



Preparing Blueberry Sites for Planting

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INTRODUCTION

The long term health and success of a potential blueberry planting is dependent upon proper site selection and preparation. Much has already been written about site selection in the Midwest Blueberry Production Guide, ID-210, and Growing Highbush Blueberries in Kentucky, HO-60. In short, blueberries prefer elevated sites that have well drained, acidic soils with a pH between 4.5 to 5.0, and a high organic matter content of at least 3%. Often one or more of these characteristics require adjustment to make growing conditions more desirable, including drain tile installation, sulfur or aluminum sulfate amendments to reduce soil pH as well as other nutrients recommended by soil testing, and peat moss or manure application. Site preparation is best initiated at

least one year prior to planting for best results. Too often, individuals decide to grow blueberries during the winter or summer, less than six months before the spring or fall planting season. Hasty site preparation often results in long term poor performance or early plant decline, resulting in reduced crop potential and monetary returns. Blueberry plantings that exhibit poor performance often have poorly drained soils that lack fertility and have a pH that is too high for optimum growth.

Providing at least one year for site preparation allows enough time for additional soil tests and any further soil amendments which may be required. It is important for the potential grower to realize that a secondary application of sulfur or aluminum sulfate may be needed, especially if the soil is predominantly

composed of clay or contains greater than 2,000 pounds of available calcium per acre or 20% of the cation exchange complex (CEC). It is likely in this situation that a significant amount of the acidifying amendments may be neutralized due to the high buffering capacity of the soil, leaving the pH too high for optimum growth. Blueberries grown in soils above 5.3 pH will often exhibit yellowing leaves with green veins, a symptom of iron deficiency along with stunted plant growth, reduced fruitfulness, and in extreme cases widespread plant death. If preliminary soil tests indicate that available calcium is above 2,500 pounds per acre or 25% of the CEC, acidification will be difficult and nonpermanent, due to the buffering capacity of the underlying soil profile making successful blueberry production unlikely on such a site. While performing extra soil tests and reapplying nutrients may delay planting several months beyond what was initially desired, doing so will increase the probability that the planting will experience long-term productivity and health.

What follows are some necessary site preparation practices that should be performed in the months approaching the desired planting date. Blueberries can successfully be planted in either the fall or spring season. Fall planting is preferable if spring rains are known to leave the soil unworkable and delay

installation into the warmer months. The timing of recommendations varies based upon desired planting period with corresponding seasonal activities being similarly influenced. Seasonal activities for fall planting will be denoted with **FP** while activities for spring planting will be denoted with **SP**.

12 months prior to planting (**FP**: fall, **SP**: spring):

FP and **SP**: Using a soil probe, auger, or spade collect numerous samples from the top 8 inches of soil from all possible planting sites. A minimum of 12 soil cores should be removed randomly across the field site to achieve a representative sample of the soil properties. Larger sites will require a greater number of soil cores to be representative or may be split into smaller units or grid cells to facilitate the sampling process. Keep cores from different field sites and different soil types within the sites separate and submit a sample from each for testing. When taking the sample place soil cores in a clean plastic bucket. Clean the bucket with fresh water and wipe to dryness between samples to ensure that cross contamination from different field sites or soil types does not occur. Once all cores for an individual sample are collected mix the soil thoroughly until reaching a finely crumbled consistency and allow to air dry in an open space for 3 to 5 days before placement in

the sample container. Fill out the sample information sheet provided by the laboratory or county extension office, indicating field history, current usage, desired crop, and any other available information that may aid in making an accurate amendment recommendation. Make sure to specify on the submission form that organic matter and available calcium should be tested in addition to the standard soil tests. For more information on soil sampling and submission procedures refer to AGR-16, Taking Soil Test Samples.

9 months prior to planting (FP: winter, SP: summer):

FP: No activities must be completed during the winter due to cold temperatures and poor soil workability. Check for signs of soil erosion and prevent if needed.

SP: Based upon the results of each soil test apply all recommended nutrient amendments, including nitrogen (N), phosphorous (P), potassium (K), Magnesium (Mg), and sulfur (S). If animal manures are available they may be applied at this time to increase organic matter at a rate of 50 pounds per 100 square feet or 10 tons per acre. Nutrients and manure should be spread evenly across the planting site and plowing or disking into the soil profile. If animal manure is applied it may be necessary to perform additional

soil tests to the raised beds as past experience by industry members has shown that applications of manure may excessively raise the pH of the soil. Remove any brush, including perennial grass or broadleaf weeds, rocks, and other debris at this time and smooth the planting site of any shallow ditches or swales.

Lay field tile at this time if the site is known to exhibit poor internal drainage. A site that is poorly drained will have standing water or excessively wet soil for periods longer than 3 days after heavy rains greater than 1 inch. Tile should be placed in the soil to a depth of 4 feet with a spacing of 25 feet. A tile diameter of 4 inches is sufficient for most plantings under 5 acres.

A summer annual cover crop such as sorghum-sudangrass or sudex hybrids, broadcast at a rate of 50 pounds of seed per acre, should be planted after the soil amendments and shaping is completed to protect from erosion as well as provide organic matter. A light fertilizer application of 30 pounds of actual nitrogen per acre may be applied three weeks after emergence to aid in establishment. Mow the sorghum-sudangrass to 5 to 7 inches throughout the summer and fall when it reaches a height of 3 to 4 feet, before it forms seed heads.

Desired blueberry cultivars should be ordered at this time from a reputable nursery that monitors for virus and root rot infections. Be sure to order at least two different cultivars with similar blooming and ripening periods to ensure adequate cross pollination and consistently large crops. Planting densities will be between 519 and 1089 plants per acre with spacings of 10 to 14 feet between beds and 4 to 6 feet between plants within the beds. Planting distance is determined by the expected vigor of the mature planting which is mostly influenced by the growth habit of the planted cultivars in addition to the soil fertility of the site. Cultivars that are described in catalogs or extension publications as vigorous or spreading will require more space than those which are described as being stocky, small, or upright.

6 months prior to planting (FP: spring, SP: fall):

FP: Follow the same site preparation procedures for the fall schedule as described under “9 months prior to spring planting”.

SP: Retest the planting sites by collecting soil cores using the same methods as practiced 3 months prior. Based upon the test results any further nutrient amendments can be spread evenly and incorporated into the soil profile by plowing or disking. Before soil working kill the planted

cover crop and any remaining weeds using a systemic herbicide such as glyphosate (Roundup) at label rate. Two weeks after herbicide application mow the remaining cover close to the soil and incorporate by tilling. Remove any brush, including perennial grass or broadleaf weeds, rocks, and other debris that may have been missed during the last soil working.

After soil working form raised planting beds at least 6 to 8 inches high and 3 to 4 feet wide by plowing the soil into ridges with each bed spaced 10 to 14 feet apart. The width between planting beds is dependent upon the size of equipment to be used in field production, such as a tractor, trailer, or sprayer, and should be at least 2 to 3 feet wider than the widest wheelbase of any equipment to be used. Apply peat moss or a mixture of peat moss, and composted pine bark mulch, at the rate of one (3) cubic foot bale or equivalent amount of composted pine bark per 200 foot of row down the top of the beds and till it in. Hardwood sawdust is not an appropriate soil addition as it decomposes slowly and immobilizes large amounts of available nitrogen in the process while also raising the pH of the soil.

Any main irrigation lines to the planting site or laterals from the mainline to individual planting beds can be trenched and buried at this

time. Bury mainlines from the water source at least 3 feet deep to prevent winter freezing. Laterals which are drained at the end of the growing season can be buried 18 inches deep. Place laterals so that they run directly perpendicular to the start of the planting beds. Attach two risers to the laterals for each planting bed, making sure that the riser heads are at least 3 inches above the bed surface. Space the risers so that each is located 12 inches from the center of the planting bed, giving a spacing of 2 feet between risers within the bed. Mark the location of the risers with a painted stake or permanent flagging to aid in location and prevent damage from equipment.

Smooth the aisle between rows and spread fescue seed evenly across the entire field surface. Broadcast the fescue seeds at a rate of 50 pounds per acre to form a permanent sod aisle and prevent erosion of the raised beds. Apply a light fertilizer application of 30 pounds of actual nitrogen per acre three weeks after emergence to aid in establishment.

If deer are observed to often frequent the planting site or if the site is near woodlands, fencing will be necessary to deter the potential browsing of buds and shoots. Fence construction should consist of 10 foot pressure treated wooden end posts and metal line posts set 2

feet in the ground so that the final height is 8 feet above ground level. Space the line posts so that they are between 30 to 40 feet apart in the row. Place the first wire at 8 inches above ground level and every wire thereafter at 10 inch intervals to an initial height of at least 5.5 feet. Alternate electrified with grounded wires along the fences length starting with the wire closest to the ground which receives a current. Be sure to insulate all wires from contact with the metal line posts as contact will ground the current and reduce their effectiveness. Connect all electrified wires to each other and to the positive terminal on the charging unit, using insulated copper or galvanized steel wire. Use the same practices for attaching the grounded wires. Further ground the charging unit by attaching a 3 to 6 feet long galvanized steel grounding rod to the negative terminal with galvanized wire. The grounding rod should be pounded into the soil to its full length at least 5 feet away from the fence line. To effectively deter deer the charging unit must be able to release at least 0.25 joule or 2,500 volts of energy along the fences length. Make sure that all vegetation is eliminated underneath the fence as any weeds that come into contact with the electrified wires will cause grounding. If deer pressure is consistently heavy additional alternating electrified and grounded wires along with a

more powerful charging unit may be required. Allow at least 35 feet of headland between the fencing and raised beds to allow easy access and a comfortable turning radius for production equipment.

3 months prior to planting (FP: summer, SP: winter):

FP: Follow the same site preparation procedures for the fall schedule as described under “6 months prior to spring planting”.

SP: No activities must be completed during the winter due to cold temperatures and poor soil workability. Check for signs of soil erosion and prevent if needed.

2 weeks prior to planting (FP: fall, SP: spring)

FP and **SP:** Begin the planting process by applying a systemic herbicide such as glyphosate (Roundup) at label rate to kill the fescue cover crop on the raised beds. Two weeks after herbicide application till the center of the raised beds to eliminate any remaining cover crop residue and loosen the soil. Dig large holes at least 24 inches wide and 12 inches deep, spaced 4 to 6 feet apart into the center of the raised beds.

Ensure adequate cross pollination within the planting by alternating every 2 or 3 rows with different cultivars that have similar bloom periods or by interspersing

solid blocks of a single cultivar with pollinizer plants so that every 5th to 10th plant in the row is a different cultivar. Generally blueberries ripen 60 to 80 days after bloom so a cultivar in the early, medium, and late ripening classes will adequately cross pollinate all other cultivars in the same class.

Fill the bottom of each planting hole with at least one gallon of prewetted peat moss. Place the two-year old plants in the holes at the same depth that they grew in the nursery and then firm the soil around the plants and water immediately to settle the soil around the root system. Apply 4 to 6 inches of woodchip or sawdust mulch that has been composted for at least one year. Do not use fresh sawdust for mulch as it can excessively tie up nitrogen in the soil when decomposing, causing severe deficiency that can lead to plant death.

After planting

Blueberries have very fine, shallow growing root systems which causes the plants to be highly susceptible to drought stress. Therefore, the plants require a consistent 1 to 2 inches of water per week throughout the entire growing season. If this requirement is not met by rainfall then additional irrigation will be needed. Drip irrigation is favored as it uses less water and

keeps the soil more evenly moist compared to overhead sprinkler irrigation. After planting lay two drip irrigation lines down the center of the beds. Each line should have one point-source emitter per plant, spaced 12 inches away from the crown to ensure water availability during establishment. Do not place the point-source emitters closer to the crown than 12 inches as this may result in excessive soil wetness and increased incidence of fungal infection. Tensiometers can be used to measure soil moisture and indicate the timing and duration of irrigation required to sufficiently wet the soil profile. Randomly place 5 pairs of tensiometers in the center of the beds at 6 and 12 inches deep throughout the planting block. Begin watering when the tensiometers at 6 inches read between 20 to 30 kilopascals (kPa)/centibars and end watering when the tensiometers at 12 inches read between 5 to 10 kPa/centibars.

Remove all flower blossoms which develop for the first three growing seasons. Cropping the plants too early will cause stunting and significantly reduce productivity in subsequent years. Fruits from such plants will be small, poorly colored, low in sugar, and generally low in quality. Early cropping will also delay

plant establishment which often results in higher mortality due to water stress, nutrient deficiency, and reduced cold hardiness.

Broadcast a light fertilizer composed of ammonium sulfate or urea evenly across the surface of the raised beds in mid-April and again in mid-May, applying 10 pounds of actual N per acre or 0.7 to 1.5 ounces of ammonium sulfate or 0.3 to 0.7 ounces of urea per plant each time, for a total of 20 pounds of actual N per acre. Use ammonium sulfate to fertilize plants when soil tests indicate that the pH is above 5.0, while urea is recommended for soils below 5.0 pH. Maintain a similar fertilizer schedule in the second year while increasing the amount of actual N per acre for each application to 20 pounds in the third year and 25 to 35 pounds in the fourth year and thereafter, for a total of 50 to 70 pounds of actual N per acre.

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