

# Rowcovers Improve Sweetpotato Transplant Production in Field Beds and Hotbeds

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**Summary.** Transparent polyethylene is used to enhance sweetpotato [*Ipomoea batatas* (L.) Lam.] transplant production in hotbeds and unheated field beds. Black plastic is used also in unheated field beds. The use of these bed covers, however, frequently results in transplant damage due to overheating. Despite the positive results obtained by using rowcovers in sweetpotato transplant production, recommendations for their use are not included in extension publications. Successful adoption of rowcovers by sweetpotato transplant producers in Alabama is illustrated.

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Sweetpotato transplants are produced in hotbeds and unheated field beds. Wood-frame structures, heated by water circulating in underground pipes or electric heating coils (Poole, 1962), are used for early season transplant production in the cool spring climate of northern Alabama. These A-frame structures are  $\approx 100$  ft long and 10 ft wide. The height at the sides and at the center are =1.5 and 10 ft, respectively. A transparent polyethylene cover is used to retain heat and provide frost protection for transplants in both production

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+systems. This polyethylene cover also excludes rain, which growers believe cools sweetpotato roots and promotes root rot.

In northern Alabama sweetpotato transplant production systems, field-grown transplants are produced for planting later in the season. In warmer parts of the state, sweetpotato transplants usually are produced in unheated field beds. Soil or pine sawdust are common bedding media in the field.

Transplant shoot-tip- and leaf-burning result in both production systems when transparent polyethylene is used because the air inside becomes too hot. To overcome this problem in hotbeds, producers remove the polyethylene at each end (Fig. 1). Venting the ends of a hot bed, however, may not reduce the temperature sufficiently to prevent transplant injury in the center of these long beds. Partial removal of the polyethylene from the bed is not a solution, because it must be fastened securely to prevent ripping or pulling up the wooden frame under windy conditions.

To reduce over-heating of field beds, the transparent polyethylene cover usually is removed once transplants have emerged. Alternatively, slits or holes may be made in the polyethylene to provide ventilation. Even when vented, transplant damage due to overheated air is very common in Alabama. Alabama transplant producers have used black polyethylene bed covers to produce field-grown sweetpotato transplants, but growth enhancement has not been obtained to the extent reported in the literature (Porter, 1991; Walker and Randle, 1986). Transplant burning also results with the use of black polyethylene due to untimely removal.

Although the results of research (Porter, 1991; Walker and Randle, 1986) provide evidence for the benefits of rowcovers in the production of sweetpotato transplants, the use of rowcovers receives little attention in the printed media. Rowcovers were not even mentioned in a recent review of sweetpotato production practices (Bonsi et al., 1992). The use of bed covers or rowcovers in sweetpotato transplant production has received little attention recently in grower-oriented publications. The topic has been ignored (Dangler et al., 1991). Granberry and McLauren (1990) reported that clear polyethylene could be rolled up



Fig. 1. In northern Alabama, sweetpotato transplants are produced in hotbeds covered with transparent polyethylene.



Fig. 2. Sweetpotato transplant produced successfully using rowcover (left spunbonded polyester; right, pe-orated polyethylene). Black polyethylene bed covers were used on the rows in the foreground and the background.



Fig. 3. These injured transplants were produced with black polyethylene bed covers.



Fig. 4. *These transplants were produced with perforated polyester rowcovers.*



Fig. 5. *Sweetpotato transplant production is enhanced with spunbonded polyester (left row, beyond the arrow) and perforated polyethylene (right row, beyond the arrow) rowcovers compared to transplant production in bare soil (in front of the arrows).*



Fig. 6. *A typical hotbed for sweetpotato transplant production is heated below ground. Sweetpotato roots are bedded in pine sawdust. The air inside the frame may become overheated when it is covered with a transparent polyethylene cover.*

on a frame to provide ventilation for (small-scale) early season transplant production, and the use of vented transparent polyethylene was suggested for field transplant production, but the use of rowcovers was not mentioned (Cannon, 1991; Nagel et al., 1990; Wilson et al., 1989).

The Alabama Cooperative Extension Service and the Tennessee Valley Authority have cooperated to disseminate information about rowcovers to sweetpotato transplant growers in northern Alabama. Perforated polyethylene (Tredegar Film Products, Richmond, Va.) and spunbonded polyester (Reemay, Inc., Old Hickory Term.) covers have been used successfully as bed covers and rowcovers in field production in a soil medium (Fig. 2). Transplants produced with black polyethylene bed covers were damaged by overheating (Fig. 3), but the transplants produced with perforated polyester were not injured (Fig. 4). Growth enhancement effects of both rowcovers compared to unmulched soil were probably due to increased heat retention (Fig. 5).

Although overheating frequently results when transparent polyethylene is used to cover sweetpotatoes growing in a hotbed (Fig. 6), satisfactory growth was achieved when spunbonded polypropylene was used to cover the sides (at least 10 ft wide) of the wood-frame structure after transplant emergence (Fig. 7). Wind did not damage the structure because air passed through the polyester cover. When either brand of rowcover was attached to the sides of the frame underneath the A-frame, there was ample space for the transplants to grow in the modified atmosphere. Because the rowcovers are supported above the sawdust media, it is unlikely that deformed transplants will result with the use of spunbonded polyester following heavy rains (Porter, 1991 ).

Transparent polyethylene is used in hotbeds and field production systems to enhance sweetpotato transplant production. In both production systems, overheating frequently results in transplant damage. Contrary to the reports in the literature, Alabama sweetpotato transplant producers frequently overheat transplants grown in field beds covered with black polyethylene. Enhancement of transplant growth with rowcovers has been reported in the literature. Nevertheless,



Fig. 7. Overheating is not a problem in a hotbed covered with spunbonded polyester,

the benefits of rowcovers are not included in any of the current extension recommendations provided to sweetpotato transplant producers. The results of the demonstrations reported herein show that rowcovers were used successfully for sweetpotato transplant production in hotbeds and in the field. Therefore, as grower-oriented publications are updated, the use of rowcovers should be included.

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