The 4-R’s of Nutrient Management

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Adequate soil fertility is an essential ingredient to any farming operation. For most producers, the concern is a lack of soil nutrients resulting in the need for supplemental fertilizer. Many producers have found that a Nutrient Management Plan can be a cost effective way of providing adequate plant nutrients without harming the environment. A Nutrient Management Plan can seem complicated, but it can be simplified into the 4 R’s:

1. The Right Amount
2. The Right Timing
3. The Right Placement
4. The Right Form

Let’s go through the 4 R’s step-by step. The first step in proper nutrient management is to apply the right amount. The right amount of fertilizer is typically determined by taking the plant needs and subtracting the nutrients the soil can provide. The difference will be the right amount of supplemental fertilizer to apply. This will generally be done for you when submitting your soil test. The soils testing lab will want to know your planned crops and will give you fertilizer recommendations. However, this is just the first step and there is a lot more to proper nutrient management than just putting on the right amount.

Once the amount of fertilizer needed has been determined, it is equally important to know when to apply the fertilizer. The right fertilizer timing is different for different crops. In general, fertilizer applications should coincide with the crop growth to reduce the chances of nutrient leaching or losses in runoff. For example, on a short lived vegetable crop all of the needed fertilizer could be applied at the start of the growing season, but for longer lived crops such as orchard trees it would be more appropriate to split applied fertilizer to help “feed” the tree during the year. This technique of split applying fertilizer will improve nutrient utilization, prevent crop deficiencies, and reduce the temptation to over apply nutrients to account for expected nutrient losses.

The right nutrient placement is also critical for proper nutrient management. Placement can refer to both horizontal and vertical placement. If a fertilizer is tilled deeply into the soil, some shallow rooted crops may not be able to access the nutrients. Likewise, if fertilizers are surface applied in an orchard where the trees are widely spaced, some of the fertilizer, falling far...
from the tree, may never be accessed by the trees. Nutrient placement is right when the growing plant roots easily intercept the applied nutrients.

The last R is the right form of fertilizer. Fertilizers can generally be either commercial store bought fertilizer or it can be an organic fertilizer which may come from the store or it could be manure or other bio solids. Any form can be a great source of plant nutrition, but most organic fertilizers take more time to become plant available. Farmers should also consider the form of nitrogen (N) contained in commercial fertilizer. Some forms of N can be quite volatile when they are not incorporated into the soil, resulting is significant losses.

Each of these 4 R’s was discussed independently of each other, but in truth they all need to be considered together. When a producer develops a Nutrient Management Plan which applies fertilizer at the right amount, timing, placement, and form the environment should be protected without sacrificing crop production. To learn more visit your local NRCS/SWCD office.

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