eventually face significant threats to its survival in the Canadian Arctic. *Rhodiola rosea* is circumboreal, growing primarily in Arctic areas of Europe, Asia, and North America. It has been used traditionally to treat fatigue, depression, and infections, strengthen the immune system, and protect the heart.<sup>6,7</sup> The herb is becoming more popular in the mainstream herbal industry, and Dr. Cuerrier has suggested that the plant may one day serve as a promising business venture for the Canadian Inuit.<sup>6</sup> Efforts to effectively and profitably cultivate *R. rosea* in the Canadian province of Alberta are already underway via the Rhodiola Rosea Commercialization Project.<sup>8</sup> According to Dr. Cuerrier, Canadian populations of wild *R. rosea* may be significantly impacted by increased competition with invasive species due to climate change, and rising sea levels generated by global warming could pose further threats to the plant's survival. Dr. Cuerrier pointed out that *R. rosea* naturally grows along the seashore in Canada, an area likely to be the first inundated through rising sea levels brought on by melting glaciers.

Cloudberry *Rubus chamaemorus* ©2009 Alain Cuerrier



Crowberry *Empetrum nigrum* ©2009 Alain Cuerrier

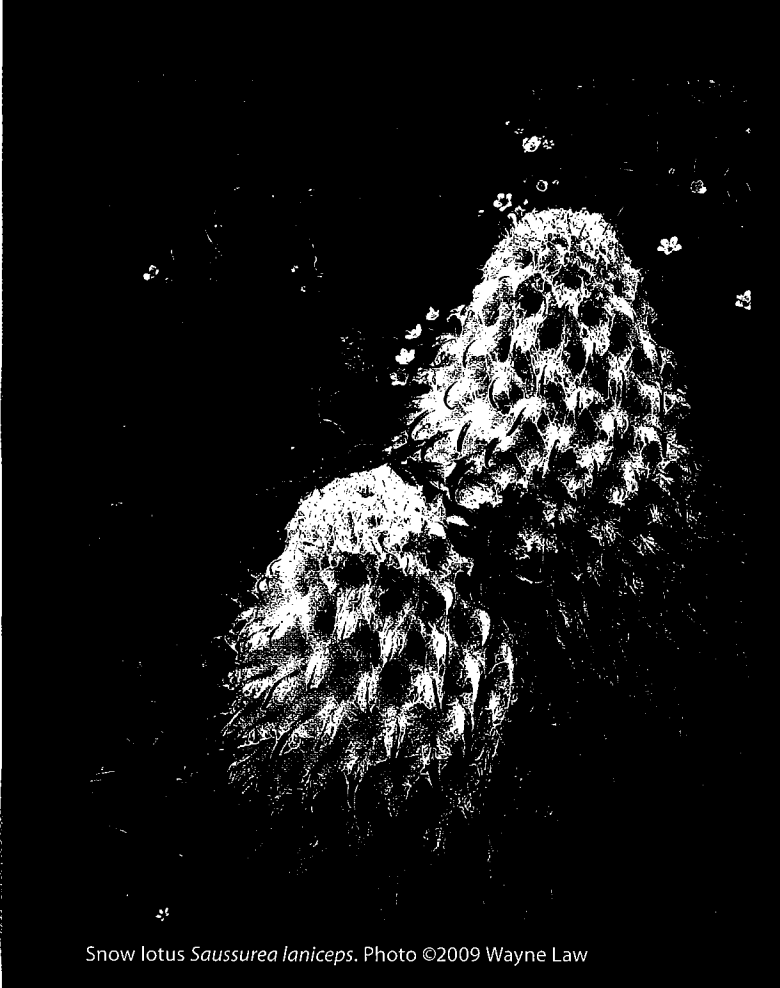
### Medicinal and Aromatic Plants in Alpine Areas

Plants growing in alpine environments may also be particularly impacted by climate change. Advancing tree lines and extinctions of montane plant populations have become increasingly apparent and documented by researchers worldwide in recent years—and have been attributed as evidence of the impact of climate change on alpine ecosystems.<sup>9</sup>

“After polar regions, alpine areas are changing faster than any other areas on Earth,” said Jan Salick, PhD, senior curator of ethnobotany at the Missouri Botanical Garden, who has conducted research on alpine environments of the Eastern Himalayas (oral communication, January 11, 2008).

Researchers have found that some cold-adapted plant species in alpine environments have begun to gradually climb higher up mountain summits—a phenomenon correlated with warming temperatures.<sup>10</sup> In some cases, these plants migrate upward until there are no higher areas to inhabit, at which point they may be faced with extinction.<sup>9,10</sup> Additionally, the upward migration of plant species can lead to increased competition for space and resources, causing further stress among alpine plant populations.<sup>9</sup>

The Global Observation Research Initiative in Alpine Environments (GLORIA, [www.gloria.ac.at](http://www.gloria.ac.at)), founded in 2001, has been focusing its efforts on documenting the changing biodiversity and landscapes of alpine environments throughout the world.<sup>11</sup> GLORIA is an international network of researchers using a standard methodology to collect information on alpine environments



Snow lotus *Saussurea laniceps*. Photo ©2009 Wayne Law

and thereby monitor climate change and its effects.

Dr. Salick utilized GLORIA's protocols in her own recent research in the Eastern Himalayas, and the information she collected has been added to the network's data sets. Dr. Salick further supplemented this data by taking doctors of traditional Tibetan medicine on her trips into the Himalayas to obtain information on the uses of the observed alpine plants. She and a colleague also conducted interviews with Tibetan people to gauge their beliefs and understanding of climate change, its causes, and its relevance to their livelihoods, health, and cosmology.

"Alpine areas are very important for Tibetan doctors' use," explained Dr. Salick. "They traditionally spend a month each year going into the mountains to collect plants. A lot of their medicines come from the mountains."

Dr. Salick and her team found that useful Tibetan plants (predominantly medicinal plants) accounted for 62% of all plant species in the alpine Himalayan sites that they examined.<sup>9</sup> Further, although overall species richness was found to decline with elevation from the lowest summits to the highest, the proportion of useful plants stayed approximately constant. This high percentage of useful plants confirms the importance of the Himalayas for Tibetan medicine and reflects the dangers posed by potential plant losses from climate change.

In a paper based on their research, Dr. Salick and her co-authors noted the projection by the Intergovernmental Panel on Climate Change (IPCC) that the Himalayas are likely to experience some of the most drastic climate changes in the world outside of polar regions, with temperature increases of 5-6°C and precipitation increases of 20-30%.<sup>9</sup> Such figures indicate that climate change is

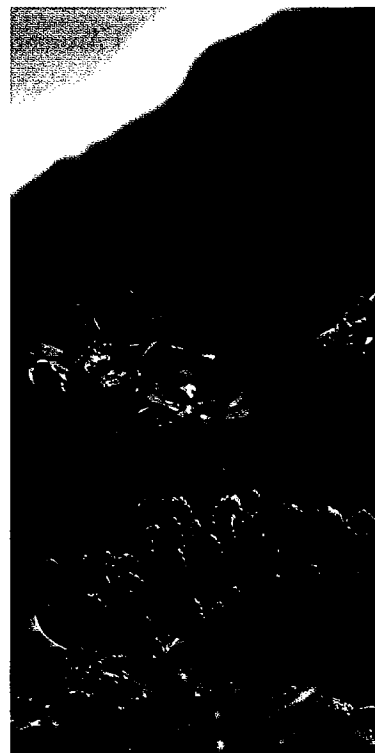
likely to have equal or greater effects on Himalayan alpine vegetation than on vegetation found elsewhere in the world. According to Dr. Salick, several Tibetan medicinal plants are already threatened by over-harvest, and the additional challenges posed by climate change could push some species—which might otherwise have been sustainable—to extinction.

One of the medicinal plant species that Dr. Salick and her former graduate student Wayne Law, PhD, have studied specifically is snow lotus (*Saussurea laniceps*, Asteraceae), a plant that has been traditionally used in Tibetan medicine to treat high blood pressure, heart conditions, and women's conditions (i.e., childbirth, dysmenorrhea). Snow lotus, which is endemic to the Eastern Himalayas, is currently considered by local experts to be in danger from both over-harvest<sup>12</sup> and negative effects of climate change, even though this herb has not yet been officially listed as "threatened" by any government body or reputable nongovernmental organization (NGO) like the International Union for Conservation of Nature (IUCN). In light of these perceived threats, repeated attempts have been made to cultivate snow lotus, largely without success.

Dr. Salick explained that many threatened alpine plant species have similarly proven difficult or impossible to cultivate. "The conditions [that they need to grow] are just so unique and somewhat unfathomable," she said. She added that one species of snow lotus in India has been shown to germinate in cultivation, yet even a success such as this is diminished by the fact that cultivated varieties of alpine plants can take years to mature.

Dr. Georg Grabherr, professor of vegetation ecology and conservation biology at the University of Vienna and chair of GLORIA, recently explored the effects of climate change on alpine medicinal plants of a different mountain range—the Central Alps in Europe.<sup>13</sup> Dr. Grabherr identified 25 native alpine plants considered medicinally useful by local traditional healers and determined that many of them could potentially invade (or escape to) higher elevations as a result of global warming and that the plants' risk of extinction under predicted scenarios appears to be relatively low. However, he added that a few medicinal alpine species are restricted to the upper alpine zone, such as *Artemisia genipi* (Asteraceae) and *Primula glutinosa* (Primulaceae). These species may experience greater impacts from warming temperatures, possibly leading to local endangerment.

Compared to the Himalayas, the percentage of alpine plants used



Above right: The Ötztal Mountains of South Tyrol in the Central Alps. Glaciers have lost approximately 50% of their mass in the Alps, and 30% of glaciated area has disappeared. Photo ©2009 GLORIA

Lower left: *Primula glutinosa*. ©2009 GLORIA  
Lower right: *Artemisia genipi*. ©2009 GLORIA



medicinally in the Alps is much lower, at approximately 10%. Dr. Grabherr noted that imported or cultivated medicinal plants have replaced many native ones for medicinal use, traditional knowledge has largely disappeared, and conventional medical treatment options have long been practiced in the Alps. For these reasons, the fate of wild medicinal alpine plant species does not appear to be a pressing concern for local inhabitants, as is the case among Tibetan societies of the Himalayas and as may possibly be the case for other mountain civilizations.

According to Dr. Salick, the Andes of South America is likely to also provide evidence of the effects of climate change on medicinal alpine plant populations. She stated that traditional healers in the Andes have begun to comment on species loss and encourage tracking of these resources. Dr. Salick plans to move westward along the Himalayas to conduct further research in the alpine environments of India and Nepal. She intends to once again use GLORIA's methodology to collect further data, which may vary from her earlier findings as climate change and vegetation effects differ according to rainfall levels, elevation, and biogeography.

### Medicinal and Aromatic Plants in Other Threatened Regions

Although Arctic and alpine areas are experiencing some of the most rapid changes from global warming, other ecosystems are also considered particularly threatened by the ongoing effects of climate change. Among these ecosystems are islands and rainforests.

Islands are considered especially at risk from rising ocean levels, in addition to changing temperatures and weather patterns.<sup>1</sup> According to the 2007 IPCC report, global average sea levels rose at an average rate of about 3.1 mm per year from 1993 to 2003.<sup>1</sup> Climate change is expected to accelerate this process through the melting of glaciers and polar ice caps, which adds water into the oceans.<sup>2,14</sup> The world's oceans also absorb excess heat from the atmosphere, and as water warms it expands in volume (a process known as thermal expansion), which will similarly contribute to global sea-level rise. In 2006, a team of scientists, using computer models and climate change scenarios proffered by IPCC, calculated that up to 65% of some islands in the Northwestern Hawaiian Islands could be submerged by the year 2100.<sup>14</sup>

Despite these threats, experts have indicated that island MAPs may not be significantly affected by conditions related to climate change. Many of the plants used by island communities are common species that are widespread and highly adaptable.

"Very few plants that are used as medicines are actually rare or endangered and most are in fact so common that they are often taken as weeds," said Will McClatchey, PhD, professor of botany at the University of Hawaii at Manoa, regarding medicinal plants of the semi-tropical and tropical Pacific islands (e-mail, April 15, 2008). "In fact, one odd aspect is that the most commonly used medicinal plants of the Pacific are coastal strand plants, or plants that live on the edge of the beach and ocean. These plants will actually do just fine as sea level rises. Individuals will be lost, but they are very tough and well adapted to storms and damage much like climate change will throw at them. Probably the greatest

threat that they will face is complete loss of some of the smallest islands, called atolls."

Dr. McClatchey noted that common medicinal plants of the Pacific islands include noni (*Morinda citrifolia*, Rubiaceae), naupaka (*Scaevola* spp., Goodeniaceae), kukui (*Aleurites moluccana*, Euphorbiaceae), and milo (*Thespesia populnea*, Malvaceae). These and other medicinal plant species of the area grow relatively fast, have high reproduction rates, and are typically resistant to salt water and wind, making them more resilient to some of the predicted effects of global climate change.

Bertrand de Montmollin, chair of the Mediterranean Islands Plant Specialist Group of the IUCN, similarly stated that medicinal plants of the Mediterranean islands do not appear to be under any considerable threat from conditions of climate change (e-mail, April 17, 2008). According to de Montmollin, most wild collected MAPs, such as thyme (*Thymus* spp., Lamiaceae) and rosemary (*Rosmarinus* spp., Lamiaceae), are rather widespread and located at lower altitudes, making them less vulnerable to climate change than plants with narrower ecological requirements.

"The mountain climate in the Mediterranean islands is not so extreme," he added. "Most of the plants can easily be cultivated ex situ. In Crete, medicinal plants are mostly cultivated in the mountains, in a climate very close to their original one."

Rainforest ecosystems are also considered to be particularly threatened by climate change. Climate modeling studies have indicated that these regions are likely to become warmer and drier, with a substantial decrease in precipitation over much of the Amazon.<sup>15</sup> Such changes could ultimately convert areas of the Amazon's tropical forest into dry savannah and result in significant loss in biodiversity, according to the latest IPCC report.<sup>1</sup>

There is not much, if any, published evidence on MAPs that could be at risk in the rainforest from climate change, and regional experts that were contacted for this article were unable to comment on specific MAPs that may be vulnerable to climate change in rainforests. However, the expected loss of general biodiversity in the Amazon, as noted in the IPCC report, indicates the potential to lose both known and undiscovered MAP species.

"There are plenty of data to show that 70% of our drugs are based on natural plant medicines, at least in precursor forms," said John Janovec, PhD, research botanist of the Botanical Research Institute of Texas and director of the Andes to Amazon Biodiversity

Program (e-mail, May 8, 2008). "Yet only about 1% of the 400,000 flowering plant species on the planet have ever been screened for medicinal compounds. Compare this to the distribution of the diversity of plants on the planet. A large percentage of plants occur in tropical rainforests, and a large portion of those are found in the neotropical region, especially the Andes-Amazon region of South America."

According to Dr. Janovec, impending climate change is just one factor that could contribute to the loss of MAPs in the Amazon. The region is also being negatively affected by deforestation and burning, unwise exploitation of the land, and rapid population growth. Loss of MAPs, coupled with loss of traditional knowledge by the indigenous peoples of these areas, could prevent important health discoveries and options in the future.

Thus, experts interviewed for this article expressed limited

## Islands are considered especially at risk from rising ocean levels, in addition to changing temperatures and weather patterns.

concern over the fate of MAPs within islands and rainforests, despite the fact that these ecosystems are also occasionally cited as being particularly threatened by future climate change.

### Widespread Effects of Climate Change on Medicinal and Aromatic Plants

Some effects of climate change appear to be impacting plants worldwide. For instance, evidence has shown that climate change has been affecting vegetation patterns such as phenology (the timing of life cycle events in plants and animals, especially in relation to climate) and distribution.<sup>1</sup> Some wild plants, including MAPs, have begun to flower earlier and shift their ranges in response to changing temperatures and weather patterns. Shifting phenologies and ranges may seem of little importance at first glance, but they have the potential to cause great challenges to species' survival. They further serve as harbingers of future environmental conditions from climate change. Increased weather extremes are also predicted to accompany climate change,<sup>1</sup> and plant species' resilience in the face of these weather events may also factor into their abilities to adapt and survive.

### Shifts in Phenology

The life cycles of plants correspond to seasonal cues, so shifts in the timing of such cycles provide some of the most compelling evidence that global climate change is affecting species and ecosystems.<sup>16,17</sup> Available evidence indicates that spring emergence has generally been occurring progressively earlier since the 1960s.<sup>17</sup> Such accelerated spring onset has generated noticeable changes in the phenological events of many plant species, such as the timing of plants' bud bursts, first leafings, first flowerings, first seed or fruit dispersal, etc. Records indicate that many plants—including MAPs—have started blooming earlier in response to the earlier occurrences of spring temperatures and weather.

A 2003 meta-analysis of 9 phenological studies from various countries, involving 172 plant and animal species, found a mean shift toward earlier spring timing of 2.3 days per decade.<sup>18</sup> Many studies have shown that plant species that normally flower in early spring are experiencing some of the greatest acceleration from warming, whereas species active later in the growing season can be unresponsive or experience delayed phenological events.<sup>16</sup> Plants in the wild appear to be more disposed toward phenological shifts than cultivated plants.

Researchers from Boston University, led by Biology Professor Richard Primack, PhD, have spent the past several years collecting phenological data of plants and birds in the Concord area of New England in the United States.<sup>19</sup> They have used the notes of renowned American naturalist Henry David Thoreau (1827-1862), in addition to herbarium records and local historical accounts, to create a baseline of spring events dating back to the 1850s. Their data indicate that many of the region's plants are now flowering more than a week earlier than when Thoreau recorded such events, just a little more than 150 years ago.

Of the hundreds of plant species tracked by the Boston University researchers, several are medicinal plants. According to Abraham Miller-Rushing, PhD, who compiled data with Dr. Primack and now serves as a postdoctoral researcher for the Rocky Mountain Biological Laboratory, wild medicinal plants in the Concord area that have experienced accelerated flowering times include wormwood (*Artemisia absinthium*, Asteraceae), feverfew (*Tanacetum parthenium*, Asteraceae), and cranberry (*Vaccinium macrocarpon*, Ericaceae). St. John's wort (*Hypericum perforatum*,

Top photo: Records show that feverfew (*Tanacetum parthenium*) is now flowering earlier in the Concord area of New England in the United States.

Bottom photo: St. John's wort (*Hypericum perforatum*) now flowers 6 days earlier than it did in the mid-1800s in the Concord area. Photos ©2009 Steven Foster



## If a cold spell occurs a few days or weeks after early blooming has commenced, then those early buds or fruits could freeze, potentially killing or affecting the production of some economically useful plants.

Clusiaceae) now flowers 6 days earlier than in Thoreau's day, and peppermint (*Mentha x piperita*, Lamiaceae) now blooms 10 days earlier (A. Miller-Rushing, oral communication, March 20, 2008).

The phenological data gathered by the Boston University researchers may offer a good prediction of how plants' life-cycles may be changing across similarly developed areas of the United States. According to Dr. Miller-Rushing, heavily developed urban areas such as Concord are typically experiencing greater temperature rises than rural areas. Much of this greater temperature rise is attributable to urban heat island effect, a phenomenon related to increased urbanization in which parking lots, streets, and buildings absorb heat while vegetation loss lessens the natural cooling effects of shade and evaporation of water from soil and leaves. Long-term weather data show that spring temperatures in Concord have risen by approximately 4.5° F, which is above the global average of about 1.5° F. Dr. Miller-Rushing noted that many rural areas, on the other hand, are experiencing temperature increases close to the global average.

Naturalist organizations and collaborations around the world have been tracking phenological shifts of plants and animals by encouraging citizens to enter personal observations and historical records of phenological events into online databases. Such a national initiative, called Project Budburst, was launched in February 2008 in the United States.<sup>20</sup> Nature's Calendar, a similar organization based in the United Kingdom, receives data entries from thousands of recorders each year. Nature's Calendar was launched as a national initiative in 2000, and its database contains phenological information on many species from previous centuries. Data from Nature's Calendar provides evidence that many UK plants have begun to bloom earlier, including such widely used medicinal plants as hawthorn (*Crataegus monogyna* and *C. laevigata*, Rosaceae) and horse chestnut (*Aesculus hippocastanum*, Hippocastanaceae).

"There has been an advance in the flowering dates of most British plants," explained Kate Lewthwaite, phenology manager of Nature's Calendar (e-mail, April 4, 2008). "Species like hawthorn and horse chestnut are good [to track] because they are widely distributed and recognized and are very responsive to temperature. Hawthorn in particular may be up to 10 days earlier for each 1° C rise in temperature. In 2007, the warmest spring since records began in 1659, it flowered on 18 March (UK average). A typical date for the 30 year average would be 3 April. Horse chestnut flowered on 4 April; the 30 year average is 15 April." (The 30 year average refers to data from 1961-1990, which the UK Meteorological Office identifies as the latest complete set of data that meets the definition of a long term temperature period.)

Shifts in plant phenology could lead to any of several disruptive ecological effects. The timing of a plant's life cycle can affect whether it reaches optimal seed set before the end of the growing season. Phenological variation between plant species in the same ecosystem can reduce competition for pollinators and other resources, and, conversely, phenological similarities can benefit plants that rely on other species to attract pollinators. The timing of growth stages can also determine the length of the growing season. Furthermore, it is possible that interdependent species—

such as particular plants and their pollinators—may not shift their phenologies in harmony with one another, and such mistimed relationships could pose a danger not only to the plant species' survival but also the pollinators, having a concomitant cascade effect on the rest of the ecosystem.<sup>2,17,19</sup>

Dr. Miller-Rushing posits that phenological shifts will likely result in "winners" and "losers." Some species may benefit from phenological shifts; others may become threatened by these shifts. He added that most medicinal plant species are relatively common, so they are less likely to be under significant risk of threat from these phenological changes. Rare MAP species occurring in small populations, however, would be more endangered by any form of environmental stress, including climate change.

"Plants have a lot of time-sensitive relationships, and many will be disrupted in the future from climate change," said Dr. Miller-Rushing. "Our best guess is that things are going to get shaken up, but we don't know exactly how."

Dr. Miller-Rushing noted that there is a lot of variability between species, and it can be difficult to predict how climate change will affect the phenologies of different plants. Highbush blueberry (*V. corymbosum*), for instance, is flowering 2 to 3 weeks earlier in the Concord area than it did in the mid-19<sup>th</sup> century, whereas many other plants have not demonstrated any change at all.

According to Chuck Wanzer of Botanics Trading LLC, a company based in Blowing Rock, North Carolina, phenological shifts of medicinal plants are not significantly affecting wild harvesting practices. He noted that there have always been variations in the timing of the seasons, and collectors of wild medicinals are accustomed to adjusting their harvesting schedules accordingly. "There's always been earlier springs and later springs, and you can adapt to that," he explained (oral communication, April 14, 2008). "But if you keep having early springs, it can change whether a species can survive in that area."

In particular, Wanzer noted that early blooming can become detrimental if an area is prone to cold spells late in the spring season. If a cold spell occurs a few days or weeks after early blooming has commenced, then those early buds or fruits could freeze, potentially killing or affecting the production of some economically useful plants. Apple orchards of North Carolina suffered severely from this type of scenario in 2007,<sup>21</sup> and Wanzer noted that the medicinal plant bloodroot (*Sanguinaria canadensis*, Papaveraceae) has also been susceptible to frost following early blooming.

In some areas of the world, plants are experiencing not only earlier springs but also warmer spring temperatures that are more typical of summer. Dr. Hans-Jürgen Hannig, head of the department of cultivation and plant breeding for the German-based company Martin Bauer, arguably the world's largest botanical raw materials supplier, commented that this phenomenon has been affecting many areas of Europe over the past few years (e-mail from V. Wypyszyk, July 20, 2008). Several European countries have experienced severe heat waves lately; researchers have found that the frequency of hot days has nearly tripled and that the duration of heat waves has doubled in Western Europe since 1880.<sup>22</sup>

"We are observing that for the last 5 to 10 years, a 'normal' spring period is absent," said Dr. Hannig. "There is an abrupt transition from winter to summer with temperatures in April and May



Jackpine trees in the Boreal forest of northern Ontario, Canada. With increased warming, more plants (such as those from the Boreal forest) will be able to move farther north and encroach into Arctic territories, where they will compete for resources with preexisting flora. ©2009 Global Forest Watch

that are more typical for summer temperatures. This has caused, for example, that throughout Europe spring planting of chamomile [*Matricaria recutita*, Asteraceae] has been disastrous with an average loss of yield of 80%.”

### Shifting Ranges

Changes in climate are also causing plants to migrate into new ranges. Studies and computer modeling programs have found that plants’ ranges have begun to shift towards the poles and/or to higher elevations in an effort to “reclaim” appropriate growing zones.<sup>17,18</sup>

A 2003 meta-analysis of 3 studies, including data on climate-related range shifts of 99 plants and animals of different Northern-hemisphere countries, found that range limits of species have advanced an average of 6.1 km per decade northward (or meters per decade upward).<sup>18</sup> The Mapped Atmosphere-Plant-Soil System Study (MAPSS), a global scale vegetation distribution model that simulates the potential natural vegetation that could exist in areas under present and future climate scenarios, also indicates a global poleward migration of plants from conditions of climate change, including northward migration of vegetation in the United States.<sup>23</sup> The Arbor Day Foundation released an updated map of US hardiness zones for plants and crops in 2006 based upon climate statistics, showing significant northward shifts of warm zones within the country.<sup>24</sup>

Few, if any, studies have focused on range shifts of medicinal plant species (although some medicinal plants may be included in studies of larger plant populations). However, Wanzer of Botanicus Trading mentioned that, from his own observations, the range of economically useful saw palmetto (*Serenoa repens*, Arecaceae) plants appears to be slowly shifting northward due to warming temperatures and changing rain patterns. Saw palmetto grows only

in the Southeastern United States—primarily in Florida but also in southern areas of Georgia, Alabama, and South Carolina. In some of the northern areas of the plant’s range, saw palmetto is able to grow but does not produce a significant amount of berries. Over the last 2 years, Wanzer has noticed that wild saw palmetto berries seem to be more dominant in central Florida than southern Florida, although this has not been confirmed by any published reports of saw palmetto populations. He predicts that more berry-producing plants may eventually spread farther into Georgia (where the plants currently grow but do not typically bear fruit).

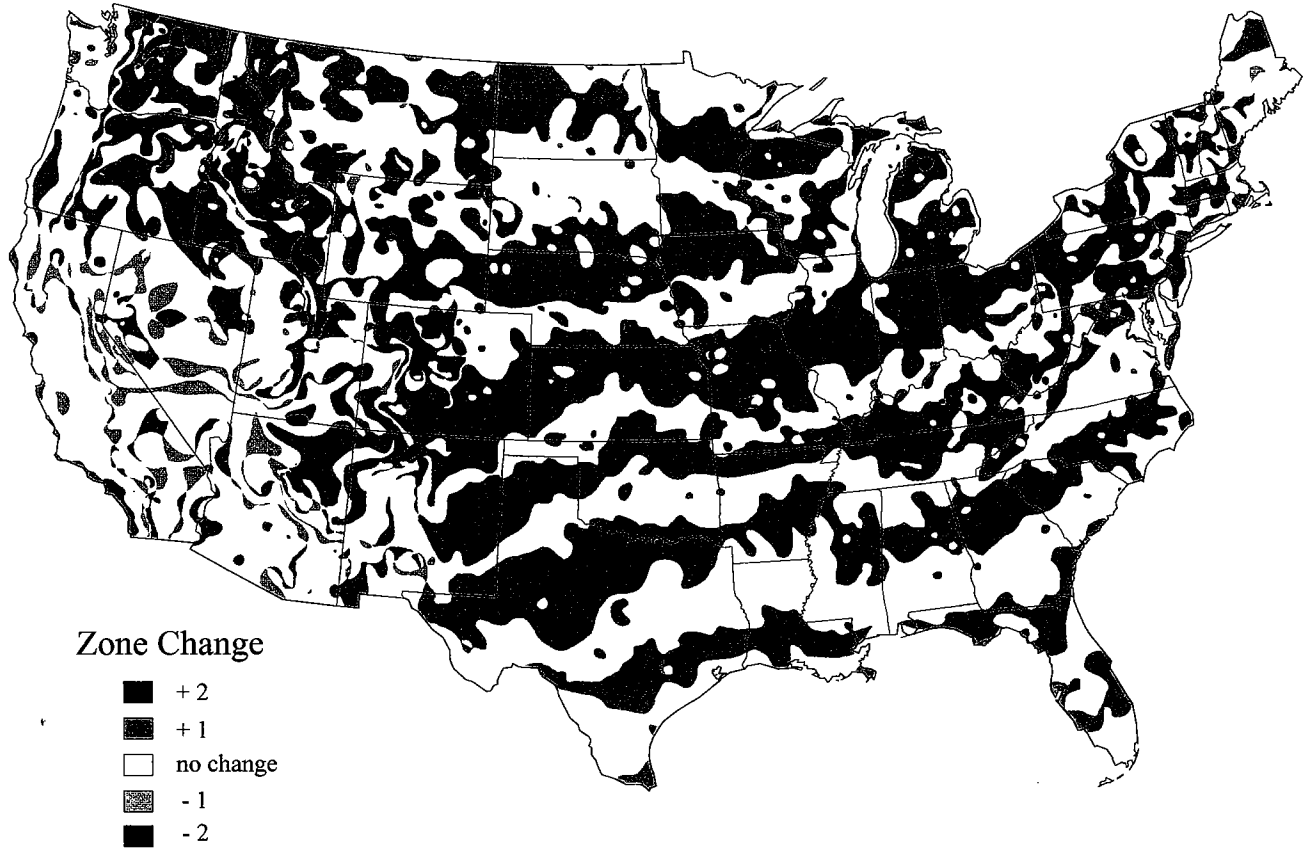
Computer models suggest that range shifts may accelerate over time, as a result of continued climate change. A 2005 article in the journal *BioScience* noted that the preferred ranges of many species could shift tens to hundreds of kilometers over only 50 to 100 years according to some simulations—“nearly an order of magnitude faster than may have occurred since the last glaciation.”<sup>25</sup>

A team of researchers from Germany and France recently used computer modeling to project how future climate and land use changes could affect the distribution of plant species in Germany.<sup>26</sup> This was the first study to estimate expected range changes of plants at a national scale under climate and land use conditions.

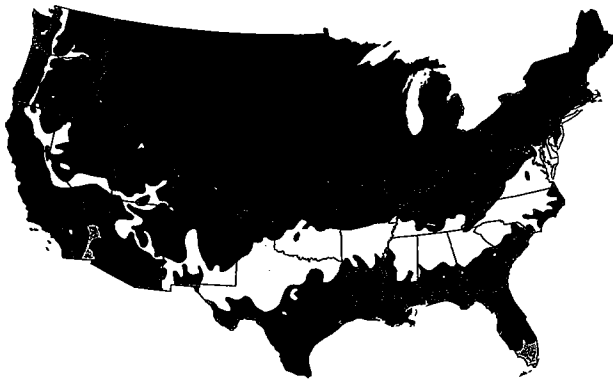
The researchers used different models and 3 different climate scenarios—forecasting moderate, intermediate, and severe climate changes—to estimate the ranges of 845 European plant species within Germany up to the year 2080. Only 550 of the selected plant species are currently recorded in Germany. As might be expected, the authors found that range loss and gain were generally most dramatic under conditions of severe climate change, with less extensive range changes associated with lower levels of warming. However, even the results of the moderate climate change scenario suggest that German flora would be affected negatively by future climate change and land use patterns. Species that are currently



Differences between 1990 USDA hardiness zones and 2006 arborday.org hardiness zones reflect warmer climate



1990 Map



After USDA Plant Hardiness Zone Map, USDA Miscellaneous Publication No. 1475, Issued January 1990

2006 Map



National Arbor Day Foundation Plant Hardiness Zone Map published in 2006.

Zone



© 2006 by The National Arbor Day Foundation®

Using climate statistics, the Arbor Day Foundation released an updated map of US hardiness zones for plants and crops in 2006, showing significant northward shifts of warm zones within the United States. The map indicates that significant portions of many states have shifted at least one full hardiness zone since 1990. Hardiness zones are based on average annual low temperatures using 10 degree increments. The average low temperature for zone 2 is -40 to -50° F, for zone 3 is -30 to -40° F, for zone 4 is -20 to -30° F, for zone 5 is -10 to -20° F, for zone 6 is 0 to -10° F, for zone 7 is 0 to 10° F, for zone 8 is 10 to 20° F, for zone 9 is 20 to 30° F, and for zone 10 is 30 to 40° F. Graphic ©2009 Arbor Day Foundation

not recorded in Germany could migrate into the country as the climate warms, potentially disrupting existing species pools.

One medicinal plant included in the researchers' projections was aconite (*Aconitum napellus*, Ranunculaceae), which demonstrated a loss of over 70% of its current range within Germany under all 3 climate scenarios. A medicinal species with large expected range gains under all 3 climate scenarios, on the other hand, is peony (*Paeonia officinalis*, Paeoniaceae).

The researchers further found that certain areas of Germany may be particularly susceptible to species loss and turnover (variation in species composition), such as the eastern and southwestern regions of Germany.

"In our analysis, we identified differences of local vulnerability of species distribution under scenarios," said lead author Sven Pompe of the Helmholtz Centre for Environmental Research in Germany (e-mail, June 25, 2008). "For instance, *Stellaria media* [chickweed (Caryophyllaceae)] or *Salix alba* [white willow (Salicaceae)] have great range loss in the east of Germany: We hypothesize that drier conditions and higher temperatures (in combination) lead to local extinctions of species."

Many uncertainties exist regarding how the ranges of plant species might be affected by future climate change, including the extent to which cultivated crops may be affected. According to Ronald Neilson, PhD, bioclimatologist for the US Forest Service, models such as MAPSS do not typically include simulations of agricultural crops (oral communication, June 4, 2008). Although it is expected that range shifts of cultivated plants would occur due to climate change, he said it is not entirely clear what type or degree of range shifts might take place. He added that there is some indication that agricultural crops will be more adaptable to climate change than natural ecosystems, but some regions may become significantly less productive. A recent report published by Botanic Gardens Conservation International noted that changes in patterns of crop distribution will have to occur with altered temperature ranges and rainfall availability. Some areas of the world are expected to gain increased suitable cropland, whereas others—particularly developing regions of Africa and South Asia—are predicted to experience marked declines in crop yield.<sup>27</sup>

The range shifts of wild plants from climate change could ultimately jeopardize the survival of some species. Dr. Neilson explained that all ecosystems contain a spectrum of species with varying degrees of migratory potential. At one end of this spectrum are those species that can migrate rapidly and aggressively, and at the opposite end are the specialist species with limited mobility. According to Dr. Neilson, vegetation will migrate in bands, with the fastest, most invasive species at the front, the slowest at the rear, and all others in between.<sup>25</sup> This could cause situations where early successive species invade areas with slow-moving endangered species, and the 2 species may have to compete with one another. Moreover, some slow-moving species may not be able to migrate quickly enough to keep pace with range shifts generated by climate change. Natural and human-made barriers to migration could also affect the survival of some species undergoing climate-induced range shifts.

Some modeling programs do indicate that habitat loss and migratory challenges related to climate change could result in

extinctions of many endemic species throughout the world.<sup>28,29</sup> Because of the migratory challenges that some species will face as they respond to climate change, some government and wildlife organizations are discussing the possibility of actively assisting species migration. This could be done by opening broad swaths of wild land as migratory pathways, establishing new protected areas, restoring degraded habitat, and reducing the intensity of management in some areas to help connect fragmented habitats and encourage successful species dispersion.<sup>27,30</sup>

## The Impact of Extreme Weather Events

Mounting evidence indicates that extreme weather events such as storms, droughts, and floods have become more prevalent and intense across the globe in recent years.<sup>1,2</sup> The frequency and severity of these events are expected to increase in the future as a result of continued warming, having negative effects on human health, infrastructure, and ecosystems. (It is important to note, however, that although trends in extreme weather events have been observed and projected, it is still difficult to attribute individual weather events directly to global warming.) Extreme weather events have been known to affect harvesters' and cultivators' abilities to grow and/or collect medicinal plant species, and such difficulties have certainly been reported in recent years.

Europe has experienced particularly devastating droughts and floods in recent decades. An intense heat wave and drought struck Europe in 2003 that caused up to 35,000 deaths, while heavy precipitation and flooding occurred throughout areas of Europe in 2002 and 2005.<sup>31,32</sup> Climate model simulations indicate that Europe could experience a pronounced increase in year-to-year climate variability and that both droughts and floods could become even more frequent and intense in the future.<sup>1,33,34</sup>

Extreme weather conditions throughout Europe are impacting medicinal plant production from seeding to harvesting. According to Dr. Hannig of the Martin Bauer company, the extremely dry soil conditions resulting from recent abnormally hot summers has prevented successful fall reseedling of some medicinal plants, such as chamomile in Germany and Poland. Dr. Hannig added that 2007 marked the first year that fennel (*Foeniculum vulgare*, Apiaceae) was recorded as having no yield at all in Bulgaria, due to drought conditions during the spring in that country. Serbia's long and dry summers, which have been accompanied by other extreme weather conditions such as strong rains and winds, have sometimes made it impossible for harvesters to perform second

cuttings of the aerial parts of cultivated herbs such as peppermint. Hungary, meanwhile, has been experiencing increasingly severe flooding for the past 3 to 4 years, which has led to yield deficits for both fennel and anise (*Pimpinella*

## Extreme weather conditions throughout Europe are impacting medicinal plant production from seeding to harvesting.

*anisum*, Apiaceae).

Medicinal plants on other continents have also been impacted by severe weather conditions. Africa's Sahel region experienced one of the most severe droughts of the 20<sup>th</sup> century. Although there has been debate as to the primary cause of this drought, some climate models indicate that human-induced aerosol loading and increased greenhouse gases are at least partly responsible for the region's drying trend.<sup>35</sup> Climatic conditions in the Sahel have improved

slightly in recent years, but the future is uncertain. Some models suggest that rainfall in the Sahel may increase in future years; others suggest that drought conditions could become even more severe than that already experienced in the 20<sup>th</sup> century.<sup>35</sup>

According to Denzil Phillips, business advisor for the Association for African Medicinal Plant Standards (AAMPS), an organization that has been developing and promoting quality control standards for African medicinal plants, medicinal plants of the Sahel include hibiscus (*Hibiscus sabdariffa*, Malvaceae), myrrh (*Commiphora africana*, Burseraceae), frankincense (*Boswellia* spp., Burseraceae), baobab (*Adansonia digitata*, Malvaceae), moringa (*Moringa oleifera*, Moringaceae), and various aloes (*Aloe* spp., Liliaceae). Phillips stated that most of these medicinal plants are primarily grown or collected for local markets. He stressed that environmental degradation associated with the areas' civil wars and mass migrations have, to date, had a far greater impact on medicinal plant production and collection than problems attributable to climate change. However, future drought from climate change could have devastating effects on the region's already suffering ecosystems and harvesting capabilities.

"Since only a very small minority of cultivated medicinal plants in Africa are grown using irrigation, the impact of global warming and low rainfall is extremely serious," said Phillips (e-mail, June 27, 2008). He explained that prices of medicinal plants have already risen substantially in many areas due to increased collection costs and declining yields. This often leads healers to switch to cheaper alternatives that are typically of inferior quality or to use less ingredients than are traditionally employed. He added that Africans may ultimately begin to move away from wild harvesting practices and reliance upon rain-fed crops in favor of irrigation, where possible, and there may also be a shift of production toward the more humid tropics.

India, whose climate is largely controlled by an annual monsoon, appears to be experiencing increasingly severe and erratic precipitation. A recent study found that the overall amount of monsoon rainfall across central India has remained relatively stable over the past century; however, moderate rainfall events during monsoon seasons have significantly decreased while extreme rainfall events have greatly increased since the early 1980s.<sup>36</sup> This increase in extreme rainfall events could indicate greater potential for future natural disasters. Experts have claimed that the frequency and intensity of flooding has likewise been increasing in India in recent years,<sup>37</sup> and hailstorms have caused huge agricultural losses across areas of India lately.<sup>38</sup>

CE Roeper, a German-based supplier of natural raw materials such as resins, gums, and herbal ingredients for the food and pharmaceutical industry, obtains some of its raw materials from Northern India. Jörn Herrmann, a sales manager for CE Roeper, visited the states of Rajasthan and Gujarat in April 2008. According to Herrmann, these 2 states experienced hailstorms and rains in 2006, 2007, and 2008, at times when such events traditionally have not occurred within the past 50 years (e-mail, July 30, 2008). During his trip there, Herrmann spoke with "some very old farmers" who indicated that they had never seen these phenomena before. Hail and rainstorms have also damaged psyl-

lium (*Plantago ovata*, Plantaginaceae), wheat (*Triticum aestivum*, Poaceae), and cumin (*Cuminum cyminum*, Apiaceae) crops in the area. The destruction of Indian psyllium crops from hail and rainstorms resulted in a smaller than usual annual yield for 2008. Similarly, Herrmann noted that the availability of menthol crystals was affected by heavy monsoon rainfall, which occurred earlier than usual in Northern India and reportedly damaged wild mint (*Mentha arvensis*, Lamiaceae) crops in 2008.

Hurricane seasons could also be affected by climate change, although experts do not agree on the possible effects. Some experts believe that hurricanes will increase in frequency, duration, and intensity; others predict that hurricanes will either

not be significantly affected or might even be inhibited by factors related to warming.<sup>39</sup> Regardless, shifts (whether increasing or decreasing) in hurricane activity have the potential to affect the availability of medicinal plants. Several hurricanes that hit the Southeastern United

## Climate change may not currently represent the biggest threat to MAPs, but it has the potential to become a much greater threat in future decades.

States in 2004, for instance, decimated saw palmetto crops that year, contributing to a temporary shortfall of saw palmetto available on the market.<sup>40</sup>

Increasing evidence and studies have thus shown that at least some types of extreme weather events have been striking more frequently and with greater force throughout the world. Although particular weather events cannot be definitively blamed on climate change, the negative effects of some recent droughts, storms, and floods on herbal crops demonstrate the threat that increased extreme weather could pose to the availability and supply of MAPs.

### Conclusion

The effects of climate change are apparent within ecosystems around the world, including medicinal and aromatic plant populations. MAPs in Arctic and alpine areas face challenges associated with their rapidly changing environments, and some researchers have raised concerns regarding the possible losses of local plant populations and genetic diversity in those areas. Shifting phenologies and distributions of plants have been recorded worldwide, and these factors could ultimately endanger wild MAP species by disrupting synchronized phenologies of interdependent species, exposing some early-blooming MAP species to the dangers of late cold spells, allowing invasives to enter MAP species' habitats and compete for resources, and initiating migratory challenges, among other threats. Extreme weather events already impact the availability and supply of MAPs on the global market, and projected future increases in extreme weather are likely to negatively affect MAP yields even further.

"As research is emerging on the effects of climate on vegetation in general, there continues to be a dearth of information on medicinal (economic) plants," said Patricia DeAngelis, PhD, botanist at the US Fish and Wildlife Service and chair of the Plant Conservation Alliance—Medicinal Plant Working Group (e-mail, September 17, 2008). "Although some information can be gleaned from general floral research, what makes medicinal plants unique from other flora is the fact that they, along with other economically

useful plants, are collected for human use." Dr. DeAngelis continued that there is a need for more research into the effects of climate fluctuations on plants in general, but there is especially a need for research that incorporates ethnobotanical information (such as the perceived availability of species, changes in collection practices, etc) as it pertains to effects of climate fluctuations on MAP species.

Climate change may not currently represent the biggest threat to MAPs, but it has the potential to become a much greater threat in future decades. Many of the world's poorest people rely on medicinal plants not only as their primary healthcare option, but also as a significant source of income. The potential loss of MAP species from effects of climate change is likely to have major ramifications on the livelihoods of large numbers of vulnerable populations across the world.<sup>27</sup> Further, the problems associated with climate change are likely to be much more difficult to combat than other threats to MAPs. Dr. Salick of the Missouri Botanical Garden noted that laws can be passed to stop deforestation and over-collection, and in some cases such laws have achieved immediate results. The problems posed by warming temperatures, disrupted seasonal events, extreme weather, and other effects of climate change, on the other hand, cannot be so quickly and easily resolved.

Climate change and its effects will certainly increase in the near future, although the extent to which they do so cannot presently be determined. The effects of climate change on medicinal plants, in particular, has not been well-studied and is not fully understood. As the situation unfolds, climate change may become a more pressing issue for the herbal community, potentially affecting users, harvesters, and manufacturers of MAP species. HG

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# COMPARISON OF HERBAL PRODUCT USE IN THE TWO LARGEST BORDER COMMUNITIES BETWEEN THE US AND MEXICO

By Armando González-Stuart, PhD, and José O. Rivera, PharmD

Over the past few decades, there has been a steady increase in the use of herbal products in various countries around the world, including the United States. Research undertaken at the University of Texas at El Paso and the University of Texas at Austin Cooperative Pharmacy Program indicates that approximately 70% of the people living in the adjoining cities of Ciudad Juarez, Mexico, and El Paso, Texas, use diverse types of herbal products, both for medicinal as well as aesthetic purposes. Due to their popularity in Mexican traditional healing systems, the use of medicinal herbs along this border community is higher when compared to the rest of the United States.



## The Surge of Complementary and Alternative Medicine in the United States

During the early 1990s, the use of complementary and alternative medicine (CAM), including herbal and dietary supplements, increased exponentially in the United States. The congressional passage of the Dietary Supplement Health and Education Act (DSHEA) in October of 1994 classified herbs and herbal supplements as foods, thereby facilitating their integration into the mainstream market and making them available to the general public.<sup>1</sup> (Note: Items classified as drugs or food additives require pre-market approval by the Food and Drug Administration.)

The results of a landmark national telephone survey conducted by David M. Eisenberg and collaborators in 1998 revealed that use of various CAM therapies in the United States increased from 33.8% in 1990 to 42.7% in 1997.<sup>2</sup> A 2002 study found that 62% of those surveyed used some form of CAM in the past 12 months.<sup>3</sup> Among the diverse types of dietary supplements, herbal product use has shown a steady increase compared to other CAM modalities.<sup>1,3,4</sup> The sale of herbal dietary supplements rose from an estimated \$4.6 billion in 2006 to \$4.8 billion in 2007.<sup>5</sup>

## Prevalence of Herbal Product Use Along the US-Mexico Border

Mexico and the United States share a 3000 km (1864 mile) border, and the border region has been defined as the distance of 100 kilometers (62.5 miles) in each direction of the dividing line between the 2 nations. This region includes a combined population of approximately 24 million people between the 2 countries.<sup>6</sup> The cities of El Paso, Texas, and Ciudad Juarez, Mexico, (hereinafter referred to simply as Juarez) together comprise the largest border community in North America with a combined population of more than 2 million people.<sup>7</sup> Every month, millions of people cross back and forth between the 2 countries,<sup>8</sup> sometimes bringing with them diverse herbal products used as foodstuffs as well as therapeutic agents.

A survey by the University of Texas at El Paso and UT-Austin Cooperative Pharmacy Program was conducted by means of bilingual questionnaires sent to 1000 homes, 500 in El Paso and 500 in Juarez.<sup>9</sup> The results of these questionnaires revealed that almost 70% of the combined population of both cities uses some sort of herbal product to treat various diseases and other physical ailments, a figure that is much higher compared to the rest of the United States (approximately 20%).<sup>10</sup>

## The Therapeutic Use of Herbs as a Mexican and Mexican-American Tradition

Various herbal products have been used traditionally by many Mexicans and Mexican-Americans for the treatment of a multitude of ailments.<sup>11,12</sup> Mexico has a rich tradition of herbal use, predating the European conquest by many centuries. This country's herbal pharmacopeia includes from 3,000 to 5,000 species of plants, which are commonly used by more than 60 different ethnic groups.<sup>13</sup> The use of medicinal plants as a healing option is a commonly accepted practice among various natural health providers in Mexico.<sup>14</sup>

Some of the various reasons for higher herbal use within the border communities between the United States and Mexico may include Mexico's rich diversity of medicinal plants, as well as the ancestral use of healing herbs by Mexicans and people of Mexican descent. Many people of Mexican descent living in the United States follow a traditional method of folk healing similar to that used in Mexico, using some herbs to treat diverse illnesses much in the same way their ancestors did.<sup>15</sup>

US Hispanics of various age groups seem to have a positive opinion of the use of medicinal herbs for the treatment of various ailments. The use of various alternative therapies, especially herbal medicine, seems to be equally prevalent among Hispanics regardless of origin. Hispanics living in the United States who may have come from the Caribbean, Central or South America, tend to have a cultural heritage of using herbs for various illnesses; however, some specific characteristics of users can vary widely, depending on the specific alternative therapeutic modality.<sup>15,16</sup>

Another factor that may explain the popularity of herbal medicine in both communities is that most herbal products are accessible to the border population without a prescription, as herbal products in both the United States and Mexico are classified by their respective health authorities as foods or dietary supplements, not as pharmaceutical drugs.<sup>1</sup> Many herbal products (especially the crude herbs sold to make teas) may also cost far less than conventional medications. However, the true efficacy of some herbs may be quite variable, and there is limited published clinical information regarding many plants commonly used in Mexican traditional medicine. In addition, certain herbal products may cause adverse reactions, either by direct toxicity or by interacting with prescription or over-the-counter (OTC) drugs.<sup>17</sup>

## Characteristics of Herbal Providers in the Largest Cities on Both Sides of the US-Mexico Border

In the 2 largest communities along the US-Mexico border, Juarez and El Paso, another survey found contrasts regarding the preference, presentation, and manner of usage for various herbal products commercialized by retail herbal providers.<sup>18</sup> This survey of herbal product providers was designed to find out which herbal products were considered most popular, what conditions/diseases those products were being used to treat by their respective clients, the source of their knowledge regarding medicinal herbal products, and how long they had been in the business of selling herbs.

In El Paso, the herbalists/herbal providers were selected at random from the yellow pages contained in the local phone book, under the headings "herbs," "herbalists," and "alternative medicine and health practitioners." In Juarez, the providers were randomly selected from a list of current herbal providers/practitioners compiled by the authors of the survey during a previous visit to diverse parts of the city, since most providers of herbal products are not listed in the phone book. To be included in the survey, the stores in both Juarez and El Paso had to be in the primary business of selling herbal products. The interviews were conducted at the selected stores. Sixteen herbal providers were interviewed in El Paso and 20 in Juarez.<sup>18</sup>

One of the queries included in the questionnaire concerned the length of time the herbal providers had been involved in selling or recommending herbs. Sixty-five percent of the herbal stores from Juarez had been in business more than 11 years, compared to 31% for those in El Paso.

El Paso providers commented that some of their principal sources of information about herbs were courses and books. In contrast, herbal providers in Juarez mentioned that personal experience in dispensing herbs was an important aspect of their work, principally because this practical knowledge is still handed down traditionally from generation to generation among many Mexican families. Herbal providers in El Paso did not mention personal experience as often.<sup>18</sup>

Some of the information regarding the efficacy and safety of various herbs used in Mexican traditional medicine is only anecdotal. Unfortunately, this type of information is not reliable evidence for the safe use of many herbal products currently in use.<sup>19</sup> The true



Herb stall in the Sunday market, Tepoztlan, Morelos, Mexico  
 Photo ©2009 Juan Cordova

**Almost 70% of the combined population of both cities uses some sort of herbal product to treat various diseases and other physical ailments**

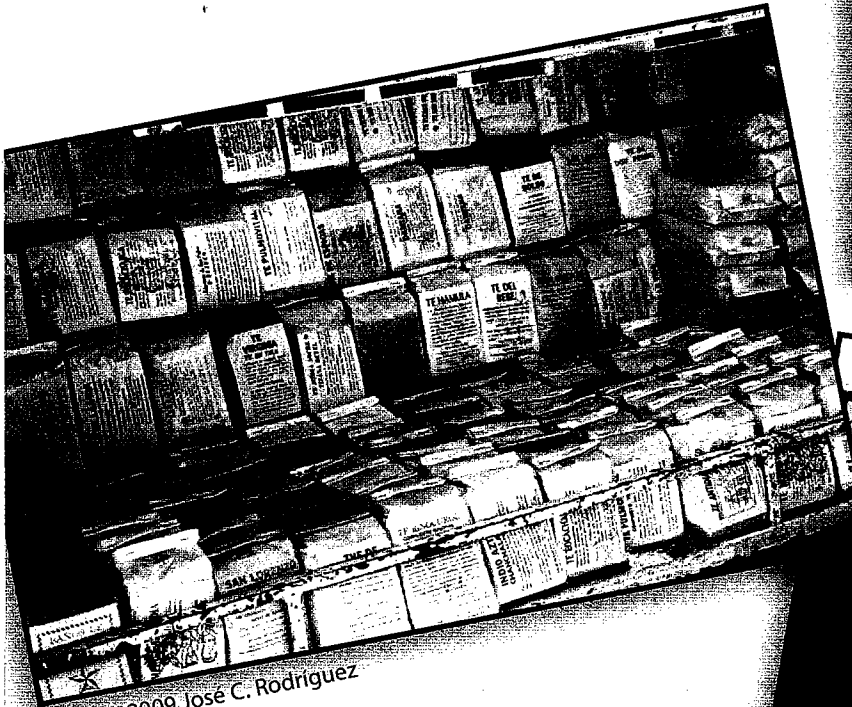


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medicinal value of many species is difficult to ascertain, since very few of the thousands of plants employed in Mexican traditional medicine have ever been researched in depth. There are, of course, exceptions. For example, some species of prickly pear cactus (*Opuntia* spp., Cactaceae), commonly known in Spanish as *nopal*, have been studied regarding their potential medicinal value in the treatment of type 2 diabetes and high cholesterol levels.<sup>20</sup>

### Types of Herbal Products Sold Along the US-Mexico Border

The types of herbal products used by the populations of both border cities can vary, although certain similarities do exist. For instance, German chamomile (*Matricaria recutita*, Asteraceae) and *Aloe vera* (Liliaceae) are very popular on both sides of the border.<sup>18</sup> Various products, ranging from simple crude herbs to processed products such as teas, liquid extracts, ointments, capsules, and tablets, are readily available on both sides of the border and used to treat a wide variety of ailments and conditions. Some products or supplements sold in herbal stores on both sides of the border do not contain solely herbs but can also be a combination of vegetable fiber, vitamins, minerals, and other ingredients.<sup>9</sup> Table 1 provides a listing of selected herbal products sold in Juarez and El Paso.

### Types of Diseases or Ailments Treated by Herbs

One of the most important questions in the herbal product provider survey was related to the major disease states for which the providers recommended certain herbal products or treatments.<sup>18</sup> In Juarez, the major ailments for which customers sought treatment were primarily diabetes and digestive problems. In El Paso, providers mentioned that clients sought herbal products to treat respiratory and digestive problems, as well as obesity.

Clients in Juarez purchased mostly crude herbs to be used as teas to treat specific diseases. In comparison, herbal products sold in El Paso were mainly processed herbal products sold as supplements, creams, tablets, capsules, or extracts used to treat conditions related to aesthetics (e.g., weight loss, baldness, and muscle mass augmentation), as well as to treat specific ailments.

Some of the commercial herbal products available in El Paso, especially those sold as extracts, tablets, and capsules, were manufactured in the United States, while the majority of those sold in Juarez were crude herbs originally from Mexico.<sup>18</sup>

### Safety Concerns of Herbal Product Use

Some safety concerns have been associated with the use of herbal products in Juarez and El Paso. Nowadays, many people may be taking multiple prescription medications that could be inadvertently mixed with herbal or nutritional supplements. Aside from interactions potentially occurring between 2 or more prescription medications, there is the potential in some cases for an adverse interaction between the medications and certain herbal products (e.g., garlic [*Allium sativum*, Alliaceae] and St. John's wort [*Hypericum perforatum*, Clusiaceae] with antiretroviral medications), which would not occur if these products were not taken concurrently.<sup>17,21</sup>

Another problem is that the majority of people who use herbal products for therapeutic reasons do not disclose this or other CAM therapies to their physicians. According to the UT survey mentioned previously,<sup>9</sup> the main reasons for this include the fact that some physicians do not routinely ask their patients about taking any CAM therapy concomitant to prescription or OTC medi-

cations, and also because most patients (67%) are wary of telling their physicians about their use of herbal products due to their fear of disapproval or ridicule. This situation is further complicated by what some have observed as a mostly negative attitude and lack of adequate knowledge about herbal products, as well as other CAM therapies, shown by some conventional healthcare providers on both sides of the border.

Additionally, the relatively limited regulatory oversight by the Mexican federal government allows manufacturers to produce and distribute herbal products that vary in quality and quantity of active ingredients. Quality control of herbal products in Mexico is essentially up to the individual or company that produces and markets them. There is currently no strict supervision or mandate for good manufacturing practices (GMPs) by either the state or federal governments. (Although there is more regulatory authority granted to the FDA in the United States, the degree to which the agency actually enforces such authority remains questionable.) Even though many plants have not been fully studied as to all of their potential bioactive ingredients, better supervision of GMPs involved in the processing of herbal supplements would make it easier for consumers to buy more trustworthy products. This is especially true in Mexico, where many herbal products are sold without adequate labeling of what they contain or only the mention of the common or regional name of the herb(s), which obviously can make the proper identification of the contents extremely difficult, at best.

The issue of improper use can also be a problem. Certain products such as *gordolobo* (*Gnaphalium* spp., Asteraceae) and *matarique* (*Psacalium decompositum*, Asteraceae), for example, should best be used under the guidance of a qualified health professional, especially if used over a long period of time, since these plants contain potentially hepatotoxic pyrrolizidine alkaloids. Additionally, these plants have not been studied in depth during pregnancy and lactation. Also worth noting is that few herbal products observed for sale in Juarez carried any warning or advisory information on the label or container.

When buying the "crude herb," safety becomes all the more important, since no precautionary information is mentioned and some of the clerks who sell the herbs have little, if any, information pertinent to the safety and precautions of various plants. A common notion is that since herbal products are natural, they are always safe, and therefore free of any adverse reactions. Unfortunately, this is not always true, due to a variety of factors, such as the intrinsic potential toxicity of a given herb or the possible herb-drug interaction with various prescribed or OTC medications.<sup>17,21-23</sup>

Common names of plants vary considerably from region to region, and this leads to confusion in trying to identify certain species of herbs. The herbal products provider survey indicated that some herbal products in Mexico were incorrectly classified; that is, the scientific name which appeared on the label was totally inconsistent with the photograph of the plant shown on the box or bottle.<sup>18</sup> The survey also found that some of the scientific names written on the labels of certain herbal extracts or tablets were outdated, indicating a lack of knowledge regarding the changes in botanical nomenclature.

Serious intoxications have occurred around the globe due to mislabeling of herbal products or erroneous identification of some plant species. A simple mistake made in the identification of an herb or the incorrect use of a certain part of a plant can have serious repercussions on the health of the consumer.

The manner in which herbs are stored and packaged is also a crucial factor determining their safety and effectiveness, since



incorrect storage of an herbal product can result in its deterioration due to environmental factors or contamination with chemicals or pests. The herbal product providers survey showed that points of sale in Juarez varied considerably with regard to organization and cleanliness.<sup>18</sup> This was especially true regarding the crude herbs usually used for teas. While some stores sold packaged herbal teas, others placed them on open containers, thus exposing the herbs to fumes from passing vehicles or possibly to pests (e.g., rodents or insects) that might be present in the shops at night.

## Conclusion

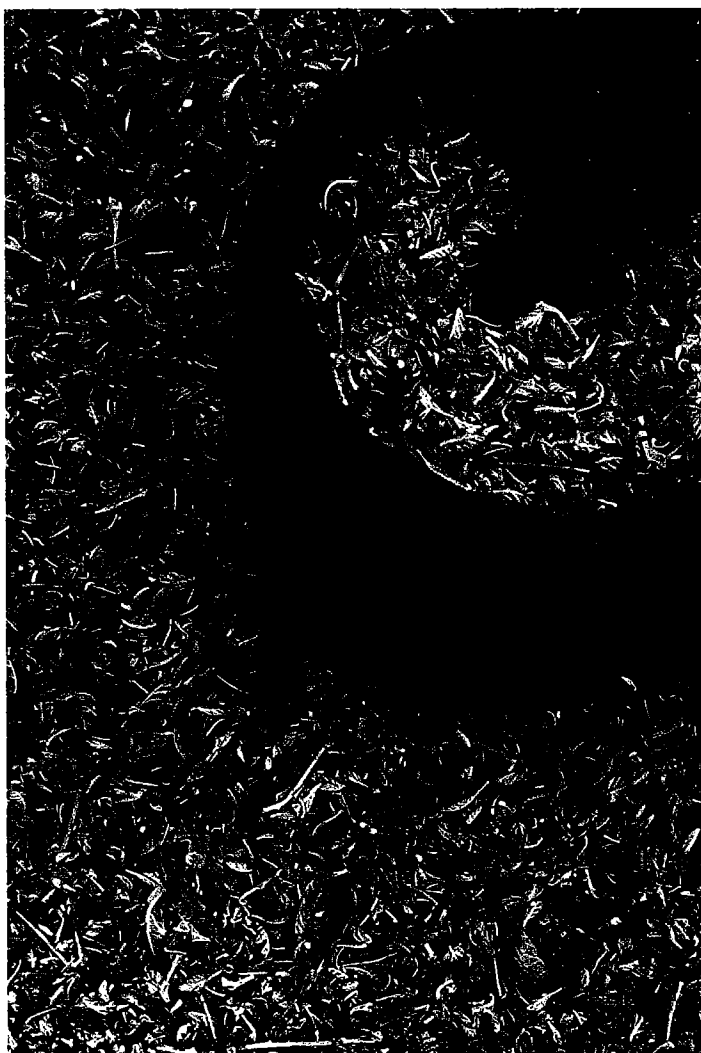
The neighboring cities of Ciudad Juarez and El Paso share many cultural similarities. Consequently, certain herbal products consumed by their respective populations are similar, although certain differences exist as to type of herbal product used, as well as the manner of use. Most herbal products bought in Juarez are raw herbs, which are used for the treatment of specific diseases, while herbal products purchased in El Paso tend to be of a more processed nature and taken as extracts, tablets, or capsules instead of the crude plant material. Many of the herbs currently employed in traditional medicine have therapeutic value, but much more research into their mode of action and safety, as well as increased quality control and better labeling (i.e., particularly in Mexico), need to be undertaken to ensure their correct application in both modern and traditional healing practices in this region.

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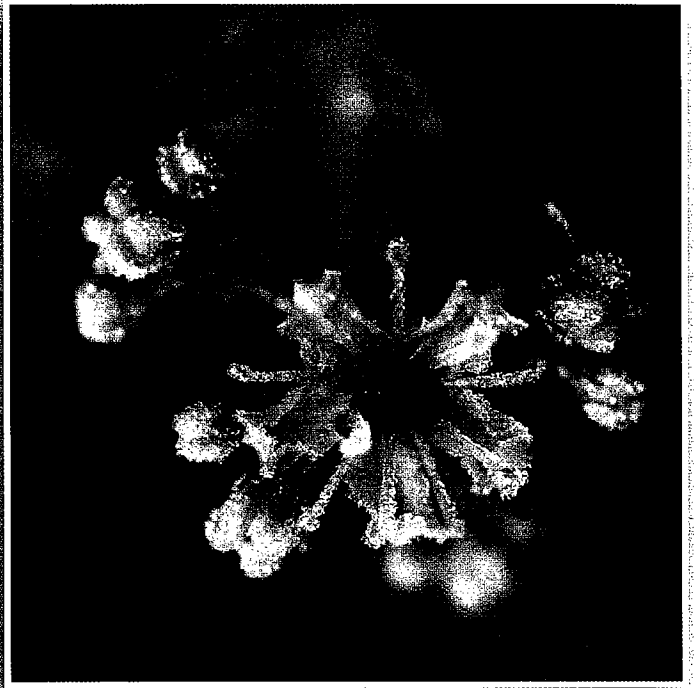
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*Damiana Turnera diffusa* Photo ©2009 Steven Foster

Table 1. Principal Herbal Products Sold in Ciudad Juarez, Mexico, and El Paso, TX.

Common name(s) (Common name(s) in Spanish)	Scientific name and botanical family	Principal use(s) in herbal medicine	Method(s) of use	Included in the top 20 herbs listed in Juarez survey	Included in the top 20 herbs listed in El Paso survey
Aloe vera ( <i>Sábila, Zábila</i> )	<i>Aloe</i> spp., Liliaceae	Burns	The gel is applied externally to burned skin	Yes	Yes
Camphor ( <i>Alcanfor</i> )	<i>Cinnamomum-camphora</i> , Lauraceae	Muscular pain and coughs	Creams and ointments applied externally	No	Yes
Centauray ( <i>Canchalagua, Tlanchalagua</i> )	<i>Erythraea chilensis</i> , Gentianaceae	Gastrointestinal complaints	Tea made from leaves	Yes	No
Cat's claw ( <i>Uña de gato</i> )	<i>Uncaria</i> spp., Rubiaceae	Arthritis, cancer	Tea from liana bark	Yes	No
Chamomile ( <i>Manzanilla</i> )	<i>Matricaria recutita</i> , Asteraceae	Internal use: Colic, stomach upset, relaxant for nervous conditions; External use: Eyewash	Tea made from flowers  Eye drops	Yes	Yes
Cinnamon ( <i>Canela</i> )	<i>Cinnamomum</i> spp., Lauraceae	Respiratory and stomach problems, diabetes	Tea made from bark	No	Yes
Citrus blossom ( <i>Flor de azahar</i> )	<i>Citrus</i> spp., Rutaceae	Nervousness, insomnia	Tea made from the flowers	Yes	No
Creosote bush, "Chaparral" ( <i>Gobernadora, Guámis, Hediondilla</i> )	<i>Larrea tridentata</i> , Zygophyllaceae	Kidney and gallstones; externally for fungal infections	Tea or tablets made from stems and leaves, taken internally for kidney and gall stones; plant is applied externally as a wash or ointment against fungal infections of the skin and nails	Yes	No
<i>Cuachalalate, Cuachalalá</i>	<i>Amphytergium adstringens</i> [syn. <i>Juliana adstringens</i> ], Anacardiaceae	Gastrointestinal problems	Tea made from stem bark	Yes	No
Damiana	<i>Turnera diffusa</i> , Turneraceae	To increase libido and treat infertility	Tea made from leaves and stem	Yes	No
Echinacea ( <i>Equinácea</i> )	<i>Echinacea</i> spp., Asteraceae	Immune enhancer; for the treatment of colds and other respiratory problems	Capsules, extract	No	Yes
Eucalyptus ( <i>Eucalipto</i> )	<i>Eucalyptus</i> spp., Myrtaceae	Coughs and respiratory problems	Tea made from leaves, tablets and essential oil	Yes	Yes
Everlasting, Cudweed ( <i>Gordolobo</i> )	<i>Gnaphalium</i> spp., Asteraceae	Coughs, respiratory problems, asthma	Tea made from the flowering branches	Yes	Yes



Top Left: **Aloe** *Aloe vera*  
Top Right: **Rue** *Ruta* spp.  
Bottom Left: **Camphor** *Cinnamomum camphora*  
Bottom Right: **Prickly Pear Cactus** *Opuntia* spp.  
Photos ©2009 Steven Foster

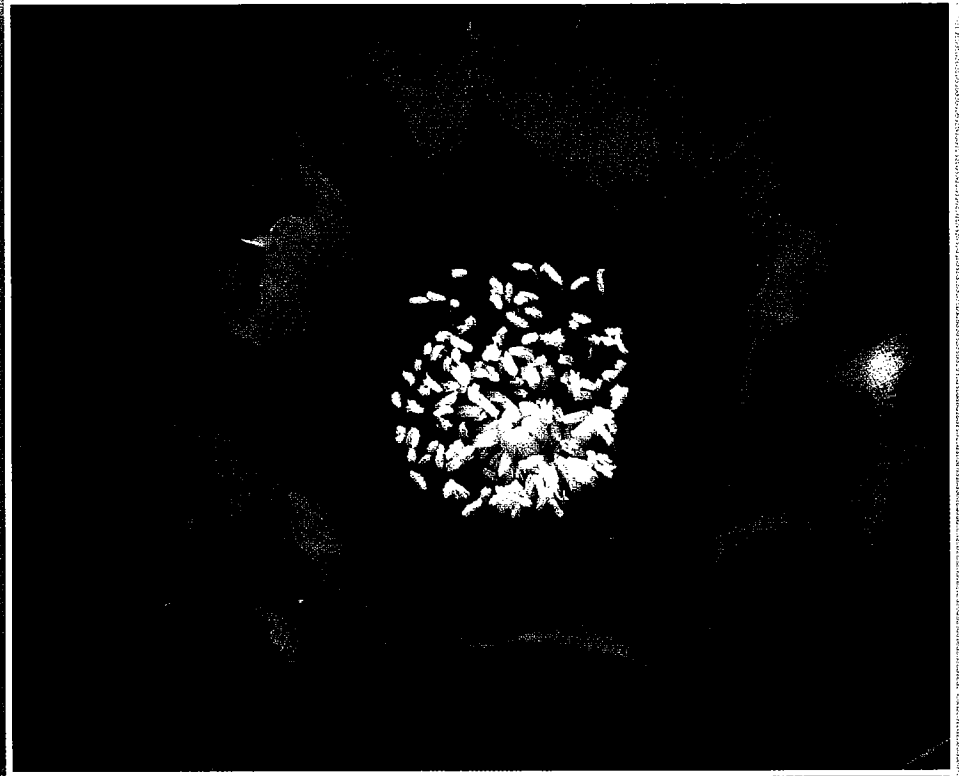
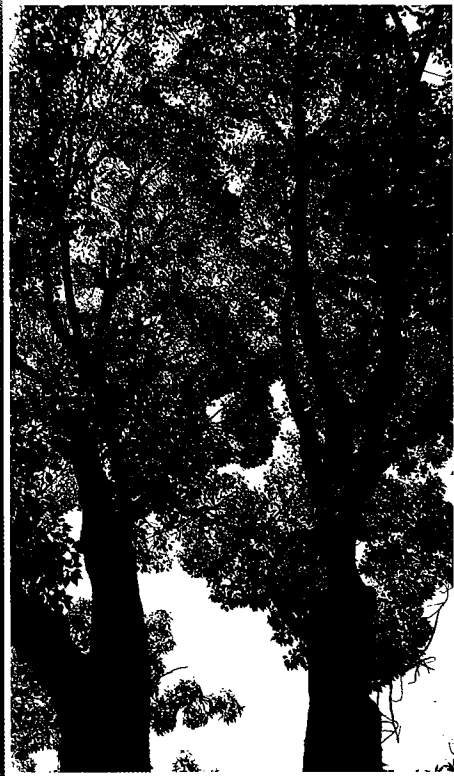


Table 1. (Continued from page 63) Principal Herbal Products Sold in Ciudad Juarez, Mexico, and El Paso, TX.

Common name(s) (Common name(s) in Spanish)	Scientific name and botanical family	Principal use(s) in herbal medicine	Method(s) of use	Included in the top 20 herbs listed in Juarez survey	Included in the top 20 herbs listed in El Paso survey
False arnica, Telegraph weed ( <i>Árnica del país</i> )	<i>Heterotheca inuloides</i> , Asteraceae	Internal use: stomach ulcers; External use: bruises and contusions	Internally: tea or tablets made from the flowers; Externally: ointment or cream made from the flowers	Yes	No
Garlic ( <i>Ajo</i> )	<i>Allium sativum</i> , Liliaceae	To lower cholesterol	Cloves eaten raw or capsules	No	Yes
Ginkgo	<i>Ginkgo biloba</i> , Ginkgoaceae	Memory loss, to improve circulation	Standardized extracts, tablets and capsules	No	Yes
Ginseng	<i>Panax ginseng</i> , Araliaceae	As a tonic; to improve circulation and combat fatigue	Tablets, liquid extracts, and capsules	No	Yes
Horsetail, Bottle-brush, ( <i>Cola de caballo</i> )	<i>Equisetum spp.</i> , Equisetaceae	Kidney stones and urinary infections	Raw herb as tea	Yes	No
Key lime ( <i>Limón verde</i> )	<i>Citrus limonum</i> , Rutaceae	Stomach ailments	Fruit juice	No	Yes
Kidney wood ( <i>Palo azul</i> )	<i>Eysenhardtia spp.</i> , Fabaceae	Urinary infections	Tea made from the bark	Yes	No
Linden flower ( <i>Flor de tila</i> )	<i>Tilia spp.</i> , Tilaceae	Nervous conditions, insomnia, stomach-ailments	Tea made from the flowers	Yes	No
Noni, Morinda	<i>Morinda citrifolia</i> , Rubiaceae	Arthritis	Commercial juice	No	Yes
Oregano ( <i>Orégano</i> )	<i>Origanum vulgare</i> , Lamiaceae	Respiratory and gastrointestinal problems	Tea made from the leaves	No	Yes
Prickly pear cactus ( <i>Nopal</i> )	<i>Opuntia spp.</i> , Cactaceae	Diabetes, high cholesterol and weight loss	The stem is eaten raw or cooked; powdered stem capsules are taken to reduce levels of blood glucose and cholesterol	Yes	No
Spearmint ( <i>Hierbabuena</i> )	<i>Mentha spp.</i> , Lamiaceae	Stomach problems	Tea made from the leaves	Yes	No
Rue ( <i>Ruda</i> )	<i>Ruta spp.</i> , Rutaceae	Rheumatic ailments	Tea made from the leaves	Yes	No
Wereke	<i>Ibervillea sonorae</i> , Cucurbitaceae	Type 2 Diabetes	Tea made from the root; capsules made from pulverized root	Yes	No
Wormwood ( <i>Ajenjo</i> )	<i>Artemisia spp.</i> , Asteraceae	Gastrointestinal problems	Tea made from the leaves	Yes	No

## Schwabe and Nature's Way Buy Enzymatic Therapy

Nature's Way Holding Company, a subsidiary of leading German phytomedicine manufacturer Willmar Schwabe Pharmaceuticals, announced in October 2008 that it has purchased herb and dietary supplement manufacturer Enzymatic Therapy of Green Bay, Wisconsin. All 3 companies issued a press release that Schwabe had reached an agreement to acquire all outstanding shares of Enzymatic Therapy with North Castle Partners, LLC, the controlling shareholder of Enzymatic Therapy.<sup>1</sup>

All parties are privately-held companies so the details of the transaction, including the price, were not revealed. However, Schwabe had the benefit of the relative strength of the euro compared to the US dollar. (The value of the euro has fallen recently, dropping from about \$1.60 in March to about \$1.35 on October 12.) The deal closed in November.

The press release notes that both companies market herbal preparations with a significant level of clinical testing. Nature's Way products are sold through the natural products market channel throughout the United States and in 40 other countries. Enzymatic Therapy manufactures and/or imports natural products for the natural products and healthcare channels of the United States, as well as 15 other countries.

"We are very delighted that Enzymatic Therapy, Inc. joins the Schwabe group of companies," said Dirk Reischig, PhD, chairman and CEO of Schwabe, according to the Schwabe press release. "We do believe that the complementary product portfolios and marketing know-how of Enzymatic Therapy and Nature's Way will significantly strengthen our presence in the US market, which is one of Schwabe's strategic key markets for future growth. Natural healthcare solutions will become increasingly important over the next few decades. The joined forces of Enzymatic Therapy, Nature's Way and Schwabe Pharmaceuticals will therefore contribute significantly to consumers in the USA and abroad in achieving the best possible health and quality of life."<sup>1</sup>

"Nature's Way and Dr. Willmar Schwabe have built their business with quality products created, produced and sold by dedicated people who care about the health and well being of the consumer," said Rory Mahony, CEO of Nature's Way. "Because Enzymatic Therapy has teams of great people who also have these cultural values, they make a perfect partner to bring into the Schwabe family. With the leadership of Randy Rose and the expertise resident in both Enzymatic Therapy and Nature's Way, we will build on our strengths and continue to offer the consumer quality products that they can trust" (e-mail, October 9, 2008).

Randy Rose, CEO of Enzymatic Therapy, likewise stated, "Every associate within Enzymatic Therapy is absolutely delighted to be aligning with such a great team of people within the Nature's Way Holding Inc. The value systems of the two organizations are aligned, as is the commitment on delivering the highest possible product quality and efficacy. I look forward to working with Rory Mahony and our collective team to elevate our mutual business with every customer as we improve the health of consumers" (e-mail, October 9, 2008).

For the foreseeable future, the new company will continue operations from both Enzymatic Therapy's manufacturing and distribution facilities in Green Bay and Nature's Way's facilities in Springville, Utah. Rose will manage the company from Green Bay, assuming the role of CEO of the combined entity, and Mahony will act as the COO. Rose added, "I intend to spend significant

time in both headquarter locations, as Rory and I focus on accelerating our combined company's positive growth" (e-mail, October 14, 2008).

The new combined entity's initial focus will be to further advance product development to bring highly effective natural health solutions onto the market. The group plans to build upon the rich heritage and advanced research and development capabilities of each of the 3 entities to further enhance natural health options.<sup>1</sup>

Nature's Way was founded by Tom Murdock in 1968 in northern Arizona. The company moved to Springville, Utah, where it has been in operation for over 30 years, selling an extensive line of herbs, phytomedicines, and other dietary supplements. Schwabe became the sole owner of Nature's Way, and Nature's Way has marketed many of Schwabe's clinically-tested phytomedicinal preparations.

Schwabe, headquartered in Karlsruhe, Germany, was founded in 1866. The Schwabe group is now recognized as the world leader in the manufacturing of herbal medicines, and it comprises 6 companies in Germany and more than 20 subsidiaries and joint ventures around the world. As a vertically integrated pharmaceutical company, Schwabe controls the entire manufacturing process of many of its products, from growing and harvesting the plants to the production of the standardized herbal extracts and the finished phytomedicinal preparations. Schwabe products are sold in over 60 countries worldwide. Schwabe developed the world's first standardized ginkgo (*Ginkgo biloba*, Ginkgoaceae) leaf extract, the world's most clinically-tested extract of hawthorn (*Crataegus monogyna*, Rosaceae) leaf with flower extract, and one of the world's most clinically-tested saw palmetto (*Serenoa repens*, Arecaceae) fruit extracts, among others.

Enzymatic Therapy was founded in 1986 by Terry Lemerond. Enzymatic Therapy was one of the first companies to market an extensive line of high quality standardized herb extracts in the United States and later also developed a line of products for health professionals under the PhytoPharmica® label. Enzymatic Therapy has been known as a pioneer in introducing various popular dietary supplements in the United States, being the importer of the leading black cohosh (*Actaea racemosa*, syn. *Cimicifuga racemosa*, Ranunculaceae) root extract Remifemin® and other products, as well as being the initial importer and promoter of Europe's leading glucosamine sulfate product. In 2000, Lemerond sold a controlling interest of his company to North Castle Partners, which has managed the company until this latest development with Nature's Way. HG

—Mark Blumenthal

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## FDA Accepts Safety of Two Stevia Preparations for Food and Beverage Use

### *Food Chemical Codex* Publishing Monograph on Rebaudioside A from Stevia

In December of 2008, the US Food and Drug Administration (FDA) informed 2 large food companies that the agency would not object to their use of preparations made from the herb stevia (*Stevia rebaudiana*, Asteraceae) as food substances that are generally recognized as safe (GRAS).<sup>1,2</sup> This decision from the FDA came about after Cargill and Coca-Cola, PepsiCo and Merisant, and Wisdom Natural Brands released the results of scientific reviews self-affirming GRAS status of their specific food grade, high purity extracts from stevia as natural, no-calorie sweeteners last year.

FDA issued “no objection” letters to Cargill (Minneapolis, MN) and Whole Earth Sweetener Co. (Chicago, IL, a subsidiary of Merisant) in December regarding the use of those companies’ stevia extracts.<sup>3,4</sup> In those letters, the FDA noted that both companies’ stevia extracts are highly purified components of the stevia plant. Therefore, the FDA’s responses to Cargill and Whole Earth Sweetener Co. do not necessarily apply to the uses of other stevia products.

Cargill has partnered with Coca-Cola in developing the zero-calorie, stevia-based sweetener Truvia™ (also referred to as rebiana). Cargill and Coca-Cola published the results of studies indicating the safety of Truvia (their trade name for the stevia constituent rebaudioside A) for rebiana’s GRAS status in May 2008.<sup>5</sup> PepsiCo has been partnering with Merisant, the maker of the aspartame sweetener Equal®, on its stevia-based sweetener PureVia™, through Whole Earth Sweetener Co. Whole Earth Sweetener Co. submitted a GRAS affirmation notification and supporting scientific data to the FDA for review in early May 2008,<sup>2</sup> a week prior to Cargill/Coca-Cola’s filing. Wisdom Natural Brands, the first company to market stevia in the United States, starting in the early 1980s, completed its GRAS review of the company’s SweetLeaf® stevia sweetener in March 2008.<sup>5</sup> Wisdom’s review was performed by 2 different groups of independent GRAS scientists. In accordance with the FDA regulations established in 1997, Wisdom Natural Brands initially chose not to file a notification of its self-GRAS affirmation with FDA; however, Wisdom reportedly is preparing to submit a formal FDA GRAS notification similar to those filed by Cargill and Whole Earth Sweetener Co. as a courtesy to FDA (S. Weinberger, e-mail, December 30, 2008).

According to Leslie Curry, director of regulatory and scientific affairs at Cargill, “We’re very pleased to see FDA’s concurrence on the GRAS status of the safety of high purity, food grade rebaudioside A (Truvia rebiana). FDA’s conclusion is consistent with United Nations and the World Health Organization’s assessment from earlier [2008] that rebaudioside A is safe for use as a general purpose sweetener” (personal communication to M. Blumenthal, December 19, 2008). Curry continued, “There is significant consumer demand for a natural, zero-calorie sweetener—our leadership and work to ensure the safety and regulatory acceptance of Truvia rebiana is important toward introducing this great-tasting sweetener to consumers around the globe.”

Kathryn Wood, a spokesperson for Whole Earth Sweetener Co., said, “The FDA’s response gives Whole Earth Sweetener Co. the green light to complete distribution discussions with all retailers, including Wal-Mart, Kroger, Walgreens, and others that would not stock PureVia before the FDA responded to our filing. PureVia is now poised to redefine the sweetener category and has signifi-

cant potential in other food products, such as beverages and cereals, through our partnership with PepsiCo” (e-mail, December 23, 2008).

“This is historic news,” said ABC Founder and Executive Director Mark Blumenthal. “Given the FDA’s earlier attempts to keep stevia from the market in the early 1990s, the agency’s approval of stevia as a safe food ingredient is good news for millions of American consumers who are seeking a safe, natural, non-caloric sweetener.” Blumenthal had recently called for the FDA to rescind its out-dated Import Alert on stevia in his “Dear Reader” column for *HerbalGram* issue 80.<sup>6</sup>



**Stevia** *Stevia rebaudiana*  
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Not all responses to the FDA's decision, however, have been positive. The Center for Science in the Public Interest (CSPI) released a statement claiming that it is too soon for stevia to be allowed in products for mass consumption,<sup>7</sup> particularly since scientists at the University of California in Los Angeles previously concluded in an unpublished toxicological review of the scientific literature that rebaudioside A is inadequately tested in terms of cancer and has caused mutations in some laboratory tests.<sup>8</sup> (The paper was co-authored by doctoral candidate Sarah Kobylewski, in the Department of Molecular Toxicology, and Curtis D. Eckhert, professor of environmental health sciences and molecular toxicology at the University of California, Los Angeles.) According to CSPI, "Congress and the Obama Administration should strengthen the law that allows companies to simply declare on their own that new additives are 'generally recognized as safe' and just start marketing them, even without notifying the FDA and public."<sup>7</sup>

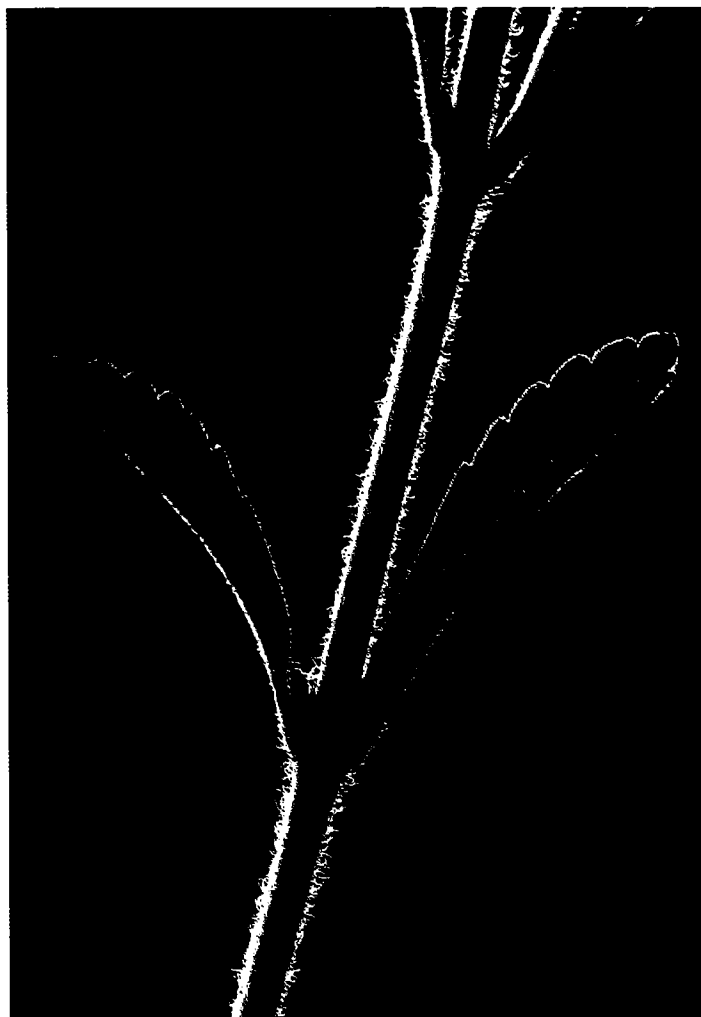
In response to CSPI's statement, ABC's Blumenthal has pointed out that the Joint Expert Committee on Food Additives of the United Nations and World Health Organization, after 5 years of research into the safety of stevia, recently concluded not only that stevia is safe (i.e., preparations consisting of 95% steviol glycosides) but that the previously contemplated recommendable daily intake

of stevia could be doubled from 2 mg/kg body weight to 4 mg/kg body weight.<sup>9</sup> "In view of the increasingly compelling body of toxicological and clinical data supporting the safety of various stevia preparations, CSPI's position appears to be based on less than compelling data, particularly since the UCLA review does not appear to have been peer reviewed nor published—a key aspect of the scientific process," said Blumenthal.

Shortly before the FDA's decision regarding stevia, the governments of Australia and New Zealand approved stevia as a food additive in October 2008.<sup>10</sup>

The latest issue of the *Food Chemical Codex (FCC) Forum*, which was released December 31, 2008, by the United States Pharmacopeia (USP), includes a proposed monograph for rebaudioside A.<sup>11</sup> The proposed monograph contains analytical test procedures with an associated level of specifications to assure the quality, identity, and purity of rebaudioside A. The monograph is open for public comment until March 31, 2009, after which a committee of the USP's Council of Experts will review all comments and finalize the monograph for the next edition of the FCC. The FCC is a compendium of internationally recognized standards for purity and identity of food ingredients.

—Courtney Cavaliere



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**Stevia** *Stevia rebaudiana*  
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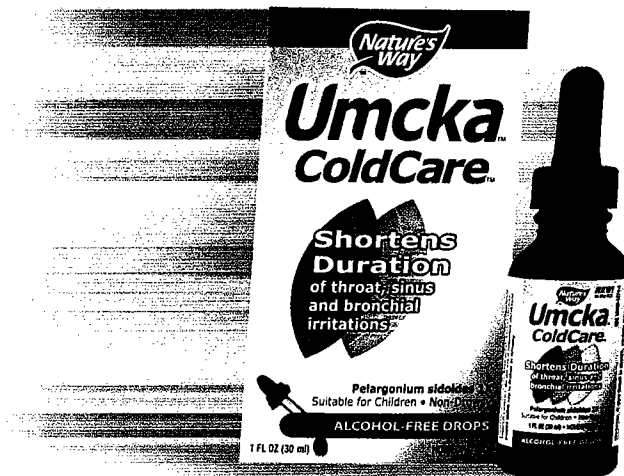


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## Book Reviews

*Duke's Handbook of Medicinal Plants of Latin America* by James A. Duke, with MJ Bogenschutz-Godwin and AR Ottesen. Boca Raton, Florida: CRC Press, Taylor & Francis Group; 2009. Hardcover; 901 pages. ISBN: 978-1-4200-4316-7. \$119.95.

Are you among the many who dream of taking the trip of a lifetime to explore medicinal plants of the Amazon or Peruvian Andes? Image your time has finally come and you take the plunge, committing time and money. The absolute best reference for your trip on medicinal plants of the region is to have ethnobotanist and herb guru Jim Duke at your side. However, as the venerable Dr. Duke rapidly approaches completing his eighth decade (forgive the reminder, Jim), opportunities to travel to Amazonia with Jim Duke grow fewer and farther between. Without Jim Duke traveling on the same trip, you begin the process of researching the venues and exploring information resources on medicinal plants of the Amazon basin. Much to your surprise, you discover there are very, very few books on the topic.

Among the most useful books you might find include Duke and Vasquez's *Amazonian Ethnobotanical Dictionary* (CRC Press, Boca Raton, FL, 1994; alas, out-of-print), and Castner, Timme and Duke's *A Field Guide to Medicinal and Useful Plants of the Upper Amazon* (Feline Press, Gainesville, FL, 1998). Another obscure and useful work is Bussmann and Sharon's

*Plants of the Four Winds: The Magic and Medicinal Flora of Peru* (Editorial GRAFICART srl, Trujillo, Peru, 2007). And, of course, nearly any book authored by or about the late, great Harvard ethnobotanist Richard Evans Schultes should be on your reading list. But aside from these and more obscure publications, there has been no comprehensive English-language work on medicinal plants of Latin America—until now. The first 2009 published title in my library arrived in mid-November 2008. *Duke's Handbook of Medicinal Plants of Latin America* covers nearly 500 species of important medicinal plants found in the region.

Entries are arranged alphabetically by scientific name, though the species entry headings themselves begin with the English common name followed by the scientific

name in parenthesis. The species accounts contain the obligatory botanical names, family name, and synonyms, and a comprehensive list of common names in various languages, with the geographical or ethnic group-origin of the name cited, along with references. Many plant entries begin with a "notes" heading following the botanical synonyms, and it is here that you will find the voice of Jim Duke commenting on the plant as if he were at your side on your hypothetical trip to Amazonia. If one simply thumbs through the pages and reads the "notes," you will come away with a much better understanding of the identity, potential use, conservation status, natural history, and potential of many of the plants in the book.

Next comes "activities" expressed as a list of single word pharmacological activities, with abbreviations of referred plant part and reference(s). This section is simply a list of activity, as is the following section "indications," which lists disease or health conditions, each followed by referred plant part and reference. A very useful section on dosages follows, which like "notes" provides the real on-the-ground details that explain, often precisely, how the herb is administered for particular uses. If appropriate to the entry, a section on "downsides" is included. Here again, one hears the voice of Duke expressing caveats, or citing the FDA Poisonous Plant Database as of July 2007. Finally, many species accounts include a section called "extracts," which includes notations on chemistry, or biological activity related to a specific, defined, scientifically researched concentration.

*Duke's Handbook of Medicinal Plants of Latin America* is certainly a welcome addition to the sparse English-language literature on Latin American herbs. The book features a list of figures, which may lead the casual observer to assume that there are 487 illustrations in the book. Actually, there are about 100 illustrations, usually a black-and-white photographic thumbnail with the background knocked out. The vast majority of plants in the "figures" list are not actually "figured." Rather, this refers to the heading "illustrations," in which a page number to a cited reference in which an illustration can be found is listed. Forty-three species are depicted in an eight-plate color photograph

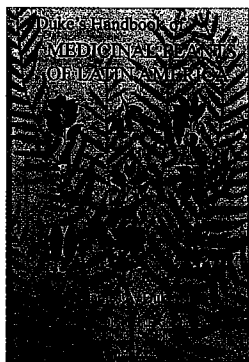
section in the middle of the book.

The front matter includes several important items not to be overlooked. A list of bibliographic abbreviations (of books and journals frequently consulted) is included. "Chemical and medical abbreviations" follows, many of which are self explanatory such as "FDA" for Food and Drug Administration and "BO" for body odor. Other abbreviations, however, are rather esoteric, such as "chd" for "child" and "pgn" for page number(?), no, pigeon. You had better bookmark this page until you have an understanding of the shorthand used throughout. A similar list of geographic abbreviations is also included.

If you're one of those readers tempted to skip a book's introduction, think again, and make sure you include this chapter as essential reading in not only this book, but any Jim Duke title. The "Senior Author's Introduction" is Duke at his best: humanizing the subject, peeling away scientific jargon to reveal the philosophical fruits borne of decades of experience. A brief chapter, "Format of this Book" is also essential reading as without it, you simply won't understand useful information embedded in symbolic expression in each entry.

Finally, the book includes indexes of "scientific names" and "common names." Attempting to index indications or activities would have created an unwieldy mess. The indexes are preceded by an alphabetical list (by author) of references cited in the book. One of the most useful aspects of the book is that, except for Jim Duke's own personal comments, each bit of data and each snippet of information is referenced. The cited references, unless specific to a PubMed call number, are mostly expressed as a three-capital-letter code citing a specific work, or in some cases a specific author. For example JFM refers to two works of Julie F Morton—her 1977 work *Major Medicinal Plants* (Charles C. Thomas, Springfield, IL) or her 1981 *Atlas of Medicinal Plants of Middle America* (Charles C. Thomas, Springfield, IL), but the two are not distinguished in the referencing.

It's actually good that there's no index of indications, because if there were, I would be looking up "insanity" to treat my symptoms induced by attempting to decipher this referencing system, which might have worked well when a computer programmer developed a punch card database in the early 1970s, but is not user friendly to the modern eye. Since one might find 200 or



## Book Reviews

more of the three-letter code references on any given page, it makes the running lists of common names, activities, and indications a bit of a challenge for the eyes. One of the publisher's teasers on the back of the book refers to the presentation as "a proven format evolved from the bestselling *Handbook of Medicinal Herbs*." I would argue that the "proven format" from the publisher's point of view must be simply putting the name "James A. Duke" on the cover of the book. It's quite obvious that the publisher simply accepts the raw data as supplied by the author and like many CRC titles on medicinal plants, in many respects the present title reads like a printout of a computer database. The "format" seems intended to save the publisher editing and design costs. These savings are passed on to you as higher profits for the publisher, though at a release price of a mere \$120.00, this is clearly a CRC bargain basement offering. The design (or lack thereof) leaves the reader to slog through endless lists of single words strung together with semi-colons. In fact, the publisher might consider submitting the book to the Guinness Book of World Records for the greatest number of semi-colons packed into a 900-page book. Tabular data is essentially presented as a running linear list. It's just hard to read, that's all. I extend my sympathies to the line editor.

These are not gripes about content; these are gripes about style of presentation. The book is a gold mine of information. The Spanish Conquistadors could only dream of such riches. To get to the gold, however, one must strain the eyes and learn a new language of abbreviations, the ore from which the book's riches must be extracted. For those looking for detailed information on Latin American medicinal plants, the effort is worth it. Enough said, I'm headed back to the mine.

—Steven Foster  
President of Steven Foster Group, Inc.  
Eureka Springs, AR

***Randomized Controlled Trials: Questions, Answers and Musings***, 2<sup>nd</sup> edition, by Alejandro R. Jadad and Murray W. Enkin. Malden, MA: Blackwell Publishing; 2007. Paperback; 136 pages. ISBN 978-1-4051-3266-4. \$35.95.

This well-written book is both concise and comprehensive. A revised edition of the 1998 *Randomized Controlled Trials: A User's Guide*, the book introduces general understanding of the technicalities of clinical

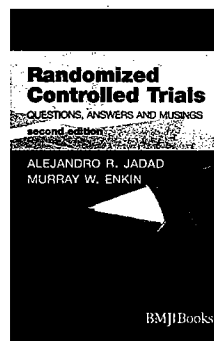
trial methodology, biases, ethics, implementation and challenges.

The principal author, Alex Jadad, widely recognized as an expert on the subject of clinical trial design, is the chief innovator and founder of the Center for Global eHealth Innovation, as well as a professor in the Department of Health Policy, Management and Evaluation at the University of Toronto. Jadad invited Murray Enkin, professor emeritus for the Departments of Obstetrics and Gynecology and Clinical Epidemiology and Biostatistics at McMaster University, to join him in a revised edition that combines wit with experience and ingenuity with cleverness. The authors, seasoned investigators and well recognized experts in "evidence based medicine" (use of evidence to improve clinical practice), excel in covering complex clinical trial methodology with quality and ethical issues and with examining the role of clinical research in evidence-based healthcare.

The book goes beyond mere explanations of randomized controlled trials (RCTs), their strengths and limitations, and how to use them while making healthcare decisions. It challenges conventional understanding of the complex interactions between clinical research and clinical practice, health professionals and patients, and pragmatism and the art of medicine. It also offers information about other types of valuable clinical studies and addresses issues applicable to major stakeholders in clinical research, including investigators, funding agencies, regulators, the pharmaceutical industry, healthcare professionals, and the seldom mentioned clinical trial participant.

The book echoes the thoughts of Sir Bradford Hill, the pioneer of modern RCTs, and his "disillusionment when he realized that RCTs can mislead as well as lead." It debates the "gold standard/top of the pyramid of evidence" status of the RCT and challenges its application in modern healthcare, but also provides understanding of the theory of RCTs and their influence and importance in clinical, research, or policy decisions.

Compared to the first edition, the book includes enjoyable and insightful "musings" at the end of each chapter that describe the value of RCTs, as well as the challenges experienced by the authors themselves and a "wish list" of how to improve



clinical research and patient care in general. The authors entice the reader to think and write new musings, to improve clinical trials, create research alternatives, search for new answers, and renew current thinking.

Each chapter answers questions with clear prose and judicious comments. Statistical concepts and medical and clinical trial examples are explained in detail. Each of the book's 9 chapters also includes a comprehensive list of references including no less than 20 citations to landmark articles published in the peer-reviewed literature. New tables, figures and updated examples significantly increase the information provided. The Index provides valuable terms for easy access of specific information.

This is the sort of book that students will appreciate when they first learn about clinical trials, the busy health professional will use as a quick reference guide, the lay person will understand, and the experienced investigator will benefit from because it will challenge and defy current paradigms.

—Carmen Tamayo, MD  
Independent Consultant  
Integrative Medicine and Natural  
Health Products  
Bethesda, MD

***Textbook of Complementary and Alternative Medicine***, 2<sup>nd</sup> ed. Chun-Su Yuan, Eric Bieber and Brent A. Bauer, eds. New York, NY: Informa Healthcare; 2006. Hardcover; 794 pages. ISBN-13: 978-9184214-297-4. \$419.95.

Complementary and alternative medicine (CAM) has reached a height in popularity among various western nations. Various courses, including phytotherapy (herbal medicine) and Ayurvedic and Chinese medicine, for example, are slowly being incorporated into the curricula of some medical schools throughout the United States. Although many publications addressing various complementary or alternative therapies exist, there are only a few that cover a wide array of therapeutic modalities in depth. The second edition of *Textbook of Complementary and Alternative Medicine* covers a diverse number of alternative therapies and does so in a comprehensive manner.

This humongous work is a collection of

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70 chapters (40 of which are new to this edition) related to diverse alternative and complementary therapies currently in use. The book is divided into 2 main sections. Section 1 includes commonly used CAM therapies and is further subdivided into 5 subsections: Dietary Supplements, Traditional Medical Systems and Therapies, Mind and Body Approaches, Energy Therapies, and Manipulative and Body-based Therapies.

The subsection on Traditional Medical Systems and Therapies includes chapters on Traditional Chinese Medicine, Chinese herbal medicine and formulations, acupuncture, Tai Chi, Qigong, diet and nutrition in Traditional Chinese Medicine, Ayurveda, yoga, homeopathy, naturopathic medicine, and music therapy. The Mind-Body subsection includes chapters on meditation, biofeedback, religion, spirituality and medicine, imagery and belief, and the space of healing. The subsection regarding Energy Therapies includes chapters on energy medicine, magnet therapy, and healing touch. The Manipulative and Body-based Therapies subsection mentions the importance of chiropractic, massage, and osteopathic medicine.

Since this review is being published in a medicinal plant-oriented publication, it will emphasize the chapters or sections dealing with herbs and herbal medicine.

The Dietary Supplements subsection includes 11 diverse chapters. Chapter 1 includes the definitions and regulatory status of herbs and other dietary supplements in the United States. Chapter 2 discusses 11 of the most commonly used herbs in the United States, including aloe (*Aloe vera*, Liliaceae), echinacea (*Echinacea* spp., Asteraceae), ephedra (*Ephedra sinica*, Ephedraceae), garlic (*Allium sativum*, Liliaceae), *Ginkgo biloba* (Ginkgoaceae), the true ginsengs: American (*Panax quinquefolius*, Araliaceae) and Korean (or Chinese or Asian) ginseng (*P. ginseng*), kava (*Piper methysticum*, Piperaceae), milk thistle (*Silybum marianum*, Asteraceae), saw palmetto (*Serenoa repens*, Arecaceae), St. John's wort (*Hypericum perforatum*, Clusiaceae), and valerian (*Valeriana officinalis*, Valerianaceae).

For each of these herbs, the background, uses, phytochemistry, safety, preparation and dosage are mentioned. For most of the

herbs, there is a balanced coverage of their effects on human health, either positive or negative, with the possible exception of kava. The brief section on this herb seems to focus mostly on its potentially negative effects (e.g., "kava dermatopathy," which is seen only in people habituated to the plant who are taking large doses for prolonged periods, but not in persons taking prescribed doses during limited periods of time), as well as its possible association to liver toxicity documented in a limited number of individuals.

Chapter 3 presents a succinct overview of 25 selected herbs in table format, including the herbs' actions, common uses, daily dosages, as well as any adverse effects or warnings against their use.

Medicinal herbs of Latin America is the topic of chapter 4, but unfortunately, it mentions only 4 species: maca (*Lepidium meyenii*, Brassicaceae), cat's claw (*Uncaria tomentosa*, Rubiaceae), guaraná (*Paullinia cupana*, Sapindaceae), and dragons' blood (*Croton lechleri*, Euphorbiaceae). For each of these herbs, the author mentions the plant's historical use, its phytochemistry and pharmacology, safety, and preparation or dosage. Although undoubtedly the herbs covered in this brief chapter are important medicinally, it does not do justice to the plethora of medicinal plants currently in use today in various countries of Latin America, from Mexico and the Caribbean to Argentina. Perhaps the editors may decide to include a much wider coverage of Latin American medicinal plants in a future edition of this book.

Chapter 5 focuses on the identification, analysis, and evaluation techniques for medicinal plants. This important section deals both with qualitative and quantitative analyses of medicinal herbs, from microscopic visual identification techniques to the more sophisticated high-performance liquid chromatography (HPLC) and ultraviolet-visible spectrophotometry, for example. Various techniques are well-explained and enriched by various drawings and pictures for better comprehension. This chapter also mentions the need to apply Good Manufacturing Practices (GMPs) to the processing of herbal medicines in order to ensure a better quality product for the market.

Chapter 6 describes the ginsengs' chemistry and biological effects in a comprehensive manner. The author includes the plants'

diverse active ingredients and their mechanisms of action both at the cell membrane level, as well as on specific tissues and organs of the human body. Research studies with both types of ginseng, employing animals or humans, are discussed, along with the results pertaining to benefits or possible toxicity. The author also mentions the so-called "ginseng abuse syndrome," much popularized by the sensationalist media 25 years ago, which was based on an uncontrolled clinical trial that has been criticized for its shortcomings in both design and interpretation of results.

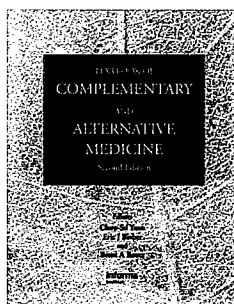
Green tea (*Camellia sinensis*, Theaceae) and its effects on health are mentioned in chapter 7. The history and the different types of tea and the fermentation techniques employed are briefly discussed, as well as green tea's effect upon cardiovascular disease, cancer, obesity and infectious disease.

Chapter 8 discusses the evidence-based use of both fat-soluble and water-soluble vitamin supplements, while chapter 9 includes a brief explanation regarding the possible interactions between herbs, drugs, and certain foods. Emphasis is made on St. John's wort, grapefruit juice, certain nightshade plants (potato and eggplant, for example) and their effects upon the metabolism of certain medications.

Chapter 9 mentions an herbal-derived product once used to treat prostate cancer known as "PC-Spes" (PC stands for prostate cancer, and Spes is the Latin name for *hope*), including its potential benefits and its ultimate disappearance from the market due to evidence pertaining to the adulteration of the herbal product with pharmaceuticals.

Chapter 10 deals with the risks of taking supplements containing ephedra. This brief chapter mentions clinical trials regarding the health effects of ephedra supplements, as well as the probable reasons that made weight loss or "ergogenic" supplements containing this plant potentially dangerous to health and ultimately taken off the market by the US Food and Drug Administration.

Section 2 is entitled CAM Therapies for Common Medical Conditions. This section is further subdivided into chapters covering the following topics: cardiovascular disease, respiratory disease, gastrointestinal disease, metabolic disease, genitourinary and reproductive diseases, central nervous system, psychiatric disorders, musculoskel-



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etal disorders, cancer and AIDS, prevention and special populations, and, finally, ethical and social implications. As mentioned previously, this review has focused primarily on the chapters involving herbs and herbal medicine.

The second edition of the *Textbook of Complementary and Alternative Medicine* is an encyclopedic work that can be very helpful in the development and application of CAM courses in biomedical colleges and institutions. Its wide coverage of diverse alternative and complementary therapies makes it an important contribution to the bibliography regarding these diverse and sometimes vaguely understood healing modalities in the West.

Although this volume contains important and varied information for both CAM as well as conventional medical practitioners, the excessively high price will make it less available to other healthcare providers and students. However, it can be an important acquisition for libraries and research institutions interested in this topic.

—Armando González-Stuart, PhD  
University of Texas at El Paso/  
UT at Austin Cooperative Pharmacy  
Program  
El Paso, TX

*Textbook of Integrative Mental Health Care* by James H. Lake. New York, NY: Thieme Medical Publishers; 2007. Hardcover; 374 pages. ISBN: 1-58890-299-4

## New Book Profiles

*The 150 Healthiest Foods on Earth: The Surprising, Unbiased Truth about What You Should Eat and Why.* Jonny Bowden. Gloucester, MA: Fair Winds Press; 2007. 360 pages, softcover, color photos; CD, glossary, index. \$24.99. ISBN 978-1-59233-228-1.

From almonds to yucca, readers will find out what nutrients each of the 150 featured foods contains, what form contains the most nutrients, if they've been recommended to combat any diseases, where to find them, how to prepare them, and how much to eat. Provides recent research findings and recommendations from around the world. Includes indexes by nutrient, disease, and food.

*The Complete Herb Book.* Jekka McVicar. Buffalo, NY: Fire Fly Ltd; 2007.

(ISBN: 3-13-136671-0). \$129.95.

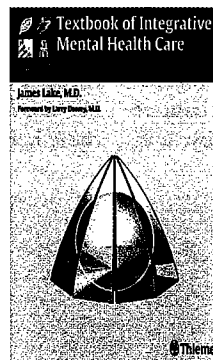
James H. Lake, MD, is a board-certified psychiatrist in private practice in Monterey, California. He is currently in the Department of Psychiatry and Behavioral Sciences at Stanford University Hospital. Dr. Lake has a long-standing interest and expertise in alternative or integrative treatments within traditional psychiatry and is currently chairperson of the American Psychiatric Association Caucus on Complementary, Alternative and Integrative Approaches in Mental Healthcare. He has written 2 other books on similar subjects: *Chinese Medical Psychiatry: A Textbook and Clinical Manual*, and *Complementary and Alternative Treatments in Mental Health Care*.

Dr. Lake is certainly the right person to write this book. The book is not written for the general public; it is intended for mental health professionals who are interested in adding new perspectives and treatment approaches for their patients. Clearly, psychiatry is a medical specialty that has been limited to rather crude and non-specific tools with which to heal the human psyche. And psychiatry has seen its share of criticism for (over)using these treatments in an attempt to mend the purportedly broken chemistry of the brain, or at least relieve some of the most painful symptoms. This book could provide a potential pathway for

physicians who are so inclined to look for a more holistic approach. Here the reader will find encouragement for kinder and gentler treatments for illnesses that are already associated with such misery.

The book is divided into two primary parts. Part I is called Foundations and Methods of Integrative Mental Health Care. Six chapters deal with topics including the evolution of integrative medicine, its philosophy, and how its paradigms differ from mainstream medicine. Also included are primers in how to take a proper patient history and formulate a treatment plan based on the best, currently available evidence. Chapter 6 was especially interesting to me since several areas of nonconventional treatment that lack a clear scientific base are discussed in a rational, yet delicate way. I would be surprised if there were many readers on either side who would be inclined to take offense. In fact, this could be said to be a primary strength of this book—the ease with which Dr. Lake moves between conventional and nonconventional models without missing a beat and with compassion for his audience and his clients.

Part II is Integrative Management of Common Mental and Emotional Symptoms. Here the reader will find 8 chapters, each dealing with various categories of mental disorders including depression, mania, anxi-



304 pages, softcover, color photos, garden plans, index. \$29.95. ISBN 978-1-55407-365-8.

A comprehensive A-Z guide to the fascinating world of herbs, providing practical information on each herb's organic growing requirements, use, mythical properties, and historical background. This new edition is updated and revised to include expanded entries for 40 additional herbs.

*Healing Herbs of Malaysia.* W. E. Wan Hassan. Kuala Lumpur, Malaysia: Federal Land Development Authority (FELDA); 2008. 201 pages, hardcover, color photos, index, glossary. \$88.50. ISBN 978-9-83995-442-5.

Beautifully illustrated with large color photographs, this book profiles 100 species of common medicinal plants used in Malaysia. Chapters include medicinal fruits and vegetables, spices and

condiments, herbs for vitality and virility, immune system herbs, and herbs used in aromatherapy. Includes species descriptions, therapeutic activity, and information on traditional use.

*Herb, Nutrient, and Drug Interactions: Clinical Implications and Therapeutic Strategies.* Mitchell Bebel Stargrove, Jonathan Treasure and Dwight L. McKee. St. Louis, MO: Mosby Elsevier; 2008. 960 pages, softcover, index, CD. \$89.00. ISBN 978-0-32302-964-3.

Presenting detailed, evidence-based coverage of the most commonly encountered therapeutic agents in modern clinical practice, this extensive resource explains how to safely and effectively integrate herbal, nutrient, and drug therapy in clinical use. Provides 70 comprehensive monographs of herb-drug and nutrient-drug interactions which include a system-

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ety, psychosis, dementia, substance abuse, and sleep disorders. Each chapter explores the current basis for integrative approaches for assessing and treating the most common core symptoms. Treatment suggestions are grouped according to the available evidence base—from “substantiated” to “possibly effective.” Also included with these discussions are case vignettes that help illumine the process. A treatment plan is provided that includes a follow-up.

A third part of the book includes an appendix with tables listing assessment approaches and treatment approaches (also arranged by level of evidence base) for several core psychiatric symptoms. A second appendix provides extensive Internet resources. A very useful tool for those who are not computer-shy. A Web site has been developed to accompany the book (mostly for other clinicians). It includes updates on various approaches and is intended to be interactive. The book as well as the Web site includes, whenever possible, names and contact information of individuals who are currently engaged in various research projects that may be of interest to the readers. In other words, the door is not closed and this is still a work in progress. Perhaps there will be an updated edition in a few years. The Web site is located at <http://www.thieme.com/SID2422907366542/mentalhealth/index.html>

The organization of the book, according to therapeutic categories or symptom clusters, will probably appeal to clinicians. This

arrangement makes the book more difficult to use as an occasional reference, say to look up the latest on omega-3 fatty acids in psychiatry. The index could have been more extensive. This would have made specific bits and pieces easier to find. With this in mind, I give this book a hearty recommendation for all clinicians, especially those whose primary commitment is to patients with mental health needs.

—Jerry Cott, PhD, Pharmacologist,  
Silver Spring, MD

***Tea: The Drink That Changed the World*** by Laura C. Martin. North Clarendon, VT: Tuttle Publishing; 2007. Hardcover; 247 pages. ISBN 978-0-8048-3724-8. \$21.95.

This book is one of the most comprehensive works written for both the tea layperson and expert. The 10 chapters and appendices take the reader to the very beginnings of tea and impart a wonderful journey around the world of tea through its history, customs, and myths.

As a tea lover, expert, historian, and author of a recent book about tea, I am pleased to see the graphics—prints, etchings, and hand drawings—included in each chapter to highlight the dialogue. I am always on the lookout for such artwork and Ms. Martin has captured some I have never seen.

As the journey begins from shrub to cup, the reader is transplanted back in time as if

witnessing the initial discovery of tea as a beverage. The author's compelling style allowed me to virtually partake in the tea customs and rituals of the different tea-drinking countries described in this treatise on the history of tea.

The appendices round out the book with descriptions of the different tea-growing countries to the increasingly scientifically-documented health benefits of tea. This distinguishes this manuscript from the other tea history books that do not address such everyday tea questions the reader may have. The United States is becoming a tea drinking nation and this book is a useful guide to have around the house for any questions that may come up.

This is a useful, easy-to-read guide to the history and customs of tea around the world. I wish this book were available before I wrote my book on tea. It would have made my job easier and saved me a tremendous amount of time.

—Mark (“Dr. Tea”) Ukra  
Author of *The Ultimate Tea Diet* and  
Co-owner of the Tea Garden & Herbal  
Emporium  
West Hollywood, CA



atic review and in-depth analysis, as well as quick-reference features. References included on the bound-in CD provide high-quality, evidence-based support.

***WHO monographs on selected medicinal plants, vol. 3.*** World Health Organization. Geneva, Switzerland: WHO Press; 2007. 376 pages, softcover, indexes, references. \$95.00. ISBN 978-92-4-154702-4.

The third in the series from WHO, this volume contains 32 additional monographs of medicinal plants, which include the same format as the previous two volumes: identity data, pharmacopeial summaries, and clinical applications based on extensive reviews of scientific and clinical research. Provides models to assist nations in developing their own monographs or formularies for these and other herbal medicines. Includes two cumula-

tive indexes to all the herbs covered in the three volumes.

***75 Exceptional Herbs for Your Garden.*** Jack Staub. Layton, UT: Gibbs Smith; 2008. 239 pages, hardcover, color illustrations, bibliography, resources. \$19.99. ISBN 978-1-4236-0251-4.

Jack Staub uses a unique narrative writing style to inform readers of the history of medicinal and culinary uses of 75 herbs. The native origin of each herb and its ties to mythology and ancient and modern history are provided where applicable and summarized in the span of about 2 pages per herb. The meaning and possible derivations of plant names are also given, as well as preferred habitats, tips for cultivating select herbs, and favorite culinary uses.

***Herbs at a Glance: A Quick Guide to Herbal Supplements.*** National Center for Complementary and Alternative Medicine. Gaithersburg, MD: NCCAM Clearinghouse; 2008. 106 pages, softcover, color photos, references, indexes. No fee or ISBN. Available online at: <http://nccam.nih.gov/health/herbsata-glance.htm>.

Forty-two common herbs are briefly profiled with basic information on each herb's medicinal uses, the plant part prepared, scientific data that supports each herb's uses, and side effects and cautions associated with each herb. A brief overview of history and native habitat precedes each herb summary. An index of common and scientific names is provided, as well as an index of health conditions and uses.

## Leon Secatero 1943-2008

Leon Secatero, spiritual elder and headman of the Canoncito Band of Navajo, died September 28, 2008, at the age of 65. He worked as an indigenous leader, raising awareness to balance the environmental, social, and spiritual energies of the universe.

Secatero spent much of his life as a shepherd in New Mexico. As an adult, Secatero emerged as a teacher and advisor, speaking widely about social, environmental and indigenous rights. He founded The Spiritual Elders for Mother Earth and acted as an advisor to the United Nations. Within these organizations and others, Secatero united indigenous elders to guide humanity toward respect, unity, and wisdom.

Deeply concerned about the future of humanity and the future of our Mother Earth, Secatero advised all “5-fingered ones” to leave behind negative feelings and move forward united, as one nation. In “A Return to Prayer,” Secatero said, “Look at the environment. Look at the clouds, the mountains, the plants, your people, and the grandchildren that are unborn yet. We want to make an entrance, a pathway, a blessing way. . . . So we are going to have to hold hands and go in one direction. All of us have to communicate, sing one song, say one prayer, and walk the next decade together with one voice, for our survival and the survival of future generations.”<sup>1</sup>

Secatero encouraged dialogues to bridge ancient wisdom and modern knowledge. He also worked as an advisor to the Sacred Earth Network, Friends of Indigenous Elders, the SEED (Source for Educational Empowerment and Community Development) graduate program, and as a Navajo language teacher.

Secatero was honorary grandfather to the Medicinal Plant Working Group (MPWG) of the Plant Conservation Alliance. Patricia DeAngelis, chair person of the MPWG, spoke about Leon with fondness: “I remember [him] as a man who sought to bring all people together—as one—for Mother Earth. He touched many lives” (e-mail, October 16, 2008).

“Leon Secatero’s knowledge of how humans and plants are intimately connected was truly impressive because he used it to teach and inspire others,” said Peggy Olwell, the Bureau of Land Management’s Plant Conservation Program lead and chair of the Plant Conservation Alliance. “During the Plant Conservation Alliance’s MPWG Symposium in 2003, Leon spoke about the indigenous peoples’ 500-year plan for the future. His words motivated the attendees to think of the future on a broader timescale, especially when dealing with vital issues such as sustainability and climate change. His work with the MPWG’s Elder Circle provided valuable insight into the perspective of indigenous peoples on medicinal plant topics. Leon will be missed, but his wisdom will be remembered and applied by the native plant conservation community” (e-mail, November 17, 2008).

Secatero served as principal elder adviser and trustee director for Sacred Seed Project (SSP), a division of the Washington, DC-based nonprofit Environmental Consulting Services. According to Katherine Koumoutseas, executive director of SSP, Secatero assisted in the founding of SSP and proposed various fruitful SSP directives. Koumoutseas offered these words in memory of Secatero: “I humbly extend my gratitude along with the gratitude of the Plant Nation, which we serve, and



Photo ©2009 Steven McFadden

for which you gave me voice to speak. We are grateful for the goals, directives, and initiatives you set forth towards the preservation of sacred medicine, plants, seeds, and indigenous knowledge and culture . . . The Plant Nation mourns the loss of a great ally. I am personally grateful for the transformative lessons that your presence has brought to my life. Many thanks to you for your wisdom, patience, guidance, gentle grace and beauty, and for the many blessings you’ve bestowed on me and my family, and to all whose lives you have gently touched” (e-mail to M. Blumenthal, November 30, 2008).

Chief Ray Couch, principal chief of the Appalachian Cherokee Nation, spoke fondly of Secatero after his passing. “He was one of my closest friends,” said the chief, “and one of the most honest Indians I knew.” Chief Ray was familiar with the spiritual power that Secatero voiced. “He had great spiritual advice that was well taken by members of our tribe” (oral communication, November 13, 2008).

Leon seemed comfortable with passing to another realm.<sup>2</sup> In 2007, Secatero suffered a stroke that offered him a journey to the other side. He spoke about this near-death experience in a number of interviews. While unconscious, Secatero saw many Navajo elders and other spirits who spoke about positivity and moving forward with positive energy so to continue the path of humanity. “The elders talked about positive things, focusing on the positive to make things happen, to bring in good energy so that life will continue. They said to use song, prayer, dance to focus on positive thought, and to help us go forward on the path to the future in a good way, in a sacred way.”<sup>3</sup> It was this message that Secatero carried to all of those he touched.

As part of his work, Secatero also spoke about the 500-year cycle of the indigenous calendar. Indigenous elders have recognized that the 500-year calendar is ending, and we must thoughtfully plan for the next 500 years. “It is the time of the reawakening of the wisdom and the prophecies, which must be shared to teach, heal, and preserve. We must take responsibility to work toward the restoration of harmony, balance, and peace for the well-being of our Mother Earth and All Living Beings.”<sup>4</sup>

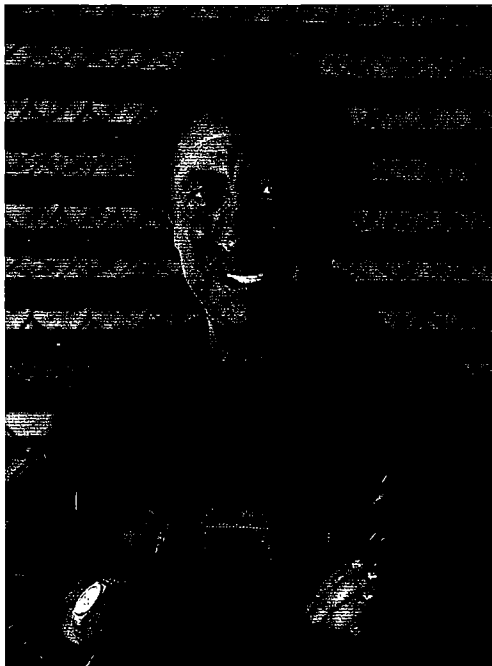
In one of his last meetings, Secatero commented, “Hope cannot be without peace; that’s all I want to leave the people. I want them to know there is hope and peace in this time. Now it is all up to you, as individuals, to make it happen.”<sup>5</sup> Secatero planted seeds of hope and peace wherever he traveled.

Though Leon’s body has run out of energy, we know that his spirit continues to influence humanity. Secatero is survived by his children Alvira, Orlando, Shawn and Renee, his many grandchildren, sisters and an extended spiritual family.<sup>5</sup> HG

—Megan Haidet

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### Mel Rich 1944-2008

Mel Rich, an industry innovator in developing science-based nutritional supplements, died on October 18, 2008, at the age of 63 after a 4-year battle with cancer. President of Great Earth Companies, Inc., the franchising arm of Great Earth Vitamin Stores, Mel was known for creating leading-edge formulas and mentoring young people in the dietary supplement industry.

Born November 29, 1944, in New York City, Mel was the son of Sidney and Charlotte Rich. Sidney Rich founded Phoenix Laboratories, Inc., manufacturing generic pharmaceuticals and, by contract, dietary supplements. As a youngster, Mel helped his father by stuffing cotton into pill bottles. In 1968, Mel graduated from Columbia University, College of Pharmaceutical Sciences, with a degree in pharmacy and began working in the family business. Drawn to dietary supplement manufacturing, he became known in the industry for creating unique, credible products. When Great Earth Vitamin Stores was founded in 1971 by pharmacists Bernie Bubman and Earl Mindell, Mel began formulating and manufacturing products for the new company.

In 1988, the Rich family purchased the Great Earth franchising company, and Mel became Great Earth's president. Believing that science should be at the root of all dietary supplement formulations and valuing efficacy over marketability, he sponsored human clinical research on many of the dietary supplements he produced. One of Mel's associates said that he frequently passed up opportunities to manufacture enormous quantities of dietary supplements for some large companies because he did not find those particular products

to be credible. According to associates, he developed several "firsts" for the dietary supplement industry; these include a mega-potency multiple vitamin, a patented time-released process for use in dietary supplements, an antioxidant formula, and "the highway of digestion"—an analytical laboratory procedure that simulates the human digestive process, allowing dietary supplements to be accurately tested to determine their ability to break down and be absorbed.

Upon hearing of his death, Mindell, author of the best-selling *The Vitamin Bible*, said, "Mel Rich was one of the pioneers of new supplements [who discovered] new ways to increase the bioavailability of nutrients. He was always looking and researching to better the industry with quality products. His enthusiasm to share what he discovered with me is something I will never forget."

In 1996, Mel Rich founded Bodyonics Limited, and its brand, Pinnacle®, to develop and provide reliable sports nutrition supplements for bodybuilders wishing to avoid illegal, dangerous, anabolic steroids. He also developed Pinnacle's unique packaging, which won several industry awards. Neal Spruce, founder of Apex Fitness Group and dotFIT, and past chairman of the National Academy of Sports Medicine, recalled Rich's influence: "I met Mel in 1993 when I was beginning my company, Apex. His amazing intellect and innovations helped my teams create a great fitness platform, which carries his products and continues to be distributed all over the world. But Mel was so much more than a business relationship. He became a friend that shared the same values and vision."

Gene Bruno, Great Earth's vice-president of education, and dean of academics at Huntington College of Health Sciences, said he would dearly miss his mentor and friend. "He taught me the importance of manufacturing integrity-based formulations and dietary supplement science, not just products that sound good on paper. Mel also believed in me, which was a gift of unsurpassed value. I will always be grateful."

Medicine hunter, author, and educator Chris Kilham described Mel as uniquely talented and bursting with creativity. "Mel sponsored several of my expeditions in the 1990s, and in doing so helped to further my career," said Kilham. "A master of the big idea, Mel would at any time keep company with PhD scientists, Penthouse pets, and world-class athletes. He saw connections everywhere. Even during the very tough times of fighting cancer, Mel remained kind and generous. Mel Rich burned bright, and deserves to be remembered for what he was, a good and talented man who could not be contained or easily defined."

Mr. Rich is survived by his wife Ronni, his mother Charlotte, and two daughters, Barrie Rich, MD, and Hallie Rich, who succeeds him as president and promised that she would continue his legacy with Great Earth. HG

—Mariann G. Wizard



**February 19-21: The Integrative Healthcare Symposium.** New York, NY. This symposium will provide attendees with a comprehensive education program in integrative medicine and product innovation, and it will offer keynote sessions by renowned physicians and practitioners of the integrative healthcare field. Areas of focus will include environmental health, women's health, nutrition, spirituality and consciousness, and practice management. For more information please visit the Web site: <http://www.ihsymposium.com/08/public/enter.aspx>.

**February 25-27: Summit on Integrative Medicine and the Health of the Public.** Washington DC. The summit will explore the science and practice of integrative medicine for improving patient-centered care and promoting the nation's health. It will review the state of the science, assess priorities, and discuss ways of improving understanding, training, practice, and other actions relevant to integrative medicine. It will also examine the ways integrative medicine seeks to address the personal and community environments that shape and empower patients' knowledge, skills, and support to be active participants in their own care. For more information, please visit the Web site: <http://www.iom.edu/integrativemedicine>.

**February 26-28: International Conference on Herbal Medicine - "Evaluation of Quality, Efficacy and Safety."** Bangalore, India. This conference will address some of the crucial and contemporary issues regarding natural health products, particularly related to their promotion and development with international coordination in exploring their quality, efficacy and safety. The conference will provide an ideal platform for interaction, debate, fusion and dissemination of ideas among national and international scientists and professionals within this field. For more information, please visit the Web site: <http://www.herbalconference2009.com/>.

**February 28 - March 1: "Successful Aging: Integrative Medicine Throughout a Lifetime" Annual Continuing Medical Education Conference.** Irvine, CA. This conference will provide an update of the different natural approaches to healthy aging and successful management of chronic medical conditions. Presenters will cover many perspectives such as TCM, chiropractic, naturopathy, mind-body medicine, spirituality, etc. Attendees will have the opportunity to hear from experienced national leaders

in the field of healthy aging and to share their thoughts and ideas with others who have similar interests. For more information, please contact Jodi Montano at [jymontan@uci.edu](mailto:jymontan@uci.edu) or visit the Web site: [http://www.sscim.uci.edu/index\\_2col.asp?page=16](http://www.sscim.uci.edu/index_2col.asp?page=16).

**March 4-5: NUTRACON.** Anaheim, CA. Nutracon is the premier event for ingredient and technology innovation in the health and nutrition industry. The conference goal is to help companies develop new science-supported products in the supplement, functional food and beverage, and nutricosmetic sectors. This year's 5 education tracks are designed to bring companies up to speed on weight management and obesity, superfruits and berries, healthy aging, vitamins and minerals, and applications and impacts of fermentation technology. Each track includes recent scientific developments, case studies, market trends, and an assessment by subject experts. For more information, or to register, please visit the Web site: <http://www.nutraconference.com/>.

**March 5-8: Natural Products Expo West.** Anaheim, CA. Natural Products Expo West is the most exciting marketplace and the most authoritative and leading national source of information on the latest ideas, product technologies, government policies, and breaking news on the multi-billion global health and wellness industries. For more information please visit the Web site: <http://www.expowest.com/>.

**March 20-22: Healthplex Expo 2009.** Beijing, China. Healthplex Expo focuses on 4 major areas of the health industry: nature medicines, functional foods, natural cosmetics and homecare products. Healthplex has been established as the largest natural home and healthcare trade show in China. Attendees can meet with over 200 companies from all over the world, exploring the latest spectrum of health products, supply related services, and machineries. For more information, please visit the Web site: <http://www.healthplex.com.cn/en/index.asp>.

**April 3-5: Southwest Conference on Botanical Medicine.** Tempe, Arizona.

Join us for a sunny weekend in the blooming April desert! Keynote speaker: Jim Duke, PhD. Conference topics: Herbs for Healthy Aging; Fibromyalgia-Botanicals vs Drugs; Nervous System Trophorestoratives; Botanicals for Musculoskeletal Spasm; Medicinal Spices; Botanical Management of Chemotherapy Toxicity; Case Studies

in Cervical Cancer and Varicose Ulcers; and much more. Pre-conference intensive on April 3: Neuroendocrine Regulation with Botanicals. Lots of outdoor events: Friday Field Studies, herb walks at the Desert Botanical Garden, and outdoor classes in medicinal herb preparation. CE credits for health professionals. Web site: [www.botanicalmedicine.org](http://www.botanicalmedicine.org). Phone: (800) 252-0688.

**April 6-9: 8th Annual Oxford International Conference on the Science of Botanicals.** Oxford, MS. The purpose of the conference is to review, discuss, and explore methods for determining the identity, purity, quality, and processing of botanicals. Each session will open with a plenary speaker outlining the current approaches, limitations, and research needs of the topic area. Speakers will include leading researchers from industry, academia, nonprofit institutions, and government. For more information, please visit the Web site: <http://www.oxfordicsb.org/>.

**April 24-26: Southwest Healthfest 2009.** Austin, TX. Natural product and organic companies representing food and beverages, supplements, sports nutrition products, health services, pet products, and more will exhibit at NPA's Southwest Healthfest 2009. For more information, or to register, please visit the Web site: <http://www.npasouthwest.org/>.

**May 2-4: World Tea Expo.** Las Vegas, NV. The World Tea Expo is the largest trade-only conference in the world showcasing tea and related products. The goal is to add value to the rapidly growing tea industry by providing a true global marketplace for commerce and education. World Tea Expo is committed to providing the most comprehensive products and resources necessary to serve the tea industry and facilitate its growth. For more information, please visit the Web site: <http://www.worldteaexpo.com/>.

**May 12-15: North American Research Conference on Complementary & Integrative Medicine.** Minneapolis, MN. The conference will showcase original scientific complementary, alternative and integrative medical research through keynote and plenary presentations, oral and poster presentations, and innovative scientific sessions. Areas of research presented and discussed at this conference will include research in basic science, clinical research, methodological research, health services research, and education research. For more information please visit the Web site: <http://www.imconsortium-conference.org/>.

**May 16-17: Healthy Living Expo West.** Reno, NV. This expo features exhibitors in the areas of health and fitness, natural products, healthy foods, and green living. The show is open to both the trade and the general public, allowing presenters to sell their products directly to consumers. The show also gives exhibitors the opportunity to demonstrate products and services, give out samples and literature, or make business and consumer contacts. Public admission is just \$5 per person. For more information, please visit the Web site: <http://www.healthylivingexpowest.com/>.

**May 31 - June 4: The Society for Economic Botany Annual Conference: Celebrating 50 Years.** Charleston, SC. This annual meeting will include a symposium on African ethnobotany in the Americas, and the meeting will coincide with Charleston's Spoleto Festival. For more information or to register, please visit the Web site: <http://2009.sebconference.org/>.

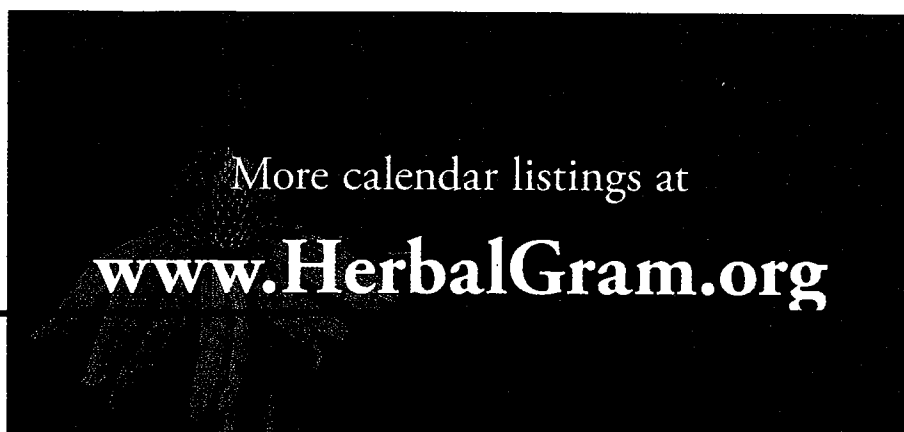
**June 9-13: 2nd International Conference on Landscape & Urban Horticulture.** Bologna, Italy. This conference will explore advances being made in a wide range of topics: from ecophysiology and plant management in urban environments to psychological and social aspects of gardening, plant use, and garden design. The objective is to

provide not only a forum for scientists, but also to share the diverse experiences, perspectives and results of participants and contributors from different fields of urban horticulture. For further information, including details for submission of abstracts, please visit the conference Web site: <http://www.luh2009.org/>.

**June 19-21: 9th International Herb Symposium.** Norton, MA. The International Herb Symposium offers herbal enthusiasts and practitioners an incredible opportunity to learn from the world's leading experts in botanical medicine. The Symposium features over 90 workshops for all levels of interest, herbal intensives for more in-depth study, hands-on demonstrations and herb walks, an herbal marketplace, and fun social activities. For

more information please visit the Web Site: <http://www.sagemountain.com/>.

**June 22-23: Berry Health Benefits Symposium.** Monterey, CA. This international conference is dedicated to exploring the latest scientific research related to berries and human health. It will showcase the latest research into the compositional elements and biochemical activities of berries and their relationship to a variety of health benefits. Attendees and presenters will have an opportunity to discuss new research findings with the goal of developing new ideas and directions to further the knowledge base. For more information, or to register, please visit the Web site: <http://www.berryhealth.org/>.



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

*2007 Annual Bibliography of Significant Advances in Dietary Supplement Research* contains annotations of 25 original papers on dietary supplements published in 2007. This is the 9<sup>th</sup> annual issue of the bibliography, produced by the Office of Dietary Supplements of the National Institutes of Health. This issue contains annotations of several studies on botanical supplements, including fenugreek, garlic, and *Salacia oblonga*. Available at the ODS Web site: [http://ods.od.nih.gov/research/annual\\_bibliographies.aspx](http://ods.od.nih.gov/research/annual_bibliographies.aspx).

*Planta Medica*, a respected phytomedicinal journal, has devoted a special issue to chemoprevention in October 2008, including numerous articles reviewing the state of potential new plant-based anticancer drugs. All articles are accessible for free via the journal's Web site: <http://www.thieme-connect.com/ejournals/toc/plantamedica/66855>.

*Leaves of Faith* is a DVD documentary

featuring the Masewal medicinal garden and national park in Belize and the herbal knowledge of the garden's curator Don Beto. Directed by Betsy Isaac, the documentary follows Beto as he walks through the jungle garden and discusses uses of the garden's many medicinal plant species. Revenue from DVD sales will be used to maintain projects for the garden. The Cornerstone Foundation in Belize is facilitating sales of the DVD, which is available with a minimum donation of \$25 (US). Contact: Sheree Fukai at [foundation@cornerstonefoundationbelize.org](mailto:foundation@cornerstonefoundationbelize.org) or 011 +501-678-9909.

*Pycnogenol® Application Videos* have been posted on the official Web site for the Pycnogenol French maritime pine bark extract. These 4- to 5-minute educational videos demonstrate the supplement's uses for cardiovascular health, diabetes care, skin care, menstrual discomfort, joint health, and sports nutrition. Available from the Web site: [http://www.pycnogenol.com/industry/industry\\_educational\\_movies.php](http://www.pycnogenol.com/industry/industry_educational_movies.php).

*Fruitipedia.com* provides photos and descriptions of hundreds of fruit-bearing plants from around the world. The descriptions include information on the plants' Latin and common names, physical characteristics, distribution ranges, and uses—including medicinal uses. A new interesting "fruit fact" is posted every week, and readers are encouraged to submit articles containing basic information about the fruits of their respective regions to the Web site's editor. The Web site was initiated and is edited by Dr. Chiranjit Parmar, and information on the Web site is available in 12 languages.

**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](http://www.herbalgram.org). P.O. Box 144345, Austin, TX 78714. 810-373-7105 or fax 512-926-2345. E-mail [abc@herbalgram.org](mailto: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 81308.

**Other**

**Australasian College of Health Sciences, USA.** ACHS.edu's online programs provide students with dynamic, interactive, and immersive online learning with comprehensive, scientific, and research-based curricula. ACHS offers DETC accredited general interest, CEU, professional credential training, and the only fully online and accredited Associates and Masters degrees in Complementary Alternative Medicine in the United States. Credential programs available in the fields of Holistic Health Practitioner, Master Herbalist, herbal medicine, aromatherapy, dynamic phytotherapy, holistic nutrition,

iridology, flower essences, and many other holistic health modalities. ACHS's prestigious faculty and Advisory Board annually review each program we offer to ensure the highest quality and standard of education is provided to our students. Request your free catalog today 810-487-8839, [www.achs.edu](http://www.achs.edu). ACHS 5940 SW Hood Ave, Portland OR 97223. Accredited member DETC.

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**Interns, Get hands-on experience before you graduate!** If you're a future pharmacist or dietician, you can choose a rotation through ABC's internship program. You'll get a comprehensive introduction to phytochemicals, 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 512-926-4900 or e-mail [education@herbalgram.org](mailto:education@herbalgram.org).

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