Missouri Botanical Garden
- Plants for a sustainable future

Rainer W. Bussmann
William L. Brown Center
Missouri Botanical Garden
Becoming the William L. Brown Center

Dr. Edgar Anderson

Dr. William L. Brown

Dr. Suri Sehgal
Countries of main emphasis
Research Areas:

- Ethnobotany / Palaeoethnobotany
- Natural products, under-used plant resources and markets
- Seed and germination ecology
- Plant ecology and regeneration ecology
- Intellectual property rights
- Natural resource management
Objectives:

- Documentation of traditional knowledge
- Harvest / production and market flows
- Development of crops and products
- Supply of “safe” and “standardized” natural products
Verification of material in commerce
Identification of Botanicals
Natural Products Research
(National Center for Natural Products Research,
National Cancer Institute,
International Cooperative Biodiversity Group, etc.)
The International Center for Indigenous Phytotherapy Studies (TICIPS)

University of Missouri – Columbia, University of the Western Cape, Missouri Botanical Garden, University of KwaZulu-Natal
Medicinal plant species used:

PERU: 510
ECUADOR: 215

Introductions: 17% in both countries
2.5% of all species traded (~10) accounted for more than 40% of the total sales volume!

11% of all plants in the market (~40) accounted for 80% of all sales.
Pseudogynoxis cordifolia (Cass.) Cabr.
Number of plant species used

Number of species

Martinez Compañón (1780) 526
Peru 510
Ecuador 215

Martinez Compañón (1780)
Comparison of species assemblies

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage of species found</th>
</tr>
</thead>
<tbody>
<tr>
<td>MC shared with contemporary</td>
<td>41</td>
</tr>
<tr>
<td>MC Amazon</td>
<td>32</td>
</tr>
<tr>
<td>MC discontinued</td>
<td>27</td>
</tr>
<tr>
<td>Peru new</td>
<td>58</td>
</tr>
<tr>
<td>Ecuador new</td>
<td>41</td>
</tr>
</tbody>
</table>
Parts of medicinal plants used in Peru and Ecuador

<table>
<thead>
<tr>
<th>Part</th>
<th>Peru</th>
<th>Ecuador</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaves</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whole plant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stems</td>
<td></td>
<td>60%</td>
</tr>
<tr>
<td>Flowers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seeds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fruit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Root</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bark</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fruit peel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Latex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wood</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Bananas in Pohnpei:

- Utimwahs: 14
- Karat Pwehu: 10
- Mangat: 9
- Taiwang: 6
- Utin Menihle: 1
Carotene content µg / 100g:

• *Capsicum*: 3840
• Butternut squash: 3650
• Chard: 4625
• Spinach: 3535
• Carrots: 8115
• Sweet potato: 3930
• Golden Rice II: 3700
• Karat Banana: 4320
• Utin Iap Banana: 8500
Markets and Threats:

- $2 million market in Region
- Collector income only 2.80-6.10$ /day
- $80 billion world market in medicinals
- Most species available online!
- Almost no cultivation of important species
- Over-harvesting due to rising demand
- Large scale bio-fuel production and mining
- High altitude systems altered by climate change
Over-harvest of Tibetan snow lotus
Axinaea flava
- found 1996
- described 2004
- 10 trees left 2009
“Sacred Seeds”
Healing the planet one garden at a time
Sacred Seeds Peru
Sacred Seeds Madagascar
Plants of Semillas Sagradas:
An Ethnomedicinal Garden in Costa Rica

In Praise of...

“Medicinal plants, often considered sacred for their healing powers, are more than ever threatened by over-harvesting, ecosystem destruction and climate change. Semillas Sagradas represents the first holistic attempt, blending traditional knowledge with modern science, to preserve important species and the associated lore for future generations. The book will be of great value to healers, botanists and teachers, and will help to pass ancestral knowledge to future generations. The authors are to be congratulated for their achievement, and that the concept of Semillas Sagradas will spread to all corners of the globe.”

—R. W. Rehmeyer, Ph.D., William C. Brown Curator of Economic Botany, Head, W. L. Brown Center for Plant Genetic Resources, Missouri Botanical Garden

“Costa Rica is a nation rich in plant diversity, and this book provides a fascinating review of the traditional uses and modern research on a selection of species employed as herbal medicines in the region. Written by two experts in the field of ethnomedicine, this book is a comprehensive introduction to some of the plants growing in Finca Luis Nica’s Sacred Seeds Sanctuary, a facility that serves as a model for the conservation of viticultural plants and ethnomedicinal lore in other areas of the world.”

—Jack M. Blumenfeld, Founder and Executive Director, American Botanical Council (ABC)

“Having personally observed the diligent field and bibliographic research of this talented team, I applaud both this book and the concepts behind it, conservation, cultural, educational, ethnomedical, and spiritual. Rafael, Michael, Ruth and Katherine have done Costa Rica and the world a favor in bringing this great garden and beautiful book to fruition.”


Rafael Ocampo, BSc. and Michael J. Balick, Ph.D.

Foreword by Peter H. Raven, Ph.D.

Edited by Ruth Goldsain and Katherine Herrera
Plukenetia huayllabambana
Herbal Products