

# Systems of Doing the Harvesting Mechanically

D. J. ROACH<sup>1</sup>

A number of different systems of operation and management will be used in the harvesting of sugar beets mechanically. The wide range of conditions that exist in different parts of the country and from farm to farm will make it impossible for a universal system or scheme to be used. Conditions in California are different from those in the Intermountain and Plains area, and conditions in both of these areas are different from those in the Eastern territory.

The average size of contract alone will make a difference in the kinds of machines that are used and the way in which they are used. I recently determined the average size contract in these several areas. In California the average size contract is 74 acres, in the Intermountain and Plains area it is 20 acres, while in the Eastern area it is 10 acres. Naturally in California with large size contracts and the characteristic use of heavy power, they will use large machines and it will be necessary for these machines to operate more continuously because of their probable greater cost. In the Intermountain and Plains area, where the family-size farm predominates and where the farm power is smaller, the tendency will be towards smaller machines owned by individual farmers or owned in some cases by two farmers. There will also be in this area some custom work done, probably by farmers with small acreages who own a machine and want to make a greater return on that machine than they can harvesting on their own farms alone. In the Eastern area where the small beet acreage is the rule, I would expect that, custom work will become more general than is true in either of the other two areas.

The length of the harvest season will to a considerable extent determine the manner in which harvesting is carried on. In California, where the harvest extends in normal years for 90 days or more, fewer total machines per 1,000 acres of sugar beets will be needed to do the work than will be true in the Intermountain and Plains area and the Eastern area where the harvest must be completed before freezing weather sets in, or within about 30 days.

The different practices in the conservation of the tops will, to some extent, determine the type of machine that will be used. In the Intermountain and Plains area, and I think properly, much emphasis is placed on complete conservation of the tops. In that area it is be-

<sup>1</sup> Vice President and Assistant General Manager, Great Western Sugar Company, Denver, Colo.

lieved that all the fertilizing elements in the tops can be returned to the soil through barnyard manure and at the same time a substantial amount of meat produced in the feeding of these tops to livestock. In the overall agricultural economy of the Intermountain and Plains area the sugar beet tops have a feed value that cannot be overestimated, and the ultimate machine must make provision for the best possible conservation of these tops. In this area the lands do not have the great natural fertility of some of the other areas, and in order to maintain a long-time successful agriculture there must be a feeding industry tied in with the farming operations. The sugar beet tops in themselves provide the basis for this feeding industry. In California not as much importance is placed upon the tops, although it is my own judgment that as time goes on more and more emphasis will be placed upon tops conservation in that area. In the Eastern area the importance placed upon sugar beet tops is about half way between the other two areas. In this area as in California, it is my belief that fuller recognition of the value of tops will be true in the future than has been the case in the past. What I want to say in this connection is that regardless of what the present practice of handling tops may be in these areas, machinery manufacturers will do well to give serious consideration to sugar beet top conservation.

The development of harvesters which can be used on only one type of tractor will slow down the universal use of sugar beet harvesting machinery. The farmer who desires a sugar beet harvester cannot in every case change over to a new type of tractor. I think that in the overall development, manufacturers should give consideration to building machines that can be attached to other than their own particular make of tractor.

The question of whether the beet harvester should be of the one-row or the two-row type is not yet clearly defined. My own judgment is that both of these types of harvesters will ultimately be used. For the grower of relatively large acreage who has plenty of hauling equipment and who has a full appreciation of the value of the tops, I anticipate the use of the two-row harvester in which the topper and the harvester are two separate units. The beets will be topped by the two-row topper and the tops delivered directly into a truck and taken to the silo. The two-row harvester will follow, with the beets being delivered directly into the truck and delivered to the receiving station. Naturally this scheme will require an abundance of hauling equipment. The large grower will have this equipment available, and in some cases the smaller growers will combine to furnish the necessary hauling equipment. Many farmers, however, will not have this hauling equipment available or may not have the power to pull a two-row harvester. They will naturally use the one-row harvester.

The subject of management in beet harvesting could easily take up a whole morning session, but much of that discussion would be conjectural and theoretical. We are just on the threshold of mechanical harvesting of sugar beets, and the American farmer with his usual caniness and ingenuity will work out and evolve those systems of management that best meet his own individual conditions. I have tried only to bring out some points that I believe need consideration in the development of sugar beet harvesting practice.

## **Mechanical Beet Harvesting From the Eastern Point of View**

CLARENCE HANSEN<sup>1</sup>

Beet growers in the eastern area experienced unusually wet soil conditions throughout the harvest of 1945, with the bulk of the rain coming early in the fall. The rainfall was not far above normal but the cloudy days were so numerous as to prevent, the heavy Brookston clay soils upon which much of the beets are grown from drying out. This prevailing adverse condition in many cases hampered the successful operation of beet combines.

Two types of combines were operated in the eastern area during the 1945 season. One lifts the beets and carries them to the topping mechanism, and the other uses a ground topper. The former will be referred to in this paper as the lifter-topper type.

The 16 bed combines used accounted for less than 1 percent of the harvested acreage. Fourteen were of the lifter-topper type and two were of the ground-topper type. Two of the harvesters were operated experimentally and were not striving for acreage. The acreage harvested by the machines ranged from 10 to 100 acres each.

### **Soils upon which Combines Operated**

The combines harvested beets grown on a wide range of soil types. They include the various types of Brookston soils, which are heavy clays, the numerous loams such as the Miami, Brady, and Conover, and the Carlyle muck.

Michigan has 100,000 acres of muck, a friable organic soil, upon which the sugar beet crop fits well into crop rotation plans. The lifter-topper type has worked quite successfully upon this soil because, as we stated, it first lifts the beets and then tops them. This fact can be borne out by the acceptable tare figures of beets raised on muck shown in table 1.

The ground-topper harvesters did a very acceptable job of topping on the firmer soils such as the Brookston clays and the clay

<sup>1</sup> Agricultural Engineering Department, Michigan State College, East Lansing, Mich.