



Rooted apical cuttings (RACs) Best practices for planting, maintenance, harvesting and storage of tubers

Introduction

- Rooted apical cuttings (RACs) are transplants produced in a screenhouse from tissue culture plantlets maintained in a juvenile state. Therefore, these cuttings have higher yield potential which translates into a greater market value.
- In the field, the transplants need careful watering and cutworm management until fully established. Thereafter, they are handled the same way as field-grown potato.

Site selection

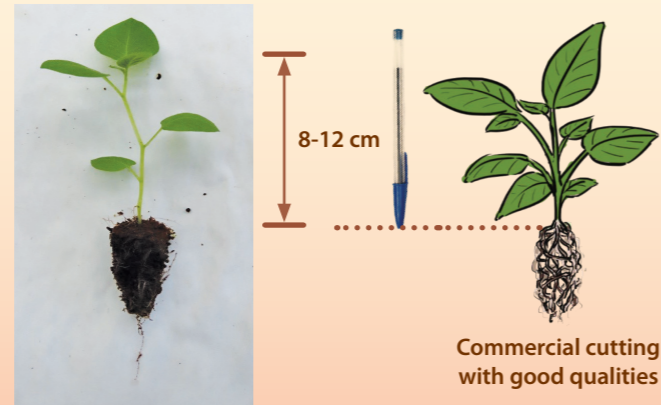
- To avoid disease spread, select a site that has not grown ware potato or potato related crops (e.g., tomato, eggplant, tobacco, nightshade, chilies) for at least two years.
- Set the beds in open fields without shade and avoid slopes below ware potato or potato-related crops.
- Soils should be loosely-textured and well-drained for good root/tuber development.
- There should be access to clean water especially within the first two weeks of establishment. If you do not have access to sufficient water, then plant at the onset of rains.
- Reserve enough land to multiply seed over 2-3 seasons, while observing crop rotation protocols.



What to note when buying cuttings

RACs for transplanting should be high-quality based on qualities listed here:

- ◆ 8-12 cm high from the collar (stem at the base of the growing medium). Ten cm is the optimal length.
- ◆ Short internodes
- ◆ Strong collar and stem
- ◆ Well-developed roots, but no root bound (i.e., roots growing round because they were placed in a too-small container)
- ◆ High vigor/dark green leaves
- ◆ Simple bottom leaves



Packing and transport of RAC seedlings

- Improper packaging and handling of RACs during transport can lead to seedling damage and reduced survival rates.
- The time interval between the RAC seedlings leaving nursery and transplantation should be as short as possible and a maximum of 2-3 days.
- Water the cuttings before transport to provide the necessary water reserve and to minimize the risk of roots being shaken out.
- Use boxes to hold RACs where large quantities are transported over long distances, and particularly when the terrain is steep and rough.
- In the box, the cuttings must be laid down in compact layers with the roots toward the edges and wrapped with a polythene film. Ensure the cuttings do not fall over and that the varieties are clearly labelled to avoid mixing.

- The RAC on transport must be constantly protected from wind and high temperatures to prevent the seedlings from drying out.
- RAC seedlings that have suffered shock during transport or that which can only be transplanted later days must be carefully unpacked from the boxes, taking care not to damage the roots and stem. Unpack the seedlings close to the planting site to minimize later transport.
- The unpacked seedlings must be temporarily stored upright in open containers under open shade, and not inside closed rooms. Water regularly until transplanted.
- Never pull the RAC seedling by the shoots when unplugging from trays to avoid damaging the plant. Instead, give a gentle push from the plug-bottom using an index finger.



RACs stacked in box for transport

Planting and management of RACs

- Plant rooted cuttings in nursery beds of two rows per bed.
- Leave 30 cm of space between rows and 30 cm between individual plants in a row and leave 30 cm to each edge and 70 cm for the interbed. When planting, demarcate the planting holes using a sisal string and a 30 cm wooden stick. Take care not to mix up varieties.
- Apply 50-60 grams per square meter of NPK/DAP fertilizer, depending on soil test results or based on the general soil fertility conditions.
- Plant on cloudy days or in the late afternoon of a sunny day.
- Plant a quarter to a half of the cutting so that only the top foliage is above the ground (part of the stem will be buried about 3 cm).
- Compact the soil around the base of the plantlet to ensure good contact between the roots and the soil.

- Water immediately after planting, and afterward once or twice a day until the cuttings are well-established. Yield loss will be high if the crop is not sufficiently watered until well established.
- When planting in the dry season, plant each cutting in a depression to retain water and to avoid run-off.
- When there is hot sun or heavy rains, protect the seed plot using a +/- 50% shade net or traditional nursery covering made from banana or eucalyptus leaves on 1.5 m wooden supporting poles. Remove the shade within 1-2 weeks when cuttings are well established (growth has been initiated and new leaves appear). Shading for too long will reduce the strength and vigor of the cuttings.
- Pest and disease control should follow the same procedure as with field grown potato.
- Place a signpost/placard or draw a map indicated the location of the different varieties, the space, number of cuttings, and the dates of planting at each seed bed to ease monitoring.

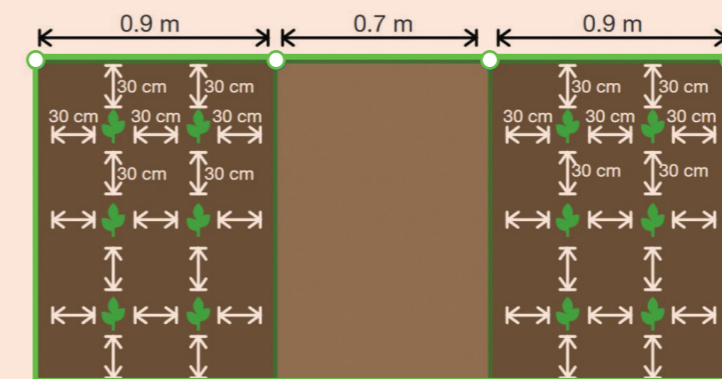
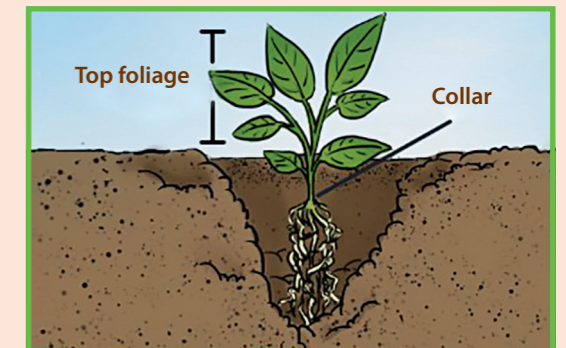
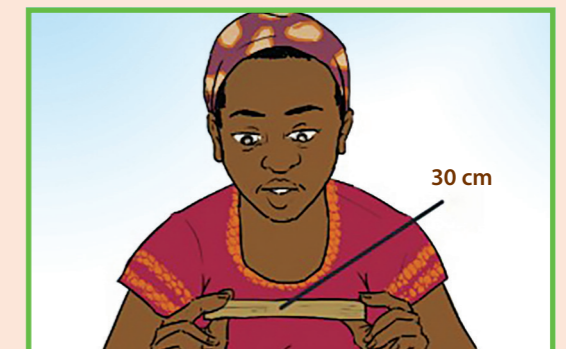
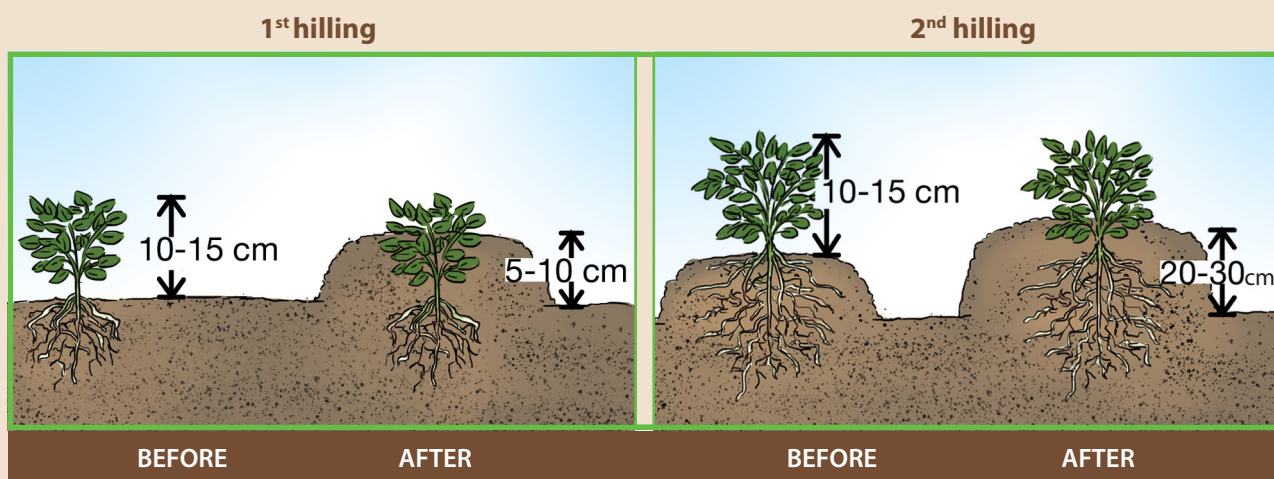


Illustration of spacing and good practices during planting





First and second hilling- take note of the height of mounds

Hilling and weeding

- Hilling increases the number and quality of tubers.
- Create ridges of soil to cover up the cutting up to the plant collar, ensuring all the stolons are covered. The soils for mounding can be dug out from the interbed spaces.
- The first hilling should be done about 2-3 weeks after transplanting.
- Keep the seed plot free of weeds by manually removing weeds that emerge after full establishment of the RAC.
- Use of herbicides is discouraged as the seedlings often die from any slight overdose or an incorrectly chosen herbicide.
- Dehaulm by pulling out the potato plant while stepping around its base to prevent tubers from coming out as well. Note: dehaulming by cutting increases the risk for pest and disease infection.
- Leave the tubers in the soil for 10-14 days for the skin to harden before harvesting. The skin is hardened when it does not peel off when pressed with the thumb.
- Harvest the tubers when weather is clear and soil is moist.
- Store in a place with natural diffused light to promote the development of strong, short sprouts.
- Only store tubers harvested from healthy and mature plants.
- Monitor stored tubers regularly and remove rotten potatoes and any adjacent tubers.
- If there is apical dominance (the development of only 1 sprout), pinch that apical and remove it to encourage the other eyes to open and sprout.

Harvesting and storage

- Check the tuber size on a regular basis as the crop matures.
- When at least 75% of the crop has reached the desirable size (chicken egg), dehaulm to stop tuber growth and to enable the skin to harden for better storage, transport, and protection against post-harvest diseases.

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