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AN ANNUAL AGRICULTURAL MISSIONS CONFERENCE TO BE STARTED BY ECHO. For several years we have dreamed of hosting an annual conference that would bring together people from our overseas network to share technical knowledge and experience in community development. Our staff has finally grown to the size that we can handle the logistics of such an endeavor (I hope). There will be a Christian atmosphere, though we trust that those who do not share those beliefs will be comfortable and would want to share the technical side of the work that we have in common.

We will set the dates years in advance so you can plan to attend during your next trip to the States. The first one will be November 8-10, 1994. We chose Tuesday - Thursday because many missionaries are busy speaking in churches on weekends while in the States. Already it is too late for many of you to plan for that date. We are going ahead and starting next year anyway. It does not matter if only a dozen or so are here, for that will give us a chance to get our feet wet before larger groups begin coming.

Americans are usually in this country at least every four years. This might become something you look forward to during each furlough. Foreign members of our network would be welcome. Each conference will be held sometime during the first half of November. By then kids of missionaries are settled into school, our rainy season has just ended, our tropical crops are at their prime and the temperate ones are starting to grow. Also Florida's famous winter weather is becoming an attraction by then, but the tourists are not yet here *en masse.* (ECHO is located in a prime tourist area in southwest Florida).
We are still forming our ideas, and welcome your input. The main attraction will be the delegates themselves. Visitors from our overseas network have especially benefitted from their stay when more than one happened to be here at the same time, sharing experiences, successes, failures and dreams. Consequently, much time will allotted for 15 minute presentations by delegates.

Each conference will have a few invited speakers. Dr. Frank Martin and Dr. Carl Campbell, two people whose names are familiar to readers of EDN, have already agreed to make a presentation and to be available to interact with you.

Probably workshops will be offered on specific subjects, depending upon the expertise available to us at the time. Delegates are welcome to stay after the conference to study in our library.

I hope that a few delegates will come from the scientific community, both to share their knowledge and to get ideas for practical research needed to support those doing development work. It will also be open to a limited number of people who are considering development or research related to Third World needs but need help in understanding what is involved and how to begin.

Every effort will be made to keep the cost low. We hope that members of local churches will offer housing to those not staying in motels.

Does this sound like something you would like to be part of? I would love to have feedback (the sooner the better, while many details are still flexible). What do you think of the idea in general? The dates? Is there a workshop topic that would be especially helpful? That you would want to teach? Special problems that need answers?

If you might want to attend in 1994, please send a preliminary expression of interest. (There is no obligation, of course, but it will help in planning and we will be able to tell other inquirers that you might be

there too). Include the date when you will leave for the States and the USA address to contact you with further details.

IRON SULFATE MOLLUSCICIDE. The horticultural newsletter "HortIdeas" (September 1990 and April 1992) has reviewed several reports on using iron sulfate (green vitriol) to control slugs. "Recent laboratory trials in England support the notion that iron sulfate is rapidly absorbed by slugs which contact it and is highly toxic to slugs. ...Iron sulfate is cheap, easily available, and not very toxic to humans." In fact "it is a widely prescribed iron supplement for people suffering from anemia."

One of their subscribers in Spain, Brian Lynas, reports great success by spraying or sprinkling (especially following rain) a solution of iron sulfate. "For over a year I have intermittently sprayed iron sulfate solution around lettuces, brassicas [Ed: cabbage family] and any other plants which were under attack from mollusks. The concentration does not seem to be critical. I use four heaping teaspoons in a five-quart sprayer (twice that concentration if using a watering can) on the soil around slug-attracting plants. ...I've sprayed the soil and also sprayed the plants directly. There's no doubt that either is effective, especially if you can directly spray the mollusks themselves.

"The spray seems to act as a contact poison, so if the animals are wetted or have to cross a sprayed area like a leaf, they die. Unfortunately, when sprayed onto soil, the soluble iron sulfate is quickly changed to insoluble hydrous iron oxides and is ... inactivated.

"Iron sulfate burns some sensitive (usually young) plants. The damage is minor, and my impression is that the anti-mollusk benefit far outweighs the disadvantage. In fact, ferrous sulfate solution at around 3% strength is often used for correcting iron deficiencies by direct spraying on foliage.

"Regular spraying - especially after rains - around the plant bases where the creatures hide, as well as generally around the cultivated area, dramatically decreases the mollusk population with almost immediate effect. [In Mallorca] a small conical snail occurs by the hundreds of thousands. A couple months ago these were infesting a patch in which I'd planted small brassicas and lettuces. Sometimes each plant would have 30 or more snails lying around underneath. I sprayed the solution over them, and they evidently all died. What's more, it seems this killed ... the eggs also, for even now there are practically no mollusks in the area."

MORINGA LEAVES TO PREVENT DAMPING OFF DISEASE OF SEEDLINGS. Christoph Ochsenbein, an extension officer in Cameroon, requested seeds of *Moringa oleifera* because he had read they could be used to control damping off. I had heard this rumor, so asked him where he read this. It is in a table in the book *Natural Crop Protection*. [This is published by AGRECOL, c/o Oekkozentrum, CH-4438 Langenbruck, Switzerland. We paid $17 including airmail for our copy back in 1987]. An anonymous, unpublished Filipino handbook is cited as the source. It claims that moringa leaves are worked into the soil one week before sowing. This time is sufficient to release the effective substances into the soil. This seems feasible because antibiotic substances are known to be in parts of the moringa tree (EDN 37-4). The main use is protecting seedlings in seedbeds. We will list this in a "wish list" publication we send to professors identifying certain hunger-related subjects needing research. In the meantime, if you do a controlled experiment with it, let us know the results.

NEW SEED AVAILABLE FOR MARAMA BEANS. Galen Sauder in Botswana has provided us with a good quantity of marama bean seed, *Tylosema esculentum*. We featured this drought resistant bean grown in the Kalahari region of southern Africa in EDN 33-6. Unfortunately the seed we had was old and of poor quality. Galen writes, "I was excited to receive your request for marama beans. The day before it arrived I was helping some people harvest these beans. They were growing by the side of the road in an area that had received rains. I could have filled my pick-up if I had all day. The beans seem to like the gutters of the road where water collects. Last year I had some of these beans. After they were roasted the woody shell cracked off and inside is a delicious nut tasting like a hickory smoked cashew."

HOME MADE MOSQUITO REPELLENT FROM NEEM. Dr. V. P. Sharma, Director of the Malaria Research Centre in New Delhi, says the repellent is particularly effective against the Anopheles mosquito which spreads malaria. When the preparation is applied to the body, mosquitoes are effectively repelled. Low-cost neem oil is mixed with coconut oil in concentrations of 1-2%. This information is taken from *Neem News*, vol 1, p. 4, published by the Neem Association, 1511 Oneco Ave., Winter Park, FL 32789, USA. The non-profit association is organized to promote communication between neem scientists, growers and producers; promote its various uses and seek other uses; promote research to develop superior varieties of neem and to develop new uses. Membership is US $20.

A SIMPLE WAY TO IMPROVE STARCHY "WEANING FOODS" . The following is abstracted from information provided by Noel Vietmeyer with the USA National Academy of Sciences which appeared in the June 1993 issue of *Spore Magazine*..

"Throughout the developing world boiled starchy grains and roots are given as weaning food.... Boiled starch is so thick and pasty that it is difficult for the very young to swallow enough to gain adequate nourishment." Germinated grains release enzymes that break down starch (as in the process of malting). "A very small quantity of malted millet or sorghum flour added to a pot of mush made from corn meal, cassava, arrowroot, potato or other boiled staples turns it to liquid in minutes. It is liquid enough for the baby to swallow but dense enough to be filling. It is also more tasty because most of the starch has been converted to sugar." [Ed: sprouted sorghum should not be eaten because of its cyanide content, EDN 10-2, but 2-3 grains in a bowl should be harmless.]

We found further information in the book *Food from Dryland Gardens*, p. 332. It states that you can make 100 g of a millet porridge of suitable consistency for a weaning food that contains 25 kcal of energy and 0.4 gram of protein. On the other hand, 100 g of porridge of the same consistency made with addition of malt contains 83 kcal and 1.3 g of protein.

ECHO spoke with Mark Dafforn, Noel's assistant, for more details.

Q. Is this process actually used in some location among the poor or is it a totally new idea? Where did the idea come from?

A. Babyfood manufacturers in developed countries routinely liquify their products, but it has a very short track record in developing countries. Noel found the recommendation in a technical report on a Swedish Development Agency (SEDA) project. It has been used in Tanzania and India, and the idea has now been picked up and is being tried in several other places. No one--including ourselves--has done a comprehensive look at its usefulness.

In a way, the concept of liquefying staples is like oral rehydration therapy (ORT) twenty years ago...an idea that was so simple it was ignored by scientists but picked up by desperate development workers--and since then ORT has saved hundreds of thousands of lives at a few pennies apiece.

Q. Does malting change the nutritional value of the porridge?

A. The porridge will be more runny, but that is because the water that was tied up in the starch is released. The starch is essentially predigested. All the original nutrients are still there.

Here is how malnutrition can develop if the porridge is not malted. Children in Third World countries often go through a nutritional crisis when they are weaned. Babies are often weaned directly onto traditional adult porridges. Because babies have trouble swallowing the thick porridge, mothers dilute it with water. It can be so diluted that the child's stomach is filled but it has not eaten as much food as it should. Also, if unboiled water is used, disease organisms are introduced.

Q. The directions said "a small quantity" per pot of mush. How much is a small quantity?

A. Let's say a teaspoon, half a teaspoon, or even less malt for a big bowl. As you know, enzymes are catalysts which speed up reactions without being
used up in the process. If you use less enzyme it will take longer. Of course, if the mush is really thick--think of dry mashed potatoes--it doesn't contain enough water to liquify in the first place.

Q. Where does one get malt? We used to buy malted milk shakes. Is this the same thing?

A. I think there's usually an important difference. In those malts the enzyme (called amylase) has been deactivated by heat so you get the flavor but you don't get runny milkshakes! (By the way, so little malt is used in liquefying staples that traditional flavors aren't overwhelmed.) You can usually purchase malt flour at health food stores. It's often called brewer's malt, because it's used to convert the starches in grains to sugars as the first step in making beer. By the way, please point out that though malt is used in brewing, it has no alcoholic content itself...that comes later, from fermenting sugars with yeast.

Q. Let's be very specific. When you used sprouted wheat, did you mash the fresh sprouts, or did you dry them first then make them into a flour?

A. Well, actually I just crushed the fresh sprouts between my fingers, and stirred. The amylase content is reportedly highest just after the seed has softened and begun to burst.

Q. Are there other applications?

A. It can be used with people needing a liquid diet with a high nutrient density. A starch based dish like mashed potatoes can be liquified while still retaining its familiar taste. If your readers have other ideas or experiences, we'd be glad to know. Just ask them to drop a brief, informal note to us at the National Academy of Sciences, Washington, DC 20418.

FOR YOUR INTEREST ONLY.

We came across this poem by Larry Fisher. After 12 years of EDN, I guess it is not too much to include a bit of levity.

Economists, agronomists and planners of late
Have discovered a new way to pontificate.
Beyond mere jargon, like "Success Enhancement,"
"Integrated Development," and "Rural Advancement."
Working in all their infinite wisdom
They're trying to define a "Farming System."
To answer the question for all of you
"Why do farmers do what they do?"

At universities and experiment stations 'round the globe,
In offices, labs and on farms they probe;
Through consultancy surveys in developing nations,
Upstream and downstream experimentations,
With yield rates, inputs and multiple regressions,
Attempting to explain that profoundest of questions
With the diverse hypotheses that each eschew
On why farmers do what they do.

Variability and generalization,
Indigenous knowledge and maximization,
The issues discussed, the factors controlled,
Computers click, theories unfold.
Papers get published, conferences convened,,,
Projects are funded; it becomes obscene
When predictably they conclude in the Final Review
That a more generous grant might give them a clue
As to why farmers do what they do.

Somewhere farmers plow and plant,
Milk their cows, work and chant.
After the interviews, trials and calculations
The experts retire to their research stations.
And the farmers continue to grow their corn
While old women die and children are born.
The men swap stories and drink their brew,
And they scratch their heads and wonder anew,
"Why do scientists do what they do?"

SEED FOR MORINGA PEREGRINA. Dr. Julia Morton sent us a few seeds of the species of moringa most prized for making oil. It was obtained at great difficulty from outlying deserts in Oman. We planted some, and will send what little is left on a first-come first-served basis. Seeds may not remain viable much longer.

BEEKEEPING & DEVELOPMENT, AN "EDN" FOR BEEKEEPERS (reviewed by Scott Sherman). I have long intended to review this quarterly networking newsletter which specializes in information related to all aspects of beekeeping in the tropics and subtropics. A typical issue contains: news briefs related to past, present, and future happenings around the world; practical beekeeping tips, like how to make your own smoker, how to build a hive out of mud bricks and concrete, and queen rearing with African bees. Feature articles deal with case studies and special issues (e. g. tropical trees for beekeepers). Useful bits of information related to job openings, books, meetings and resources of interest to beekeepers in the tropics round out each issue.

One tidbit we recently picked up is how to use a paper clip (with 4 mm inner measurement) as a queen excluder. Newsletter subscriptions are £12.00 ($25.00) or 5 kg beeswax barter. Folks living in developing countries may request a sponsored subscription. In addition to their newsletter, they distribute a variety of educational materials, provide free expert advice to those on the field and can assist in: project planning and implementation, teaching, organizing seminars, preparing documentation, etc. Write Dr. Nicola Bradbear, Editor, Bees For Development, Troy, Monmouth, NP5 4AB, UK, phone: 0 600 713648, fax: 0 600 716167.

SEED FOR PSYLLID RESISTANT LEUCAENA TREE. We asked Mark Powell at the Nitrogen Fixing Tree Association what *Leucaena leucocephala* variety he would recommend where psyllid insects are a problem. He sent us a variety called K636, the top performer in their 'New Giants' trial at Waimanalo. "Although this variety has performed well especially after it achieves heights above 5 meters, it will support large psyllid population buildup which can defoliate all juvenile leaves. It has been observed that it tends to retain its older leaves during periods of high psyllid pressure." The K8 variety was the favored giant type when ECHO first offered trial leucaena seed packets (EDN 7-2). This is now "disfavored due to its relatively high susceptibility to psyllid defoliation." A trial size packet of K636 is free to Third World development or scientific organizations; $2.50 to others.

ECHOS FROM OUR NETWORK *ECHO's name symbolizes ideas, information and seeds "echoing" back and forth between ourselves and our overseas network. We owe much of our effectiveness to you. There are many examples in this issue. The most difficult editing decision is always which material to delay. We have enough material to print many issues of EDN. The information you send may or may not make it "into print," but be assured that we have made use of it internally and greatly appreciate your calling it to our attention*.

Roland Lesseps, S. J., Zambia. "Termites here make it very difficult to establish tree seedlings in the field. In some places at Kasisi we have lost about 90% of our *Leucaena leucocephala* seedlings. So we are always on the lookout for a tree that is termite resistant. An excellent one is *Senna (Cassia) siamea*. We planted four rows four years ago (about 70 trees per row) in a field terribly infested with termites. Almost all the trees are alive and growing luxuriantly. We have coppiced them three times and used the leaves in compost piles. The cut branches make good poles or firewood. We earlier fed the leaves to cattle, then we heard at an ICRAF meeting that the leaves, though eaten by goats, are not good for cattle."

TEPHROSIA VOGELII FOR GREEN MANURE AND INSECT CONTROL. Three members of our network recently wrote us about the same plant for different reasons.

Beth Adams writes from Malawi, "I planted several rows of leucaena trees on the edges of terraces, for green manure and erosion control. They are doing well and beginning to flower. I've found a shrub that seems to be much better though, fish bean or *Tephrosia vogelii*. It produces an incredible amount of leaf matter, grows very quickly, and is very easy to establish.. I planted them about 2 feet apart and now, 7 months later, they are almost a solid wall. They are *not* used as fodder."

"I have been very impressed with fish bean as an insecticide. Some of my students told me they had used the leaves to kill caterpillars, so we tried it. It killed every caterpillar overnight. It was incredible since most natural insecticides don't seem to work that quickly. We did an experiment on an okra crop that was full of aphids using Malathion, tephrosia bean extract, soap (1 teaspoon per liter) and a tephrosia/soap mixture. The latter had the best results, tephrosia and Malathion were about the same, and soap was least effective. We've not been able to use neem because the trees planted in 1992 keep dying back and then regrowing. So I am encouraging students to plant tephrosia since it is much easier to establish here and can be used as a green manure as well.

Emmanuel Soko in Tanzania is an extensionist working with Fr. Rupper, who has frequently written and shared seeds. Emmanuel shared how tephrosia is used for insect control in grain storage. "Take fresh leaves and dry them under the sun. Grind the dried leaves into a powder. Mix 100 grams of powder with 100 kg of maize to control maize weevils and the larger grain boer; with 100 kg of beans to control the bean bruchids. The chemical is effective up to three months. After that time the process must be repeated.

The plant has many other uses.

"To control ticks, lice and flies, animals (cattle, sheep, goats, pets) are washed with the extract of the plant. To make the extract, fresh leaves and branches are pounded in a mortar. This is diluted with five times that volume of water before applying to the animals.
"To make an insecticide, allow the above mixture to soak overnight or boil it for 30 minutes. Add a bit of soap to help the spray stick to the leaves. It can be used with garden vegetables, fruits and field crops, to control termites, ants, beetles, aphids, cutworms, various bugs and weevils, stalk boers, flies etc.

"In the evening the walls of the room, especially corners, are beaten with fresh branches to repel mosquitoes, lice, ticks, cockroaches, etc. It is fed to animals for intestinal problems. "

Roland Lesseps sent a copy of a fact sheet written by his colleague **Andy McDavid at the Kasisi Agricultural Training Center in Zambia**, from which a few excerpts follow.

"It has been used as a fish poison for hundreds of years and an insecticide for over a hundred." "Cattle deaths have been reported as a result of drinking water of poisoned fish ponds. Also, reports have been made from one village of people getting sick after eating fish poisoned with the extract. I do not advise its use as a fish poison.

"The shrub may grow as rapidly as 2-3 meters in 7 months. The compound leaves contain the highest concentration of rotenoids, which are responsible for its insecticidal effectiveness. ...Its compounds are effective against a number of different pests (tested at least 90% effective against termites, citrus aphids,

red spider mites). They break down in about 7 days (2-3 days in bright sunlight)." Seeds should "be soaked in water for about 24 hours for good germination (about 90%). Plant about 1 meter apart." If very large numbers are planted, use 35,000 seeds per ha for greatest leaf yield.

"In harvesting, only the leaves need to be taken off the shrub. ... If removed carefully, the shrub will continue to produce leaves for ... extract or mulch. The most effective concentration for killing insects was found to be 20 g of leaves for every 100 ml of water. If a scale is not available, take the amount of leaves equal to the weight of an empty 300 ml coke bottle, then add 7 coke bottles full of water. ...The crushing of leaves does not need to be done perfectly; a plastic feed bag and large rock can be used." After soaking for 2 hours (NOT in direct sunlight) filter the suspension through a cloth and use directly in the sprayer.

"It is important that the spray have contact with the pest. If the pest is underneath the leaves, be sure to actually hit the pests. ...If all the spray is not used immediately, it will still be approximately 70% effective 24 hours later, IF kept out of direct sunlight." Beyond that its potency drops quickly. The "used" leaves may be reused for a second extract. Tests have not determined concentrations to use but have shown that effective chemicals are left. "The leaves contain an antifeedant, so termites will not eat it. In areas of heavy termite infestation this mulch can be very helpful."

Seeds are available from Emmanuel or Fr. Rupper at P. O. Box 1, Peramiho, Tanzania, East Africa. If you want more than a small trial packet, correspond with them to determine how much money to send. We have also asked them for a supply of seed, so you can write to ECHO for a small trial packet. Expected arrival of the seed is late 1993. Trial packets (once seed arrives) are free to Third World development or scientific organizations; $2.50 to others.

UPCOMING EVENTS

A training course and workshop on "Household Food Security Through Home Gardening" is being offered in the Philippines by the Asian Vegetable Research and Development Center and International Institute for Rural Reconstruction. Dates are February 21-March 11, 1994. Cost is $2,000. Write IRRI, Silang, Cavite 4118, Philippines. Tel (0969)9451; FAX (0969)9937.

BOOKS AND OTHER RESOURCES

ILEIA NEWSLETTER ON LOW EXTERNAL INPUT AGRICULTURE. (Reviewed by Scott Sherman). ILEIA, the Information Centre for Low External Input and Sustainable Agriculture, has been sharing information on sustainable agriculture since 1982. Their quarterly **ILEIA Newsletter** (actually it is more like a magazine) currently goes out to more than 6,000 individuals and organizations world wide.

Each issue focuses on a central theme, such as natural pest control, agroforestry, farmer's networks, etc. The last issue included articles on: raising mushrooms as a means of supplementing women's income, using ewe milk, crossbreeding cattle, biological water purification, starting a local library, designing a seed system for smallholders, and smallholder beekeeping. Networking is a goal of each issue with articles based on specific cases from around the world. Whenever possible, sources of additional information are provided. Each issue reviews new literature and highlights other useful resources relevant to sustainable agricultural development. We have found the newsletter to be a great resource. Yearly subscriptions are $12.00 for people in the Third World and students worldwide and $25.00 for others. Write: ILEIA, Kastanjelaan 5, P.O. box 64, 3830 AB Leusden, The Netherlands.

A NEW MANUAL ON RAISING RABBITS FROM THE HEIFER PROJECT (reviewed by Scott Sherman). Dr. Steven Lukefahr sent us a copy of his new book, *The Rabbit Project Manual, A Trainer's Manual for Meat Rabbits Project Development.* In addition to coordinating the International Small Livestock Research Center at Alabama A&M University, Dr. Lukefahr works closely with the Heifer Project International assisting rabbit projects around the world.

Two things make this book different from most rabbit books in our reference library. First, it is written with Third World applications in mind. Second, it is a "trainer's manual," presented in the form of "Instructional Modules". Each module is designed to complement a development worker's own personal experience raising rabbits as he prepares lessons to share with others.

The book is divided into two sections: Instructional Modules and Stages of Rabbit Project Development. The 11 modules cover all the bases (breeds and selection, housing, feeds and feeding, reproduction, disease control, marketing etc.). Modules are well illustrated by diagrams, charts, and photographs and each one is followed by suggested lesson plans, training activities and helpful references. The second section, Stages of Rabbit Project Development, deals with the logistics of rabbit project development, covering: project feasibility, project design, project monitoring and project evaluation.

Copies of this spiral bound, 8 1/5" x 11", 103 page book are available by writing the publisher: Heifer Project International, P. O. Box 808, Little Rock, AR 72203, USA. A donation of US $10.00 is suggested, please address to Marti Greenman.

TWO MORE TECHNICAL NOTES FROM DR. FRANKLIN W. MARTIN (Reviewed by Scott Sherman). There's probably no one request that appears more frequently in our mailbox than, "It is so dry here! What can I grow?" Being located in Southwest Florida, we feel more comfortable giving advice to those working in hot, humid regions than arid areas. So we asked Dr. Martin to put together a "Primer on Plants and Techniques for Agriculture in Dry Regions of the Tropics", an introductory orientation to arid gardening for those with little or no previous experience. The document discusses the principle problems of agriculture in arid regions, describes some techniques for farming arid lands and contains a series of tables where various crops are rated as to their degree of adaptation to arid lands. The document also contains a section devoted to animals for dry regions. Two additional pages have been added by ECHO staff, one listing related publications and another listing sources of seed and information specifically geared for those working in arid areas. ($3.00 to those not directly involved in development, free to those who are.)

The second document, "Forages for the Small Farm," addresses a topic about which we are occasionally asked and with which we have little first-hand experience. Though written with the needs of the small farmer in mind, this document probably best fits the needs of those with more than a couple animals to feed and who farm at least a couple hectares and perhaps even have some mechanized equipment. It addresses the need for forages on the small farm; site selection; species selection; basic botany of grasses and legumes and the role both play in animal nutrition; the benefits and disadvantages of grazing verses "cut and carry" systems; general principles of forage management; and recommended forages for various sites and purposes. As ECHO carries relatively few forage species, an addenda has been prepared that lists sources for seed and further information. This document is larger than most of the ones we distribute so we ask that only those that really feel their work would benefit from such a document request free copies. ($3.50 to those not directly involved in development).

NATURAL VETERINARY MEDICINE. The Swiss agricultural information network, AGRECOL, has published a 183 page book on ectoparasites of animals in the tropics (i. e. in contrast to internal parasites). They see this as a sequel to their exceptionally useful book *Natural Crop Protection in the Tropics* by Gaby Stoll. Consequently, 80 pages are devoted to "Insecticidal, repellent and wound healing plants." The botany and propagation of the plant is summarized (often a botanical drawing is pictured to help in identification), then uses are briefly discussed and references listed. Sometimes I find this crucial how-to section frustratingly brief with many unanswered questions, but this is probably due to the inadequacies in the literature upon which they had to rely. A research scientist could find a wealth of research ideas by looking for these gaps.

The first 86 pages discuss the ectoparasites of primary importance. Each section includes a picture of the parasite, a discussion of its life cycle, hosts, symptoms/damage and control measures. A couple "gems" from the general discussion follow.

"Plant preparations applied for ticks should be applied especially when resistance to ticks is low. Some factors having influence on tick resistance are: (1) Livestock shows its lowest resistance in tropical autumn. (2) Female calves are more resistant to ticks than males. (3) Young cows are more resistant than old ones and sucking calves more than their mothers. (4) Pregnancy might lower resistance, especially in the last stage. (5) Lactation also lowers resistance, especially at the end of lactation.

" It is of great importance to assure a confrontation of cattle with ticks and tick vector diseases in areas where anaplasmosis and babesiosis is prevalent (not more than 10 engorged female ticks/animal!) Animals kept tick-free for long periods will lose their immunity to these diseases and a heavy reinfection might be fatal." New born animals should not be kept tick free for the first half year, when they can gain a natural immunity."

The book can be ordered from AGRECOL for sFR 28.50 (US$18.10) per copy. Airmail is sFr 11 (US$7.00) and surface mail sFr. 2.80 (US$1.80) per copy. Their address is c/o Oekkozentrum, CH-4438 Langenbruck, Switzerland. By the way, I asked if an endoparasite book is planned, but it is not.

USE OF TREES BY LIVESTOCK, (A SERIES). Nick Davison, press officer for the Natural Resources Institute, sent us this new series. Three of the four attractive 18-30 page booklets deal with a particular genus of tree (gliricidia, acacia, and prosopis species), the fourth with anti-nutritive factors found in trees used as feed.

The series should be an especially helpful tool for agriculture teachers. There are 800-900 species of *acacia* and 44 species of *prosopis*. Looking at them one at a time would be out of the question in the classroom. Considering each as a group, how they differ and what they have in common in terms of livestock feed, is a handy approach.

A few items from the booklet on anti-nutritive factors follows. Hydrogen cyanide is potentially the most serious anti-nutritional factor in fodder trees. Symptoms of cyanide poisoning are labored breathing, intense red conjunctiva (whites of the eyes), frothing at the mouth, bloat, convulsions and a staggering gait. Post-mortem examination often reveals a characteristic smell of almonds from the stomach contents. A full stomach tends to buffer the absorption of cyanide in ruminants, possibly due to its reaction with sugars or sulphur compounds to form harmless compounds. Poisoning is more likely to occur during drought or feed scarcity, when hungry animals consume large amounts of a particular feed over a short period of time. Avoid feeding pods that are wet. Physically separate potentially dangerous feeds from water

sources. Cold water appears to encourage the release of cyanide. Mix potentially toxic feeds with sulphur or molasses, or feed them in conjunction with licks that contain these substances.

Do not be too quick to decide that a tree species can or cannot be used for fodder based on a report you read or even your own quick test. "There are many contradictions in the literature regarding the acceptability of fodder from trees and shrubs." Some possible reasons follow. Acceptability can change during the year. For example, milk goats consume more gliricidia when foliage is older with mature leaves. As the growing season progresses, the proportion of mature leaves increases and leads to improved consumption by goats. In some cases it may take several days for animals to accept a new feed, but once accustomed they may consume it readily. Preference for one feed over another does not mean that they will not eat it when it is the only choice. Within a single species, differences can exist between varieties, individual trees and even between parts of the same tree. Acceptability can be influenced by climate and soil conditions. For example, acceptability of the same varieties of *Stylosanthes* spp. in Australia varies greatly between the sandy, infertile soils of one region and the more fertile soils of another.

Groups working with community development in countries eligible for British aid can request a copy by writing Nick Davison, NRI, Central Avenue, Chatham Maritime, Kent ME4 4TB, United Kingdom.

INSECTS IN TROPICAL STORES (A POSTER). Also new from the Natural Resources Institute is a poster with color pictures of 14 insects which may be found where foods are being stored in the tropics. Accompanying an enlarged photo of each insect is the scientific and common names, a guide to actual size, and notes on the commodities they damage and their biological development and behavior. Order from NRI at the address in the previous review.

DIRECTORY OF INTERNATIONAL TRAINING AND EDUCATIONAL OPPORTUNITIES IN AGROFORESTRY. Several have asked us where you could go for a degree in agroforestry, a question that we have not found easy to answer. So we welcome publication of this 78 page book by the United States Department of Agriculture. "One of the most severe limitations to the successful adoption of agroforestry land-use systems has been the dearth of personnel with the knowledge and skills to integrate the various disciplines required in researching, planning and managing agroforestry interventions." The book covers both universities and other institutions; both degrees and short courses; both in the USA and overseas. They are working on a 1994 edition, because new programs and courses are coming on line all the time. To order a copy or to let them know about a course your institution offers, write to Robin Maille, International Forestry, RPE L101; United States Dept. of Agriculture; P. O. Box 96090; Washington, DC 20090-6090. As far as we know the book is free.