

How Fertilizer Works.

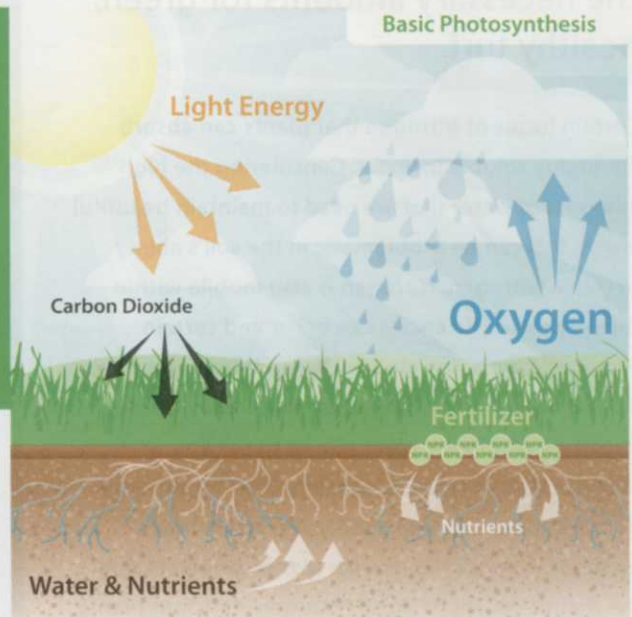
Fertilizers provide turfgrass with the necessary nutrients needed to maintain health and this in turn provides for beautiful green lawns that are easier to maintain. Plants are affected by what they're fed, just like humans. A person's proper health and growth depends on a steady, consistent, nutritious diet, not just a huge meal now and then. That's why it is best to make multiple applications of fertilizer throughout a growing season, or better yet, apply a long lasting, slow- or controlled-release product that delivers nutrients gradually to the plants for weeks or even months at a time.

Turfgrasses get nutrition by absorbing nutrients in the soil through their root systems. If the soil doesn't provide enough nutrients on its own, or if other plants have already depleted them, the turf will suffer. Therefore it's necessary to add fertilizer to supplement what the turf needs.



Photosynthesis - the process through which plants use sunlight to convert water, Carbon Dioxide and nutrients into carbohydrates for food, and then release Oxygen back into the air.

There are 17 chemical elements that have been identified as essential for plant growth, but certain ones are needed more than others. The key nutrients that plants need—also called the primary macronutrients—are Nitrogen (N), Phosphorus (P), and Potassium (K). They are commonly found in 50 lb. bags of fertilizer with different amounts of each. Plants use them along with the other required nutrients for photosynthesis.



2

Why Nitrogen is Important.

Nitrogen is a vital part of every plant cell. Turfgrasses use Nitrogen in larger quantities than any other chemical element except for Carbon (C), Hydrogen (H), and Oxygen (O), which are supplied by air and water. Plants can obtain Nitrogen from organic matter already present in the soil through decomposition. However, soils don't contain sufficient amounts of Nitrogen to sustain turfgrass needs. Therefore, commercial fertilizers are applied to provide the necessary amounts for green, healthy turf.

Certain forms of Nitrogen that plants can absorb are highly soluble in water. Considering the high amounts of water that are used to maintain beautiful lawns, this can be problematic in the soil's ability to retain Nitrogen. Nitrogen is also mobile within the plant so deficiencies can occur and certain symptoms are associated with this. When soils have a deficiency, the Nitrogen that has already been absorbed within the plant moves to the younger shoots and leaves and is consumed at the expense of more mature shoots and leaves. When that happens, you get the familiar loss of green color in the mature leaves of those Nitrogen-deficient plants. By applying fertilizer, you can restore Nitrogen, improving the health and quality of the turf.

The Difference Nitrogen Makes



GREEN, HEALTHY TURF.

Effective applications of Nitrogen will restore and maintain the darker green color that people want to see in their grass and landscape plants. Proper levels of Nitrogen will also promote dense turf, stress tolerance and overall quality of the lawn and landscape.



NUTRIENT-DEFICIENT TURF.

For turfgrass that's low in Nitrogen, the blades appear pale yellow to yellow-green. This condition is called chlorosis and is due to the reduction in chlorophyll production for which Nitrogen is required. Nitrogen shortages can also lead to thin turf that is vulnerable to weed outbreaks and certain fungal diseases.

3

Not All Fertilizers are Created Equal.

COMPARE THE BENEFITS OF DIFFERENT FERTILIZERS.

When you get right down to it, Nitrogen is essential, but that doesn't mean all fertilizers that contain Nitrogen are the same. There are big differences in how each fertilizer product delivers its Nitrogen, and how often and how much to apply.

Most traditional fertilizers are the common, soluble products that release nutrients quickly. They typically dump out Nitrogen after a good watering and then they are not available to the plant. So if that's what you're using, you'll have to make several more applications to keep that landscape green and healthy. On the other hand, slow- and controlled-release fertilizers deliver nutrients to the soil gradually and consistently to feed the plant over a longer period of time. So if you're using a slow- or controlled-release fertilizer, you'll make fewer applications to keep the turf green and healthy. Plus, research shows that certain slow- and controlled-release fertilizers allow you to apply less Nitrogen per year due to the extra efficiency of the consistent release and plant uptake.

In recent surveys, lawn care professionals across the country said they typically average four to six fertilizer applications per year at any given location. If you think about it, that eats up a lot of time, energy, labor and fuel for you. Now, think about how much better it would be if you could achieve green, healthy turf that would last for months with literally half the work.

Organic Fertilizers vs. Slow- and Controlled-Release Fertilizers

What's the

ORGANIC FERTILIZERS

You probably get this question from customers because many people believe that organic or natural products are better for the environment. Some consumers think that if a product is naturally occurring it's organic, and a man-made product isn't. There's much more to it, though.

In chemistry, an organic compound is something containing Carbon combined with other elements such as Hydrogen, Oxygen, Nitrogen and Sulfur. Inorganic substances do not have both Carbon and Hydrogen. In fertilizers, the chemicals used are essentially organic since they have Carbon in them.

Organic fertilizers are generally thought to come from naturally produced sources such as blood meal, humates, composted manures, sewage sludge, etc. However, it takes a very large amount of these natural products to make a fertilizer with sufficient nutrients.

Consider this simple example: a 30-2-10 blend of a synthetic organic fertilizer versus an organic fertilizer with 6% Nitrogen. You have to apply five times as much of the organic fertilizer to get the same Nitrogen use rate. Organic fertilizers certainly serve an important function in disposing of waste products; however, one must also consider the carbon footprint that is left by having five times as many trucks hauling thousands of tons of fertilizer around the country.

Organic Fertilizers

(Natural nutrients containing Carbon obtained directly from a plant or animal)

- Unpredictable release of Nitrogen
- Low Nitrogen content per ton (usually 2-10%)
- Unpleasant odor
- Blends with limited flexibility

SLOW- AND CONTROLLED-RELEASE FERTILIZERS

Some materials occur naturally but can also be reproduced synthetically, including urea, one of the most widely used forms of Nitrogen. Urea fertilizers also contain Carbon, so they are classified as "synthetic organics." Controlled-release Nitrogen fertilizers are based on an advanced polymer-coated urea whereas slow-release Nitrogen fertilizers are based on sulfur-coated or polymer sulfur-coated urea, both are considered synthetic organics. Other slow-release fertilizers that react urea with other ingredients work a lot like natural organics, but provide much higher concentrations of Nitrogen. Their high Carbon to Nitrogen ratios provide increased microbial activity, which fortifies soils and reduces thatch buildup. In some ways, that's like the best of both worlds.

Difference?

Slow- and Controlled-Release Synthetic Organic Fertilizers

(Nutrients containing Carbon that are reproduced synthetically)

- Predictable release of Nitrogen
- High Nitrogen content per ton (up to 44%)
- No odor
- Blended for your region for maximum results

Slow- and controlled-release fertilizers can keep your customers' lawns looking their best while allowing you to make fewer applications. Effective slow- and controlled-release fertilizers deliver Nitrogen to the soil gradually and consistently to feed the plant roots steadily over a longer period of time. That gives you beautiful, healthy turf, and saves you a lot of time and money throughout the season.

Try this simple equation: if common, fast-release fertilizers provide only four weeks of nutrition, you need six applications to feed a lawn or landscape for a 24-week growing season. But if you have a longer-lasting fertilizer that will feed a landscape slowly and evenly over 10 weeks, then you achieve that same 24-week fertility effect with half the number of trips to the site. Think of all you could do for your customers with that extra time!

On the other hand, you might say, "Hey, wait, I get paid by the visit or per application." But you can turn this issue into a win-win. First, tell your customers about the unique advantages of a gradual, sustained nutrient delivery from slow- and controlled-release fertilizers. Explain how that gives their lawn and landscape optimal feeding for more consistent quality and appearance. Plus, there are also environmental benefits of adding less fertilizer. Then, just convince your customers to pay you for the results, not for the number of trips you make. Everybody comes out ahead.

Applying dependable slow- and controlled-release fertilizers is an easy way for you to be more efficient and save money. Remember that simply paying less for fertilizer is not a good long-term option to lower your costs. Using cheaper products or eliminating needed applications will only backfire in terms of reduced lawn quality and dissatisfied customers.

Pounds of Fertilizer Product Needed to Cover 1,000 Square Feet.

Controlling your nutrient release means less Nitrogen needed per year.



Typical Slow- and Controlled-Release Fertilizer Blend



Typical Organic Fertilizer Blend

Why Slow- and Controlled-Release Fertilizers Work So Well.

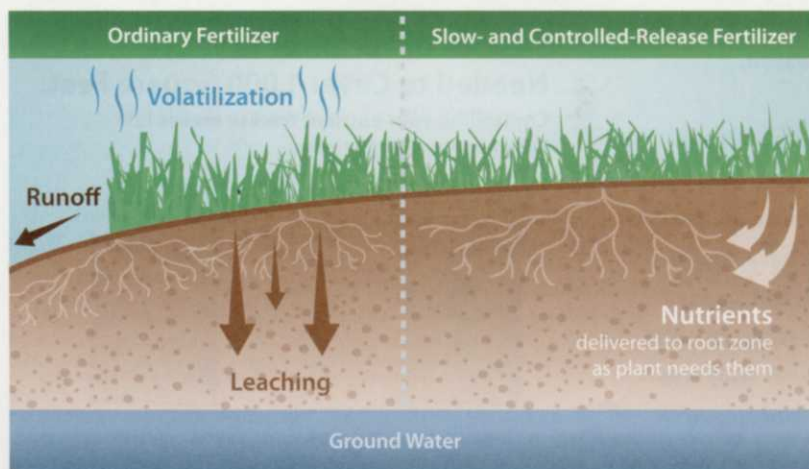
5

Now that you know the difference, you can see why slow- and controlled-release fertilizers are better. Slow- and controlled-release fertilizers are granules or particles of balanced nutrients that may be encapsulated within a special coating or specifically formulated to depend on soil micro-organisms for release. Because of these unique fertilizer technologies, Nitrogen is gradually released to meet the turfgrass' demands. That provides a steady supply of nutrients into the soil over many weeks or months, with minimized chance of Nitrogen loss.

Industry-leading fertilizer suppliers such as Agrium Advanced Technologies are developing new and better choices in slow- and controlled-release fertilizers that promote "enhanced efficiency" fertilization. To help achieve optimum performance, our technology uses an exclusive, patented coating

process that enables the fertilizer nutrients to be activated by soil temperature, regardless of moisture levels. That assures gradual, consistent performance without the surge growth triggered by excess water, and it assures landscapes get nutrients when they need them. In short, "enhanced efficiency" fertilizers mean you can use less Nitrogen per year, save money, and get great results.

Plus, since slow- and controlled-release fertilizers deliver nutrients when the plant needs them, you reduce the risk of losing valuable nutrients, therefore reducing environmental impact. These technologies allow you to use less total nutrients per year and helps ensure you don't waste unnecessary money on fertilizer.



You can see what happens when ordinary fertilizers release Nitrogen too quickly. The Nitrogen can runoff the surface or leach through the soil profile both of which can contaminate ground water. The quickly released Nitrogen may also be lost to the atmosphere through volatilization.

On the other hand, slow- and controlled-release fertilizers effectively protect nutrients against environmental loss. Nutrients stay in the root zone and feed the plant at the root, which results in green, healthy turf.

Protecting Our Environment.

6

In addition to not lasting very long—and causing you extra work—ordinary fast-release fertilizers are often very inefficient. When Nitrogen is delivered too quickly, the plants' roots can't take it all in, so those leftover nutrients have to go somewhere else.

That means fertilizer is subject to loss by leaching through the soil or volatilizing (escaping into the atmosphere), which is not good for the environment. A nutrient that leaves its intended application site becomes a pollutant. It's also a painful waste of money for that unused fertilizer to just go away without helping the turf or landscape.

Leaching generally receives the most attention. A nutrient leaches when it moves beyond the grass root system and is no longer available for plant absorption. Through leaching and surface runoff, Nitrate-Nitrogen and Phosphorus can contaminate ground water and create health hazards. Nitrate and Phosphorus in water bodies or wetlands can lead to algae "bloom" and other plant growth that deplete Oxygen in the water and reduce its ability to support life.

Increased concerns about fertilizer runoff and resulting risks of water contamination are prompting government officials to pay closer attention to the landscape industry. Many local and federal regulatory agencies (such as the Department of Natural Resources, the Environmental Protection Agency (EPA), municipal water companies, etc.) are considering new restrictions on fertilizer applications.

Agrium Advanced Technologies is committed to protecting and preserving our environment and we support the 4R system, a new science-based approach to best management practices. The 4R system calls for the Right Product, Right Rate, Right Time, and Right Place.

4R System

- Right Product
- Right Rate
- Right Time
- Right Place

By using dependable slow- and controlled-release fertilizers, you effectively deliver more nutrients to the intended plants while reducing nutrient losses. This can mean big savings in your fertilizer budget and increased profits. Better yet, fertilizers that pose less risk of runoff and pollution will give you a big selling differentiation with customers who appreciate those environmental advantages.

7

Making the Right Fertilizer Choice.

Now that you know the difference between fertilizers, it's time to figure out how to go about selecting the right fertilizer. Most fertilizer distributors sell a large variety of fertilizer products. So, how do you know which one is best for you?

Well you need to know how to read the fertilizer label. Every fertilizer bag must clearly display a label with the brand, grade, guaranteed analysis, name and address of the fertilizer manufacturer/company, directions for use and net weight. Some bags contain additional information such as the size of the granules or size guide number (SGN).

THE BRAND

The brand can be represented as an actual fertilizer brand like (XCU™, POLYON®, etc.) or as a batch number.

SGN (SIZE GUIDE NUMBER)

Describes the size of the granules in millimeters times 100 (i.e. a 250 SGN is 2.5mm in average particle size).

THE GUARANTEED ANALYSIS

This clearly states all nutrients that are being claimed and from which form they are derived (i.e. the percentage of Nitrogen derived from a polymer coated, sulfur coated urea).

DIRECTIONS FOR USE

This information will tell you how to best use the product.

NAME & ADDRESS OF FERTILIZER MANUFACTURER/COMPANY

This information will tell you where the product was produced and what manufacturer/company produced it.



THE GRADE

The grade is considered the three numbers boldly displayed on a fertilizer bag that represent the percentages of Nitrogen (N), Phosphorus (P) and Potassium (K).

THE FIRST NUMBER

Represents Nitrogen. Therefore a fertilizer bag with a 30-2-8 on the label means it contains 30% Nitrogen.

THE SECOND NUMBER

Represents Phosphorus expressed as Phosphate (P₂O₅), which contains Oxygen.

THE THIRD NUMBER

The third number represents Potassium expressed as Potash (K₂O), which also contains Oxygen.

HOW TO CALCULATE HOW MUCH FERTILIZER YOU NEED.

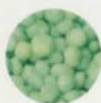
If you wished to apply a rate of 1 pound of Nitrogen per 1,000 square feet, with this bag of fertilizer, you would need to apply 3.33 pounds of actual product (1.0 pound Nitrogen desired / 0.30 = 3.33). In doing so, you would be applying 0.07 pounds of Phosphate (3.33 x 2%) and 0.27 pounds of Potash (3.33 x 8%).

BAG LABEL: THE GUARANTEED ANALYSIS IN DEPTH.

Let's take the example of a 30-2-8 fertilizer blend that claims 50% of Nitrogen is derived from polymer-coated, sulfur-coated urea. The product contains 30% total Nitrogen, but only 15% slow-release Nitrogen. That's why it's important to know what you are buying. Research shows that a fertilizer with 75%-100% slow- or controlled-release Nitrogen allows you to apply less total Nitrogen per year, thanks to its added efficiencies. It is also important to know the difference between polymer-coated,

sulfur-coated urea (PCSCU) and polymer-coated urea (PCU). They are not the same, PCU's are advanced technologies engineered to last longer than PCSCU's.

Phosphorus, like Nitrogen, is found in every plant cell and is a very important element in healthy turfgrass. Potassium ranks next to Nitrogen in its quantity within plants, and it supports many vital growth processes. Nitrogen is still the most important and required nutrient, and is usually the largest of the N-P-K numbers on a fertilizer label.



XCU™ Slow-Release Fertilizer

Sulfur-coated urea (SCU) products have been around for decades, but XCU brings a major advancement in this coating technology. The patented process provides the highest Nitrogen content (43%), most durable, and longest lasting SCU on the market. As more XCU is specified in a blend, the added efficiency kicks in allowing you to reduce your Nitrogen rate to turf. A good rule of thumb is to look for a blend with at least 75% XCU.



DURATION CR® Controlled-Release Fertilizer

Using the latest scientific achievements in controlled-release fertilizer technology, DURATION CR offers long-lasting, consistent Nitrogen release. Available in four longevities to best meet the needs for your climate and growing season, DURATION CR has been extensively tested and consistently stands out against the competition. In fact, new research trials indicate that one application of DURATION CR can provide six months of continuous green, healthy turf.



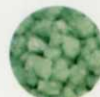
POLYON® Controlled-Release Fertilizer

For years, top golf courses have relied on the famous POLYON® Controlled-Release Fertilizer to feed their turf effectively and consistently for months at a time. And those same advantages help keep lawns and landscapes healthy and beautiful. What most professionals don't know is that POLYON is very affordable in an annual fertilizer program. POLYON also gives you access to the company's exclusive POLYGRAPH® nutrient-prediction software, which customizes programs for your specific growing area.



NITROFORM® Slow-Release Fertilizer

With over two-thirds of NITROFORM being water-insoluble Nitrogen (WIN), it effectively delivers organic feeding like no other fertilizer. NITROFORM supplies both Nitrogen and energy-rich Carbon to increase and sustain populations of beneficial micro-organisms in the soil.



NUTRALENE® Slow-Release Fertilizer

NUTRALENE enriches your soil's microbiology, which helps to increase root growth and improve plant health. Because NUTRALENE's release is triggered by temperature and microbial activity in unison with plant demand, you're assured of highly efficient feeding.

Make The Right Choice, And Make A Real Difference.

To remain competitive in the market and stay ahead of future environmental restrictions, many landscape/lawn care professionals will need to adjust their approaches to fertilizers and the time spent applying them. Fertilizers will always be a necessary and essential investment as well as a requirement of time. But when you can reduce those time commitments, your efficiency and profit potential will substantially increase.

For more information about Agrium Advanced Technologies and how our products can help your business, visit www.agriumat.com or call 888.757.0072 for a distributor near you.



Canada

888.757.0072
10 Craig Street
Brantford, ON N3R 7J1

United States

888.757.0072
100 Technology Loop
Sylacauga, AL 35151

www.agriumat.com