

Short Communication

A PLANTING AID FOR POTATO SEEDLING TRANSPLANTS

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Abstract

Hand planting large numbers of seedlings into field plots is difficult, time consuming and labor intensive. Conventional mechanical planters have long been available, but do not do an adequate job when numerous small plots are to be planted, seedlings vary widely in size, or when the seedbed is not uniform or contains rocks or clods. A conventional peat pot transplanter was modified to make it more effective in planting potato seedlings. The planting mechanism and supporting structures were removed. Seats were relocated to make it possible for the operator to place the pot in the furrow by hand. The modified planter gives results comparable in quality to hand planting, but requiring significantly less time and effort.

Introduction

Hand planting potato seedlings in the field requires numerous workers and considerable effort. Common mechanical vegetable planters perform well when planting whole fields of seedlings of uniform size at a uniform spacing under uniform field conditions, but research plantings of numerous plots of plants of varying sizes often require more flexibility in planting depth and spacing.

New approaches to potato breeding could benefit from better planting technology. In recent years, methods for growing the potato crop from botanical seed (TPS) have been developed (2, 3) and it has been recognized that development of associated machinery is also needed (4). Also, as more is learned about how early generation selection can be employed to improve breeding (1), practical systems for planting large numbers of seedlings in the field may be necessary.

Potato genetics, enhancement, and breeding research projects often require planting large numbers of seedlings of various sizes in the field. As

1Cooperative investigation of the U.S. Department of Agriculture, Agricultural Research Service and the Wisconsin Experiment Station. The use of trade or brand names in this research does not constitute an endorsement by the USDA or University of Wisconsin.
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Accepted for publication July 6, 1995.
ADDITIONAL KEY WORDS: Transplanter.
is the case with other genebanks, at the US potato collection (NRSP-6) at
Sturgeon Bay, WI, numerous plots of seedlings are grown yearly to facili-
tate proper taxonomic classification, to verify accession identities and purity
following seed increases, to provide materials for herbarium specimens,
and as subjects of various characterization, evaluation, and research stud-
ies. The great amount of time and effort required to plant these plots
prompted the development of a mechanical planting system.

Materials and Methods

Modifications were made to a commercially available mechanical
seedling transplanter (Model 1250, Holland Transplanter Co., Holland,
MI, USA). This transplanter is designed to carry two persons facing for-
ward who place peat pots (6 cm square) containing seedlings into a hold-
ing bracket. The pots in this bracket are then picked up by one of the
planting arms rotating on a disc centered over the furrow opener. When
the planting arm reaches the bottom of the furrow, the arm releases the
pot. The disc and planting arm assembly are driven by chain from a for-
ward depth adjusting wheel. Following release of the pot in the furrow,
angled covering blades on both sides of the furrow direct soil around the
pot. Finally, two pneumatic tires mounted on angled axles serve to firm soil
around the newly planted seedling.

This planter was modified by removing the entire rotating disc and
planting arm mechanism with its associated chains and sprockets. The
brackets designed for holding trays of seedlings were completely removed
such that no obstructions remained above the two main frame members
(tray holding brackets were cut flush with the main frame). The two seats
were moved from the rear of the planter, and placed near the furrow
opener, and facing the rear of the planter. The transverse beam formerly
holding the seats was replaced with a fabricated assembly combining
footrests and a tray capable of holding one flat of 54 pots. A foam rubber
pad was attached to one of the main frame members directly forward of
the pneumatic tire press wheel to serve as a cushioned hand rest. A 15 cm
wide piece of sheet metal was secured around the upper edge of the fur-
row opener to prevent soil from spilling over the top when planting very
deeply. Figure 1 illustrates the modifications made.

The person planting, if right handed, sits in the left seat and rests his
left hand on the foam rubber pad. An assistant sits in the right seat with
the current flat of seedlings on his lap. The assistant removes the seedlings
from the flat and transfers them to the left hand of the planter, one or two
pots at a time. The planter then takes plants from his left hand and places
them on the bottom of the furrow near the rear of the furrow opener
where soil will close around and secure the pot as the machine travels
down the row. A tray mounted over the press wheels is used to hold the
next flat to be planted, so it is immediately accessible to the assistant.