A COMBINATION LANDSCAPE BOX SCRAPER, DOZER, AND SCARIFIER FOR SMALL TRACTORS

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Abstract. A combination box scraper, dozer, and scarifier for lawn and garden tractors has been developed that can be used for landscaping and other soil forming work. This implement is simple enough that it can be fabricated by most welding shops from readily obtainable materials. The replaceable soil cutting edges are moldboard plow shares and the implement has an effective working width of 40 inches. This tool can be pulled by most 7-16 hp lawn and garden tractors equipped with hitches for rear mounted implements. The function of the implement can be readily changed so soil can be loosened with the scarifier teeth before it is scraped, leveled or dozed.

With increasing shortages of labor in most industries, labor saving pieces of equipment are needed and this holds true for the landscape contracting businesses. A combination box scraper, dozer, and scarifier (Figure 1) for lawn and garden tractors has been developed that can be used for landscaping and other soil forming work. This implement can be used for excavating, scraping, and transporting soil and gravel; leveling lawns; filling trenches; loosening compacted soil and for most jobs where a man with a shovel and rake would ordinarily have to be employed. Tractors such as the International Cub Cadet, Bolens Husky, and others in the 7-16 hp. range have sufficient power and weight to handle this implement. This combination scraper can be attached to any lawn and garden tractor equipped with a hitch point conforming to ASAE standards, ASAE S348T (1), and can easily be modified for tractors with other hitch arrangements. An important feature of this tool is that it can be used in confined areas where a larger tractor could not operate and it is easily transported from one job site to another. It also extends the usefulness of lawn and garden tractors that are commonly used for mowing operations.

This 70 lb. implement consists of three main assemblies: the moldboard (Figure 2), a drawbar, and a lifting linkage (Figure 3). The moldboard is a welded assembly consisting of a blade with a replaceable cutting edge, end plates (L) (Figure 2), and scarifier teeth (G) (Figure 2). This soil working part of the implement has an effective width of about 40 inches but this dimension can be adjusted to fit the power of the tractor that it will be mounted on. The end plates help contain soil in front of the moldboard during transport and serve as depth gauges during excavating operations. The scarifier teeth for loosening compacted soil or sod are mounted so that they project from the back of the moldboard as shown in Figure 2.

The second assembly is a drawbar which is used to attach the moldboard to the implement hitch of the tractor. The moldboard is pivot mounted in the drawbar assembly so that it can be rotated to any of three working positions.

A lift linkage (Figure 3) which attaches to the implement lift of the tractor is the third assembly. The one shown is for the IH Cadet tractor but this design can be adapted to other tractor lift arrangements.

Fig. 1. Box scraper excavating and transporting soil.
ASSEMBLE BY ARC WELDING

NOTE ON CUTTING EDGES:
IH 463241 R2 PLOW SHARES ARE SUITABLE

Fig. 2. Moldboard assembly for combination box scraper, dozer, and scarifier.
Fig. 3. Drawbar assembly and lift linkage for combination box scraper, dozer, and scarifier.
Materials and Fabrication

The fabrication of this implement is very simple and should be within the capabilities of most welding or farm workshops. The implement is made of mild steel plate, channel, bar stock, and square tubes which are welded into three major assemblies. The moldboard assembly consists of two end plates (L), a main channel (K), a moldboard plate (J), scarifier teeth (G), and attachment brackets (H) for the removable cutting edges. The cutting edges are slightly modified flat plow shares that are held in place with plow bolts and these are obtainable from most farm implement dealers. Each scarifier tooth is welded to a cutting edge attachment bracket on one flange of the main frame channel, and these reinforce each other. The holes in the cutting edge brackets must be bored to align with holes in the two plow shares. Two shares for 16 inch plow bottoms are needed for a 40 inch wide scraper. The upper corners of the ends of the plow shares are cut off at a 45° angle to provide clearance between the cutting edges and the end plates. This clearance helps prevent material from packing into the corners of the moldboard. It is necessary to have the cutting edge project at least % inch below the end plates so the latter do not impede the entry of the shares into the soil.

The drawbar assembly (Figure 3) is a weldment of two-inch square tubing and has brackets for attachment to the tractor hitch and to the lift linkage. The lift linkage consists of two steel bars with attachment holes spaced so that the height of the implement on the tractor can be adjusted.

Adjustments and Operations

The moldboard assembly is pivoted in the drawbar assembly with two mild steel bolts; two pins are provided for locking the moldboard in place after it has been located at the desired working position.

The forward moldboard position (Figure 1), with the cutting edge down, is used when soil is to be excavated, transported, or spread. By rotating the moldboard assembly 90° backward (Figure 4) the scarifier teeth are put into working position and the moldboard can be used to hold additional weight such as concrete blocks or rocks to assist the penetration of the four teeth. The moldboard can be rotated 180° so that it faces to the rear; this position is used for dozing in backfilling operations (Figure 5) and also for leveling and spreading soil (Figure 6). The implement can be tilted so that one end is lower than the other by attaching the drawbar at different levels on the tractor hitch. This tilted position, which can be used for excavating drainage ditches, also improves penetration in hard or sod ground.

The implement lifts on most tractors provide for two modes of implement operation—fixed and floating. In the fixed mode, the implement is held
in a fixed position relative to the tractor and in the float mode the implement is allowed to follow the contour of the ground. Usually this scraper is used in the fixed mode for spreading soil and shallow scarifying. The float mode is more commonly used during scraping, leveling, and scarifying operations. Some tractor lifts are designed so that the operator can apply down pressure to implements, and this pressure is especially helpful during scarifying and excavating operations.

Literature Cited


Fig. 6. Leveling and smoothing soil with the combination box scraper, dozer, and scarifier.

NEW POTENTIALS IN AMARYLLIS BREEDING

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Abstract. Certain Amaryllis species offer new challenges for the plant breeder. Amaryllis evansiæ, A. aglaiae and A. parodii are among the species which provide germ plasm for true yellow hybrids. New floral forms can be derived from A. angustifolia and A. cybister. Foliage of hybrids of A. reticulata var. stratifolia has special aesthetic merit. Others should contribute to lengthening the flowering season and to disease resistance. Triploid which are not readily insect pollinated add new dimensions to landscape plantings. The genus Amaryllis also illustrates a contemporary horticultural problem. Hybrids are usually easier to grow than the species, so the latter are frequently lost. The species habitats are often limited geographically and are being sacrificed to urban development. This threatens the existence of some Amaryllis species as well as other plants of horticultural value. Efforts by concerned amateurs could help save valuable germ plasm.

Hybrid Amaryllis L. (Hippeastrum Herb.) are familiar sights in southern gardens and have been grown extensively in colder areas as pot plants. Present-day garden amaryllis in Florida are the result of selections that have continued for almost 200 years. Florida was not without its share of pioneers in this area (7). Theodore L. Mead and others developed strains which were well suited to Florida conditions. Although these plants lacked the size and perfection achieved by Dutch breeders, they provided reliable sources of brilliant color for the gardener. Further hybridization between Dutch and Florida-developed strains increased the size and quality of the resulting hybrids with much of the vigor of the Florida strains retained. One commonly sees listings by commercial growers of Dutch-Mead hybrids.

Early breeding was accomplished by using whatever material was available. A few natural tetraploid (4n, where n is a set of chromosomes) species were among the germ plasm which was incorporated into the early hybrids. Although most amaryllis species are diploid (2n), partially fertile triploid (3n) hybrids can be produced by pollinating diploids with tetraploids (2). It seems that this is what happened in the early breeding of this