

Deer blamed for lack of forest development

UNIVERSITY PARK — Tree regeneration of some kind almost always develops following a forest disturbance in the temperate eastern United States. Almost always, that is. Occasionally, ecological balances are disrupted in such a way that natural regeneration failures become a serious problem. Such is the case in many parts of Pennsylvania today.

This lack of natural regeneration threatens the very future of our Pennsylvania forests. A survey of 65 timber cuttings made in northwestern Pennsylvania between 1968 and 1971 revealed that satisfactory natural regeneration was developing in only 35 (54 per cent) of them. The remainder contained few tree seedlings. Some areas were developing into open savannahs dominated by ferns, grass, goldenrod, and aster. Once established these plants may produce substances which inhibit tree seedling establishment, tending to perpetuate the open treeless area.

Similar conditions exist in areas of central Pennsylvania where repeated insect defoliations have killed the overstory trees over extensive areas. Few seedlings are regenerating on these areas, and herbaceous plants promise to dominate there too.

Numerous experiments conducted over the past eight to 10 years have shown that excessive browsing by deer is the primary factor responsible for these regeneration failures. Fences to exclude deer were erected on about 40 cutover sites on the Allegheny National Forest in northwestern Pennsylvania and the Pocono area of northeastern Pennsylvania. Regeneration was measured

inside and outside of the fences at all locations. Of those failing to regenerate outside the fence, 85 per cent regenerated satisfactorily when deer were excluded. So at least 85 per cent of the failures can be attributed directly to deer browsing.

Actually, this is a conservative estimate, because these fences were erected after cutting, while deer browsing occurs on understory seedlings before cutting as well. Other experiments have shown that these advance seedlings are very important in determining regeneration success. If advance seedlings are lacking, regeneration may fail even when protected against browsing. So browsing that occurs before cutting reduces the potential for an area to regenerate. To demonstrate the full impact of deer browsing, fencing would have to be erected 10 to 15 years before cutting to allow advance seedlings to develop naturally.

Where regeneration fails to develop naturally, it is standard forestry practice to plant seedlings or sow seeds to establish a new forest. Unfortunately, deer damage to artificially established seedlings is even more severe than to natural seedlings. Planted seedlings that have been fertilized in the nursery are especially nutritious, and deer walk down the rows to eat each and every one. We cannot afford to plant or seed the tens of thousands of seedlings per acre that are normally expected in natural regeneration. Planting 6 feet apart results in only about a thousand seedlings per acre, and deer can consume these few seedlings in a very short time.

Many techniques have

been tested to protect seedlings from deer browsing. Chemical repellents of many kinds have been sprayed on seedlings to keep away, but none have been found effective in areas of high deer population. Apparently hungry deer will put up with the unpleasant taste or odor when there is little else for them to eat.

The only protection that has proven effective is a fence of some type, either to surround an entire regeneration area, or as a cage around individual seedlings. An 8-foot-high fence is required if a large area is being fenced; costs of such fencing run \$250 per acre or more. Attempts to develop cheaper techniques using plastic materials or outrigger or electric-shock designs have either not been effective or have not reduced costs appreciably.

Researchers have also tested various cages of wire or plastic mesh, to protect individual seedlings. The most effective is a plastic tube five to six feet high, that protects the seedling until it grows out the top, by which time it is above the reach of deer. But these cages are also expensive — about \$2 per seedling. If more than 100 are used per acre, fencing is usually cheaper and gives better results.

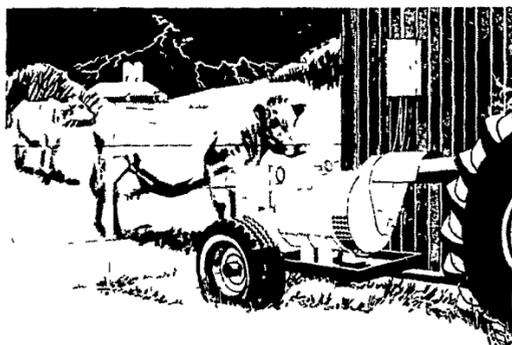
One technique foresters are using to minimize deer damage is fertilization. In areas where seedlings are present but being browsed



severely by deer, an application of nitrogen fertilizer will stimulate rapid height growth of three to four feet per year, so that seedlings grow out of the reach of deer in a couple of years rather than the five or six years normally required. Although no guarantee that seedlings will escape fertilization does reduce the damage considerably, and can be applied by helicopter for less than \$100 per acre. Where it can be used, it is a better investment than fencing.

But even \$100 per acre is a formidable investment when

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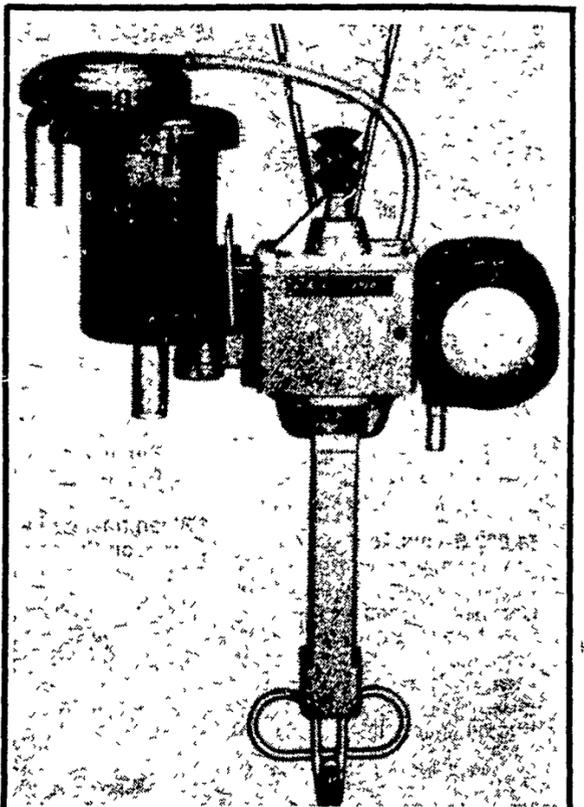
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