
Large Animals

- "How Do I Keep Birds Out of the Garden?"
(<https://www.echocommunity.org/resources/bdc55b96-353c-4574-8b65-06d7107860ba#HowD>)
- When Crab Burrows Cause Washout of Canals
(<https://www.echocommunity.org/resources/bdc55b96-353c-4574-8b65-06d7107860ba#When>)
- Keeping Elephants Out of the Fields
(<https://www.echocommunity.org/resources/bdc55b96-353c-4574-8b65-06d7107860ba#Keep>)
- Protecting Trees from Goats
(<https://www.echocommunity.org/resources/bdc55b96-353c-4574-8b65-06d7107860ba#Prot>)
- "How Can We Keep Goats and Other Animals from Eating Tree Seedlings When Farmers Plant Leucaena?"
(<https://www.echocommunity.org/resources/bdc55b96-353c-4574-8b65-06d7107860ba#HowC>)
- Iguanas are a Garden Pest
(<https://www.echocommunity.org/resources/bdc55b96-353c-4574-8b65-06d7107860ba#Igua>)
- Keeping Monkeys and Baboons Out of Your Crops
(<https://www.echocommunity.org/resources/bdc55b96-353c-4574-8b65-06d7107860ba#Monk>)
- Porcupine Control (<https://www.echocommunity.org/resources/bdc55b96-353c-4574-8b65-06d7107860ba#Porc>)
- Success with Homemade Mousetrap
(<https://www.echocommunity.org/resources/bdc55b96-353c-4574-8b65-06d7107860ba#Succ>)
- *Gliricidia sepium* (Mother of Cacao, Mata Raton, Rat Killer) Used in Rat Control (<https://www.echocommunity.org/resources/bdc55b96-353c-4574-8b65-06d7107860ba#Glir>)
- Keeping Rats Away from Oil Palms
(<https://www.echocommunity.org/resources/bdc55b96-353c-4574-8b65-06d7107860ba#Rats>)

"HOW DO I KEEP BIRDS OUT OF THE GARDEN?" Comments like "How can we keep birds from damaging the ripening millet?" or "How can we 'parrot-proof' our corn?" come up year after year. Bird damage to ripening grain is a common problem. Commercial methods available in the States include: sound repellents (electric, propane, pyrotechnics), taste repellents, visual repellents ("scare-eye" balloons, fake snakes), chemicals that make them timid or uneasy, and various

netting or screening materials. It is common knowledge that birds quickly become accustomed to some of these and others are inappropriate for the small-holder overseas.

One relatively "low-tech" approach effective in keeping away at least some bird species is the use of a reflecting mylar tape suspended between posts. These "bird tapes" are about 1.3 cm/0.5 in wide with metallic red color on one side and silver on the other. When properly strung between rows they reflect the sun and move in the wind in such a way as to effectively continue scaring birds away.

An article in *HortIdeas* (vol 9, number 3, pg 26) mentions the use of mylar tape to control birds in strawberries. Drive strong stakes into the ground no more than 10 m (30 ft) apart. You will need mylar tape, strings (50 cm/20 in long) to connect the mylar tape to the post, and strong adhesive tape to secure the mylar to the strings. About 12 cm (5 in) above the ground, tie the strings to the stakes, leaving 20 cm (8 in) of each end of the string free. Make an "eye" with strong adhesive tape on one end of the mylar tape. Run the strings through this "eye" and tie. Stretch the mylar tape tightly to the next stake. Twist 3 or 4 times and attach in the same manner to that stake. This design allows the mylar to rotate in a breeze without knotting or breaking.

Suspend the tape just above the ground so it can move freely without hitting crops and weeds. Tighten it if it stretches out and replace when the shiny coating wears off (about 6 weeks in the sun). Suppliers: Modern Agri- Products (322 Main St., Lynden, WA 98264; phone 800/352-7496 or 360/354-8884; fax 360/354-8885) who carries "Birdscare Flash Tape"--minimum order: five 290-foot rolls for \$15.00 plus postage (\$3 in USA); also Brookstine, 1655 Bassford Drive, Mexico, MO 65265-1382, USA, has "Sparkle and Startle"--one 200-foot roll is \$5 plus postage.

Some people in Florida keep birds from landing in their pools by stringing monofilament lines (i.e. fishing line) over them. These are hardly noticeable to us, but birds see them. *HortIdeas* (vol 9, number 4, pg 42) says that a similar approach is used to protect corn and berries. Drive 2-meter/6-foot stakes in the ground around the garden. String the line at about eye-level around the perimeter of the plot and criss-cross it in the middle. According to Cornell University biologists, the reason for success of this technique may be that the fishing line mimics the "impedimenta" warning strings spiders construct near their webs to keep birds from flying through them and destroying their work.

Rosalyn Rappaport, author of *Controlling Crop Pests and Diseases*, says that West African farmers bend the sorghum heads over when it is nearly ripe to make it hard for seed-eating birds to reach the grain. She also mentions "humming tape," which involves stretching video or cassette tape between posts. When a breeze blows over the tape it hums, which scares birds away. The tape should be about 5 mm wide and should not break when pulled. How you string the tape is crucial. Place posts 4-5 m/15 ft apart and stretch tapes tautly perpendicular to the prevailing winds **without** any twists. If wind direction is variable, orient them at assorted angles. Hang them high enough to be above the crop at maturity. When protecting large areas (0.5 hectare/1.2 acres or more), place lines 10-20 m/32-65 ft apart. Video or cassette tape will stretch more than commercial tapes and should be replaced every 5 or 6 weeks.

One farmer told us that shooting birds worked fine for him until they learned to avoid the field he was hiding in. He then found that if two people walked into a field and only one walked out, the birds would return. Apparently birds can't count. Some farmers kill one bird and hang it from a stick in the field to scare other ones away.

Tom Datema said that farmers in Sierra Leone keep birds from eating newly planted corn seeds by planting in cone-shaped holes about 20 cm deep. By the time the birds can reach the seedlings, they are too big for them to bother.

Joy Niland in South Africa wrote, "An idea which has proved quite effective in some places is to secure thin, dark-coloured string in a zig-zag pattern across the bed. The string should be about 3 cm above ground level. When the birds try to walk in the beds they trip over the string and generally fly off to less hazardous places. The string also acts as a deterrent to small animals."

If you try any of these methods, please let us know your results. We would also like to hear of other approaches to bird control that you or farmers you work with have personally found to be effective. (https://cdn.ymaws.com/echocommunity.site-ym.com/resource/resmgr/a_to_z/azch8lar.htm#Table)

WHEN CRAB BURROWS CAUSE WASHOUT OF CANALS. David Ramse asked what he could do about this plague of his work in Nepal. We passed the question on to Dr. Bryan Duncan at Auburn University's International Center for Aquaculture. "I have had to worry a lot about crabs in my coastal pond work, and know of no easy preventive measures. One simply has to patrol ones dikes, canals, etc. and stop crab activity as soon as it appears. Here are a few 'home remedies.' (1) Introduce quicklime, pesticides or other noxious substances into burrows. (2) Introduction of fine rice bran into burrows is said to foul the gills and cause suffocation. (3) Use a stick with a metal hook on the end to pull the crabs from the burrow. (4) Let your imagination be your guide." If any of you have a proven method let us know. (https://cdn.ymaws.com/echocommunity.site-ym.com/resource/resmgr/a_to_z/azch8lar.htm#Table)

KEEPING ELEPHANTS OUT OF THE FIELDS. I always imagined that elephant damage to a field was akin to hurricane danger at ECHO--it could happen but it might be years before it does. This view changed when I visited Kristin Kroll at her Food for the Hungry project in Marsabit, Kenya. Her experimental plot of Buhrow's white desert sweet corn had been destroyed just before my visit. (It had been doing well and was almost ready to harvest, by the way.) If I recall correctly, elephant damage was so prevalent that people seldom bothered growing crops. Elephants also can be dangerous. Two farmers and a little girl had been killed in the past year, I was told, when they accidentally came across elephants after dark. Kristin was able to obtain a grant for an electric fence, which I understand admirably controlled the problem. But what alternatives are available where an electric fence is too expensive or might be stolen?

A Mennonite missionary told me that some 70 years ago in Tanzania the British government wanted to keep elephants north (</resources/6b4fe9b6-b6ac-40de-9fff-2eaa14ee76e7>) of an area where crops were grown. It was bounded on two sides by two large bodies of water, I believe he said about 30 miles apart. The government constructed a trench approximately 4 feet wide and 4 feet deep between the two bodies of water. Elephants reportedly are so large that they will not

try to cross such a trench. I mentioned this to Harrison Akabala from Kenya who visited ECHO. His face brightened and he said, "That is how farmers near the river keep hippopotamuses from their fields. They dig trenches."

Do any of our readers have first-hand knowledge of this technique, and how well it works, or of the old project in Tanzania? Someone told me that elephants will fill in a trench to cross to the other side. I can also imagine that if the land is sloping, the trenches could



cause erosion. And if the land is flat, they might fill with water and lead to mosquito-born diseases or bilharzia. This is a problem I never expect to face at ECHO, so we would like to hear more from those with experience.

The following is excerpted from material from George Atkins. "Henry and Jill Neusinger went as volunteers to Sri Lanka where they developed a demonstration smallholding. Although they had some fencing, in the early days they lost most of their crops and some fruit trees because of the elephants. So Henry set about developing an elephant-proof fence and he managed to create one that really did work!

"The fence consisted of stakes about 2 feet long and 6 inches in diameter. The idea was to bury them in the ground with the points up. With the top sharpened the elephant cannot or will not put his foot on them. No damage is done because elephants kick forward when they walk. The points extend 6 to 9 inches above the ground. This height is very important. Too high out of the ground and the elephants pull them out, or push with their feet and lever them out of the ground. They are very intelligent and if they think they can push out the stakes they will. Of course, if the stakes are too low in the ground, the elephants can just tread on them. So they have to be high enough that the elephant cannot tread on them, yet not so high that he can push them over. They must also be pointed so he cannot get a grip on them with his trunk and pull them up.

"They did trials with tame elephants and tested 5 different methods: distance between stakes, height, point and no points. The only method that succeeded had 9 inches (23 cm) between stakes. The fence is 5.5 feet (1.7 m) wide and runs around the perimeter of the village. It took a lot of effort and expense to build a fence like this, but the village people were losing something like \$8,000 worth of crops a year, less than the cost of the fence. They used hardwood. Maintenance consisted of spraying with herbicide to keep down the growth on the stakes. If white ants got to the wood, they also had to spray with pesticide. They expect it to last 20 years."

Jim Ardill in Ethiopia wrote details of a similar technique. "Strong wooden poles, about 15-20 cm diameter and 1 meter long, are sharpened on one end and driven or dug into the ground until about 25 cm are exposed. (Leaving the upper end flat makes the driving part much easier.) Cut the exposed end into a sharp point. Position these spikelike poles at about 30-40 cm intervals in a band about 2 meters wide for a barrier to elephants. Clean off the bark to make the poles slippery and make sure any knots or protrusions are removed (making it difficult to grasp with the trunk). Treat the poles with tar or diesel oil to enhance the lifespan, or a similar pole can be made from concrete. I trust that these ideas will be helpful to someone." (https://cdn.ymaws.com/echocommunity.site-ym.com/resource/resmgr/a_to_z/azch8lar.htm#Table)

PROTECTING TREES FROM GOATS. This item is excerpted from *Rurcon News*. "Axel Bosselmann, writing from the University of Tasmania, describes how he stopped his goats from ring-barking and doing other damage to trees. He painted the trees with a mixture of goat, chicken and cow manure, and mud slaked with water or diluted urine. The mixture was applied at the level of his outstretched arms to the bark, branches and twigs and lightly over buds and leaves. It proved effective in keeping the goats away for about a month during the heavy rains before the trees needed repainting."

Roland Bunch in Honduras says, "In Bolivia some years ago, I stumbled across some villagers who had painted some eucalyptus trees with a mixture of water and goat manure, much like your recipe. This had completely stopped the goats from destroying the trees. I would guess this would work with many animals that are territorial in nature." (https://cdn.ymaws.com/echocommunity.site-ym.com/resource/resmgr/a_to_z/azch8lar.htm#Table)

"HOW CAN WE KEEP GOATS AND OTHER ANIMALS FROM EATING TREE SEEDLINGS WHEN FARMERS PLANT LEUCAENA?" The following is adapted from a discussion of this problem in the March 1985 issue of the *Heifer Project Exchange* newsletter (free from Heifer Project, P.O. Box 808, Little Rock, AR 72203, USA; phone 501/376-6836).

(1) The nursery must be surrounded by a fence. An effective and inexpensive fence for goats can be built by cutting thorn bushes and stacking them around the nursery. (2) Convince farmers to control their animals before the project starts. This will be more easily done if they are told and believe that the trees will later be a renewable source of food for their animals. (3) Use the "bare-stem" transplanting method to help the seedlings survive grazing by animals. Follow these steps:

Start the nursery at least three months before the rainy season, so that the leucaena seedlings will be at least three feet tall when the rains begin. Soak the seed bed thoroughly before transplanting, so the seedlings can be pulled out of the soil easily. Strip all but the top leaves off the seedlings. If the uprooted seedlings will not be planted for over 12 hours, pack the roots in mud to keep them from drying out. Plant a high number of trees per acre (at least 3,000). Goats will be more likely to eat only the lower leaves and move on to the other trees when the planting is dense. It is better to develop a certain area well and expand the reforested area each rainy season than to spread the trees too thinly. There are three reasons for the success of this method. (1) Because the seedlings will have almost no leaves until the grass turns green, goats and other animals are less likely to be attracted to them. (2) The seedlings can better survive grazing because the root system is already quite well developed. (3) When the leaves start to appear, the seedling is tall enough that the lower branches can be grazed and the upper leaves will allow the tree to grow and establish itself. (https://cdn.ymaws.com/echocommunity.site-ym.com/resource/resmgr/a_to_z/azch8lar.htm#Table)

IGUANAS ARE A GARDEN PEST for Cory Thede in Brazil. His trials (about 600 miles up the Amazon) were devastated by (/resources/c5adb2ba-c4a3-4fc1-94f2-



7288a42c0625)various lizards. He reports: "The iguanas are 1-2 feet nose to tail, with green/brown/black colors. They eat both false roselle and katuk, but not

chaya. Now that we have a dozen cattle, I'm succeeding with vegetables I couldn't grow here two years ago, thanks to the manure. ...Part of the success is that I avoid the plant-eating lizards and ants by hiding or 'camouflage planting' in weeds rather than on bare soil, which the people prefer around their houses. By planting the seeds among weed vines, the seedlings are not found among all the leaves.

"Some control the iguanas by draping old fishnet over seedbeds for transplants. The elevated gardens are easily covered. [Most gardens are on raised platforms.] Seedlings can grow up through the net, and iguanas/lizards avoid it. I killed a few iguana pests in rat traps. They hide in scrap woodpiles, so keep these away from the garden. In another area (Jurutã area in N Brazil), iguanas ate the pigeon peas, but in Santarem, they didn't touch them--perhaps from the resemblance to a similar-leaved stinging vine that grew as a yard weed in Santarem."

(https://cdn.ymaws.com/echocommunity.site-ym.com/resource/resmgr/a_to_z/azch8lar.htm#Table)

KEEPING MONKEYS AND BABOONS OUT OF YOUR CROPS. William Boykin in Zambia asked if anyone in our network has found a way to keep monkeys from fruits, vegetables and peanuts (other than a gun). We asked for your ideas on this and many members of our network contributed helpful solutions. Be forewarned that this article contains some graphic descriptions of controls used in the field which we do not endorse.

Fr. Gerold Rupper in Tanzania sent us the following. It involves a plant that is an old "friend" to our readers--sunn hemp. Sunn hemp is receiving widespread acceptance as a green manure in East Africa. The species they grow is *Crotalaria ochroleuca*. Fr. Rupper writes, "Early in the campaign for planting sunn hemp (also called zanziberica), we got a report from a youth group that monkeys had been afraid to traverse a belt of sunn hemp around their field of maize. I could not ask the monkeys why they did so. But one can imagine that first of all it is a strange sight to see sunn hemp growing together and forming a barrier. Secondly, the husks give a clattering sound, which may disturb the monkeys. [Ed: the word "crotalaria" comes from the Greek root 'crotal' meaning a rattle or castanet. The genus for rattlesnake is *Crotalus*.] Thirdly, if they are caught stealing maize, it is almost impossible to flee through the sunn hemp field as the branches form a rather strong network like wire. In the case of maize [corn] there is some synchronization between the maize and sunn hemp. The husks of both crops form about the same time (depending on the maize variety). People let the corn dry in the fields, at which time the barrier effect of sunn hemp becomes important. We have developed a new method of planting sunn hemp. Two rows of maize alternate with one row of sunn hemp. Here the maize is well protected against monkeys.

"By the way, here is another story. Some years ago Tanzania feared an invasion from South Africa. People were told to dig pits and cover them. Of course, before people went into hiding, snakes and other reptiles made their home there. So we sunn hemp people told them to grow sunn hemp. The plants form a solid black coverage where chickens etc. feel very safe from preying birds. If an invasion had come, they would have never suspected that sunn hemp fields are the best air shelters, although not yet listed as a war technology."

Fr. Rupper's comments about how the upright plants fall into each other helps me understand a problem we have had. ECHO (/resources/ce80aec0-d833-46f8-b064-

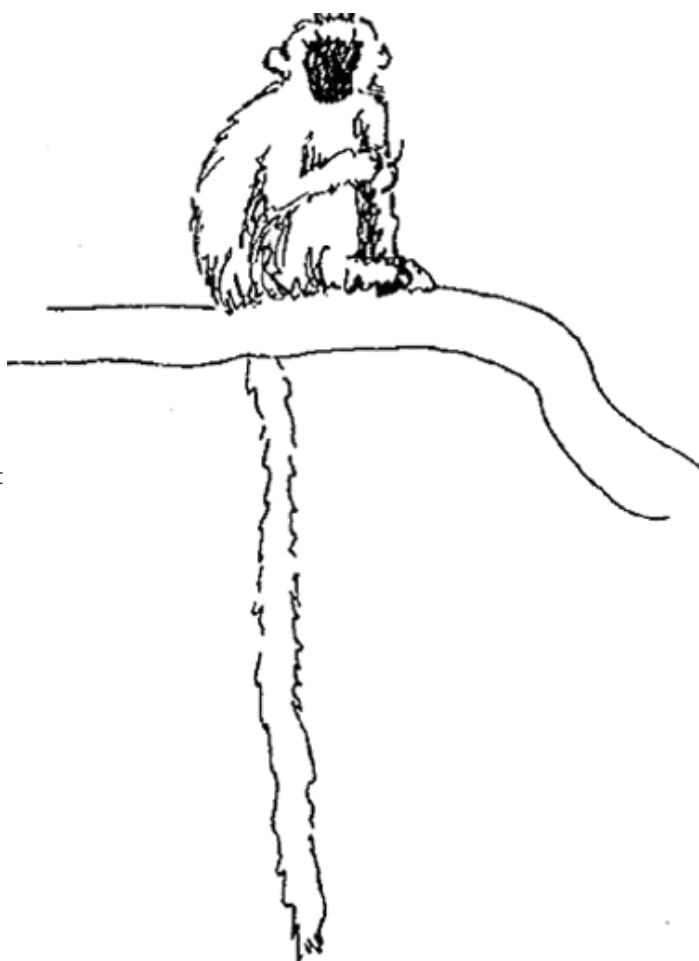
c7ac71ab1e14)

grows only very small plots of each plant for our seedbank, perhaps only 2 rows deep.

The sunn hemp plots usually look terrible because they fall over.

Apparently that is what they are supposed to do, but in the field they fall into each other and so hold each other up. There must be a sermon illustration in there.

[ECHO can send a small packet of sunn hemp seed; see the chapter on soil health



(https://cdn.ymaws.com/echocommunity.site-ym.com/resource/resmgr/a_to_z/azch6.htm) for more information. We usually also send another species developed by the University of Hawaii, *Crotalaria juncea*. You can determine which does best in your conditions. People in Tanzania can contact Fr. Rupper at St. Benedict's Abbey, P.O. Peramiho, TANZANIA. He says that people in Zambia can obtain seeds from Ginnie Goodfellow, Box 61, Siavonga; Marleen Kramer, Dioz. Development Committee, Box 450014, Mpika or White Fathers Missions in Mbala, Kasama and Mansa dioceses.]

Sina Luchen with the Ministry of Agriculture in Zambia sent suggestions on controlling monkeys. "Some years ago I happened to stay in a place where monkeys were a major pest. From my experience, the most effective control method against monkeys is the use of a sharp pitched bell in the field which is rung at intervals of about 30 minutes. This need not be a complicated bell. A small metallic object struck against a hanging piece of rail or old plough disc is adequate. Monkeys are frightened at the sound of the bell. Clearing vegetation around the fields also helps, as monkeys prefer to hide in the bushes surrounding the field to scan for human presence before moving on the crop.

"I stayed where there were pet monkeys for 8 years and learned a few things about their behavior. Monkeys fear cattle. The sight of cattle sends a monkey in a frenzy panic. Our monkeys used to help us detect the presence of stray cattle in the

unfenced orchard. Maybe there is a way to use cattle in fending off monkeys."

Cheru Tessema in Ethiopia asked local farmers how they keep monkeys out of their fields. "They catch one monkey in a trap and paint it so that it is a different color than the other monkeys. When they set the differently colored monkey loose it runs to join its group. The whole group runs in fear of the different looking monkey approaching them. The released monkey doesn't know that it looks different and keeps on following its group, thus driving them far from a given farm."

Rev. Herbert Perry, a former missionary in Zimbabwe, wrote in response to this method from Ethiopia. "I suspect your report is somewhat incomplete. Studies of monkey life and behavior have been conducted over a number of years by field workers who routinely dye a monkey so that it may be identified and observed over a period of time. As far as I know, there is no evidence that the alteration in color in any way disturbs the rest of the clan."

"In Zimbabwe monkeys and baboons are frightened away in a way similar to that report, except that instead of paint farmers use the animal's own blood. [Ed: This becomes gory and neither I nor Rev. Perry recommend it. However, it is worth knowing about people's practices.] After trapping a single animal, they strap it securely to a board and proceed to flay large areas of the animal's body, releasing it as a bleeding mass of screaming pain. When this animal attempts to rejoin its compatriots, they indeed are frightened off. Eventually, of course, the wounded animal dies. It strikes me as being unnecessarily cruel and inhumane." If any readers have first-hand and successful experience with the painted monkey technique, please send us every detail you can think of about the process and its effect. It might save a lot of animals from being tortured.

J. D. Balarin in Kenya says that monkeys were a pest on the large banana plantation on the Baobab Farm. "We used a dog on a running line as a deterrent and it worked. A less gruesome solution."

C. H. Hansen in Zimbabwe wrote concerning the monkey painting. "When I worked in the copper belt in Zambia a neighbor told me about the same trick: catching and painting a baboon with bright colors. Only they also drenched it in perfumes and evil smelling chemicals. He said that scared off the troop with the victim in hot pursuit and that they would eventually turn around and kill the victim. Of course, this just moves the problem to some one else's farm."

Fr. Gerold Rupper in Tanzania wrote again about monkeys. "After all you have to kill them if you do not want to simply drive them away from your own field into your neighbor's farm. The common method in this part of Africa is to locate the herd of monkeys. Then you fix a large net on trees for a length of 30 meters. The 'killers' hide themselves behind thick trees with knob-kerries (sticks with knobs). Another group of men, in the very early dawn, chase the herd toward the net. They bypass the trees with the men in hiding, arrive at the net, try to climb it, and are caught in its meshes. They are then killed by the men with knob-kerries. The tribesmen hired for this cruel work get to eat the monkeys." Fr. Rupper prefers using the borders of sunn hemp to protect his own field.

Roger Sharland in Kenya has worse problems with baboons, followed by monkeys, jackals, porcupines, squirrels and rats! He wrote, "After a time of telling people 'We know the problem but can't help,' we decided to do something about it." Someone

suggested a development organization buy baboon tails, but that would lead to dependency. He realized that baboons were not always a problem and are not as bad everywhere, so they began interviewing older men and seeing what other communities are doing. I report what was told to Roger, even though some are gruesome.

The common principle seems to be to make the animal so afraid of man that it will not risk coming near your patch for food. In the past people lived in larger communities and had a relatively smaller periphery to defend against animals. People then waged war continually on baboons who became afraid of man and looked elsewhere for food. Some folks located where they roost then went on a baboon hunt. They would burn around the tree or rock and shoot large numbers as they came down. For those who use bows and arrows, this tends to be a big social event. One solution is to encourage eating baboon meat. One medical assistant shot a baboon but did not kill it. It ran away and he has not had trouble with baboons since, even though he is in an area that has a lot of problems with baboons.

Another solution that Roger thinks is practical and seems to work is to put chili powder on the paths that the baboons always use in coming to the garden. Baboons always rub their eyes when they sit down, getting the powder into their eyes. This either frightens them away or makes them easier to shoot. Supposedly in one region baboons became afraid of men but not women, so the men would dress as women and carry a short bow under their skirt, though Roger says this presumably would not work often!

Continue to let us know other ideas you have. It is a pressing problem for many communities. (https://cdn.ymaws.com/echocommunity.site-ym.com/resource/resmgr/a_to_z/azch8lar.htm#Table)

PORCUPINE CONTROL. Michi Vojta, a Peace Corps volunteer in Kenya, wrote, "One problem that discourages planting of tuber crops (sweet potato, cassava, etc.) is porcupines and other burrowing animals that substantially reduce harvest. Any suggestions to protect foods from the burrowing ones?"

Porcupines live in many habitats, from tropical forests to sandy semi-arid regions, and create extensive underground burrows with several entrances where they shelter and breed. Most are nonselective vegetarians and can be major pests in orchards or areas of reforestation by eating all parts of seedlings and girdling mature trees. In cultivated areas, they may damage root and tuber crops, pumpkins, melons, maize, vegetables--and irrigation tubing. They usually forage alone at night. Porcupines are hunted by large birds-of-prey, wildcats, pythons, scavengers, and even, in various countries, for human food.

Joe Brooks with the Denver Wildlife Research Center writes that porcupines in Pakistan died when they ate bait set out to poison wild boar. The bait was wheat flour or grain, corn oil, brown sugar/molasses, anticoagulant poison (warfarin or coumatetralyl) at a concentration of 0.025%, and enough water to make a stiff dough, rolled into small balls. He suggests that since the porcupines damage root crops, it might be worth trying cubed pieces of the affected crops mixed with the anticoagulant concentrate for a bait. (See below for information about

using *Gliricidia sepium* as a similar rodenticide.) It is also possible to fumigate the burrows with 5-10 aluminum phosphide tablets per burrow system, but care must be taken to close all entrances to the burrow system except the one to be treated.

Porcupines find their food by hearing it fall, feeling it with their whiskers, or with their keen sense of smell. K.S. Ramalingam, visiting ECHO from India, says it is important to make rat baits smell appealing with ghee butter or groundnuts, and to stir them with a stick to avoid imparting the human smell. We have heard of fresh mint tea being poured on the ground or sprayed on plants in Thailand as a rat repellent; similar techniques might work for porcupines. To keep rodents off the bark of young trees, farmers in the Solomon Islands wrap them with a local thorny vine and make bamboo "collars" for the trees. Indian farmers grow sunflowers and build perches to encourage owls and birds-of-prey to perch in their fields and eat rodents. Might the sunken bucket trap (see below) be adapted for porcupines? If anyone in our network has more ideas for control of burrowing animals, please let us know so we can share your idea with others.

(https://cdn.ymaws.com/echocommunity.site-ym.com/resource/resmgr/a_to_z/azch8lar.htm#Table)

SUCCESS WITH HOMEMADE MOUSETRAP. Barry Rands in Mali reports that his gardener recently caught 150 mice in (/resources/dcfac382-cdc4-4ef7-9805-5293d344dfec)one

night with four traps in their garden.

Here is what he

does. Barry

emphasizes that this is not his idea, but is

borrowed from

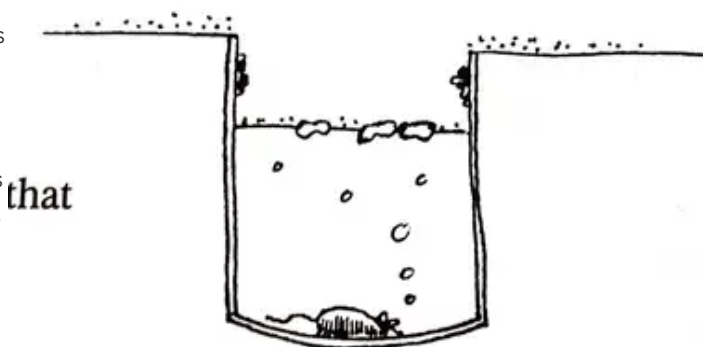
local folks that have

been doing this for

years. He has

popularized the

technique by including it in his extension program.



Remove the top from a 20 liter oil can and set the open can (or similar size container or bucket) in the ground so the top edge is flush with the surface. Fill the container water to within 8 cm of the top. Sprinkle sweepings from a millet threshing floor on the surface and around the trap to provide both camouflage and bait. Replace with fresh bait each evening. Other materials that would float would probably serve the same purpose. The mice come at night to eat, drink or play (they are not sure why the trap is so attractive) and fall into the trap by the dozens and drown.

Three or four such traps set around the perimeter of a small (1,000 m²) garden should be sufficient for rodent control, depending on the severity of the problem. Where containers are in short supply you can dig a 40 x 30 cm deep hole then line it with clay or cement to make it hold water. He has also successfully used a brew made from the pods of *Acacia nilotica* as a sealant.

When floating camouflage bait is not available, he has successfully used two pieces of cloth stretched over the trap with a 5 cm (larger if your rodents are bigger) gap in between. A bait such as millet, corn or other grain is then placed on the cloth and

somehow the mice manage to fall in!

There is reference to a similar trap in *Natural Crop Protection*, which suggests floating a few peanuts and placing a generous ring of peanut butter 3 cm below the rim of the container. (https://cdn.ymaws.com/echocommunity.site-ym.com/resource/resmgr/a_to_z/azch8lar.htm#Table)

GLIRICIDIA SEPIUM (MOTHER OF CACAO, MATA RATON, RAT KILLER) USED IN

RAT CONTROL. Some people use *Gliricidia* to kill rats. Roland Bunch has seen the following done in Honduras. A few good-sized pieces of bark are stripped from the tree and boiled in water with about 20 pounds of corn. The corn is then tossed into the fields. Both rats and mice are killed by the treated corn. It is not as effective as regular commercial rat poison but it does work and is less lethal in case of an accident. It takes a day or two before they start finding dead rats and mice in the fields. We have heard rumors of other methods, including some manner of fermenting the leaves. We asked for help from our readers and received several responses, though not enough to provide a "recipe."

Mike Bengé with USAID sent us a 1966 technical report by Harry Hockman titled "Mechanism of Rodenticidal Activity of *Gliricidia sepium*." The author claims that it is commonly used in Central America as both a rodenticide and an insecticide.

Dr. Hockman isolated a substance called coumarin from the leaves of *gliricidia*. Although this compound is itself not especially toxic, it is converted by bacteria into dicoumerol. This is chemically so similar to vitamin A that it interferes with the normal role of vitamin A in permitting the blood to clot. This was shown in 1948 to be effective in killing rodents. It is not a rapidly acting substance, but repeated doses result in fatal hemorrhages within a few days. Rats fed baits containing dicoumerol feed freely and do not develop the bait shyness that is so common with other rodenticides. This eventually led to the well known rat poison D-Con (which is actually not dicoumerol but a synthetic substance, warfarin, with a somewhat similar structure that is even more effective).

The authors looked into how Central Americans have used *gliricidia*. "In southern Mexico the bark or leaves are ground and mixed with damp corn flour or spread on bananas. In Panama the leaves are ground or mashed and then mixed with grain. At this point, however, there are two versions of the proper procedure. One method requires that the bait be cooked or steeped and dried before use, and the other that the uncooked mixture be used. At either locality it is worthy of note that the ground leaves are mixed with grain and allowed to ferment under the conditions of high humidity and temperature that exist in these areas." Others observed that "when rats eat it, their hair stands straight up and they bloat up and die in 4-5 days. This is the type of clinical picture one would expect from a hemorrhagic poison. Unfortunately no autopsy has been performed on a rat killed by *gliricidia*."

Dr. Hockman quotes research in which rats "fed a normal diet of unincubated *gliricidia* leaves in amount of 1.5 grams three times a day for six days showed no pathological changes. Those fed on incubated leaves in amounts of 1.5 grams three times a day for six days showed clear signs of hemorrhage in the gut, lung, and spleen."

This research went no further because there were more potent synthetic rat poisons. That may be valid for the U.S. market, but a natural rat poison that could be obtained at no cost to peasant farmers would be an enormous blessing to the third world. (Alternatively it might lead to small-scale village industries.)

I highly recommend this project to our readers within the scientific community. We need more precise "recipes" ready for village-level use with more detailed experiments to show the effect. What is the best method of preparation? With what should it be mixed, and how, to make an attractive bait? How much does a rat need to eat to be killed? How long will it be before the effect takes place? Is there much variation in effectiveness between gliricidia trees from different locations? How long and in what manner can the product be stored? Does it have a short life so it is useful only as produced on the farm, or can it be produced, stored and sold in the city?

Dr. Hockman says that "Gliricidia has two additional uses that one would not normally associate with a toxic plant. First, the young shoots are nontoxic to humans and are considered to be a delicacy in some parts of Central America. Second, silage composed of two-thirds corn and one-third Gliricidia leaves is more acceptable to and shows greater weight gains in cattle than either plant alone." It is commonly used as feed for animals. Other uses include living fences, green manure, poles for yams, alley cropping and in barriers for erosion control. Most of you will find gliricidia seeds or cuttings available locally. If not, we can send a small packet of seed. We can send a copy of the article to scientists considering this as a research project. I have summarized all the general material, so the only additional information is highly technical and of no use except for laboratory research. (https://cdn.ymaws.com/echocommunity.site-ym.com/resource/resmgr/a_to_z/azch8lar.htm#Table)

KEEPING RATS AWAY FROM OIL PALMS. The following is taken from West Africa Link. "Rev. Noah Kyireh, agronomist at the Nyankomasi Methodist Agricultural Project, has found an effective method of keeping rodents away from young oil palms. The young trees can be attacked by rodents, which will eat the stem right at ground level, killing the tree. Wire netting placed around the tree is not completely successful because the rodents can dig under the wire and still get to the tree. Noah Kyireh has been putting logs of dry wood around young oil palms at a distance of some 20 centimeters from the stem. It is the tropical fire ants, which subsequently inhabit the dry wood, which then keep the rodents away. He says it is much more effective than the use of wire netting, and certainly much cheaper." (https://cdn.ymaws.com/echocommunity.site-ym.com/resource/resmgr/a_to_z/azch8lar.htm#Table)