The effect of transplanting age and seasons on tomato production

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SUMMARY

Four transplanting ages of tomato cultivar Laurano seedlings, namely 20, 25, 30 and 35 days, were compared during the major and minor rainy seasons for 2 years. Field survival of seedlings was least for 20-day-old transplants but high for the 25- and 30-day-old transplants. The 20-day-old transplants flowered before the 35-day-old transplants Both 25- and 30-day-old transplants matured early and gave higher yields than 20- and 35-day -old transplants.

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RÉSUMÉ

AGBLE, F.: *L'effet d'âge de repiquage et des saisons sur la production de la tomate*.Quatre âges de repiquage de plantules de variété cultivée Laurano, de tomate, à savoir 20, 25, 30 et 35 jours ont été comparés pendant et des saison majeur et mineur de la pluie pour deux ans. La persistance des plantules dans le champ était très bas pour les plantules repiqués à 20 jours mais élevée pour celles repiqués à 25 et 30 jours. Les plantules repiqués à 20 jours ont fleuri avant celles repiqués à 35 jours. Les plantules repiqués a 25 et 30 jours ont atteint la maturité précocement et ont donné des rendements plus élevés que celles repiqués à 20 et 35 jours.

Introduction

In Ghana all tomatoes are produced from transplants and not directly seeded. When tomato seedlings are transplanted at variable ages rather than direct seeding, it saves seed. There is also better weed control at the nursery stage before transplanting. Various results have been recorded on transplanting age of tomatoes in other countries but such information is unavailable in Ghana.

Sumeghy (1965) reported that transplanting tomato seedlings gave higher mean yield of first grade fruit for the season. Four out of eight transplanting dates also yielded more fruit than corresponding direct-seeded plots.

Korodi (1966) observed that flowering was delayed when seedlings were transplanted at later stages of growth in tomato and pepper. Yields were also reduced when tomato and pepper seedlings were transplanted at 4- and 6-leaf stages than at 2- leaf stage.

Loomis (1925) observed that the check in growth due to transplanting was proportional to the size of the transplants at setting time.

Mercik & Skapski (1960) evaluated five self-determined tomato varieties and reported that apart from Fireball in which the youngest (4-week-old) transplants produced the highest early yields, the highest early yields were produced from the oldest (8-week-old) transplants. A delay of 2 weeks in planting out resulted in late maturity and reduction in yield of all five varieties.

Minges (1961) noted that younger tomato seedlings at planting time, yielded more. Tomato seedlings which were 3 weeks old from sowing yielded 88.5 t/ha as compared to 87.3 and 69.5 t/ha from 5- and 9-week-old seedlings respectively.

Nicklow & Minges (1962) observed that fruit size, early and total yields were closely related to the stage of development of the transplants of tomato variety Fireball at the time of field planting. They found that if fruit set within 10 days after planting was greater, the greater was the reduction in vegetative growth and total yield.

Tomato growers in Ghana transplant tomato seedlings at different ages from about 4 weeks to visible flower bud stage. The author gathered no obvious reason for this practice from growers interviewed, since some of them even transplant overgrown seedlings.

The present study was conducted to investigate the best transplanting age for tomato seedlings in one of the heaviest tomato production areas in Ghana.

Materials and methods

Seeds of tomato cultivar Laurano were sown densely on seed beds. The seedlings were thinned at the first expanded leaf stage, and transplanted in the field 20, 25, 30 and 35 days after sowing in March 1984 and 1985 major rainy seasons; and also in August 1984 and 1985 minor rainy seasons.

Each age group was represented by two rows of 12 seedlings per row spaced 50 cm × 90 cm in a randomized complete block design with three replicates. The inner 10 plants of each row were used for the records.

Eight days after transplanting, 15-15-15 compound fertilizer was applied at the rate of about 18-20 g per plant followed by same amount of ammonium sulphate at flower initiation. Weeds were controlled by hoeing and diseases as well as pests were controlled by spraying the field with Dithane M-45 and Sevin at weekly intervals till first harvest.

Observations were made on seedling survival, days from sowing to flower opening (50% plants), days from sowing to first harvest (earliness), and yield.

Results

Table 1 shows means of 2 years results on the effect of transplanting age on seedling survival. The 25- and 30-day-old seedlings had the highest survival rates while the 20-day-old seedlings had the lowest. The 35-day-old seedlings survived better than the 20-day-old seedlings but both survival rates were not as high as those for 25- and 30-day-old seedlings.

TABLE 1
Effect of Transplanting Age on Seedling Survival

Transplant age	*Seedling survival*	
Days	*Major season*	*Minor season*
20	60.4	65.3
25	80.4	86.1
30	82.5	88.3
35	76.3	72.9
LSD 0.05	4.8	6.2

For flower opening, the 20-day-old transplants flowered earlier than all other age groups in both seasons (Table 2). Flowering was delayed when seedlings were transplanted at the older ages.

TABLE 2
Effect of Transplanting Age on Days to 50 per cent Flower Opening

Transplant age (days)	*Season*	
	Major	*Minor*
20	40.9	41.2
25	45.0	46.0
30	45.6	44.9
35	50.0	48.0
LSD 0.05	3.6	4.0

Although the youngest transplants flowered earliest, the 25- and 30-day-old transplants were harvested earlier than the other transplants in the major season. In the minor season, there were no significant differences between the ages of the transplants (Table 3).

The mean of total fresh fruit yields is presented in Table 4. The 25- and 30-day-old transplants gave higher yields than 20- and 35-day-old transplants in both seasons. There were no significant differences between the 25- and 30-day-old transplants in yield. Only 30-day-old transplants were significantly different from the 35-day -old trans-

TABLE 3
Effect of Transplanting Age on Days to First Harvest

Transplant age (days)	*Season*	
	Major	*Minor*
20	80.2	81.3
25	78.4	79.0
30	75.1	80.1
35	80.6	78.2
LSD 0.05	4.2	3.8

TABLE 4
Effect of Transplanting Age on Fruit Yield (t/ha)

Transplant age (days)	*Season*	
	Major	*Minor*
20	12.6	12.4
25	13.2	13.1
30	13.8	13.9
35	11.8	12.0
LSD 0.05	1.9	1.7

plants in both seasons but this was not significantly different from the yield of the 25- and 30-day-old transplants.

Discussion and conclusion

Commercial tomato growers often experience plant losses from poor quality transplants, pests, poor cultural techniques and from environmental factors such as inadequate soil moisture and temperature stress. Plant losses usually vary from area to area, but most occur within a few weeks after transplanting.

The present study indicates that age of transplanting tomato seedlings is very important whether planting is in the major or minor rainy seasons. The rate of seedling survival is better when seedlings are transplanted between 25 and 30 days from sowing. Early transplanting age has low survival rate.

In other places, seedlings are pricked out before being transplanted in the field; young seedlings accordingly become hardened and survival rate can be high. Ware & McCollum (1975) stated that the rate of recovery from transplanting depends not only on the kind and age of plant but also on the quantity of stored food, especially carbohydrates. The 20-day-old transplants had probably not stored enough food for good recovery from transplanting in the field.

The 20-day-old transplants flowered earlier than the other transplants but the first harvests came from the 25- and 30-day-old transplants. It was possible that many of the flowers on the first truss aborted and dropped and so never formed fruits. Korodi's (1966) observation that flowering was delayed when transplanting was done at later stages of growth in tomato and pepper was also noted in the present study with tomato seedlings.

Early harvest of tomato crop in the major season enables growers to get higher prices. The 25- and 30-day-old transplants were the first to mature for early harvest and also gave the highest yields. However, Loomis (1925) indicated that transplanting in itself does not increase yield or hasten maturity; he emphasized increase in space per plant and better cultural conditions which transplants receive.

In the present study, it is concluded that for better seedling survival in the field, early maturity and better yield, tomato seedlings may be transplanted between 25 and 30 days from seeding.

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