### Slow Release Fertilizers

#### Characteristics
- Water insoluble
- Low salt
- Not susceptible to environmental loss
- Lasts several weeks to several months
- Nitrogen is released over long periods
- Formulation allows fertilizer to slowly dissolve or release into the soil solution surrounding roots
- Nitrogen release is dependent on microbial decomposition or physical and/or chemical processes in combination with microbial activity (microbial activity is dependent on soil moisture, pH, and temperature conditions)

#### Turf Response
- Provide low, uniform supply of nitrogen throughout the growing season
- Initial turf response is slow, but the consistent release allows the fertilizer to last up to several months

#### Sources
- **Slowly Available Water Soluble Sources**
  - Fertilizer granules can be coated in semi or impermeable membranes which regulate nutrient release. These products include: polymer coated urea, sulfur coated urea, and methylene urea.
  - Release occurs between 5-11 weeks.
  - Release is determined by temperature, moisture and/or the thickness of the coating.

- **Water Insoluble Sources**
  - These products include: urea formaldehyde, IBDU, and organic sources.
  - Release starts at 12 weeks and can last more than 32 weeks.
  - Release is dependent on microbes. Microbes are influenced by soil moisture, pH and temperatures.
  - Slow release organic sources require some combination of dissolution, hydrolysis, or microbial decomposition to release plant available nitrogen.

#### Most efficient use
- Apply at higher rates less frequently

#### Advantages
- Release nutrients at more gradual rates which permit maximum uptake and utilization of the nutrient in the plant
- Reduced losses due to leaching or volatilization
- Cuts back on excessive turf growth
- Longer turf response

#### Disadvantages
- More expensive than quick release products
- Some slow release sources are temperature dependent, which can be problematic in cooler regions