Propagation of Stevia rebaudiana by Rooted Cuttings

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Rooted cuttings of Stevia rebaudiana are needed for successful commercial production of stevia leaf in many parts of the world (Figure 1). Stevia varieties that have higher performance and higher amounts of steviol glycosides (such as rebaudioside A) can be increased by rooting cuttings under mist in a plastic house or frame.

Choosing mother plants

Cuttings of stevia need to be collected from plants that are growing in vegetative conditions. This means that the plants have not been induced by short day-length to flower. Plants are actually induced to flower before buds or flowers are visible on the plant (Figure 2). Stevia is a “short day plant” which means that most stevia will flower when the nights are longer than 11 hours (Metiviar and Viana, 1979; Kang and Lee, 1981; Valio, 1977; Zaidan et al., 1980). Stevia varieties can vary in their sensitivity to the length of the night to initiate flowering.

Adequate light duration

Adequate light regimes are needed for mother plant root stock and rooting cuttings. Neither the mother plants that are a source of cuttings nor the cuttings that are being

Figure 1. Stevia rebaudiana cutting rooted in a plug.

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rooted should be maintained in an environment that induces flowering. Cuttings that have been induced to flower or are already flowering produce very poor plants. The plants from cuttings that have been induced to flower are poor because they root weakly and grow slowly.

The light regime can be extended to a longer day by artificial lighting or the night can be interrupted with white or only red light to avoid flowering (Ceunen and Genus, 2012, 2013; Ceunen et al., 2011, 2012).

**Collection of plant material to increase**
Pinch or clip off the growing tips with two or three well-formed nodes, each with a couple of expanded leaves. Place each growing tip cutting individually in a cell of a planting tray. Use trays with cells so that the rooted cuttings will be easier to transplant to the field because the root system will be intact when pulled out of the cells.

**Use rooting hormone**
Rooting hormone helps rooting success. The hormone product should contain indole butyric acid (IBA), a common rooting compound. Cuttings can be dipped in the rooting hormone, drenched with a dilute solution of rooting hormone, or sprinkled with a solution of rooting hormone immediately after being inserted (stuck) into the soil.

**Planting trays**
Fill planting trays with sterile growth medium. Ideally the growth medium should be a plug mix so that the rooted cuttings will pull easily out of the planting tray. The growth medium must be sterilized to avoid transmitting soil borne diseases and nematodes to new fields. Place the cuttings so one half is buried in the growth medium (Figure 3).

**Rooting under mist**
Place the trays with cuttings inside a plastic house and turn on an intermittent misting system (Figure 4). The trays must be suspended above the soil surface to avoid transmitting soil borne diseases and nematodes to the new cuttings and eventually into new fields.

Figure 3. Trays of growth media with *Stevia rebaudiana* cuttings inserted into the media.

Figure 4. Trays with *Stevia rebaudiana* cuttings in the planting media being rooted under mist. The trays are suspended off of the soil surface to reduce pest transmission to the field. Photo by R. Lishman.

The light regime in the mist chamber must be managed to avoid flower induction.
After a couple of weeks, the cuttings should have roots (Figure 1). Reduce the misting frequency and very lightly increase the water stress. Continue to manage the light regime to avoid flower induction.

**Hardening off the rooted cuttings prior to transplanting**

After a third or fourth week, the rooted cuttings can be moved outdoors (weather permitting) under a sprinkler system to harden off the rooted cuttings before transplanting. Once again the trays must be suspended above the soil surface to avoid transmitting soil borne diseases and nematodes to new fields. Continue to manage the light regime to avoid flower induction.

If cuttings are being grown in a less favorable environment where each step takes longer, adapt the timeline to the growing conditions.

**Care upon transplanting**

Plants require frequent irrigation and moist soil when first transplanted. With successful transplanting, survival is almost 100% (Figure 5).

**References:**


Figure 5. Harvesting of a new planting of *Stevia rebaudiana* that had been planted five months earlier using rooted cuttings.