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Blueberry Improvements Using Terreplenish



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Introduction

Blueberries are long-lived, woody perennial shrubs that produce an annual crop of one-quarter- to three-quarter- inch diameter berries. They are members of the Ericaceae family that include plants adapted to acid soil such as azaleas and rhododendrons. Blueberries are naturally found in well-drained, but nutritionally poor organic sands. Blueberry production in the USA totals nearly 600 million pounds annually.

Three years ago, Feed Earth Now asked Solutions in the Land, LLC (SITL) to conduct extensive research on the effects of using Terreplenish for blueberry production and protection. Terreplenish is a blend of proprietary microbes that is OMRI certified for use in organic production. The following is a summary of those findings.

Field Selection and Preparation

Increasing organic matter (OM) levels has been shown to have a positive impact on plant growth, especially when soils have less than 3 percent OM. Organic matter improves soil structure, holds moisture, and increases the availability of nutrients. Preplant additions should be made as either a directed application over the row or in the planting hole as plants are set. Sphagnum peat moss, composted leaves, and well-decayed sawdust or bark mulch are good choices. Unfortunately, conversion of cellulose and lignin to organic matter is a process that can take many years.

We selected compost materials typically used by blueberry growers to increase organic matter; a combination of wood chips, dairy manure, turkey litter and other inexpensive waste nutrient streams. We put 2,000 cubic yards of compostable materials in ten 300' long windrows, approximately 8 feet wide and 5 feet in height. Terreplenish was mixed at a 25-1 ratio with water and applied to five of the ten windrows at 50 gallon (with water) per acres rate. Temperatures were monitored and piles were turned at 140° F.

The treated piles rose to temperature faster and had to be turned more frequently. White mycelia were much more prevalent on the treated piles. After 4 weeks, the treated piles were reduced in height to 80% of the untreated piles. The treated piles were much higher in moisture. The wood chips in the treated piles were crumbly while those in the untreated remained firm. No noticeable ammonia order was present in any of the piles. All piles were sampled and sent to the lab for analysis. The treated samples were much higher in both nitrogen and moisture.

Preliminarily, we suspect that adding Terreplenish to compost piles can reduce composting time by 15-20%. Odors can be greatly reduced by keeping the compost in an aerobic state at higher temperatures, additional nitrogen capture will increase the value of the compost and management requirements will be reduced. The significant implication is the Terreplenish treated compost added to cropland will reduce the length of time to breakdown compost into to



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soil organic matter, providing yield increases with lower input cost compared to chemical amendments.

Planting

Planting bare-root stock should be scheduled for the early spring (February to March) as soon as soils are workable. Containerized plants can also be set in the fall (September to November) in all but the coldest elevation regions. Fall planting has the advantage of allowing good root development through the winter and earlier spring growth. Spring plantings often are delayed by wet conditions and tend to have smaller root systems by the end of the first growing season. Extensive field trials have shown that the addition of Terreplenish diluted in water will reduce or eliminate transplant shock in either the fall or spring seasons. Reducing transplant shock allows bushes to recover faster, resulting in greater whip growth.

Mulching

Various studies have shown that mulching, even under irrigated conditions, results in larger plants and two to four times greater yields over time as compared to non-mulched plants. The primary benefits of mulching are better soil moisture retention and uniformity and better weed control. Mulched soils remain cooler during the summer and warmer during the winter and have reduced effects of frost heaving. By moderating early spring temperature fluctuations, mulching results in delayed spring growth (and crop maturity) as compared to no mulching. Mulching is not a replacement for irrigation, which is often necessary during low-precipitation periods.

Almost any organic material will function as suitable mulch. However, using Terreplenish treated compost will also make plant nutrients available much quicker, getting those nutrients into the root zone early. Fresh mulches, such as sawdust, decay at the point of soil contact through microbe activity, which uses nitrogen in the decomposition process. To get enough nitrogen through the decaying mulch and into the soil, nitrogen rates need be increased, often by two to three times to compensate, depending on the state of mulch decay. Application of a well-decomposed Terreplenish treated mulch or compost will help to lessen nitrogen requirements while holding more soil moisture reducing the irrigation expenses.

Irrigation

Supplemental irrigation of blueberries is considered essential in most areas. Blueberries are shallow-rooted plants with the majority of the root system in the top one and a half to two feet of soil. Blueberry rootlets are less efficient than those of other plants because of their limited root



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hairs (very fine roots) to absorb water and nutrients. Crop water use is significant: four to six gallons per day per plant or one acre-inch per week for a mature planting and two inches when plants have a full crop load. Blueberries thrive under constant, yet moderate soil moisture. While avoiding droughty conditions and fluctuations is important, it is equally important to avoid excess soil water that favors soil-disease development and root rot. Irrigation needs are related to the use of mulch and its status; as mulch degrades water requirements will increase. Monitoring soil moisture is essential to determine the true moisture status. No matter the type of irrigation used, this is a good opportunity to add Terreplenish for assimilation of plant nutrients or protection against soil-borne pathogens.

Fertilization

Several factors affect the need for fertilization: age of the plants, soil pH and nitrogen source, use of and the condition of mulch, and the water applied.

The nitrogen rates are determined by site conditions and plant growth response under specific conditions. For mature bushes, six to 12 inches of new growth per year is adequate; while generalized leaf yellowing and poor shoot growth is a sign of nitrogen deficiency. New applications of fresh mulch, or materials worked into the soil may lead to an N deficiency, and supplemental N should be added. Older and thinner mulches do not tie-up as much N, and the total annual rates may be decreased by one-third to one-half of the above rates (40 to 60 pounds N per acre), provided growth is maintained. Using composted mulch that has been treated with Terreplenish will reduce the nitrogen competition from decaying mulch and assure adequate available nitrogen for a highly productive plant.

Insects and Diseases

Maintaining adequate cultural conditions and healthy plants helps to prevent problems. Growers should be aware of potential pest problems in their area and understand their biology and life cycles to better target control measures. A number of insecticides and fungicides are available for use on blueberries. Each material has specific one-time and seasonal application rates, re-entry and preharvest intervals to consider, as well as very specific target-pest activity.

An integrated approach to insect pest management, which only targets pests that are present or known to potentially be a problem in the area, as determined by thorough observation and field scouting, is the best approach. Typically, insects attack the unhealthy plants first. Plant health is the first line of defense for both insects and disease.

Soil applied Terreplenish has been shown to reduce the pressure of soil borne pathogens, while foliar applied treatments will reduce air borne pathogens.



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Notes on Organic Production

For growers interested in organic production, acquiring official certification of the operation and farm site is needed before the product can be labeled "organically grown." Early planning is needed to achieve timely certification and to avoid actions (such as herbicide application) that lead to delay. Again, the first approach is to keep plants healthy. Terreplenish treated compost, soil and/or foliar applied Terreplenish can be this first line of defense while making plant nutrients more available. Terreplenish is OMRI approved and can be used without restrictions.

Summary

Blueberries are a specialty small-fruit crop that can be grown successfully in many areas at many different scales. Cultivar choice, site selection, and preparation are important to meet specific cultural requirements. Blueberries have the greatest potential for direct marketing in roadside stands and Pick-Your-Own operations, as well as for selected wholesale markets. Consumer interest in this crop is on the rise due to increased awareness of its nutritional qualities, and the future for increased markets looks promising.

Toxic chemical approaches have failed us from a cost/benefit perspective as well as with control. We feel strongly that the next iteration of agriculture is biological approaches to both crop production and crop protection. Today, the market is being bombarded with biologicals. Most products take the course of singulation of individual species of bacteria or fungi. Microbes do not live in singulated communities. Terreplenish is a community of bacteria that live and work together. All plants grow in a system. We need to think of our crops as a system and not to attempt to isolate every mode of action as if we know what is best when for microbial relationships.