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ECHO DEVELOPMENT NOTES

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Delegates and ECHO staff attending the November 1996 Agricultural Missions Conference.

PLEASE NOTE THE NEW DATES FOR OUR FOURTH ANNUAL AGRICULTURAL MISSIONS CONFERENCE. We had to change the date of the 1997 conference after EDN 54 went to press. A note was enclosed, but we would hate for anyone to buy plane tickets for the wrong week. If others are likely to read your copy, please change the date printed in that issue. The correct days are November 4, 5 and 6, 1997. The 5th conference was correctly listed as November 10-12, 1998.

This year brought 175 delegates representing work in 30 countries. Roland Bunch spoke from his experiences working with development and green manures in Central America. Paul Noren of Zaire shared plants and techniques he has used in forestry and crop production in that country. Other speakers and workshops covered mycorrhizal fungi, drying fruits, aquaculture, grafting, agricultural radio in Haiti, tropical fruits, and more. It would be impossible to measure the incredible amount of networking that occured between folks working with similar situations from all parts of the globe. Make plans to attend the 1997 conference if at all possible!

MAKING BONEMEAL FERTILIZER. Tim Motis in Ethiopia asked us about grinding animal bones to make bonemeal fertilizer for increasing phosphorus levels in poor soils. Bonemeal fertilizer is produced commercially and at one time was much more widely used. Motis is interested in village-level production. The following is extracted from information sent to us after we asked VITA (Volunteers in Technical Assistance) for help and from the Food and Agriculture Organization book *Animal By-Products: processing and utilization.*

VITA sent an excerpt from a book published in 1947 called *Commercial Fertilizers, their sources and use*. Author Gilbeart Collins states that bones were used as fertilizer in England as early as 1653. "Their value as a fertilizer appears to have been recognized in England much earlier than in any other country.... During the latter part of the 19th century deposits of bone were sought, particularly by the English, and collected from all parts of the world for use as fertilizer." Even battlefields and catacombs were used. In early USA history, "large quantities of buffalo bones were collected from the western plains for making fertilizer." "As virulent anthrax organisms have sometimes been discovered on old bones ... many countries require a certificate of sterilization before bone may be imported."

Processed bones may have been cooked, steamed, or treated with acid, or just been exposed to the elements for some time (desert bone). Any of these make grinding easier. Equipment for grinding can range from simple mortar-and-pestle pounding to animal-powered grinding wheels to modern hammer or roller mills.

Green [untreated] bones are sometimes ground and sold as 'raw bonemeal.' "The fatty materials found in raw bonemeal tend to delay the decomposition of the material when it is added to the soil. [Raw bonemeal] contains 2-4% nitrogen and 22-25% phosphate." The raw bone contains elastic materials which make the grinding process considerably more difficult, though the protein they contain adds a bit of nitrogen to the final product.

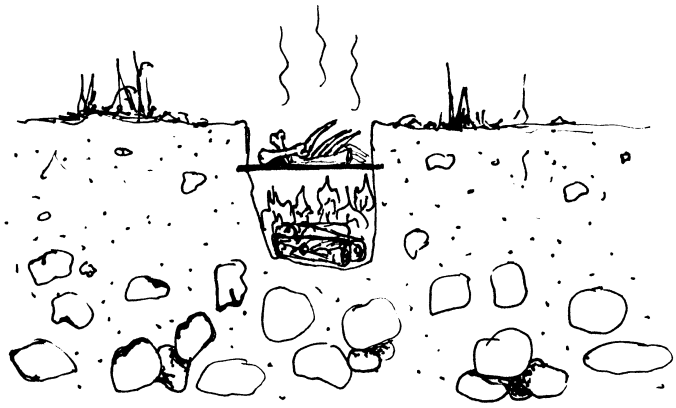
Most commercial bonemeal is steamed. Bones are boiled or steamed at high pressure to remove the gelatinous material (used commercially to make gelatin and glue). Thus treated, they can be ground finer, making the phosphates more readily available. Bonemeal is superior to mineral phosphates in its crop-producing powers. Its effectiveness is increased by the modest nitrogen content and the various micronutrients it contains. The calcium salts (lime) also present tend to reduce soil acidity.

"Bones are sometimes heated in a closed retort.... The residual charcoal is known as bone-black [and is] used to clarify sugar. It contains 30-35% phosphate and 10% carbon."

So is it practical to make bonemeal at the farm or community level? Possibly. The FAO publication *Animal By-Products: processing and utilization* says that "a crude but effective method is to burn the bones and to use the meal so obtained either as a mineral livestock-feed supplement or as a phosphate fertilizer." Both dry and fresh bones can be used though the process goes faster with older, dry bones.

"If the bones are only required for soil dressing, they can be piled directly over firewood or any other combustible material and fired. The charcoal and bones are collected together and poured into sacks." "To obtain a clean product [as opposed the charcoal/bone mixture] is to erect some form of large grill from old piping, (or perhaps from old car springs or similar material), pile the bones on top and make a fire underneath." The bars should be spaced close enough to prevent small bones from falling through, and should not be piled too high. They recommend a pile about one foot high (30.5 cm). The whole process will take from half to one hour. The bones are ready to be taken from the fire once they have become spongy and brittle."

A variation on this method is "trench-firing". A fire is built in a trench a minimum of 2 feet (30 cm) deep. The grid is laid across a shelf dug some 6 inches (15 cm) below ground level along the trench and the bones piled on top of the grid. "The advantages of this simple method are that large logs may be used for firing and that the heat is concentrated so that the required temperature is reached more quickly."



The firing process achieves three aims: "(1) it sterilizes the bones; (2) it burns off all the fat, blood vessels, marrow etc.; (3) the 'calcined' bones are so soft that they can be pounded easily with a pestle and mortar...." It can also be done with little equipment.

"The average analysis of several samples of bonemeal obtained in this way was as follows:

1. (dry bones) 15.5% phosphorus (equivilant to 35.5% P_2O_5), and 30.5% calcium (equivilant to 42.8% CaO).
2. (fresh bones with meat first stripped away) 15.2% phosphorus and 31.0% calcium."

"The meal is equal to the best quality steamed bonemeal," which is often unobtainable locally or imported at high prices even though bones may be freely obtainable.

Because older, dry bones have already lost a lot of water and organic substances, they do not lose as much weight upon burning and the yield is higher. One hundred pounds of dry bones should yield about 66 pounds of bonemeal. Fresh bones may yield about 33 pounds.

A junior-high student in the Ft. Myers area recently came to ECHO asking for an idea for a science fair project. We suggested he make some bonemeal and do a trial. He grew four containers of radishes - one without phosphorus, one with phosphorus supplied by triple-super-phosphate, one with commercial bonemeal, and one with bonemeal he and his father made with a barbeque grill and mortar and pestle. The radishes grown with his preparation produced the best of the four.

It is easy to see why one might want to add bone-meal to soil as a fertilizer, but why feed it to animals? Many tropical and subtropical soils are "highly deficient in phosphorus. Pastures grown on such soil are low in phosphates, especially when the fully mature plants start to dry out. Animals grazed on such land have a low blood phosphorus level." "The deterioration of livestock manifests itself by unthriftiness, lack of production, reduced fertility, poor calves, lack of resistance to parasitic infestation, losses in meat and milk. Because the appetite decreases proportionately to the decrease of phosphorus in the blood, the animal's intake of protein is reduced." Unfortunately, such losses of production are often attributed to droughts and diseases and rarely to phosphorus deficiency, which can easily be remedied by supplementation of phosphorus!

In extreme cases, called pica, "Animals suffering from lack of phosphorus have a depraved appetite. A craving to eat bones leads them to ingest putrid material which often contains toxins produced by the botulinus bacteria. In such cases, animals usually succumb to paralysis.... Healthy animals very rarely touch decomposed matter or bones. Two or three ounces of moistened bonemeal, spoon dosed, is sufficient to remedy phosphorus deficiency. It may also be given in troughs, as a lick in brick form, or mixed with salt and trace elements."

You can also make your own cattle lick to overcome mineral deficiencies. "Bonemeal can be fed alone to cattle, but it is better to enrich it by addition of other trace elements which may be lacking in your particular area. In Kenya, very good results have been obtained from the following formula: 66 pounds of bonemeal, 33 pounds of red oxide salt (containing iron), 6 ounces of copper sulphate, 1/15 ounce of potassium or sodium iodide, and 1.5 ounces of cobalt nitrate or cobalt sulphate or cobalt chloride.... In countries where other trace deficiencies occur, different trace elements should be used."

"The weighing of the trace element fraction and the initial mixing of such a small percentage is impractical in the field. Hence the trace elements for 100 pounds of mix should be weighed previously, thoroughly mixed with 1

pound of bonemeal and sealed in a small package. Then to each 66 pounds of bonemeal and 33 pounds of red oxide salt, there is added one such pack and the whole is mixed together...."

***GREVILLEA ROBUSTA* SURVIVES ON PHOSPHORUS-POOR SOIL.** I [mlp] was surprised during a visit to Kenya by the extensive use in agroforestry of this tree that is a popular ornamental in Florida. Commonly called 'silk oak,' 'silver oak,' or 'grevillea,' this native to Australia has become widely utilized in agroforestry throughout Africa and other tropical regions, despite the fact that it is not a legume. We turned to ECHO's library for more information about the tree. The following comes from *Grevillea robusta in Agroforestry and Forestry: Proceedings of an International Workshop* [ICRAF; C.E. Harwood, ed.] except where noted.

Grevillea was brought to Africa and India for use as a shade tree in coffee and tea plantations in the early part of this century. While these industries are now reducing their use of grevillea due to indications it may reduce yields of those high-value crops, the use of the tree on small-scale farms has become widespread. Grevillea is a tropical or subtropical tree suited for semi-arid regions of 600 to 1700 mm annual rainfall and dry seasons up to 6 months. Grevillea trees are commonly found as windbreaks; interplanted with such crops as maize, beans, black pepper, bananas, potatoes, and cotton; or grown next to the home for wood and/or ornamentation. Grevillea grows straight and has fine foliage, giving a light shade. Growth rates of 2 m height and 2 cm diameter per year for the first 5 years are common on suitable soils; slower rates after 5 years are normal. Grevillea leaves add organic matter to the soil as they fall and decay (though see below for more about nutrients in the leaves). A special trait is its deep tap roots and few shallow roots, allowing crops to be planted very close to the trunk with minimal competition.

Grevillea wood is widely used for lumber, fuel, poles, and rafters. Trees over 30 years old are said to have the best wood, though younger trees are often cut. Trees grown in plantation systems usually do poorly compared to those in agroforestry systems. Once established, grevillea can tolerate severe pruning or pollarding, surviving repeated and complete defoliation and removal of branches for fuel, poles, or fodder. The leaves are used as fodder for animals in parts of Kenya; however, they are not of high quality. One farmer is reported as saying, "grevillea leaves do not increase milk production but keep the cows alive." The tree does not tolerate coppicing (cutting to the ground in expectation of regrowth).

The April-June 1996 issue of *Agroforestry Today* (**AT**) discusses new insights regarding another important trait, namely its ability to grow in soils that are lacking in available phosphorus. The article points out that capture of nutrients by a plant involves three steps. It has to find areas of the soil where particular nutrients are located; it has to have a mechanism to make the nutrients soluble so they can be absorbed; then, it has to transport them to areas of growth where they are needed. "Exploration, exploitation and exportation" is how the article summarized these steps.

Nitrogen-fixing leguminous trees are usually the choice in agroforestry, but sometimes phosphorus deficiency in the soil may be as limiting or more limiting to plant growth than nitrogen deficiency. One way to observe whether the soil contains all the phosphorus a plant needs is to add phosphorus fertilizer and see if it responds with more vigorous growth. A wide range of trees has been screened in this way and almost all species respond positively to phosphorus, except *Grevillea robusta*. This suggests that in soil that has too little available phosphorus for most trees, grevillea is able to find phosphorus, make it soluble and absorb it for its own use.

Grevillea and some trees in the families Casuarinaceae, Myricaceae and Moraceae, have special root structures to capture nutrients. If phosphorus levels are low, they can produce "cluster roots." These root structures live only about 3 months, and do not have root caps.

Do the root clusters form when the root encounters phosphorus? Apparently not. When roots are grown in nutrient solutions lacking phosphorus, these cluster roots develop at fixed distances along any lateral root, so there is probably some internal signal from the plant to start making root clusters to locate and absorb phosphorus. The clusters exude citrate, which is known to help mobilize iron phosphates for use by a plant. The end result is that grevillea can grow in some of the poorest soils in the world, especially where phosphorus is limited.

Does this mean that grevillea leaves make an especially good soil ammendment because they contain high amounts of phosphorus? This question is answered in the October-December 1996 issue of **AT**. Analysis of grevillea leaf tissue shows very low levels of nitrogen and phosphorus compared to many tree species. Apparently its adaptability to soils low in phosphorus is due not only to its ability to mobilize existing soil phosphorus but also the ability to maintain a high photsynthetic rate even with low tissue nutrient levels. One species with higher leaf-phosphorus levels (O.3% vs. 0.06% in grevillea) is *Melia volkensii*, indigenous to Kenya. Another plant with high leaf-phosphorus content is *Tithonia diversifolia*, a weedy shrub native to Central America but found in most tropical

regions [we recently learned that *Tithonia* is being used in agroforestry research at ICRAF].

If you cannot find grevillea seeds in your region and would like a small packet of seeds for experimentation, they are available from ECHO's seedbank. Trial packets are free to those working with small farmers in developing countries; others please send US$2.50 per packet.

MORE SOURCES OF TREE SEEDS AND INOCULANT. Silo National des Graines Forestieres in Madagascar has an impressive seed listing of approximately 150 tree species. You can request an overseas catalog by writing them at B. P. 5091 Ambatobe, ANTANANARIVO 101, Madagascar (phone: 261-2/412-30; fax: 261-2/351-18). Their catalog lists usual collection dates, seeds/kg, pretreatments required, and price. Many orders are filled only with fresh seed, so advance ordering is essential.

The **National Tree Seed Programme** in Tanzania has an equally impressive seed listing of 130 tree species. Scientific name, English and Kiswahili common names are given along with provenance, altitude and rainfall of the source zone, germination rates, moisture content, purity and seed weight where available. Prices are comparable to the above source. For a catalog or to inquire about a species write to PO Box 373, Morogoro, Tanzania (phone: 255-56-3192, fax: 255-56-3275).

The Spanish-language **Catalogo de Semillas Forestales** from CATIE (Centro Agronómico Tropical de Investigación y Enseñaza) in Turrialba, Costa Rica uses a very similar format to the Tanzanian catalog for its listing of 42 species of forestry trees for Latin America. Write to CATIE, 7170-137, Turrialba, Costa Rica (phone: 506-556-1933 or 506-556-6431, ext. 233, 212, or 364; fax: 506-556-1533 or 506-556-7766; e-mail: etrujill@catie.ac.cr).

Agroforester Tropical Seeds (P.O. Box 428, Holualoa, Hawaii 96725, USA; phone 808-324-4427, fax: 808-324-4129, e-mail: agroforester@igc.org) sells inoculant as well as tree seeds. "We manufacture our own high-quality inoculant, selected for optimum performance by the University of Hawaii's NifTAL Center. Inoculant is available in two types of packaging. One is a special system called the SAFTI-Pack, which has a shelf life of approximately 6-12 months. Unless subjected to high heat (above 45°C) or severe desiccation, this packaging ensures high populations of actively reproducing rhizobia.... We also carry the standard peat-based packet of pure rhizobia, which has a shelf-life of ... 3-6 months. Both come in 50 g size, which treats approximately 3 kg of seed." The SAFTI-Pack costs US$7 each; the standard pack $5.

"The cost for airmail shipping is $5 for the first inoculant packet and $2 for each additional packet. If seed is included in the order, shipping is charged according to carrier's charges." To order inoculant, specify which species you are planting and enclose payment in US dollars (check or international money order). For non-profit organizations, inoculant is included free of charge with seed orders of 1 kg or more of the host species.

The company has a list of 34 species of nitrogen-fixing trees for sale, and two very helpful tables. One list charts each species against 12 uses and 6 tolerances. The other lists inoculant group, pregermination treatment, number of seeds/kg and price. The price on 25 gram orders is quite reasonable for variety trials (nearly all well under $10). Prices are also given for 100 g and 1 kg lots. If you need a phytosanitary certificate, an extra $35 is charged.

A Caution on Weediness. We heartily agree with the caution printed on the Agroforester order form. "By their nature many nitrogen fixing species are well adapted to harsh conditions, grow vigorously and can seed prolifically. They are pioneers of degraded, disturbed and ruined land, and will proliferate freely in such conditions. Selection of less weedy species can reduce the risk of spreading. Proper management for the life of the project can also prevent weediness. Also, consider using pioneers already present on-site before introducing new species."

ECHO staff believe the danger of introducing a serious weed pest is much greater with these "super trees" than with trials of plants grown primarily for human food. In a situation where trees have been essentially eliminated and need for firewood is enormous, it is difficult to conceive of a tree becoming a weed. But where each tree is not highly valued, the danger is real. Please be careful.

RATS! [The following is abstracted from an article by Roger Bullard and Harlan Shuyler in *Horizons* in 1983. It will not tell you how to solve rat problems, but graphically puts the nature of the problem into perspective. Roger Bullard took early retirement from the US Government's Denver Wildlife Research Center and is now a volunteer at ECHO.]

"Calcutta, India--1968. At 3 a.m. I sat on the concrete floor of the grain warehouse, amused by the group of 17 rats that had just walked across my lap. As long as I remained quiet, the wild rats investigated me as they would any object--sniffing, licking and walking over me."

Those are the words recorded by Stephen Frantz as part of his doctoral study of the lesser bandicoot rat. Each night about 200 adult rats visited the warehouse and ate an estimated 5 kg (11 lbs) of rice. Frantz figured that in his 5-acre study area of 40 warehouses there were 10,000 rats. In the United States one pair of rats living in a granary consume about 27 lbs (12.3 kg) of food during fall and winter.

But the rats do more than eat while sitting in the world's grain bins. Rodents continually dribble small amounts of urine. One adult rat roaming over the surface of stored wheat can contaminate as much as 10,000 kernels per day. In a U. S. study, a pair of rats excreted 25,000 droppings and 1.5 gallons of urine in one year. To make matters worse, contaminated and clean grain are often later mixed.

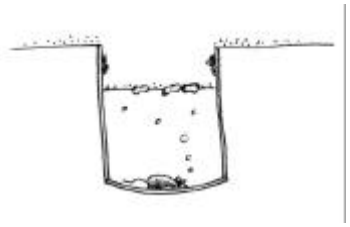
A rat sheds its half-million body hairs twice a year. One rat dropping, which will dry and disintegrate, may contain as many as 200 hair fragments. These may drift through normal air currents within the storage facility. Combined with urine residue, they often cling to grain as it passes through cleaning processes. The screening processes that isolate the gluten fraction also concentrates rodent hairs.

Rats or parasites that live on rats transmit the diseases of plague, murine typhus and rat-bite fever, salmonellosis, leptospirosis and trichinosis. They caused the black plague that killed 25 million people in Europe and the Middle East in the 14th century and 12.5 million people in India 600 years later.

Rats' chisel teeth exert a pressure of 24,000 lbs per square inch, enough to gnaw through lead pipes and cinder blocks.

The lesser bandicoot rat is the most prolific of all rats, producing a litter a month, 7 pups per litter. One pair can produce 3,600 descendants in one year even if half of the young die before sexual maturity. They store in their burrows 4-8 times as much grain as they eat on the surface. One Bangladesh farmer dug up a bandicoot burrow and found 32 pounds of stored food.

ECHO has had some success catching rats in a bucket sunken into the ground with the top flush with the surface. Barry Rands is reported in *Amaranth to Zai Holes* p. 213 as having caught 150 mice in one night in four such traps. The trap is filled to within 8 cm of the top with water. Each evening fresh sweepings from a millet threshing floor are floated on the surface to provide both camouflage and bait. Rodents apparently see the floating bait, assume it is a solid surface, and jump in. We find it works best if the bucket fits loosely enough that it can be removed and the water replaced frequently.



FIRE ANTS EAT SOME CROP SEEDS. Several years ago Tom Post told me of an experimental field in Belize that was planted to sesame. When it never came up, they realized that the seed had been eaten by ants. This has always seemed strange to me. Now scientists at the U.S. Department of Agriculture in Texas recently discovered that fire ants "sometimes eat the tender inside parts of newly planted crop seeds (such as wheat, corn, grain sorghum and soybeans). In fact, the ants sometimes eat the seeds very quickly, completely wiping out a field of wheat seeds in only a few days." They report that "preliminary trials suggest that fire ant damage to seeds can be reduced by using liquid starter fertilizer at planting time" but more research is needed. It seems that fire ant problems could easily be mistaken for bad seed. [*HortIdeas* October 1996 brought this to our attention.]

CAN YOU HELP US?

TRADITIONAL SEED MANAGEMENT. Laura Meitzner writes from Cornell University that she is looking for information and contacts on household-level seed selection and storage from around the world. To understand how farmers maintain their varieties, one needs to understand how and where seed is selected (in the field, the storage bin, the kitchen, or the market) and how farmers decide whether to save or purchase seed of various crops. Please send your insights on seed selection and local storage methods to her at lsm7@cornell.edu, or 201 Maple Ave., #E3, Ithaca, NY, 14850, USA.

HOW DO YOU STORE SEEDS? We would like to prepare a feature on simple ways to store seed where electricity is not available. (ECHO's seedbank has air conditioning and dehumidifiers to help ensure that we can send you top-quality seed in spite of our hot, humid climate.) We would like to hear your evaluation of how effective various methods are at preserving seed viability and protecting from insect pests. We especially value perspective based on experience or first-hand observation. We hope to hear from you.

ECHOES FROM OUR NETWORK

MORE ON CONTROLLING LEAF CUTTER ANTS. Dr. He. E. Hostmark, director of research at Fundacion Hondurena de Investigacion Agricola writes, "The most practical method until recently was the use of insecticide baits manufactured in Brazil. The actual insecticide ingredient is low (usually 0.005%) and the bait is applied in a small area near the nest so that environmental contamination is minimal. This bait is now off the market, leaving us with no effective bait to my knowledge. I've used Tanglefoot, but lost two Yland-ylang trees when some ingredient in the Tanglefoot girdled the trunk. Perhaps tying a piece of plastic or plant material around the trunk of the tree to be protected and THEN placing a ring of Tanglefoot over it would work."

"Local Hondurans tell me that if you pour a shovel full of earth from one nest into another, the leaf-cutter ants in the second nest will desert the nest (and make another somewhere else?). The Mosquito indians pour a quart of

gasoline in the nests and light it with a long flaming pole."

"Neem does not work. The ants will sometimes defoliate neem trees, but strangely, will reject the leaves outside the nest after carrying them into their nests."

CYBERSPACE

ELECTRONIC RESOURCES COMING TO YOU SOON. I [mlp] just returned from the annual conference of AERDO (the Association of Evangelical Relief and Development Agencies). A highlight was a technologies update by Paul Lay of MAF (Mission Aviation Fellowship, a Christian organization which has done much to bring electronic communication to missionaries). Many in our network who live far from the nearest phone have recently begun corresponding with ECHO by e-mail because of the radio-operated e-mail and computer system MAF has installed in many countries. Thanks MAF!

By the time you read this, MAF expects to be distributing a briefcase-size telephone that can call via satellite from anywhere in the world for US$3 per minute. The unit costs about US$3000. For information contact Paul Lay at MAF (P.O. Box 3202, Redlands, CA 92373, USA; phone: 909-794-1151, fax: 909-794-3016, e-mail: MAF-US@maf.org).

Paul said that the US Agency for International Development is sponsoring a major thrust to have direct internet access (enabling use of the world-wide web) available in the capital city of every country in Africa by early 1997. This will mean that our web page will become a resource for many more people.

Dan Sonke, ECHO's technical resource specialist, gave a live demonstration at our Agricultural Missions Conference of agricultural resources on the web. You could hear "Oooh's" and "Aaah's" from people who had never before accessed the web. Over the course of a few minutes we viewed documents at Cornell University, the Asian Vegetable Research and Development Center in Taiwan, ECHO, and the International Development Resource Center (IDRC) in Canada. Our cost is $20 per month for 300 hours of use. I [mlp] must admit that I am still at that "I can't believe it" stage myself. If you are in a situation where you do not have access to the web, take advantage of the opportunity as soon as it comes your way. This is revolutionary.

A USEFUL PERIODICAL NOW ONLY AVAILABLE ON-LINE. [by Daniel Sonke] With the ever-increasing growth of Internet resources, we decided to begin a series of short reviews for those of you who have access to e-mail and/or the World Wide Web. This is the first:

IDRC has begun publishing their journal ***IDRC Reports*** electronically and has discontinued their print version. Instead of the colorful quarterly journal published prior to April 1996, the reports are published electronically via a colorful World Wide Web page at http://www.idrc.ca/books/reports. A new article is published each week. Since April, there have been articles on using mosquito nets to prevent malaria, using native endod berries to kill the snails which cause schistosomiasis (bilharzia), ecotourism in Thailand, breeding beans for pest resistance, and the breeding of a high-yielding corn variety for Burundi, to name a few.

Spanish versions of some articles are available by clicking on a link at the top of the English versions. French versions are also available. Those who pay dearly for World Wide Web access may wish to set their web browser program so that it does not download the pictures or use the e-mail version (see below). From the "Reports" page, one can click on links to IDRC's other pages, including their searchable library database and their extensive "To the World" list of links to other organizations in the development and research fields.

Those without Web access but with e-mail services can subscribe to receive a text version of the "Reports" which will be sent to their e-mail account each week (without photographs, of course). To "subscribe," send an email message from your account to listproc@internet.idrc.ca. Leave the subject field blank and write in the body of the message, SUBSCRIBE REPORTS-DL firstname lastname (substituting your first and last names). Write nothing else in the message or subject heading since you are sending commands to a computer. Further instructions will then be sent to you as e-mail messages.

BOOKS AND OTHER RESOURCES

A FEW FREE COPIES OF *AMARANTH TO ZAI HOLES*.... We realize that some in our network are with third world organizations that work directly with small farmers or urban gardeners but cannot come up with the US dollars to pay for our new book and shipping. ECHO has asked its financial supporters to consider making a gift to cover the cost of sending a free copy of ECHO's new book to such organizations. If this is your situation, write us a brief letter on official letterhead telling what group you work with and a sentence or two about its work. If approved, we will place your name on a list. Whenever a gift comes in, we will send a copy of the book to the next person on the list. This is open to both nationals and expatriate workers who could make good use of the book but just do not have the resources to order it.

CARAPHIN NEWS. Dr. Pamela Anderson writes that "CARAPHIN NEWS, the newsletter of the Caribbean Animal and Plant Health Information Network, is published by the Inter-American Institute for Cooperation on Agriculture. It provides a medium for disseminating technical information on matters related to agricultural and environmental health, particularly information that is generated in and should be shared within the Caribbean Region. Articles cover topics on plant health (including plant disease and insect pest outbreaks) and animal health. The newsletter also includes a section on tools and resources, as well as announcements on conferences, courses and publications of interest. The editor, Sandra Vokaty, states that there are no country restrictions on subscription, though it would be financially difficult to cope with a huge number of new requests since subscriptions are free. If you are interested, write Sandra Vokaty (IICA, P.O. Box 1318, Port of Spain, Trinidad and Tobago; e-mail: svokaty@iica.org.gy).

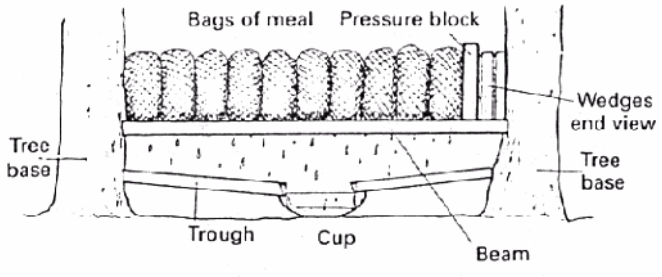
SMALL SCALE VEGETABLE OIL EXTRACTION. We have long felt the need for something to provide perspective on extracting oil from seeds using options available for household or village level situations. Questions along this line are frequently received at ECHO. From now on most will be answered by referring to this book. It does an outstanding job of concisely presenting just enough information. Some of my favorite books are those which I could study for three hours and then give a one-hour lecture on the subject and be thought an expert by a general audience! This is in that category.

The first two chapters provide a basic understanding of the science and composition of oils and economic and marketing considerations. Chapter 3 covers principles of oil extraction. "The main difference between commercial and small-scale processing is that commercial mills refine the oil before selling it. Good quality unrefined oils produced by small-scale methods are in no way inferior ... and are, in many cases, preferred by the consumer as they retain the flavour of the oilseed."

Five basic oilseed processing methods are considered. (1) Oil extraction methods using water, (2) manual methods using kneading, (3) manual presses, (4) ghanis and (5) expellers. (The ghani is, in effect, a mechanized version of the kneading method.)

"The hot water flotation method is traditionally used in rural areas of many developing countries. Usually decorticated seed is used [the outer shell has been removed]." The oilseed kernels are heated, ground by pounding in a mortal and pestle, then suspended in boiling water and boiled for at least 30 minutes. Liberated oil floats to the surface and is scooped off.

Using presses of various types increases oil yield. Several well-illustrated designs of various complexity are shown. This wedge press is one of the simplest.



Chapter 4 covers the major oil sources and discusses specific small and intermediate technologies for each. Results from actual third world situations are used. For example, the discussion of obtaining oil from sesame seed covers a hot water flotation method used in Uganda and Sudan, the bridge press (laboratory only), the ram press in Tanzania, the ghani process in Sudan, and a small-scale expeller in the Gambia. Technical details for each are summarized in a few paragraphs, including oil yields.

Though the book has many drawings that are helpful in understanding each process, no attempt is made to give detailed instructions on making the equipment. References are given to articles where specific third world experiences are detailed, some of which might tell how to make the press. A 14-page appendix lists several suppliers that produce and sell small-scale equipment.

The 107-page book is published by the Natural Resources Institute (NRI). No charge is made for single copies sent to governmental, educational, research, or non-profit organizations working in countries eligible for British aid. Free copies cannot normally be addressed to individuals by name but only under their official titles. Please quote **CRP4** when ordering. NRI--Free Issues, Central Avenue, Chatham Mar., Chatham, Kent ME4 4TB, United Kingdom. Others may order for £12.50.

UPCOMING EVENTS

TILLERS INTERNATIONAL 1997 WORKSHOPS. This U.S. non-profit organization provides training in the use of animal traction and in the production of the necessary tools. This year's offerings include "Yoke Building (April 10-11, US $170)," "Ox Training Clinic (April 12-13, US $95)," "Draft Horse Basics (April 26-27, US $95)," "Farming with Oxen and Horses (May 27-31, US $180)," "Draft Power for Overseas Projects (June 9-13 or Aug 4-8, US $285)," "Ox Driving (June 20-21, November 6-8, tentatively Aug 9-10, US $95)," and various courses in blacksmithing (offered several times in 1997, price varies with course). All courses will be held in Kalamazoo, Michigan, U.S.A., with one possible course to be held in Uganda in May. Some lodging is available at a reasonable cost. For registration materials, contact Tillers International (5239 South 24th St., Kalamazoo, MI 49002, U.S.A.; phone: 1-616-344-3233 or 1-800-498-2700); e-mail: TillersInt@aol.com, or visit their webpage at http://www.wmich.edu/tillers/.

INTERNATIONAL CONFERENCE ON SUSTAINABLE URBAN FOOD SYSTEMS. This conference will be hosted by Ryerson Polytechnic University, Toronto, Canada, May 22-25, 1997. Sponsored by the Ryerson Centre for Studies in Food Security in cooperation with the International Development Research Centre (IDRC), FoodShare Metro Toronto, Oxfam Canada, the Toronto Food Policy Council, and the Toronto Food Research Network, the conference will address the challenges and benefits of urban agriculture and urban food policy. Registration is open to concerned researchers, practitioners, and community organizers.

Rooms are available at the college. Registration fee prior to March 15, 1997 is CA $150.00 (students: CA $75.00). After March 15 the fee is CA $180.00 (students: CA $90.00). Contact Mustafa Koc (Dept. Sociology, Ryerson Polytechnic University, 350 Victoria Street, Toronto, Ontario M5B 2K3, CANADA; phone: 416-979-5000 ext. 6210, e-mail: mkoc@acs.ryerson.ca, world-wide web: http://www.acs.ryerson.ca/~foodsec).

35TH INTERNATIONAL APICULTURE CONGRESS. The congress will be held September 1-6, 1997 in Antwerp, Belgium. Conference themes are: General theme: "Ancient and recent history of the honeybee and beekeeping;" Beekeeping and the economy: "The future of the consumption of honey and other products of the bee colony;" Bee biology: "Honeybee and biodiversity: recent evolution;" Bee pathology: "Evolution of the alternative control methods of bee diseases;" Flora and pollination: "Bee pollination in the modern developing agriculture;" Technology and equipment: "Examination of bee colony products;" Apitherapy: "Beehive products: from ancient methods of treatment to modern apitherapy;" Beekeeping for rural development: "Development of apiculture in the 21st century." Organizers are calling for papers by potential delegates. Simultaneous translation will be in English, French and German. The registration fee is US$240. Write APIMONDIA, General Secretaria, Corso Vittorio Emanuele 101, 1-00186 Rome, Italy (phone/fax: +39-6-685.22.86; e-mail: APIMONDIA@MCLINK.IT.)

 Subscriptions are $10 per year ($5 for students). Persons working with small 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.) ECHO is a non-profit, Christian organization that helps you help the poor in the third world to grow food.

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