

Berry Establishment Procedures

The following procedure for the establishment of blueberry plants are recommended:

Soil Identification and Preparation:

- Blueberries require sandy/sandy loam well drained soil with less than 15% clay and with a low pH of 4.5 to 6 KCl.
- Dig soil profile holes and do a final profile survey of the land. Two holes per ha depending on the soil type and uniformity are recommended. This will determine the soil preparation technique and type of drainage, if needed. Soil sampling for chemical and fractural analysis can also be done at this stage.
- A soil analysis will determine the suitability of the soil and any recommendations for the chemical adjuvants needed. Important to note, in addition to the normal macro- and micro elements, also test for pH, EC, bicarbonates, calcium carbonate, sodium, chlorites, active lime and resistance in Ohm. Also do a fraction analysis in terms of the % clay, silt, sand & stone particles. Water analysis should also be done at this stage. It is important to also have the EC, pH, TDS, bicarbonates (CO₃), sodium, chlorides, SAR, Nitrates (NO₃) and Total Hardness tested.
- An irrigation design company should measure out the land and do a block layout plan. Blocks should be as close to 1ha units as possible.
- The irrigation company should supply a design plan indicating the blocks, main/sub-main lines, valves and pump station with fertigation.
- If any drainage is needed, a soil analyst should do a soil inspection, draw up a drainage plan indicating gradient as well as position of drains and water deposit points. Manholes should be positioned as such that it does not impede the movements of tractors and implements.

Plant Spacing:

- Recommended plant spacing is 2.5m x 0.75m for intermediate vigour and upright growing varieties. Strong vigorous and open growing varieties need a spacing of 3m x 0.8-1m. If planted in pots, spacing should be at 2.5m x 0.6m. Row direction should be North/South, but if against a slope, it should be with the slope to ensure surface drainage.
- Rows should ideally be 70m long, but never be longer than 100m. A narrow service road is recommended in between.
- A service road of 5m wide is needed around the planting, and 3m wide for inside the nets, to allow for tractors and sprayers to turn and harvesting with trailers.

Nets and Soil Preparation:

- Once the irrigation layout map has been completed, the net contractor could start with a net design and plan. This should allow for service roads and doorways.
- Nets should be 4.2m high from ground level, and nets on top should preferably be the blue/crystal combination net of Knittex with 18-20% shading, and side nets should be 40-60% shaded white net for better wind protection. Bees work better under a higher net of blue colour.
- Soil preparation process: Rip/plough to a depth of 80-100cm depending on the soil type. Disc the soil level afterwards. Remove all big stones.
- If required, all areas prone to surface drain water or sub-surface water tables, should be drained at this stage. It is important to ensure no wet soils after establishment as berry plants are very susceptible to wet feet and Phytophthora.
- After soil prep and drainage, the net contractor should plant all end poles for each block.
- Once the poles are planted the exact row lines can be determined and ridging can proceed. Ridges should be made with a ridge plough if there are stones present. If pure sand, then ridging can be done with a rotovator with a ridging shoot at the back. When pine bark and/or peat is incorporated into the soil, it can then be done with a rotovator, otherwise with stony soils a ridge plough will work better.
- If any fertilizers or other chemicals such as gypsum are needed, it could then be added on top of the soil or ridge and ploughed or rotovated in. Apply chemicals before the organic material.
- Pine bark or white peat is needed to add organic matter to the soil. Apply bark at 450m³/ha or peat at 120-150m³/ha. Alternatively, a combination of 100 m³/ha peat & 250m³/ha pine bark. The more clay, the more bark/peat is required. White peat is proven to give better results. Bark/Peat will ensure sufficient organic material, lower the pH, aerate the soil and ensure better plant vegetative growth. Use a hydraulic tip wagon or manure spreader with a chute at the back to deposit the bark/peat directly on the ridge.
- Only use composted pine bark or composted whole chipped pine trees. Africa Biomass in the Cape uses big tub grinders to chip complete pine trees. Contact Calie Rabie at 0726024543. BVB, Legro & Lichen are bulk suppliers of white peat in South Africa.
- Rotovate bark/peat into the soil. Two passes would be required to thoroughly mix the bark/peat with the soil and to build up the ridge. Make sure that the tractor driver drives in a perfect straight line. The ridge should be 75cm wide at the base and 50cm wide at the top. Make sure that the ridge is level and flat at the top.
- As soon as the ridges are done, the net contractor can proceed to plant the inside poles and complete the net structure. This will take approximately three months for a ten-hectare site.

Tunnels:

Haygrove is a well-established company in the berry industry with either plastic or net covered tunnels. Andrew Wood (0725877750) from Grabouw is the Operational Manager. Mark Bolas (+263772345732) is the representative in Zimbabwe. Vegtech (Deon van Rooyen - 0832718793) is also a big supplier of plastic houses and tunnels.

Pole and Net Structures:

Andre Vermeulen of Milan Shades (0834547026), Dennis Jooste (0823472442) & Andre Kriel (0823240126) are recommended for net and pole structures in the Cape. Francois Fourie of Turf Technologies (0836266573) is recommended to do pole and net structures for the North. Haygrove also does flat roof steel pole and net structures in South Africa as well as in Zimbabwe. Contact Mark Bolas (+263772345732) in Zimbabwe for further assistance.

Irrigation Installation:

- The installation of the underground irrigation system and pump house can start as soon as the soil preparation is done and should be completed before the net contractor starts with the final net installation. Position all main valves inside the pumphouse.
- Ensure that the irrigation design allows for the blocks to be on pressure within one minute for in-field plantings and 30 seconds for in-container plantings. Only use pressure compensated drippers that is non-leak.
- For in-soil plantings, two dripper lines of 0.75-1L/h inline drippers at a 30cm spacing is recommended. Space the lines 10cm apart at planting to ensure that the small root system gets wetted. Maximum water usage per plant for in-field plantings is 7L/plant/day at max ET₀ and crop factor. For container plantings each pot should have 4x1L/h arrow drippers branching from a 4L/h button. Due to higher plant densities in pots and smaller plants, work on a 5L/plant/day water requirement.
- Make sure that the in-soil design can handle at least five irrigations per day and the turnaround time to water all blocks is less than 9 hours. Plan to water plants in pots up to 8 times daily at 10 minutes per cycle, with a maximum turnaround time of 8 hours. Dedicated mainlines are required for blocks of different ages and or varieties. Make sure that you install variable speed drives for pumps.
- The best possible filtration system is required due to low flow drippers. Either a Netafim or Agriplas fertigation system is recommended. A seven tank (3x2 plus 1 tank system) is recommended with 6 x 5000L tanks for the A/B and Acid mixes and a supplementary 2500L tank for the injection of other chemicals on an ad hoc system. A premix tank is also handy to premix fertilizers and ensure a purer mix and less cleaning time.
- The pump system/house should be as close to the water source as possible. If pumping out of boreholes, a backup water reservoir for at least one day peak water

requirement should be provided for. Make provision in the pump house for the storage of fertiliser bags. A water filling point with cement slab, and soakaway for tractors and chemical storage room, could also be built adjacent to the pump house.

- Installation of infield dripper lines can commence once the nets are completed and before the weedmat is rolled out.

Irrigation Design:

A Netafim fertigation unit and filtration system is highly recommended. The infield underground products are mainly manufactured and supplied by a company such as Agrico. White irrigation pipes for pots are recommended to prevent heat build-up in the pipes during hot days.

Western Cape based irrigation specialists to measure up the land and design a layout plan: Charles Cherry of Cherry Irrigation (0824922508) charles@cherryirrigation.co.za, Johan Koegelenberg (0794718965) of Loxton Irrigation johank@loxtons.co.za, Roelof Le Roux (0834587997) of Agrico Wellington, Johann van Staden of Bergrivier Besproeiing (0828962582) johann@bergrivier.co.za. The above specialists have done extensive blueberry developments in the Cape.

Recommendations for the North:

Francois Fourie of Turf Technologies (0836266573) coisfourie@gmail.com. He has extensive experience in turn key blueberry projects and does irrigation design, installation as well as net structures.

For Zimbabwe, Graham Wright (+263772231212) is a well-known irrigation specialist with extensive knowledge of designs for blueberries.

Cherry Irrigation (Hilgard Rossouw - +27762825531) also does designs in Zimbabwe with Driptech in Harare that supplies irrigation materials.

Weedmat:

For soil plantings, a 1.5m wide polyethylene weedmat is spread over the ridge to prevent weeds from growing on the ridge. For container (pots) planting, a full cover weedmat (5.3m wide strips sown together) is recommended.

Spilo is the only local company that manufactures weedmat and they handle about 90% of the berry plantings in SA. The black/white (grey colour) works better in warm climates and is recommended. Spilo 021-8626100 or George Taljaard (0824511131). Twine & Cordage in Zimbabwe are the agents for Spilo (Salie Khan +263775472104). The two recommended types of weedmat is High Density Polyethylene (Light) HDPE (105gsm) or a heavier type, High Density Polyethylene HDPE (134gsm).

Plants:

- Planting will take place once all the above is in order. Make sure to test run the irrigation before planting. Make sure not to plant on very hot days. Plan to plant by April or Aug/Sept to ensure a full year of growth before flowering starts.
- Make sure to keep plants moist during planting. Wet the plants directly after planting with a water cart for the first few days to ensure roots are well wetted.
- Make sure not to plant plants deeper than the level of the substrate of the tray plants.
- All plants are made by VitroplantSA in Somerset West. All growers need to place an order ten months in advance to ensure that VitroplantSA is able to multiply sufficient material, especially with large orders. Contact Rijk Dankwerts (0826674840) or Marcus Rosochacki (0741791606). Plants will be grown out in a 32-count hole tray (400ml) or a 1L container to a height of 20-40cm. All plants will be fully rooted and ready to plant. If needed, plants could be planted out into bigger 2L bags or pots. It normally takes 8–12 months from order until a plant is ready. Plants for Zimbabwe will be grown out at a satellite nursery in Harare, where local growers can collect plants once ready.

Pots:

Denser planting spacing is required for pots (2.5m x 0.6m = 6666 plants/ha). A 25L square pot on legs is recommended for this spacing. The latest design pot is from Spilo (www.boostpot.co.za) at a cost of R28/pot. A cheaper 25L round pot is also available from Spilo. Contact Spilo at 021-8626100 or George Taljaard (0824511131). Do not plant in bags as this will not give proper drainage and will lead to a build-up of salts and wet soggy bottoms.

Planting Medium for Pots:

Recommended is: BVB (George Taljaard 0824511131 from Spilo); Legro (Brett Young 0824687508) or Salie Kahn from Twine & Cordage in Zimbabwe for berry substrates. Most important here is the percentage of block peat, coco peat and perlite. Coco peat tends to break down after a few years and no more than 33% is recommended in a mix. Perlite is important for drainage and block peat for stability and durability. BVB has a depot with Spilo in Paarl and Harare and Legro in Cape Town all companies deliver countrywide. BVB, Legro also have white peat available for soil application. Several other substrate companies such as Klasman and Lichen also supplies substrate. Avoid mediums with a high percentage of coco peat.

Pine bark/Peat:

Only bark or chips from pine trees is acceptable for incorporation into the soil to improve soil organic content, to lower soil pH and to enhance plant growth. Companies such as Earth2earth at Ngodwana, Nelspruit & Bio Logistics (Melanie Jacobs service@accounting.sageone.co.za) supply composted bark. Also try timber companies such as York Timber in Sabie. Peat is imported by BVB, Legro and Lichen.

Cooling & Packing:

Ensure that your cooling and packing facilities are planned well in advance. Use an experienced consultant. SWD Verkoeling (Lucas van der Westhuizen 0833038052, lucas@swdverkoeling.co.za) has extensive experience with blueberry cooling procedures and requirements.

Pollination:

Bees are critical in the pollination process. Eight to ten hives per hectare is needed from the second year of production. There are several beekeepers that supply hives for pollination. One beekeeper in Cape Town that does substantial ha's of berries is Kolie Lötz (0829214697). Mark Bolas (+263772345732) in Zimbabwe is also a beekeeper with hives to rent.