



CARROT

Production & Spray Guide



Carrots Production Guide

“Integrated Crop Solution”

General

Carrots are a very popular vegetable as they are rich in Carotene (Pro Vitamin “A”). Carrots are produced for the market place and are used as a fresh cooked vegetable, also raw in salads. They are either sold tied in bunches with the leaves attached, in packs of sliced or diced and in packs plain with leaves removed. The main demand in colour for carrots is the orange to orange red. Novelty coloured varieties such as purple, yellow, red and white are also available from seed houses. Carrots are also used in mixed vegetable packs in supermarkets. Carrot shape mostly needed in the market place is for a cylindrical to longish tapered root. There is also a market for conical baby carrots, longer more cylindrical fine baby carrots and to a lesser degree round carrots. For type, colour and where the carrot is to be marketed, the time of the year, ask a Prime Seed Agronomist for this information. Carrots are hardy and can stand winter cold and medium frosts. They do best in a temperature range of 10° C to 28° C. Carrots will germinate slower in cool soils so if plantings are sequential take this into consideration. Germination is quicker in warm soils. In most areas of the country carrots can be grown year round.

Soils

A sandy loam to loam with a deep, well drained friable structure is highly preferable. Lighter textured soils are also used because the carrot seems to be smoother, straight, has a good appearance and the roots are easily washed. Soils should be free from stones, no restricting layers and not prone to capping. If organic matter is being used in the rotation, do not plant carrots immediately after this application, better plant carrots as a second crop in the rotation as soils with fresh humus or compost tend to make the roots hairy or forked, rough and course on the outside and develop excessive leaf growth. The soil should have a PH value of 5.5 – 6.5 so have the soils checked and follow the soil analysis recommendation. The soil should be deep ploughed or deeply sub soiled to break up any root obstructing layer. After this the soil should be harrowed once or twice so as to achieve a level, fine, loose, slightly firm soil surface ready for planting. Carrots are usually grown on beds for easy harvesting or on small flat ridges and even on the flat. Beds should be 1.5m – 1.8m centre to centre with at least 1m -1.2m top section for planting on and around 30cm – 35cm high. Ridges can also be made up 50cm or 75cm apart, 30cm – 35cm high with one row planted on the 50cm ridge and two rows on top the 75cm ridge.

Seeding

Planting is normally done with a precision planter direct drilling the seed into the ground. Seed can be obtained coated which is preferable or uncoated. Seed can also be graded to achieve even stands. Seed size can be between 1.25mm and 1.75mm. The advantage of the larger size seeds is that they germinate more uniformly and produce stronger plants. With pre-sized seeds very good results can be obtained as uniform spacing can be managed with precision planters. Seed can also be bought in weight units (Kgs) or number of seeds in a packet i.e. 10,000 up to 100,000 seeds. Depth of planting needs to be between 7mm – 20mm. Green shoulders caused by the sun can be prevented by paying attention to the depth of planting in relation to soil types and irrigation used. If it does occur carrot shoulders must be covered with soil using a small hoe. Care must be taken to avoid damage to the plants. This can be done at the 6 – 8 leaf stage. Seeds need to be spaced about 2cm apart in row. Depending on the number of rows per bed a population of 90 – 160 plants per square metre should be aimed for. On beds 1.8m bed centre to bed centre this figure comes to 162- 288 plants per running metre. At 1.5m bed centre to bed centre this figure will be 135 – 240 per running metre. Target populations of between 400,000 – 900,000 plants per hectare is dependent on what the market requirement is or to specific orders for carrots i.e. very long for processing, normal size for supermarkets or smaller size for specialised orders. The amount of seed required for 1 hectare of large carrots is usually between 2 – 3 kgs with baby carrots nearly 7kgs. These amounts are guides as differences can occur in seed size, coated or naked, hybrid or open pollinated. Deciding on plant populations they type of seed must also be considered. With open pollinated cultivars seed losses through poor germination can be as high as 50% whilst Hybrid cultivars the germination is usually around 90%, so seeding rates need to be calculated accordingly. Carrots that are hand sown tend to be uneven as some areas the density is too high resulting in carrots twisting around one another, are much smaller and have a lower quality making saleable yields lower than expected and where lower densities occur carrots are normally too big. Thinning is possible but very labour intensive, so with large scale plantings this is not practical.

Fertilization

Carrots do not require high levels of Nitrogen as high levels stimulate top growth at the expense of root growth, delays harvesting and promotes development of leaf diseases. Most of the nitrogen is applied at planting or as a side dressing very early on if grown on sandy soils. Compound "D" at 600kg- 800kg per hectare or Compound "L" at the same rate both applied pre planting at bed making.

Top Dressings

First top dressing starts 2 weeks after germination, with 50kg of AN or 100kg Potassium Nitrate per hectare. Next top dressings in weeks 3 – 4 – 5 - 6 use Potassium Nitrate at 25kg a hectare, Calcium Nitrate at 40kgs per hectare and Magnesium Sulphate at 10kg a hectare. From weeks 7 – 8 – 9 – 10 apply Magnesium Sulphate at 14kg per hectare, Potassium Sulphate at 50kg a hectare and Calcium Sulphate at 25kgs a hectare. About 2 weeks before harvest apply Magnesium Sulphate at 14kg a hectare and Potassium Sulphate at 50kg a hectare. High Potassium applications ensures a better quality, crisper, better coloured carrot and enhances the keeping quality.

Irrigation

If possible the use of a solid set sprinkler system can be used to apply up to 4 light cycles per day from planting to emergence, it can then be moved to the next planting. Normal sprinkler irrigation can now take over. From planting the soil should not dry out and the top 30 – 40mm of soil kept moist. This will provide constant moisture for rapid and uniform germination. In hot weather it helps to cool the soil, also prevents fertilizer accumulation due to evaporation in the top soil layer. From emergence to a root diameter up to 7mm watering is progressively reduced and smaller light irrigations giving way to larger less frequent amounts. This is to induce deeper rooting. Monitor irrigations by reducing amounts until the crop is close to but not wilting. Make sure irrigations always place moisture beyond the growing root to around 45cm soil depth. At this stage stressing is now finished as the crop grows from 7mm diameter to harvest, sufficient irrigation is required to keep the entire soil profile wet. Soil moisture should be maintained at above 50% of available moisture after stressing. Generally 25mm of irrigation per week should be adequate but in warmer to hot weather go up to 50mm. Check the evaporation pan figures.

Harvesting

Large size carrots require around 110 – 130 days to mature, and slightly longer during the colder months. Carrots are harvested when they obtain the required size, are still tender and succulent before they get woody and fibrous. Normally the market requires a size of around 20mm to 30mm diameter .

Harvesting can be done mechanically or by hand. Mechanically a blade is drawn under the bed below the carrot roots. Once loose they are pulled from the soil by hand. Carrots required without the leaves for the market, the leaves are broken off and left in the field. Those required for bunching the leaves are left on and the carrots put into crates. Once the carrots are in the crates they are taken in for washing and grading. Carrots lifted by hand with a fork require very careful placement or otherwise too many carrots will be damaged by the spikes of the fork. The soil should be moist but not over wet at pulling to help reduce soil stick. Last irrigation should be timed to around a week before intended date of lifting. Do not lift carrots that have been under water stress or post-harvest keeping quality will be reduced. At harvest handle carefully as wounds can lead to bacterial infections and rot. Do not tip carrots from excess heights onto other carrots on the shed floor or in crates as damage will occur. Washing can be done in a bath, but regular changing of water must be done to avoid soil particles scratching the skin. Carrots can also be put in a concrete mixer type drum with brushes instead of metal bars and slow revolving to wash carrots. If carrots have to be stored keep the temperature at 2°C to 3°C with a R.H. of 90% to 95% in the refrigeration room. Carrots grown in light soils do not store as well as those grown in heavier soils.

Yields from 20tons - 40tons per hectare are now common and with Hybrid varieties, yields can get up to 60 tons or more per hectare. These yields are being achieved by successful farmers who pay attention to detail. Baby or small carrots will generally be half the yield of that for large carrots.



Carrots Spray Guide

| Stage | Pre-Plant | Sowing & Emergence | Seedling Establishment & Root | Rapid Leaf Growth | Root Thickening | Mature |
|---|-----------------------|-----------------------|-------------------------------|--------------------------------------|-----------------|--------|
| Days: | -7 | 0-14 | 14-28 | 21-56 | 35-70 | 75-120 |
| Pest Problems | | | | | | |
| Nematodes | | Solvigo | | | | |
| Soil Pests & Aphids | | Actara Soil drench | | | | |
| Cutworms | | | Karate Zoom / Ampligo | | | |
| Aphids | | | | Actara / Proclaim / Polo | | |
| Disease Problems | | | | | | |
| Damping off | | Apron Star Seed Dress | | Revus / Ridomil Gold MZ / Folio Gold | | |
| Cavity Spot | | | | | | |
| Alternaria | | | | | | |
| Powdery Mildew | | | | Ortiva / Score/Amistar Top | | |
| Weed Problems | | | | | | |
| Below are off-labe suggestions; grower must do own tests for crop damage. | | | | | | |
| Before planting - post emergence perennials | Touchdown | | | | | |
| Before planting - post emergence annuals | Gramoxone / Touchdown | | | | | |
| Pre-emergence: grasses | | Dual Magnum | | | | |
| Post-emergence: grasses | | | Fusillade Forte | | | |
| Post-emergence: grasses & broadleaf | | Codal Gold | | | | |

| CROP | DAYS TO MATURITY | | PLANT SPACING (cm) | | PLANTS/HA X1000 | AVERAGE SEED PER GRAM | SEED REQUIREMENT (Kg/Ha) | COMMON PESTS | COMMON DISEASES |
|----------------------|------------------|------|--------------------|---------|-----------------|-----------------------|--------------------------|--------------------------------------|--|
| | WARM | COOL | IN ROW | BETWEEN | | | | | |
| Garden Beans | 55 | 65 | 2x7* | 50 | 285 | 4-5 | 75 | Bollworm | Rust Anthracnose Halo Blight |
| Beetroot | 80 | 110 | 10* | 20 | 450 | 50-60 | 8 | Aphids | <i>Ccpa</i> <i>Rzoc</i> |
| Broccoli | 70 | 90 | 40 | 70 | 36 | 225 | 0.2 | Diamondback Moth Aphids | Black Rot White Blister |
| Butternut | 90 | 120 | 50 | 100 | 20 | 8-10 | 3 | Fruit Fly | Gummy Stem Blight Anthracnose |
| Cabbage | 80 | 110 | 40 | 50 | 30 | 300 | 0.2 | Diamondback Moth Aphids | Black Rot Club-root S |
| Carrot | 90 | 120 | 3* | 15 | 1100 | 800 | 2 | Nematodes | <i>ta</i> |
| Cauliflower | 85 | 110 | 40 | 70 | 36 | 240 | 0.2 | Diamondback Moth Aphids | Black Rot Club-root |
| Cucumber Field | 60 | 85 | 40 | 150 | 16 | 40 | 16 000 Seeds | Red Spidermite Aphids Whitefly | <i>Fm</i> Powdery Mildew Downy Mildew |
| Cucumber Tunnel | 65 | 85 | 45 | 150 | 16 | 40 | 3 per m ² | Red Spidermite Aphids Whitefly | <i>Fm</i> Powdery Mildew Downy Mildew |
| Eggplant | 75 | 90 | 50 | 75 | 27 | 220 | 0.15 | Thrips Aphids | Powdery Mildew |
| Gem Squash Semi-bush | 50 | 70 | 35 | 150 | 18-22 | 10-12 | 4 | Pumpkin Fly | Powdery Mildew |
| Gem Squash Vine | 55 | 80 | 50 | 150 | 14 | 10-12 | 2 | Aphids | Virus Diseases |
| Hubbard Squash | 110 | 130 | 100 | 150 | 7 | 6 | 1.5 | Pumpkin Fly Aphids | Powdery Mildew |
| Lettuce | 50 | 70 | 30 | 60 | 55 | 800-1000 | 0.05-0.07 | Aphids Leafminer | Powdery Mildew Bacterial Rot |
| Marrows | 35 | 55 | 40 | 150 | 18 | 8-10 | 2.5 | Fruit Fly Whitefly | Virus Diseases Powdery Mildew |
| Melon | 85 | 100 | 40 | 150 | 16 | 20 | 1 | Fruit Fly | Anthracnose Fusarium Root Rot |
| Onions | 170 | 190 | 8* | 20 | 850-1000 | 250 | 3.5 | Thrips | White Bulb Rot Pink Root Rot <i>ta</i> |
| Peppers | 70 | 85 | 2x40* | 150 | 30-35 | 150 | 0.25 | Aphids Thrips | Virus Diseases Phytophthora Root Rot |
| Pumpkin Semi-bush | 90 | 120 | 80 | 180 | 8 | 4 | 2 | Pumpkin Fly Cutworm | Powdery Mildew Fruit Rots |
| Pumpkin Vine | 120 | 140 | 100 | 180 | 5 | 4 | 1.5 | Pumpkin Fly Cutworm | Powdery Mildew Fruit Rots |
| Sweet corn | 75 | 100 | 20 | 90 | 55 | 8 | 8 | Stalk Borer Bollworm | Rust NCLB |
| Swiss chard | 60 | 75 | 20* | 45 | 200 | 60 | 4-6 | Aphids | <i>Ccpa</i> |
| Tomato | 80 | 100 | 40 | 150 | 16 | 250 | 0.1 | Bollworm Whitefly Nematodes | Blight Bacterial Wilt Viruses |
| Watermelon | 80 | 90 | 50 | 180 | 6 | 20 | 0.3 | Fruit Fly | Gummy Stem Blight Anthracnose |