Establishing asparagus plantations with seedling plants

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The development of new varieties of crop plants often influences the horticultural practices utilized in the commercial growing of the crop. Recently the first commercial hybrid asparagus variety was released. During the development and evaluation of the hybrid UC157 asparagus variety, a new system of establishing commercial asparagus fields was developed at the University of California Agricultural Experiment Station. The system utilizes greenhouse-grown seedling asparagus plants that are mechanically transplanted into the production field. Transplanting of seedling asparagus has some advantages that may make some of the horticultural practices involved in crown transplanting and direct seeding obsolete.

In the early stages of the development of this system, asparagus seed was planted in preformed peat pots and grown to a transplantable size. Later the use of preformed Speedling-type trays was found to be more economical. The shape and size of raw asparagus seed allows for easy singulation and mechanical planting into the preformed trays, which can handle a greater density of plants than can the peat pots.

Growing seedlings

Seedling asparagus plants were grown successfully in preformed trays with a plant density of 1 plant per 1.65 square inches (196 plants in a 1.5 foot x 1.5 foot tray).

The development of the seedling crown above the root system requires that the seed be planted not more than ½ inch deep. Since the developing root system will fill the soil reservoir by transplanting time, a well tapered soil reservoir reduces the difficulty of removing the seedlings from the tray.

Asparagus seed germinates best at 75°F; seedling should begin emerging in about 10 days at that temperature. A greenhouse temperature range of 65°F night minimum to a 85°F day maximum will provide good germination and plant growth.

Irrigation and fertilization

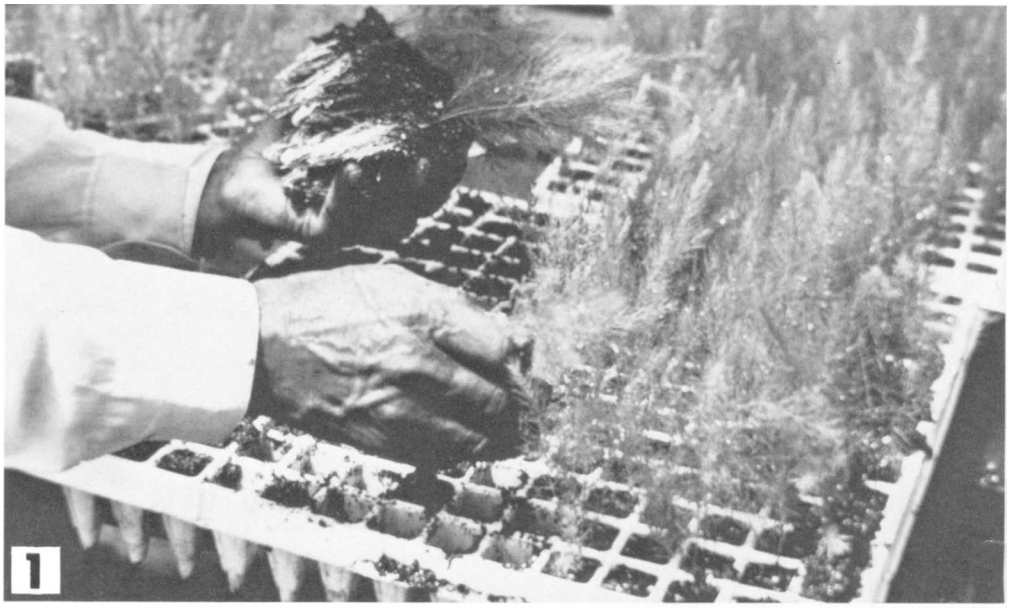


Fig. 1. Ten-week-old seedling asparagus being removed from Speedling-type preformed trays.

Fig. 2. Bare root transplanter modified to plant seedling asparagus in furrow bottom.

Fig. 3. Seedling transplants 4 months after transplanting. Note uniformity of growth.

Fig. 4. Field of mechanically planted Speedling-type transplants, 4 months after transplanting.

programs for the seedlings vary with the size of soil reservoir, soil mix, and the age of the seedling. The initial nutrient requirements of the seedlings can be met by incorporating a complete fertilizer with micronutrients into the soil mix. Additional weekly applications of a liquid fertilizer should provide adequate nutrients for the developing seedlings. Irrigation should be closely regulated to the growth of the plants to ensure adequate moisture at all times.

Eight to 10 weeks after seeding, the seedlings should have a top growth of 4 to 6 stems 6 to 10 inches tall. The developing crown should have several buds formed in addition to the stems, and a root system that has filled the soil reservoir of the planting tray. The seedlings can be gently pulled from the tray at this stage of growth.

Transplanting

Following removal from the trays the plants are packed upright in moisture resistant boxes and watered before shipment to the grower's field. It was found that if the plants are kept moist and cool, they can remain viable for several days.

The transplants are set by either hand or machine into the bottom of preformed furrows in the field. It is important that the bottom of the furrows not be compacted so that there will be adequate loose soil in which to plant the entire root system. An irrigation should immediately follow the transplanting to supply water to the seedlings and settle the soil around the roots. Either furrow or sprinkler irrigation can be used satisfactorily. In transplanting studies, the survival rate of the seedlings has been near 100 percent.

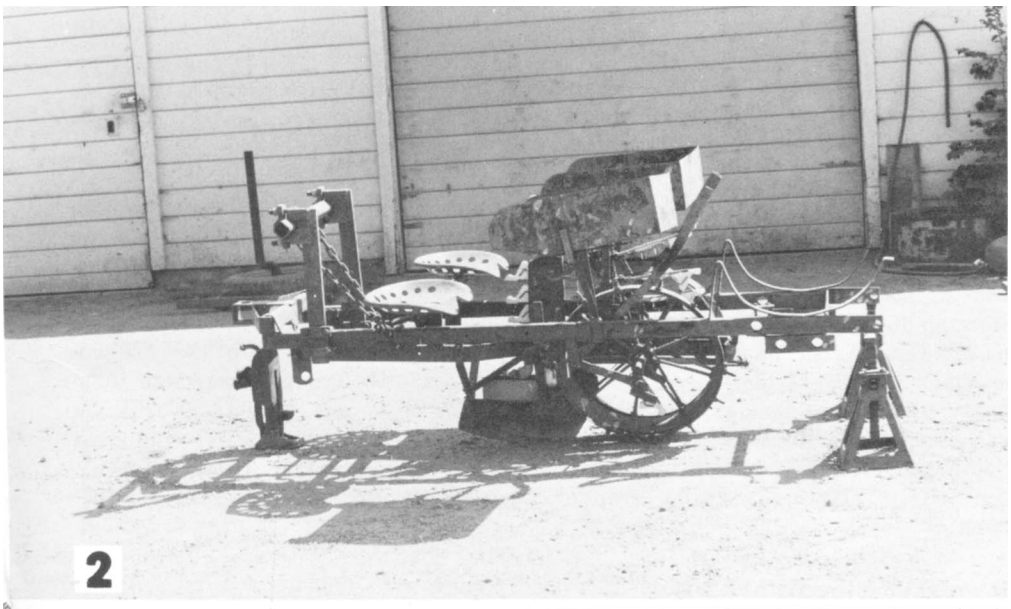
Weed control will probably be the most difficult problem encountered during the early growth of the seedling asparagus. Either shielded spraying with contact herbicides or mechanical cultivation controls weeds outside of the plant row. As the seedlings grow, the furrow can be gradually filled in with soil for weed control and plant support. Several light cultivations as needed for weed control, and soil movement, are better than a large amount of soil being moved at one time. As in all cropping situations, starting with a weed-free field reduces weed control costs.

In early May, 1977 four plantings of seedling transplants were made in asparagus growers' fields as demonstration plots. The plantings were made with a modified bare-root transplanting machine. The major modifications were to the rubber plant grippers, horizontal clearances on the machine sides, and the addition of a 3-point hitch. Softer rubber grippers were used that did not crush the tender stems. The four plantings have had very low mortality rates and look quite vigorous.

Conclusions

The four demonstration plots and an experimental planting at the UC Experiment Station at Davis have shown the advantages of establishing commercial fields with seedling transplants of vigorous asparagus lines. The advantages of seedling transplanting over crown transplanting are: (1) lowers establishment costs since it can be done by machine with little labor cost, (2) reduces the time from nursery seeding to harvest, (3) reduces seed requirement by as much as one-half, (4) eliminates injury caused by crown separation from nursery to planting, and (5) decreases the risk of *Fusarium* sp. being introduced into a new plantation since seedlings can be grown in disease-free media in greenhouses.

The advantages of seedling transplanting over direct seeding are: (1) requires less seed per acre, (2) requires less precise irrigation at time of planting, and (3) the transplants get a better start in the field and can possibly be harvested after one season's growth.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