Strawberries require intensive management and can be financially rewarding. This crop has growth characteristics that enhance its ability to adapt to a wide range of growing conditions and management methods. Employing the 4R principles into a nutrient management program minimizes potential loss through various loss/fixation mechanisms in the soil and increases potential yield. When plant nutrients are managed to optimize availability, strawberries can be very productive.

TIGER products provide opportunities to boost productivity and obtain greater return on investment.

Strawberries are a popular small fruit that can be grown in many areas of North America. It is a favorite from backyard gardens to large commercial farms. Over the last five years, approximately 59,000 acres of strawberries were harvested annually in the United States of America. The average yield was 51,400 pounds per acre (lbs./ac). The primary production areas were California and Florida with 68% and 18%, respectively, of total harvested acres (USDA Agricultural Statistics Service).

**STRAWBERRY CULTURE**

Strawberries are produced and managed based on their photoperiodic characteristics:
- Spring bearing
- Ever-bearing
- Day-neutral

Spring bearing strawberries tend to produce fruit approximately around June time-frame; hence often referred to as June bearing. They yield larger berries over 2-3 weeks. Within this plant type are early, mid-season, and late season varieties. Proper variety selection can extend the fruit production season. Ever-bearing varieties generate flower, produce fruit, and initiate flower buds during summer. They produce two crops, and, in some regions, can produce up to 3 crops in one growing season. Day-neutral strawberries will produce a good fruit yield in the first year they are planted. Whereas, spring bearing and ever-bearing plant types require a year to establish before significant production can occur.

Day-neutral strawberries will flower and produce fruit when ambient temperature is between 40-80°F (Himelrick et al., 2002, Demchak, 2014).

Strawberries are herbaceous perennial plants composed of a crown, leaves, stolons (runners), and root system (Fig. 1.0). The crown is the growing point of the plant.
Stolons are strawberries’ mode of vegetative propagation via daughter plants developing from the parent plant. Root system growth and development is critical to overall function of the plant. Root growth is most prolific during the spring and fall; but, growth and functionality continues until soil freezes. The root system is shallow, penetrating the soil 6-12 inches depending on soil type.

**SOIL CHARACTERISTICS**

Strawberries adapt to a wide range of soil types and produce satisfactory yields. Best yield performance generally occurs in deeper fertile soils that contain >2.5% organic matter with good drainage. Production potential is greater when soil fertility is maintained in optimum range for your area. Soil pH should be 6.0-6.5. Nitrogen, phosphorus, and potassium applications should be based on local university extension recommendations. Following appropriate recommendations for your area can be critical to maximizing production.  

Exceeding suggested nitrogen application rates can contribute to malformed fruits, excessive vegetative growth, and reduced yields. Strawberry fruit size and yield can be reduced when potassium rates are higher than recommended (Hochmuth & Albregts, 2003). Generally, multiple fertilizer applications are divided throughout the growing season based on crop growth stage. Several publications do not address need for secondary and micronutrients in strawberries. Attention to details to fine tune nutrient management programs that include secondary and micronutrients can contribute to financial success.

Strawberries take up 1.3 lbs. sulphate (SO$_4$) per ton of harvested fruit. Based on national average strawberry yield presented earlier of 51,400 lbs./ac. strawberries absorbed 33.5 lbs. SO$_4$ /ac.  

$51,400\text{ lbs.} = 25.7\text{ tons x }1.3\text{ lbs. SO}_4 = 33.5\text{ lbs. of SO}_4\text{ per acre.}$

Sufficient amounts of SO$_4$ can be supplied using TIGER 90CR at 37 lbs./ac. or TIGER XP at 40 lbs./ac. Strawberries have a high response potential to iron (Fe) and manganese (Mn) if they are deficient. Soil sample analyses should be employed every 2-3 years to evaluate soil fertility status. It is highly suggested to follow local university extension recommended application rates for sulphur (S) and the micronutrients. Manganese and Fe application rates are a function of soil pH.

Plant available Fe and Mn decreases as soil pH increases, especially >7.0. The manganese soil test value and soil pH are utilized to determine appropriate application rate.

TIGER Micronutrients Mn 15% and TIGER Micronutrients Fe 22% are good product choices to fulfill S, Mn, and Fe needs in strawberries. These products release plant available nutrients gradually throughout the growing season and minimize loss and/or fixation due the physical, biological, or chemical interactions within the soil environment.

**TIGER-SUL RESEARCH**

H.J. Baker/Tiger-Sul conducted a 3-year strawberry research trial in California to evaluate yield response to sulphur and micronutrients. The response to sulphur and zinc was significantly greater than the grower standard (Figure 2.0). Grower standard was the producer’s normal fertilizer application program which was included with each of the TIGER product treatments. The greatest response was with the highest rate of TIGER 90CR and there may have been some benefit from soil pH reduction and higher rate of sulphur. There was 3000 lbs. yield increase with 200 lbs./ac of TIGER Zn 18% compared to the TIGER 90CR applied at 200 lbs./ac. Apparently, Zn contributed to this yield increase.

An economic comparison revealed a greater net return of $900.00/ac with TIGER Zn 18% instead of the highest yielding treatment with TIGER 90CR at 400 lbs./ac. This is a good example where maximum yield is not the maximum economic yield (Figure 3.0). The value of strawberries was established based upon the market value at harvest each year.
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Strawberries take up 1.3 lbs. sulphate (SO₄) per ton of harvested fruit. Based on national average strawberry yield presented earlier of 51,400 lbs./ac. strawberries absorbed 33.5 lbs. SO₄/ac.

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Sufficient amounts of SO₄ can be supplied using TIGER 90CR at 37 lbs./ac. or TIGER XP at 40 lbs./ac. Strawberries have a high response potential to iron (Fe) and manganese (Mn) if they are deficient. Soil sample analyses should be employed every 2-3 years to evaluate soil fertility status. It is highly suggested to follow local university extension recommended application rates for sulphur (S) and the micronutrients. Manganese and Fe application rates are a function of soil pH.

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Strawberries require intensive management and can be financially rewarding. This crop has growth characteristics that enhance its ability to adapt to a wide range of growing conditions and management methods. Employing the 4R principles into a nutrient management program minimizes potential loss through various loss/fixation mechanisms in the soil and increases potential yield. When plant nutrients are managed to optimize availability strawberries can be very productive.

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References:

Figure 3.0
Net return with strawberry production averaged over 3 years’ data