



## Spring Fertility in Strawberries

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When we talk about spring fertility applications to fruiting fields of strawberries we are usually talking about nitrogen applications that may or may not be beneficial. Strawberries are not considered a high nitrogen demand crop and if your soil has naturally high background fertility due to high organic matter or previous cropping history application of nitrogen may in fact be detrimental by causing excessive vegetative growth with consequential increases in leaf and fruit diseases like *Botrytis* gray mold. However, research has demonstrated that when winter injury occurs, early season growth and vigor are reduced and subsequently yield. Further to this, research has shown that these detrimental effects can be at least partially alleviated by a timely nitrogen application, depending upon the degree of injury. As such it is essential that growers accurately assess the degree of winter injury as soon as possible after mulch removal.

This assessment can be easily done by a random sampling of plants from throughout each field and from each variety, followed by a careful examination of crowns and roots of these plants. By slicing the crown of each sample lengthwise, the degree of injury can be accurately assessed. Injury begins with browning at the base of the crown and as the degree of injury increases the browning extends toward the top of the crown and intensifies in color. The last tissues to be killed are the leaf primordia at the very top of the crown and the vascular tissue. When the latter occurs, outright plant mortality results but this is relatively rare. Strawberry plants are amazingly resilient; however, even slight browning has been shown to negatively affect growth, vigor and yield. Timely nitrogen application will not increase fruit number, which was determined the previous year, but it can alleviate the injuries by producing larger fruit. It does this by stimulating new growth of roots and leaves, which can subsequently support larger fruit and extended sizing.

Growers can also assess degree of winter injury by monitoring early season growth and vigor before deciding whether nitrogen application is advisable. The disadvantage of this method is that there is a delay in decision-making and less time for the plants to benefit from a nitrogen application if it is deemed necessary. This is important because strawberries are a very early fruiting berry species and if there are insufficient new roots to support the crop there will be greater flower abortion, and smaller remaining fruit.

If it is decided that a nitrogen application would be beneficial the source of nitrogen is very important. Urea has traditionally been the source of choice for early season applications because the cooler temperatures at this time of the year minimize volatility and leaching concerns. However, soil temperatures at this time of the year can be low and the soil bacteria responsible for converting urea to plant-usable nitrate and ammonium can be largely inactive, causing a delay in plant response. The more time the injured plants have to recover the better so, depending on the degree of injury and how soon you identify it, more soluble and usable forms of nitrogen may be desirable, despite the

increased leaching concerns. Calcium nitrate (15.5-0-0) is an expensive source of nitrogen but it is highly soluble and provides a readily available source of nitrogen and calcium to the plant in a non-burning form. Ammonium nitrate (34-0-0) is another form of nitrogen that should be considered. It provides nitrogen in both the ammonium and nitrate forms and because the former type is less mobile in the soil, ammonium nitrate can be expected to persist for a longer time than calcium nitrate and be used more efficiently. It is also less costly per unit of nitrogen but is not as soluble (and therefore not as immediately available as calcium nitrate) and has a higher burn potential. Calcium ammonium nitrate (27-0-0) is a uniform mixture of 80% ammonium nitrate and either calcitic or dolomitic limestone. When calcitic limestone is used, 6% of the product is calcium and if dolomitic limestone is used, 4% of the product is calcium. Because of the limestone component, this form of nitrogen is less acidifying than ammonium nitrate and it is less of a burn concern. Finally, diammonium phosphate (18-46-0) is a nitrogen form that has the advantage of adding high analysis phosphorus in addition to the nitrogen. This is particularly beneficial if soil analysis of phosphorus is low; however, with suitable soil preparation prior to planting, this should not be the case.

What about how much nitrogen? As noted above, strawberries are not a high nitrogen demand crop and applications at this time of the year are only advisable if injury and/or poor vigor have been observed. With this in mind relatively low levels of nitrogen are recommended for spring application to strawberries. Levels should be modified depending on organic matter level, soil type and previous application history. A standard rate of 30 kg/ha of actual nitrogen is a good target for this time of the year but this rate should be modified according to the variables listed above.

On a final note, low boron levels in picking fields have been associated with poor growth and vigor. Soil tests have shown that this occurs when levels of this nutrient are 0.2-0.3 ppm or less. Although boron adjustments should have been made with pre-plant fertilizers this micronutrient is mobile in the soil and in older fields levels of this nutrient may well have dropped below the threshold level noted above. If this is the case boron should be applied by spraying with Solubor (20%B) at a rate of 5 kg/ha and irrigated into the soil.

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