

### NEW DISEASE-RESISTANT BANANA HYBRIDS

**AVAILABLE.** By Daniel Sonke with Dr. Phil Rowe. A serious banana and plantain disease became epidemic in the Pacific and Asia in the early 1960's. This leaf spot disease, called black Sigatoka (BS), is caused by the fungus *Mycosphaerella fijiensis* var. *difformis*. In the early 1970's it spread to Latin America and in the late 1970's it reached Gabon in West Africa. From there it has spread throughout sub-Saharan Africa, threatening the plantains which are a staple food to about 70 million people on that continent alone. While fungicides can be successfully used to limit the damage done by BS, their use is expensive and possibly damaging to the environment.

The following description of BS is taken from the CAB International book *Bananas and Plantains* which was reviewed in EDN 57. "Initial disease symptoms on the leaves are small, translucent, pale yellow streaks which develop into brown, oblong flecks. These eventually become necrotic lesions with light grey centres and surrounded by yellow circles. When the lesions coalesce, patches of leaf are destroyed, which ultimately leads to reduced yields and premature ripening of bunches (up to 50% yield loss)."

In 1997 I (Daniel Sonke) attended a presentation given by Dr. Phil Rowe on his work with the Honduran Foundation for Agricultural Research (FHIA) in breeding of bananas and plantains resistant to BS. Dr. Rowe has developed two robust hybrids that are resistant to BS. These new hybrids are also resistant to Panama disease and tolerant of nematodes.

The new banana, FHIA-01 (also known as Goldfinger), has a pleasant, slightly tart (apple-like) flavor when ripe, and is also a tasty cooking banana when boiled or fried green. Fruit of FHIA-01 ripens naturally to an attractive yellow color after harvest, and the hands ripen sequentially providing the availability of ripe fruit from the same bunch over about a 10-day period. Also, "mashed ripe FHIA-01 is an excellent baby food. At least, the babies who served as our test panel here loved it," writes Dr. Rowe.

In 1995, ECHO obtained plantlets of FHIA-01 which we planted in both Florida and Haiti. Neither Florida nor Haiti has yet reported a problem with BS. While the plants have since produced in Haiti, the Haitian ECHO staff were not especially impressed with the flavor of the cultivar, which was developed for shipping to American banana markets. They seemed to prefer the local banana types, which can be

harvested and sold ripe. However, American ECHO staff found the flavor appealing in comparison to bananas purchased in US supermarkets. Perhaps if Haiti developed a BS problem, opinions regarding FHIA-01 would change.

The other hybrid, FHIA-03, has a recommended use as a green cooking banana (boiled or fried as chips). FHIA-03 has a strong, semi-dwarf plant type which permits using a ladder and knife for removing fruit as needed from unharvested bunches. By harvesting gradually in this manner, the green life of the remaining fruit is preserved and green fruit can be obtained from the same bunch for about 6 weeks.

Both FHIA-01 and FHIA-03 support 100-lbs. (45 kg) bunches with no propping. These hybrids are especially suited for home gardens. In addition to being adapted to the tropics, both are cold-tolerant and perform well under subtropical conditions. In trials in Honduras, when no BS control measures were applied, FHIA-01 was twice as productive as the standard Cavendish variety of banana and FHIA-03 was twice as productive as the widely-cultivated Bluggoe variety of cooking banana.



Dr. Rowe with FHIA-03

Dr. Rowe and FHIA are offering to provide plantlets of FHIA-01 and FHIA-03 to missionaries and development workers around the world. The only cost for obtaining these hybrids is for reimbursement of the postage charges for shipping. Tissue-cultured plantlets (10-20 of each), which are free of diseases and ready for transplanting to plastic bags, will be sent upon request. A sterilized soil mix is recommended for this

initial transplanting. This can be obtained by placing 6-inch (15 cm), metal containers of dry soil in an oven for one hour at 300°F or 150°C. The planting bags should be about one quart (or liter) in size with holes in the bottom for drainage.

Plants should receive protection from direct exposure to the sun for about 3 months. Shade trees are ideal for this sun protection. At 3 months plant about 10 feet (3 meters) apart for fruit production.

Most shipments will be by the commercial shipping courier DHL. This company requires an exact address (instead of a P.O. Box number) for delivery, and a phone number if available. The 20-40 plantlets will weigh about one kilogram and easily fit into a large DHL mailing envelope. DHL in Honduras estimates the shipping cost to Africa to be about US\$82.00. Please address requests to: Dr. Phil Rowe, FHIA, P.O. Box 2067, San Pedro Sula, Honduras; Fax (504) 682313; E-mail: [dinvest@simon.intertel.hn](mailto:dinvest@simon.intertel.hn).

**SEED FOR SORGHUM THAT IS RESISTANT TO STRIGA IS AVAILABLE FROM ECHO.** Scientists Larry Butler and Gebesa Ejeta at Purdue University have developed this variety and successfully tested it in Africa.

First, what is striga? The following excerpt from the home page of the International Development Research Center (IDRC) in Canada, written by Philip Fine, describes this parasitic seed plant well.

"When the head of a family farm in Mali looks out over crops of maize or millet and sees a vibrant pink flower spreading throughout the family's land, the reaction is one of resignation. The farmer knows that the treacherous weed named striga has returned. It means lost hard work, diminished potential income, and less food available for the family. The family may pull out some of the weeds, but the damage began long before the striga flowers appeared [Ed: the roots of a young striga plant enter the roots of the sorghum or millet and began living off of the host plant's sap.] Even rotating the crops or using new fertilizers does little to stop the weed's spread. Each striga plant yields thousands of seeds [Ed: which may survive in the soil for up to 30 years] which means that next year's crop will likely be stunted as well."

"Striga is a serious constraint to sorghum, millet and maize production in the dryland zones of Africa, accounting for crop losses as high as 70% among subsistence farmers. Striga is also a problem in sub-humid to humid regions. It is estimated that two-thirds of the 73 million hectares (180 million acres) devoted to cereal crops in Africa are seriously affected by striga, which thrives under conditions of low soil fertility and decreasing plant diversity. The overall revenue loss from striga in Africa is estimated at US\$7 billion per year."

If striga is a problem in your area, you can write ECHO for a single packet of striga-resistant sorghum seed to try. The variety mix was kindly provided to us by the World Vision Food Security Africa Region program in Accra, Ghana, where the Purdue varieties are being multiplied. If it does well, you can increase your seed year by year. It is possible

the resistant variety has already been tried in your area and seed may already be locally available from World Vision or another organization.

Katrin Wilkins, a German missionary who has worked for four years in Chad, says that in the region where she works, striga affects millet, sorghum, maize and rice. "It does not appear every year. My first two years there we didn't see it, the last two years we saw it a lot."

"One reason for the variability in striga incidence appears to me to be the rainfall pattern. I've read that the too little rain creates favorable conditions for striga, but in our situation it seems that when there is too much rain it seems to develop a lot. In our region [a very dry part of Africa] it seems that 2-3 weeks of drought during the growing season holds it down. It is also much worse when the soil is poor. Intercropping with cowpea or adding manure helps. In some years rice was badly hurt, especially in poor soil. It is not as much of a problem in heavier soils as in sandy soils. The effect of manure on the plants was very evident in the worst year of striga incidence. With no manure, ears were very small and not filled out very well. Where the manure piles had been located there was no striga at all."

"We obtained our striga-resistant seed from ECHO two years ago. We are now multiplying it. We have not yet done controlled experiments because there was so little seed. We wanted to grow that in good, manured soil, where striga would probably not have shown up anyway."

According to the IDRC home page, Researchers at McGill University in Canada and the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) are working on another possible striga control. They have found that *Fusarium oxysporum*, a naturally occurring soil fungus, effectively controls the striga weed.

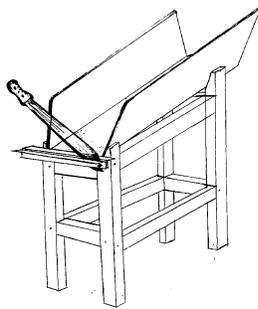
"In 1991, IDRC funded a team at McGill University in Montreal to search for substances present in African soil that could control the cereal-killing weed. Although striga has no known natural enemies, the researchers identified a hundred promising fungal pathogens in the fields of Burkina Faso, Niger and Mali. In experiments conducted in Canada, eight of the soil pathogens proved effective in stopping the striga weed. Studies showed that the most deadly foe of striga, *Fusarium oxysporum*, is not toxic to humans and causes no harm to cereal crops. In 1995, the scene shifted from a quarantined facility at McGill to testing in a sorghum field in Mali. The results were dramatic. Eighty-five percent of the striga weed was wiped out at the seedling stage by the *Fusarium* fungus, which had been grown on sorghum waste, dried, and then spread over the fields. At harvest time, there was almost twice as much grain and 70% less striga.

"While such data are encouraging, scientists caution that further studies are needed to evaluate the effectiveness of *Fusarium* under different climate and soil conditions. By 1999, the McGill team which is collaborating with the International Crops Research Institute for the Semi-Arid

Tropics (ICRISAT) and Mali's Institut d'Économie Rurale expects to have more conclusive results. One of the most encouraging properties of the *Fusarium* fungus is that it is relatively easy to multiply. In the next phase of this project, team members will seek the input of Malians and visit local villages to see whether *Fusarium* production could be handled by individual farmers or by cooperatives set up for this purpose. The dried fungus, which can be stored for months without any measured reduction in potency, will eventually stay in the hands of local farmers. If all goes well, someday they can spread the fungus on their fields, preventing them from turning pink with striga." [The above two paragraphs were excerpted from an article in *IDRC Reports* by Philip Fine. It is found on the internet at <http://www.idrc.ca/books/reports/1996/28-01e.html>.]

**CHUFF CUTTERS.** By Darrell Cox. The following is abstracted from *Uganda Environews*, April 1997.

The chuff cutter is a simple tool used by farmers for chopping fodder that is fed to zero-grazed livestock. The chuff cutter offers the following advantages over the conventional chopping method that utilizes a machete and log: 1) time savings, 2) uniform chopping with reduced



Sketch of a chuff cutter

wastage, 3) increased safety, 4) portability which allows fodder being chopped to fall directly into a feeding trough, and 5) reduced physical labor. It has become popular among Ugandan women farmers who often are responsible for chopping and feeding Napier grass (*Pennisetum purpureum*) to zero-grazed dairy cattle. These women find the chuff cutter does not require as much energy as the

local conventional method. In addition, the time that is required for chopping fodder is reduced so women have more time to attend to other responsibilities. As a result, it has been promoted as an appropriate technology for sustainable agriculture and saving labor in East Africa. The production of chuff cutters by community groups has potential for being a successful income generating activity.

The chuff cutter illustrated here was developed at the Mogabiri Farm Extension Centre in Tarime, Tanzania and has been promoted and sold by the following development organizations in Uganda: Environmental Alert, Africa 2000 Network, UNDP, P.O. Box 7184, Kampala, Uganda (We thank them for allowing us to use the illustration); Joint Efforts to Save the Environment, P.O. Box 728 Fort Portal; and Akutwala Rural Development Assoc., P.O. Box 9038, Kampala.

**INTERNATIONAL AID PROVIDES SERVICES TO MISSIONARIES.** By Darrell Cox. This Christian non-profit organization offers two core services for missionaries:

- Sells many personal items at up to a 90% discount to career and short-term missionaries and relief workers.
- Provides Christian hospitals and health care professionals with medical supplies & equipment, medicines, institutional support, sight-restoring surgeries, and trains nationals in the maintenance and repair of bio-medical equipment.

International Aid's "Mission Resource Center" (MRC) near Grand Rapids, Michigan, offers products at a discounted price (generally 10% of normal retail price) to missionary families and relief workers who are registered with a recognized mission agency. The MRC contains a selection of hundreds of personal and home care items, food products, clothing, educational materials that could be used in home schooling, Bibles, and medical supplies. You can shop at their Michigan location or make a mail/fax order. By contacting them, you can receive a catalog of their supplies. You also may want to ask for a copy of their publication "Missionary Resources" that lists more than 300 organizations that provide services and products that may be of interest to missionaries. It includes the names and contact information for everything from audio-visual equipment to foreign language materials to travel agencies and more.

My wife and I stopped at their Michigan location in the spring of 1992 and found it well stocked with many of the personal items we were planning to take with us for our first term in East Africa. We were able to purchase a large assortment of items, more than we could put in our car, and had them shipped to us in Minnesota where we did the remainder of our packing. Because of agreements with the distributor of the products, most items obtained from International Aid must be used outside of the U.S. In some cases further restrictions on use exist.

International Aid is located at: 17011 W. Hickory, Spring Lake, MI 49456; phone (616) 846-7490 or 1-800-968-7490; fax (616) 846-3842; e-mail [intlaid@juno.com](mailto:intlaid@juno.com); website <http://www.internationalaid.org>

**BETTER BUTTER: A RECIPE.** By Martin Price. During a recent visit to missionaries Scott and Jody Daby in Haiti, I especially enjoyed the fresh bread and real butter they served. Surprisingly the tasty butter was spread like margarine even when just removed from the refrigerator. Jody explained that it was a recipe to make butter go further called "better butter." She mixes 2 cups (0.5 l) of butter, 2 cups (0.5 l) of cooking oil and 4 tablespoons (60ml) of milk powder and salt to taste. After blending, she stores it in the refrigerator. If left unrefrigerated in the tropics it might be too soft. An extra benefit: this presumably cuts the cholesterol and unsaturated fats in each unit of butter in half if you use the right kind of cooking oil.

**KATUK, SAUROPUS ANDROGYNOUS, A GREAT VEGETABLE FOR THE HOT, HUMID TROPICS (WITH A CAUTION).** By Martin Price. Katuk, *Sauropus androgyneus*, has become one of my favorite vegetables for

hot, humid climates. It has a pleasant peanut-like taste when eaten raw and the cooked leaves taste excellent as spinach. The plant is sold everywhere in Malaysia and nearby countries, where it is grown as an edible hedge. Malaysian scientists have developed a technique for forcing the shoot tips to grow extra long and tender by applying plenty of manure, water and (sometimes) shade. The 5-inch (13 cm) shoot tips (locally called "sayor manis") are sold to upscale restaurants locally and also exported to Japan, and possibly elsewhere, as "tropical asparagus." I ate sayor manis in a hotel in Malaysia and it was outstanding. The chef stir-fried it for one minute.

In 16 years of growing katuk in southwest Florida, we have never had a serious disease or insect problem during the hot rainy season when most temperate vegetables do not survive. In our cooler winter, however, when we are enjoying temperate vegetables, katuk essentially goes dormant. At that point leaves may be damaged by disease or insects.

ECHO has never featured katuk in *EDN*, in spite of its excellent qualities, because we have only been able to propagate it by cuttings, and they have not survived simulated overseas mailings. Occasionally we do get seed, but it does not seem to retain its viability for long (not surprising for a plant native to a rainforest region). If you would like to be placed on a waiting list to receive seed when our plants produce again (realizing we can make no guarantees of viability), please write to ECHO. If you will be visiting ECHO sometime we can give you a plant or cutting.

We were quite surprised when Yang Wang, a citizen of Taiwan, wrote us after an internet search for information about katuk led him to ECHO's web site. In Taiwan there have been several cases of irreversible lung damage that have been traced to use of katuk. How could a common vegetable in Malaysia be harmful in Taiwan? We have not been able to get the kind of details we would like, but apparently the health problem is caused by special circumstances. It appears that katuk was used in Taiwan as part of a dieting program. Dieters ate leaves raw; probably in large quantity. We do not know whether they ate anything else with the katuk. We asked Mr. Wang for more details. He could only add that he heard that in the Taiwan dieting method dieters drank raw juice made from katuk leaves. I believe they may have consumed very large quantities and thus concentrated a harmful substance in the juice they were drinking.

I spent a summer working under Dr. Peter Van Soest in the animal sciences department at Cornell University. He said that one "should learn a lesson from the deer." A deer will eat plants that can kill cattle. How? Deer are browsers. They will eat a little of something they like, but then go on to look for something else. Grazing cattle, on the other hand, sometimes "founder" or are poisoned by eating one type of plant in large quantity. Goats are probably in the same class as deer. Dr. Van Soest pointed out that the liver can detoxify small amounts of most poisons in food. Large amounts

overwhelm this ability. This is a compelling reason for diversity in diet. I find so many applications of this principle as we work with different foods at ECHO that it has become a standing joke among the staff. It could be that in the case of katuk, we need to "take a lesson from the deer," and enjoy it in small quantities.

An article in the *American Journal of Epidemiology* (May 1, 1997 - Volume 145, 842-9) states that, "In late April 1995, an outbreak of a poorly defined respiratory illness related to the ingestion of leaves of *Sauropus androgynus* was observed in southern Taiwan. To further evaluate the association between *S. androgynus* and bronchiolitis obliterans syndrome, a hospital-based case-control study was conducted with one case group and three different control groups at Veterans General Hospital-Kaohsiung .... A total of 54 cases (50 females, 4 males), 54 age- and sex- matched neighborhood controls, 54 matched routine physical check-up controls, and 54 matched self-referred patron controls (who had ingested *S. androgynus* yet without obstructive physiology) were interviewed for clinical symptoms, history of *S. androgynus* consumption, and potential confounding factors. All 54 cases (100%) ingested *S. androgynus* compared with only five (9%) neighborhood controls." Their statistical analyses showed that the lung problems were related to consumption of large quantities [4.5 kg (10 lbs. versus 0.4-2.0 kg (0.9-4.4 lbs.) in controls] and drinking raw katuk juice rather than stir-fried or boiled leaves.

What is our conclusion? We still highly recommend katuk as a quality vegetable for the hot, humid tropics. Just learn a lesson from the deer.

**TECHNIQUES FOR STORING ONIONS.** *The following was adapted by Roger Bullard for EDN from the book reviewed in this issue, Onion Storage In The Tropics – a practical guide to methods of storage and their selection.* The wild species giving rise to the bulb onion (*Allium cepa*) came from southwestern Central Asia, and from it a variety of landraces and cultivars have been developed which flourish under a wide range of climatic conditions.

Onions are normally harvested at the end of the bulbing process when "the leaf blades are no longer able to support themselves, the neck softens and the leaves collapse. At this point the bulb has reached maturity. It then enters a period of dormancy during which little change appears to occur..."

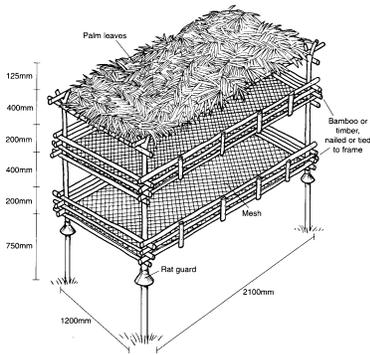
"Onions grow best under dry conditions and at moderate temperatures. Under these conditions onions mature fully and, if they are cured before storing, may last for a long time without loss of quality." Onions grown under very hot or wet conditions face difficulties from fungal and bacterial diseases. In addition to lower yields, the storage losses will probably be higher because bulbs may have been infected before they went into storage. Harvesting after the leaves have completely dried but before the bulbs have begun to resprout, and topping (cutting off the leaves) after most of

the leaf has dried, will decrease storage losses to these plant pathogens. Poor quality “culls” should be removed before the onions are dried and stored.

It is best not to promote excessive bulb growth with too much nitrogen fertilizer and irrigation.

Cultivars vary considerably in how well they store. Cultivars suitable for storage should produce a number of outer dry scales or skins which form a vapor barrier around the bulb, thereby minimizing moisture loss and the entry of fungi or bacteria. Locally adapted onion varieties, selected over many years within the tropics, will probably store better than the imported types, especially the ‘short-day’ varieties from temperate climates.

Before storing, bulbs should be properly dried and cured. Use some technique that will both remove surface moisture and allow high temperature formation of strong, intact outer protective skins and neck closure of the onion. High



*Permanent shed for outdoor drying of onions (Ministry of Agriculture, Jamaica).*

temperatures (e.g. 27° C or 80°F), low humidity (< 60% RH) and good ventilation are important in drying. Laying the onions on the soil in windrows is the simplest form of field drying. Alternatively, they may be removed from the field and placed in a heap, or spread in a shallow layer, preferably on a cement slab to avoid contamination of soil-

borne pathogens. Problems associated with outdoor drying can include poor drying rates, sun scald, and rain.

A simple outdoor shaded structure can avoid these problems. A good design for natural ventilation is to make shallow trays with screen or woven bottoms. Arrange trays vertically, spaced sufficiently apart to catch the prevailing winds. If clear corrugated plastic sheeting is available, heat required for the curing process can be achieved by using it in the roof structure and thereby capturing passive solar energy.

Maintaining the bulbs at suitable temperature and humidity is vital to the successful storage of onions. The optimum relative humidity range is from 65-75%. There are two favorable temperature regimes. Minimal storage losses occur at 0-5°C (32-41°F), but for the farmer or villager not having refrigeration, 25-30°C (77-86°F) would be the best choice. Temperatures that are either too high or too low will increase rotting or sprouting. These are the greatest enemies to successful storage of onions. A high technology solution to the sprouting problem is to add chemical "sprout

suppressants" prior to storage.

Stored onions should be arranged so that some air reaches each onion, if possible. The storage structure should be designed to maximize natural ventilation. In the tropics there are a variety of ways to do this in home storage. Strings of onions may hang from the ceiling or roof beams or horizontal bamboo rods or racks. In Belize they are hung over the fireplace where wood smoke may have an inhibiting effect on sprouting. They may be stored in bags in the home or in the shade. Ventilation is facilitated by arranging the bags in a particular way. In Pakistan bulbs are sometimes laid on beds of coarse sand. An experiment in the Philippines compared storage of onion layers separated with 50mm of sand, sawdust, rice straw, rice husk or wood shavings. All materials improved storage performance, but sand and sawdust were best.

Many traditional on-farm structures for storing onion are found worldwide. They are constructed from mud, bamboo, straw, wood and other materials with thatching or some fabricated material to protect the interior from rain. A typical good design would be a simple ventilated structure constructed from bamboo. The floor would be at least 15 cm (6 in.) from the ground with framework constructed from poles about 8 cm (3 in.) in diameter placed 0.6 m (2 ft.) apart. The roof is grass thatch and the four sides and base are constructed from split bamboo poles with gaps of 2.5 cm (1 in.) between them to allow good air flow. Onions would be layered within this structure in one of the manners discussed above which will allow air flow to each stored onion.

[Editor: Missionary Tom Post told me of a dramatic example of the importance of onion storage. An innovative farmer in Belize found a way to produce nice bulbs in a region where few farmers could achieve this. If I recall correctly, the farmer received about as much income that year from a rather small plot of onions as from the rest of his farm. But the next year he could hardly sell the onions. It turns out that the storekeepers who bought his onions the year before had suffered huge losses during storage.]

“Successful onion storage is the outcome of a process which begins at the crop planning stage and which continues through cultivation, harvesting and post-harvest handling right through to sale of onions to the consumer.”

The physical method in which the onions are held (i.e. bulk, tray, box, bin, or bag) and designing the storage area for maximum natural ventilation are important considerations. If power is available, one can make further improvements in the storage conditions by strategically placing fans as a means of forced aeration.

**ECHOES FROM OUR NETWORK**

**Michael N. Oparah, Head of the School of Forestry at**

**Ibrahim Babangida College of Agriculture in Nigeria,** writes "the College Consultancy Department has continued to expand the use of Kerosene Emulsifiable Concentrate (KEC) by local farmers. This is an insecticide (at times it acts as a fungicide) which has a very wide spectrum as far as dealing with various insects is concerned. All insects found on all the crops in this locality are affected and killed by this poison."

"KEC is prepared by mixing kerosene, detergent powder, and water in this ration: Kerosene = 1 part, Soap = 1 part, Water = 20 parts. These are put into a plastic jerry can. Cork the jerry can, agitate it vigorously several times and keep it overnight."

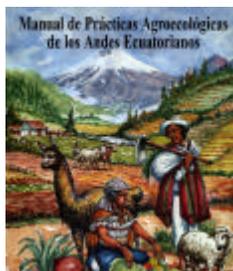
"In the morning, shake it vigorously again, sieve the contents into another container or into a knap-sack sprayer and spray onto the crops. It is very effective. The kerosene is the concentrate, the soap is the emulsifier while the water is the solvent."

Dr. Darrell Cox tried this formula in his work in Kenya (he now works at ECHO). He found the mixture to be somewhat effective. "It does reduce insect populations but should not be expected to completely kill them like an insecticide would."

## FOR YOUR INTEREST ONLY

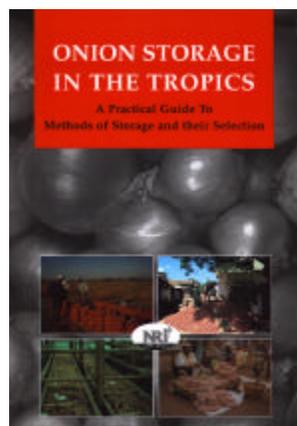
**ROCKEFELLER FOUNDATION FUNDING RESEARCH ON GENETIC ENGINEERING OF CASSAVA.** By *Martin Price*. I am sometimes asked whether genetic engineering will have much of an impact on the work of the people in ECHO's network. Most research in this area (which is extremely expensive) is done by industries and universities hoping to create new varieties that they can patent and sell. Those will have little impact on people who farm with little money.

The Rockefeller Foundation, however, is funding research at the International Laboratory for Tropical Agricultural Biotechnology that may be quite relevant. They are attempting to alter the genetic makeup of cassava so that it will resist viruses that are "decimating the yields of subsistence farmers" in Africa. The grant requires that the agencies doing the research "make their technologies freely available in developing countries." "Typical yields of cassava in Africa are 4 tons per acre, but [scientists] hope that resistance to viruses could boost them tenfold." By the way, cassava was introduced to Africa by Portuguese traders who brought it to the Congo from the Americas before 1600. (This information is gleaned from a feature in the *Los Angeles Times* December 26, 1997 by Martha Groves, "Plant Researchers Offer Bumper Crop of Humanity.")



## BOOKS AND OTHER RESOURCES

**Manual de Prácticas Agroecológicas de los Andes Ecuatorianos.** (Available in Spanish only). Reviewed by *Martin Price*. The mountainous zones in the tropics have unique crops, soils, and production problems. This new manual from IIRR describes in precise detail farmers' own effective practices to manage soil fertility and conservation, pest control, agroforestry, animals, and "integrated farms" with resources found locally in the Ecuadorian highlands. This easy-to-use resource is exceptionally well illustrated with large drawings and tables. [Ed: Reading this book would be a great way to help a "gringo" or "gringa" improve his or her vocabulary of Spanish words useful for work on small farms.] You may order the book for US\$20 (postage included) by sending a check on a bank located in the USA to IIRR, Apartado 17-08-8494, Quito, ECUADOR; phone/fax (593-2) 443-763.



**Onion Storage in the Tropics – a practical guide to methods of storage and their selection.** Reviewed by *Roger W. Bullard*. "Onions are second only to tomatoes in their importance as a vegetable in the tropics," according to a 116-page manual authored by J. Brice, L. Currah, A. Malins and R. Bancroft and published by the Natural Resources Institute of the University of Greenwich, UK. The

discussion of onion storage technology at all resource levels in the tropics was informative and practical.

The book discusses storage both at the village level where minimal resources are available and in situations where more use of technology is feasible. You can get a feel for the book from the article on onion storage in this issue (page 4), which is based entirely on excerpts from this book.

Part I gives the background information one should understand before attempting long term storage of onions under any conditions: bulb physiology, how it grows, how the growth transitions or stages are affected by both environmental and internal factors, and the pre- and post-harvest factors which affect storability.

Part II discusses alternatives storage techniques and how to select the best one for your situation

Part III is 25 pages of good examples of onion storage, ranging from a naturally ventilated household, to on-farm storage or small-scale ambient stores at the village level, to larger stores accessible to power for forced aeration, refrigeration, and even controlled atmospheres.

Available from Publications Distribution, Office Natural Resources Institute, Central Avenue, Chatham Maritime,

Kent, ME4 4TB, UK; phone: +44 1634 880088; e-mail: publications@nri.org. Non-profit, educational, research and governmental organizations working in countries eligible for British government aid may request a single copy free of charge. Give your official job title. For others, the price is £20 (approx. US\$34).

## UPCOMING EVENTS

### THREE ECHO-SPONSORED CONFERENCES - IN EAST AFRICA, HAITI AND FLORIDA

**Conference for Christian Workers In East Africa.** The conference will be held October 12-15, 1998 at the Limuru Conference Center, Limuru, Kenya. We are assured it was chosen for both comfort and modest cost. A local committee of nationals and expatriates is hard at work on details.

The specific objectives of the conference are: (1) to facilitate networking among the participants, i.e. to enable participants exchange experiences, information and ideas, (2) to provide opportunities for the participants to gain new knowledge or ideas and (3) to provide opportunities for moral and spiritual encouragement; many of the participants work in tough or discouraging situations.

The local committee expects up to 200 delegates, coming from NGOS, Christian missions and churches, government and government-related organizations, research organizations and farming communities. They hope that at least 25% will be women. The specific countries targeted are Eritrea, Ethiopia, Djibouti, Sudan, Uganda, Rwanda, Burundi, Tanzania and Kenya, including both nationals and expatriates. Though it is expected that the majority of the participants will be Christians, others will be most welcome.

Our co-sponsor is the African Institute for Scientific Research and Development. Its director, Dr. George Kinoti, should be your contact point. He and the local committee are making all arrangements and decisions. Dr. Kinoti writes, "There is already a very good response from EDN readers and others who have heard about the conference. The Steering Committee are really excited about the conference and are working hard to ensure that it will be enjoyable and beneficial. We send a warm welcome to all EDN readers. Registration forms will be sent out in March or April to all those who express interest in attending the conference."

The total cost including accommodation and meals will be no more (and possibly less) than \$200 double occupancy (\$250 single). Both the local committee and ECHO are trying to raise scholarships for those who really need them and to keep registration costs to a minimum. We want the conference to include a broad range of those doing agricultural development work, including some with very limited means. (If you have any leads for funding for the conference, get in touch with ECHO or the committee.)

One confirmed speaker is Tony Rinaudo, whose work on the "underground forest" was featured in EDN 58. If there is an interesting topic you would like to address, please suggest it to the committee. You may contact the committee at AISRED, P.O. Box 14663, Nairobi, Kenya; phone/fax: 254-2-446141; e-mail: Gkinoti@ken.healthnet.org or CRWRC-K@AfricaOnline.org.

### The Second Annual Conference for Christian Agricultural Workers in Haiti

follows a successful 1997 conference, which was attended by 150 delegates from all parts of Haiti. The 1998 conference will be held May 26-28, 1998 at the Christian University of the North in Limbe. The conference will be presented in the Creole language so as to facilitate networking and learning by both expatriate missionaries and Haitian agricultural workers.

Key themes planned for the 1998 conference will be Reforestation, Cooperatives - Establishment and Structure, Animal Production and Aquaculture, and the Gospel and Agricultural Teaching. Ivan Barineau, D.V.M., of the Christian Veterinary Mission is chairman of the organizing committee. A key speaker will be Dr. Joel Timyan, Ph.D., author of *Bwa Yo: Important Trees of Haiti*.

For more details and a registration form, write Ivan Barineau, c/o MFI-MCA, P.O. Box 15665, W. Palm Beach, FL 33416. All registrations should be arranged through Dr. Barineau and the committee.

### The Fifth Annual Agricultural Missions Conference at ECHO's home base in Fort Myers, Florida

November 10-12, 1998. The conference last November was a dynamic three days, with 200 delegates representing work in 30 countries sharing formally in talks, less formally in workshops and one-on-one in personal networking. We will be offering a substantial discount for early registration, so let us know of your interest. Send your request for conference information to ECHO-AMC at the address on this newsletter. (Future conference dates are November 9-11, 1999 and November 14-16, 2000.)

**Biointensive Sustainable Mini-Farming Workshops.** John Jeavons, author of the book *How to Grow More Vegetables*, will be giving a three-day Biointensive Sustainable Mini-Farming Workshop in Willits, CA, USA, on March 6-8, 1998 and Chambersberg, PA, USA on March 20-22, 1998. Lectures, discussions, and demonstrations will cover soil preparation, sustainable soil fertility, fertilization, compost, compost crops, crops for full nutrition, and crops for income. For more information, contact Ecology Action, 5798 Ridgewood Road, Willits, CA 95490; telephone: 707-459-0150, fax: 707-459-5409.

**Second Pan-African Christian Wholistic Development Course;** April 21-May 31, 1998 in Jos Nigeria. Course content includes: African development realities, Biblical theology of development, participatory development methodologies, strategic development management, social

marketing and networking, and appropriate technology. Course fees are \$900; to apply contact: The Executive Director, RURCON, Nigeria Bible Translation Centre, Old Airport Road, P.O. Box 6617, Jos, Nigeria.

**Community Health Workshop for Physicians, Nurses, and Mission Workers;** May 26-31, 1998, at Epworth-by-the-Sea Conference Center on St. Simons Island, GA, USA. MAP International will host a workshop designed to prepare Christian health workers to meet the critical issues their ministries face in working to improve the health of communities around the globe. Titled "Transformation for Better Health," the workshop will be facilitated by Dr. Dan Fountain, a surgeon, educator, and community health leader known globally for his work in church-related health ministries. Workshop fee is \$195. Lodging, including meals, is available from Epworth for between \$34 and \$71 per day. Contact: C.G. Rosser, Registrar, MAP International; PO Box 215000; Brunswick GA 31521-5000; phone: 1-800-225-8550, ext. 6633; fax: 912-265-6170; e-mail: [crosser@map.org](mailto:crosser@map.org).

**Rural Livelihoods, Empowerment, and the Environment: Going beyond the Farm Boundary;** November 29 – December 4, Pretoria, South Africa. Themes of the conference are ecologically sustainable development and farming systems, short-term farmer survival vs. long-term sustainability, empowerment through capacity building, the institutional environment and farming systems, methodological issues and challenges. For more information contact: AFSR-E Symposium '98. P.O. Box 411177, Craighall 2024, South Africa (phone: +27 11 442 6111; fax: +27 11 442 5927).

**IPALAC events being planned in 1998.** IPALAC, the International Program for Arid Land Crops, serves as a catalyst for optimizing the utilization of arid land plant species in development projects in semi-arid and arid lands. Its plans for calendar year 1998 include:

June 1998 - Course in Israel on **Date Palm Cultivation (in French)**. This is the opening salvo of a large stage project covering Mauritania, Senegal, Burkina, Mali, Niger, Cameroon and Chad. The participants in the training will be in good measure nominated by collaborators in them, but if they learn of a group that they think should take part in the overall project (promoting date palm cultivation) they would act accordingly.

**November 2 – 5, 1998 - Conference on Combating Desertification with Plants,** Beer Sheva, Israel.

The conference theme is the wise use of plants that are either native or adaptable to conditions of semi-arid/arid lands. Scientists/researchers, development workers/agencies, or others who have used plants in income generating or environmental projects in semi-arid regions are encouraged to share their experience during the conference.

Potential topics, depending on what speakers pick up on, include: (1) Plants that might be useful for wind and fire breaks, sand dune stabilization, soil erosion control, reclaiming saline lands, landscaping, etc. (2) Traditional and new crops--genetic improvement, crop transfer, domestication, etc. (3) Agroforestry and non-wood forest products--living fences, fodder banks, honey, silk, aromatics, gums, etc. (4) Social, cultural and economic aspects related to the use of plants in combating desertification (5) Ecological considerations. If you would like to give a presentation, submit a one page abstract by March 15, 1998.

For further information regarding IPALAC conferences contact the Organizing Committee, International Program for Arid Land Crops, c/o Ben-Gurion University of the Negev, P.O.B. 653, Beer Sheva, Israel 84105. Tel: 972/7/646-1905 or 646-1972; Fax: 972/7/647-2984; E-mail: [ipalac@bgumail.bgu.ac.il](mailto:ipalac@bgumail.bgu.ac.il). Supported by: UNESCO and Finland's Division of International Development.

**THIS ISSUE** is copyrighted 1998. Subscriptions are \$10 per year (\$5 for students). Persons working with small-scale farmers or urban gardeners in the third world should request an application for a free subscription. Issues #1-51 (revised) are available in book form as *Amaranth to Zai Holes: Ideas for Growing Food under Difficult Conditions*. Cost is US\$29.95 plus postage in North America. There is a discount for missionaries and development workers in developing countries (in the Americas, US\$25 includes airmail; in Europe, Africa, and Asia, \$25 includes surface mail and \$35 includes air mail.) Issues 52-59 can be purchased for US\$8, including postage. ECHO is a non-profit, Christian organization that helps you help the poor in the third world to grow food.

**ECHO DEVELOPMENT NOTES -- ISSUE # 59**  
17391 DURRANCE ROAD  
NORTH FORT MYERS, FL 33917-2239 U.S.A.  
PHONE 239/543-3246 FAX 239/543-5317  
E-MAIL [echo@echonet.org](mailto:echo@echonet.org)