



## Hybrid Seed Production in Radish and Beetroot

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Root vegetables include Radish and Beetroot and number of crops which are grown for their enlarged, edible storage root. They are hardy, cool-season crops with a long storage life. They are actually storage organs that are enlarged to store energy in the form of carbohydrates. Root crops include a number of vegetables grown for their enlarged, edible storage roots. The root crops discussed here are all hardy, cool-season crops with a long storage life. While they belong to several unrelated plant families, these crops have similar cultural requirements. This profile will overview several root crops grown in Kentucky. Radish, and rutabaga are raised only for their roots, while beets and turnips may be grown for their tops as well. Salsify is cultivated primarily for its long, tapering root, but the grass-like leaves can also be added to salad greens. In India, the area, production and productivity of radish and beet is 1.73 lakh ha, 24.85 lakh ton and 14.34 t/ha, and 0.63 lakh ha, 10.74 lakh ton and 17.20 t/ha, respectively.

**Key words:** Hybrid Seed radish and Beet root .

### Radish

Radish is a member of the Cruciferae (mustard family). *Raphanus sativus* is a cool season annual (depending on when it is planted). Radishes have been cultivated for thousands of years in both China and the Mediterranean area. Radishes were a common food in Egypt before the building of the pyramids and is one of our most ancient cultivated plants. Nutrient **Content:** Good source of Vitamin C, potassium and magnesium, plus trace amounts of other nutrients. Four radishes supplies 5 kilocalories. Radish vary in color from white to black. Radish is a quick growing cool season root vegetable.. The best quality and root shape are obtained when the crop grows and matures at moderate temperatures (10 to 18 C) in intermediate to short day length. Radish remain in prime condition for only a few days.

**Seed production system:** Both root to seed and seed to seed are used.the root to seed is used for the biennial types is especially in Europe and temperate region. the root are lifted in the autumn the tops taken of and the radish are stored usually in clamps, during the winter. It is also the method use for stock seed production of the annual type but in this case the material is replanted immediately after selection. In some areas of the world especially in Asia up to half of each stecklings root is removed before replanting. The seed to seed system is used for final multiplication stages where inspection of the mature root are not considered necessary and is normally used only spring sown seed crop unless the cultivar has vernalization requirements

**Seed production growing condition:** Radish requires a moderate amounts of fertility. Manures - are not generally recommended due to weed seed problems and their unpredictable release of nitrogen for such a short season crop. Nitrogen - a relatively low amount of nitrogen is usually broadcast pre-plant and incorporated into the soil (up to 60 kg of nitrogen per hectare). Phosphorus - would be best banded but is usually broadcast prior to planting and

incorporated in the soil. Potash - is usually broadcast before seeding but up to 70 kg per hectare could be banded.. Micronutrients - Apply 0.2% boron in the fertilizer. Radish can be grown on wide variety of climate. Asiatic type can be grown year around for root purpose except during the extremely cold month of year. Sowing season September to October for seed crop

**Sowing and seed rate:** It is a advisable to sow the seed on ridges formed at 45cm apart in line as thin sowing this help in better root development and drainage when the seedling are 10 to 15 day old thin out the seedling to a distance of 7 to 8cm with in the rose. Seed rate for 4 to 6kg/hac. The root are produced in 1 hac is sufficient for transplanting in 2.5 hac

**Harvesting and processing:** The entire plant are cut when the plant are fully matured and the siliqua turn brown colour drying of siliquais must for easy separation of seeds .The seed are separated by betting with pliable sticks the seed should be dry to 6% moisture content cleaned and treated with bavistin @2gm/kg of seed. Then tested for germination before packing

### **Beet root (*Beta vulgaris*)**

After sugar cane it is the second most important crop for the preparation of Sugar. Beet root is the rich source of protein, carbohydrate, Ca, P and vitamin C. The colour of root is due to the presence of red-violet pigment Beta-cyanins and yellow pigment Beta-xanthins. Upper portion of root develops from the hypocotyl and the lower portion from the tap root, from which the secondary roots arise. The seeds usually contain one or more seeds and are called "Seedball" which is viable for 5-6 years under normal storage condition. Probable progenitor of garden beet is *Beta vulgaris* ssp. *maritima*. Origin from Mediterranean region.

### **Seed production method**

**Seed-to-seed method:** This method is also known also in-situ or over-wintering method. It is much simpler than root-to-seed method because the roots are allowed to over-winter in the field where they were grown earlier and thus time and cost of labour is saved. The only drawback is the lack of thorough roguing. The soak seed used for seed-to-seed plantings should be taken. The use of this method should be restricted to the production of only certified seed (market seed) as on the grower's field negligible off-types do not matter much.

**Root-to-seed method:** The selected roots of is the specialized technique of quality seed production where the roots / steckling of beet are grown first year in the same way as for market crop and in second year t bre replanted in the well prepared field for the seed crop. This is the most satisfactory method stock seed production and also followed in breeders' seed and foundation seed production. Before the roots reach full size by the end of the growing season, they are either replanted immediately stored in trenches depending upon the severity of winter (amount of snowfall). In areas of heavy snowfall like Kalpa (Himachal Pradesh), stecklings uprooted in November-December are stored in shallow trenches up to March by the time snow melts.. The stecklings should be larger in size as smaller ones ge shriveled and dried in the storage.

**Manures and fertilizers:** Ploughing in June in temperate region before the rainy season starts Apply well rotten farmyard manure 10-15 tonnes / ha atleast 4-6 weeks before sowing the seed. At the field preparation, 50 kg N, 50 kg P, and 100 kg K should be incorporated thoroughly into the soil in the ratio of 1:1:2. Another dose of N /ha is applied before initiation of root development. Apply about 100 kg N in 2 equal split doses, first after 40 days when the new leaves start developing and the second at bolting of the crop.

**Seed rate and Spacing:** For raising stecklings, seed 10-12 kg/ha is used for beet seed production, moderate-sized stecklings having a diameter of 5-7 cm are more preferable to either smaller or larger ones. For raising of stecklings, 5cm \* 10cm for replanting stecklings 45 cm \* 45 cm of 60 cm \* 45 cm spacings are most suited. Transformation from vegetative to

reproductive phase takes place only when the plants after root formation are exposed to low temperature of 4.4-10°C for 60-90 days

**Sowing time and replanting:** The optimum time for sowing is the second fortnight to July in Kullu and Srinagar where the snowfall is comparatively low and root-to-seed or in situ method is followed. Time of sowing influences size, shape and colour of foliage, and texture and become thick, broad and savoyed whereas high temperature of 10° 15°C become thick, broad and savoyed. Beet has only temperate types which bolt and produce seed only in response to low temperature. This is particularly true in the case of the crop grown later in the season (October-November) in the plains of North India, which is vernalized during winter before reaching maturity.

**Harvesting:** 2 to 3 harvestings manually are often necessary. To prevent losses in shattering, the seed crop should be harvested when two-thirds of the seed on a branch are being ripened i.e. changing. Ripened seeds sometimes shatter easily but if harvesting is done early in the morning when it is sufficiently moist the problem of shattering can be prevented. As ripening is uneven, colour to light brown. On an average 800 - 1,000 kg/ha seed yield can be obtained.

### Conclusion

Root to seed is a promising tool for improvement of the Radish and Beet seed germination process, as well as early seedling growth and disease free seed as compare to the in-situ method. Root to seed method of seed production is also called ex-situ method. Generally, nucleus seeds are mined via this method. Seed to seed method can't be applied in case to tropical varieties as they can't withstand the attack of pathogen. After the true to type and fully mature plants are selected, they are uprooted and given a proper cut and basically during mid-November to mid-December. Selection and rouging are done on the basis of foliage and root characters like color, shape, size, flesh color, pungency etc. produce the seed disease free



### Reference

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