



POCKET GOPHERS

NORTH DAKOTA STATE UNIVERSITY

JUL 19 1988

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Pocket gophers get their name from their fur-lined (pocket-like) cheek pouches in which food is carried. They are medium-sized burrowing rodents which live almost entirely underground. There are many species distributed over much of the north central, southern and western parts of the United States. They should not be confused with moles, which at times construct somewhat similar tunnels. (Moles do not occur in North Dakota.)

Pocket gophers have prominent, yellow incisor teeth. The different species vary in length from 6 to 13 inches. Color varies with species and locality, from light brown to deep chocolate. Because of their underground life, pocket gophers have rather poor eyesight, but other senses are acute. Their tails are sensitive and are used to guide the animals when they travel backward in their burrows.

There are two species of pocket gophers found in North Dakota. The genus *Geomys*, represented primarily by the plains pocket gopher (*Geomys bursarius*), is found primarily in the Red River Valley. The northern pocket gopher (*Thomomys talpoides*) is found throughout North Dakota except for the extreme southeastern counties. The

easiest way to distinguish these pocket gophers is by the presence and number of grooves on the upper incisors (front teeth). The plains pocket gopher has two grooves on each tooth, and the northern pocket gopher has ungrooved incisors.

Biology and Behavior

The Plains Pocket Gopher

An adult plains pocket gopher weighs about one pound and is 10½ to 12 inches long, of which the sparsely haired tail constitutes one-fourth this length. The fur-lined external cheek pouches open anteriorly at the side of the mouth. The two cheek pouches are used to carry food to storage chambers but not to transport soil. The anterior most teeth (incisors), two in the upper jaw and two in the lower jaw, are functionally outside the mouth; the lips close behind these teeth. They are used for digging in the soil as well as for cutting roots and other parts of plants into sections short enough to fit in the cheek pouches (figure 1).

The plains pocket gopher ordinarily has only one litter per year in the northern portions of its range

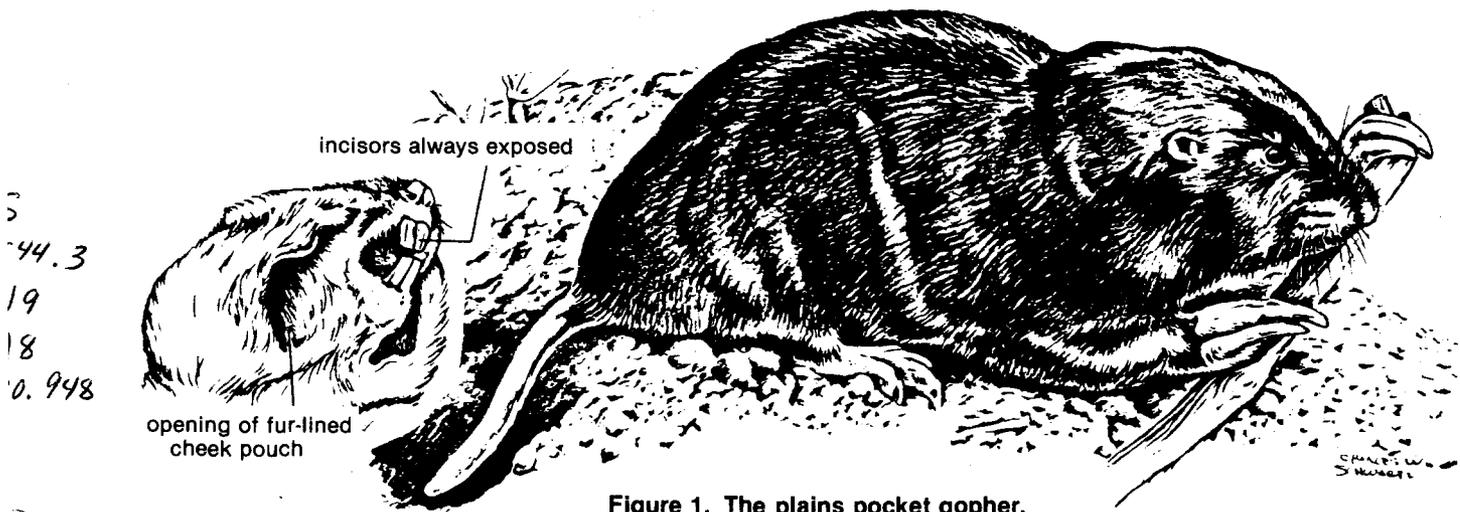


Figure 1. The plains pocket gopher.



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and two or more in the south. Each litter consists of one to six young. For most of the year, pocket gophers are solitary. Only a few multiple occupancies of burrows have been recorded, and they were in spring – the season when a male and female would be expected in one burrow, if only briefly, for mating. Also, spring is the season when partly grown young would be in the mother's burrow.

The burrow systems of the plains pocket gopher consist of both deep and subsurface runways. The subsurface runways, some of which are several hundred feet long, are the most extensive. Usually there is a single major subsurface runway with shorter runways branching off it. Mounds on the surface of the ground are thrown out from short lateral tunnels (figure 2).

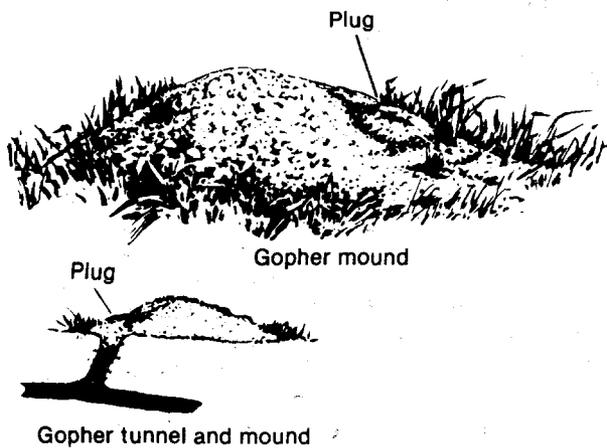


Figure 2. Pocket gopher mound and its relation to tunnel.

Depth of subsurface runways averages 9 to 10 inches below the soil surface. Deep runs lead to nests or end blindly and may attain a depth of 4½ to 5 feet. They are not connected to the surface except for subsurface runs. In the course of excavating these deep runs, the gopher may push dirt several feet vertically and 40 to 50 feet horizontally in order to bring it to the surface.

Most nests are not in the deepest parts of tunnels, but are a foot or so below the surface. The nest is usually lined with grasses and resembles a slightly flattened sphere 5 inches high and 7 inches wide. Only one nest is found in any one burrow system.

In one year, one gopher can transport up to 2¼ tons of soil. At this rate, seven gophers on an acre could cover the surface area with a layer of loose soil 1 inch deep in 10 years.

The Northern Pocket Gopher

Northern pocket gophers are smaller than plains pocket gophers. They also have small front feet and smooth upper incisors. Northern pocket gophers vary in size throughout their geographic range. Body size varies with vegetative type, locality, altitude and latitude.

Northern pocket gophers have one or two litters of three to seven young that are born from March through June. Like other species, they have external fur-lined cheek pouches.

The burrows of the northern pocket gopher are similar to those described for the plains pocket gopher, but tend to be shallower. The subsurface tunnels are found from 4 to 12 inches below the surface with a deep tunnel descending 18 to 24 inches usually connecting with the nest chamber.

The only materials that pocket gophers are known to transport from above ground to below ground are nesting materials and forage. Old nest material, spoiled and rejected food stores and fecal pellets are usually pushed into special chambers below ground, but these materials may also be pushed to the surface. Food stores (caches) are usually located in laterals off the main shallow tunnel system and are walled off by a loose soil plug.

In areas where snow pack is deep in winter, northern pocket gophers leave three types of physical signs on the surface of the ground that are visible in the snow-free period. These are mounds, earth plugs and soil casts. Soil casts are formed from soil removed from the below-ground burrow system and pushed into tunnels made in the snowpack. When the snow melts, these rope-like casts are left on the surface of the ground and are conspicuous features of rangelands just after snowmelt.

Legal Status

Pocket gophers are not protected by federal or state law.

Economic Status

It has been said that the pocket gopher is either an asset to be left alone or a hindrance to be reduced in numbers, depending on the use man makes of the given land area. Less is commonly known about benefits conferred than about nuisance aspects of the animal. Therefore, some of the beneficial aspects are discussed first.

- Weathering of the substratum is hastened by the burrow systems carrying water and contained

solvents to the subsoil particles and rock masses below.

- The subsoil is brought to the surface where it is exposed to an increased rate of weathering.
- The loose earth brought up and piled on the surface of the ground becomes available for transportation by wind and water to contribute to building fertile valleys.
- Water is conserved because snow melts more slowly on porous ground than on hard packed soil or bare rock, so runoff is retarded and the supply to streams is distributed over a longer period of time. The porous soil also retains water longer than packed ground and gives it up more slowly. Spring floods are less liable to occur and a more regular water-supply is insured.
- A porous moist soil produces a full vegetational cover, which again favors water conservation.
- The ground is made more fertile through loosening of the soil as well as by the penetration of it by the tunnels admitting both air and water to the roots of the plants; the mineral constituents of the soil become more readily available, and the rootlets are better able to penetrate the earth.
- The accumulated vegetational debris on the surface of the ground is eventually buried by the soil brought from below by the gophers and becomes incorporated to form the humus content favorable for the successful growth of most kinds of plants.

It was reported that in Kansas when pastures are overgrazed the grasses are partly replaced by weeds with large roots. These large roots are one of the special adaptations permitting these plants to live under adverse conditions. These large roots constitute an abundant food supply for pocket gophers, which thrive and multiply. The action of the pocket gophers in "plowing" the soil and actually destroying the weeds hastens the return of grass if the overgrazing is controlled. With the return of the grass, the pocket gophers decrease in number.

Depending on local vegetational conditions and species of gopher, several types of damage are attributed to pocket gophers.

- Many complaints against pocket gophers stem from damage they do to alfalfa plants or the nuisance they constitute in those fields. Eating the roots of alfalfa can kill plants and serious damage results from the gopher gnawing on the root crowns. The mounds of soil thrown out on the surface of the ground may kill some alfalfa plants and create a nuisance by plugging and dulling mower cutter bars or swathers.
- Pocket gophers reduce the amount of herbage available for livestock and other herbivores in rangeland areas by harvesting and burying vegetation.

Gophers alter composition of vegetation through selective feeding and soil disturbance. They tend to suppress plant species on which they commonly feed and maintain those that benefit from disturbances, such as usually undesirable annuals.

- Gophers reduce ground cover and sometimes may be the primary cause for exposure of bare soil.
- Gophers create a nuisance and cause damage to lawns and gardens by destroying garden plants and creating mounds in lawns.
- Gophers sometimes cause serious problems in attempts at reforestation of burned or logged areas by eating the roots of seedlings, causing death or severe damage to young trees.

Control

Control operations can best be conducted during the seasons when the pocket gophers are most active near the surface. This usually is indicated by the presence of fresh mounds of dirt. At other times, labor and material may be wasted on unoccupied systems of runways.

Trapping

In most areas autumn is the best season to trap because gophers are most active in bringing soil up to the surface and can most easily be located. Traps should be set at "fresh workings." The next best season is spring. Success depends on proper use of traps. The following steps are suggested:

1. Locate the newest mound in the area.
2. Probe to locate the main runway. To locate the main runway, find the plug where the gopher has filled up the lateral tunnel and left a horseshoe-shaped depression in a fresh mound. The main runway will be about 15 to 18 inches away from the mound on the same side as the horseshoe-shaped depression. To build a probe use a piece of $\frac{3}{8}$ to $\frac{1}{2}$ inch rod about 35 inches long. The end section which is forced into the soil should be solid and pointed. A foot pedal on the probe may make the task easier. The release of ground tension will be felt when the probe drops into the runway.
3. Dig down until you locate the runway and remove soil from the burrows so that traps can be placed far back into the runway (figure 3).
4. Attach a piece of wire by running it through the coil spring. Fasten the other end of the wire to a metal stake to serve as an anchor and also to help locate the set for tending so the gopher cannot pull it into the burrow.

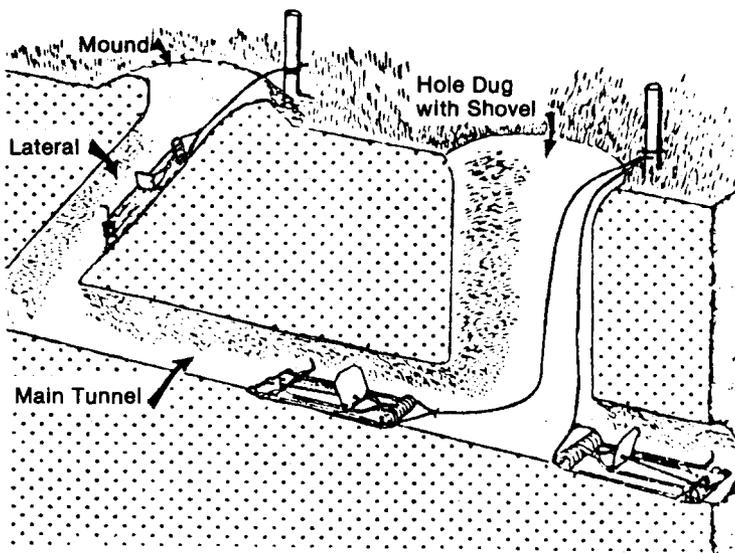


Figure 3. Trap placement in lateral or main pocket gopher tunnels. Note that traps are staked.

5. Set and place two traps, one in each direction. The trigger is placed away from the excavation. Be careful not to spring the traps while placing them.
6. The open burrows attract the gopher and it will be caught while trying to plug them. However, if you let in too much light, it may push a large amount of soil ahead of itself. This may spring the trap and let the gopher escape. Therefore, push traps into the open tunnel as far back as possible or partially cover the entrances.
7. Watch for evidence of gophers you may have missed and continue with your trapping program.

The trapping program is usually most beneficial in small scale control of gardens or lawns. In large fields, the time it takes for control can better utilized with other methods.

Toxicants

Landowners who feel that it is justifiable to use poison and find no legal restrictions to its use will be interested in the following recommendations. Over large and heavily infested areas, poison grain can be used. The poison recommended for use is strychnine alkaloid that is coated on grain. Poisoned milo, oats or wheat properly used also will result in good control. Using as low as 0.31 pounds per acre of 0.5 percent strychnine-coated bait will give excellent results. One pound of bait

per acre is more than enough to kill all the gophers on any field and poison bait placed underground is not likely to be picked up by other kinds of wildlife. However, it is possible for an animal to obtain a lethal dose of strychnine by eating poisoned gophers. Exposed bait should not be left lying around and spilled bait must be picked up immediately.

The durability of bait in the ground is very important in obtaining good control. During the spring, a bait lasting two weeks is sufficient for good control. Most of the gophers are killed during the first week after poisoning.

The first means of using poison is baiting by hand. After probing to locate the main tunnel, as described under trapping, open a hole into the main gopher runway using a shovel. Place a tablespoon of grain bait in the runway. Make sure the bait is placed far enough back in the runway so that it will not be covered with soil when you fill in your excavation. A long handled spoon or metal hand-operated dispenser is recommended (figure 4).

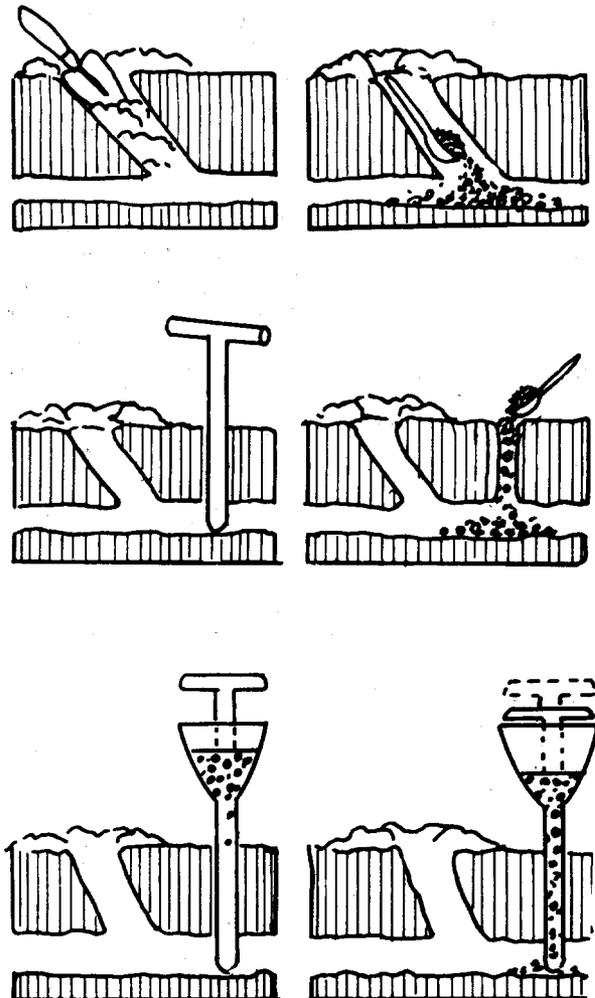


Figure 4. Methods of applying gopher bait by hand or with a probe.

The second means of placing poison bait is by use of the burrow-builder. This makes an artificial burrow for the pocket gopher and at the same time places the poison bait in the constructed burrow. The machine is attached to a tractor and pulled back and forth across a field making a series of parallel burrows about 25 feet apart. The artificial burrow cuts across many of the natural pocket gopher burrows. The gophers begin to explore these shortly after they are made. They smell the bait, pick it up and carry it back to their own burrow system where it is stored and eaten. After eating the poison, the gophers usually die in their natural burrows (figure 5).

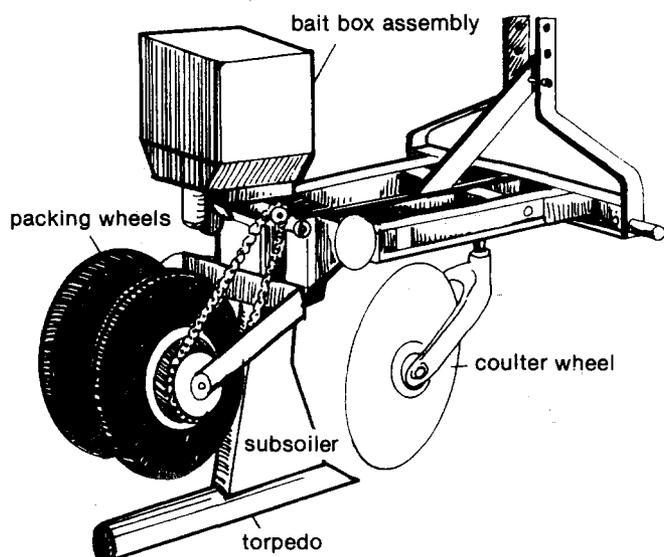


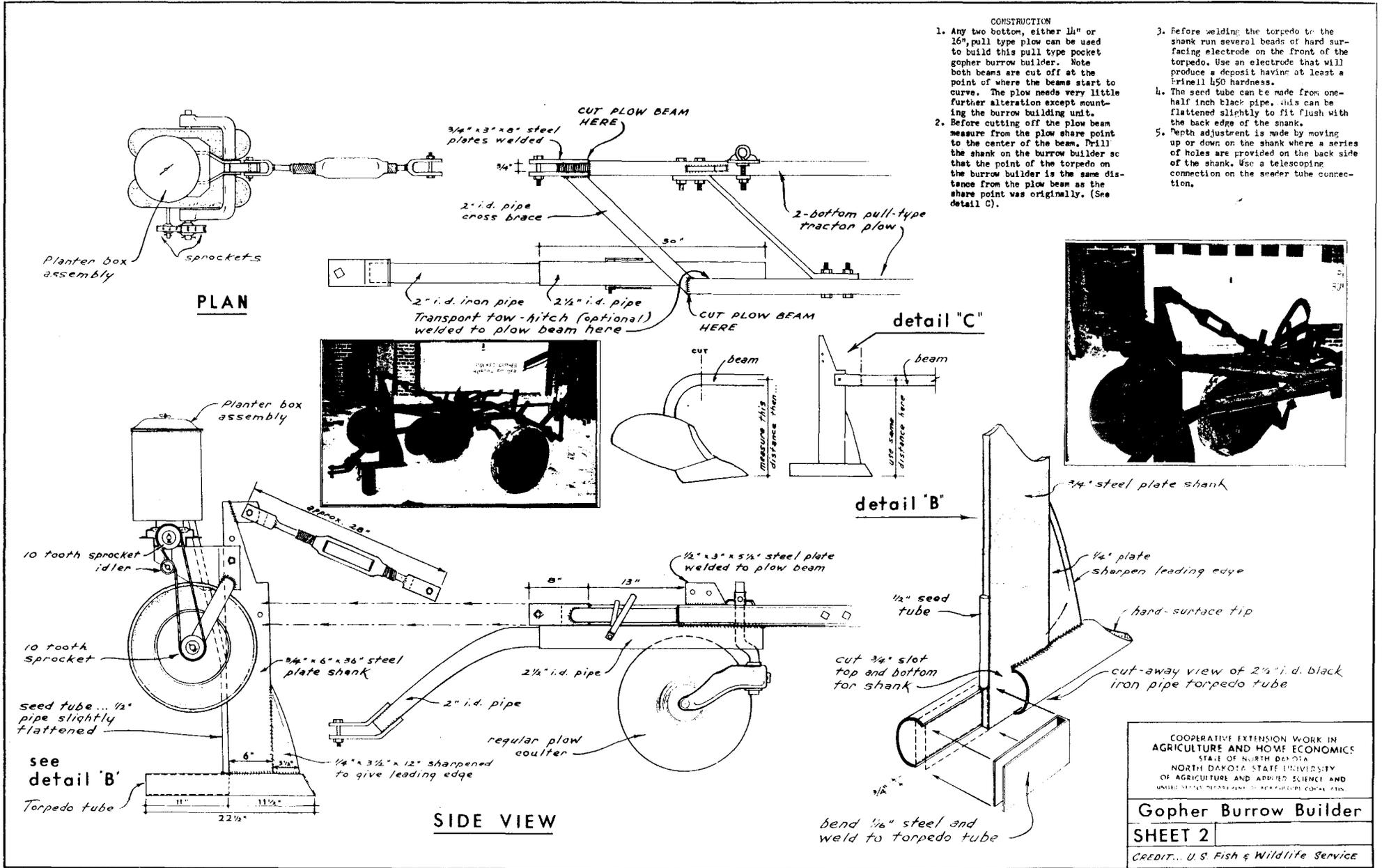
Figure 5. The "burrow-builder" machine may be used to control pocket gophers on large acreages.

The three general types of "burrow-builder" made are the remodeled plow type, the hydraulic lift type and the three-point hitch type. The machine consists of a corn planter type feed mechanism with two rubber-tired wheelbarrow wheels as packers and a drive for the feeding mechanism, coulter wheel and steel used to make frame, subsoiler and torpedo. Ready-made parts for the three-point hitch may be purchased. The parts are similar to a Ford 32-inch by 4-inch by 4-inch model 100-1 tool carrier bar with one 24-inch subsoiler, subsoiler shankless chisel and boot, one corn planter can with standard bottom, one large whole center drop plate equipped with one press wheel drive assembly less press wheel, and two wheel assemblies, including axles, spacers, cup and 2 4-inch by 8-inch tires and tubes (figure 6).

The "burrow-builder" can be used for control of gophers in any area where soil conditions and the physical condition of the land make it possible to drive over the area with a tractor and construct an artificial burrow. Generally if the soil is damp enough so that a handful can be compressed and hold its shape, it is suitable for the machine.

In general a burrow depth of 9-10 inches is desirable. The effectiveness depends on the gophers finding the artificially constructed runway and using it long enough to find the poisoned bait. To make this possible, the artificial burrows should be constructed at a depth and spaced so as to cut through the greatest number of natural gopher tunnels.

If further assistance with pocket gopher problems is needed, contact the Extension Wildlife Specialist, Stevens Hall, NDSU, Fargo, ND 58105 or the USDA APHIS, Animal Damage Control Office, 1500 Capitol Avenue, Bismarck, ND 58501.



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Gopher Burrow Builder

SHEET 2

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