

## **Florida Lawn Fertilizer Made Complicated**

I have a horrible lawn which is desperately in need of complete renovation via a good Florida Lawn fertilizer program. It has patches of Saint Augustine alive here and there in very thin Bahia grass with a lot of weeds and sedge grass. So I'm killing the weeds and sedge grass with multiple applications of broadleaf weed killer and sedge grass killer. Tests by the Extension Office showed my soil to be very poor in Phosphorus and very calcareous and alkaline, a condition which ties up Phosphorus in the soil. The question then became what is the best Florida lawn fertilizer program to get the grass back in shape. Being an obsessive compulsive engineer I researched and analyzed everything I could find on the subject of Florida lawn fertilizer. This very lengthy pedantic report is the result.

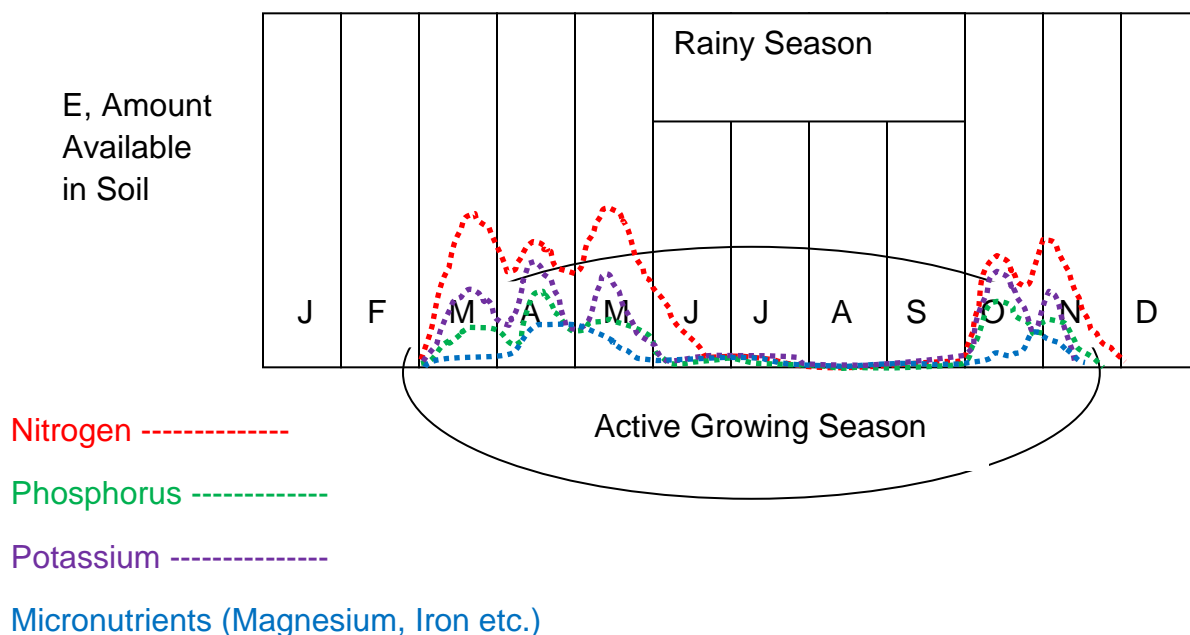
The short version of this study is that the best Florida lawn fertilizer program for a phosphate poor calcareous sand or shell soil in LaBelle is using a palm fertilizer and applying it frequently in relatively small amounts. No Florida lawn fertilizer should be applied during the rainy months of June, July, August and September. Such applications are a waste of money as the Florida summer rains just wash the lawn fertilizer into the nearest creek.

The big surprise that came out of all this research was the importance of Potassium to Florida lawn fertilizer. Most people think Nitrogen is the only element needed in large quantities by a Florida lawn fertilizer. That just isn't true. Potassium is just as important as Nitrogen, especially in sandy soils where there is a lot of rain and very little clay or organic matter. Potassium is required for Nitrogen to do its job and it should be present in Florida lawn fertilizer in equal quantities to Nitrogen, especially in South Florida.

Florida lawn fertilizer such as 29-0-5 N-P-K (Nitrogen-Phosphorus-Potassium) is almost useless, it has far too little Potassium. Yet Florida lawn fertilizer like this is the only "lawn fertilizers" sold in home improvement centers and large retailers. Palm fertilizers such as 12-4-12+4Mg sold by fertilizer companies such as Diamond R in LaBelle are far better Florida lawn fertilizer.

### Florida lawn fertilizer : The Palm Fertilizer Method for Established Turf

This palm fertilizer method will work well on a good established turf where there is ample Phosphorus. It also uses two fertilizers. It uses 50-50 slow release Nitrogen Lawn fertilizer in early March, early May and late October (16-2-8 fifty lbs. for \$15.38). The rate is 150 lbs. per acre. In early April and early October use palm fertilizer (12-4-12+4Mg fifty lbs. for \$22.75) 150 lbs. per acre. This way the Florida lawn fertilizer is released evenly over the entire growing season that is outside the rainy season. Both the Nitrogen and the Phosphorus limits and recommendations of the State of Florida are met with five applications of fertilizer. Once a month spray a solution of two cups of Iron Sulfate per two gallons of water with spreader sticker added onto the foliage of the lawn



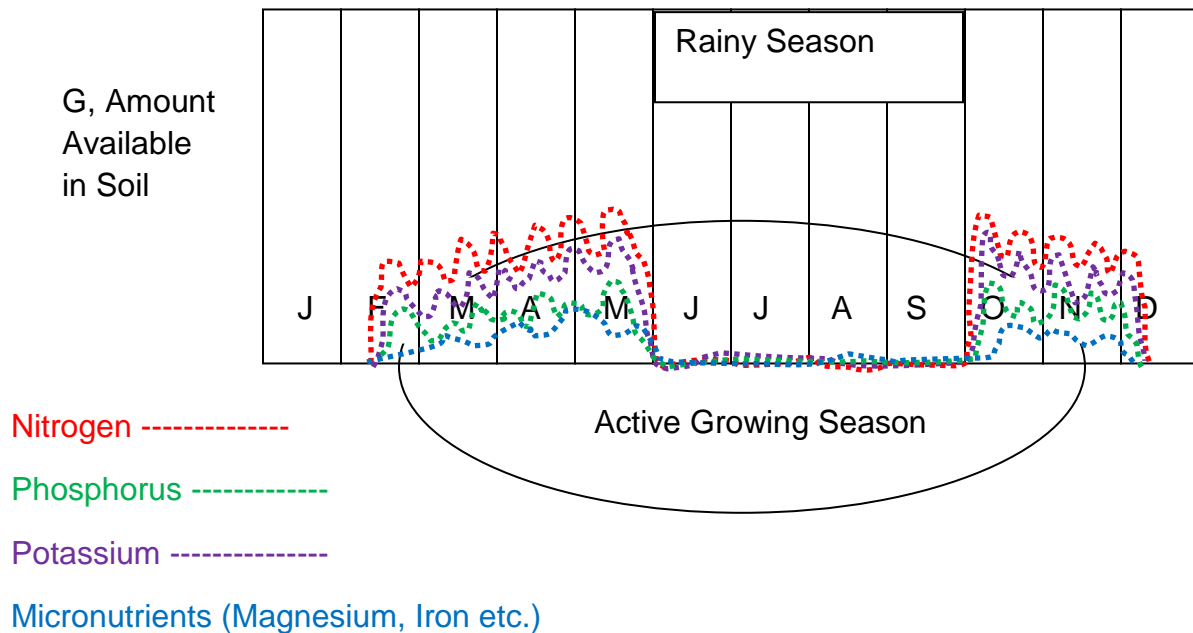
This is a decent Florida lawn fertilizer approach with only five low applications of fertilizer, which is reasonable for us older folks. The U of F recommendations were five applications. Five applications give excellent coverage. This is a good Florida lawn fertilizer approach to an established lawn which is in decent shape and has a good level of Phosphorus. It makes efficient use of the lawn fertilizer and doesn't waste lawn fertilizer in the rainy season. It should be optimum for the environment as well. It keeps the level of Potassium close to the level of Nitrogen, which is essential for Florida lawn fertilizer.

Unfortunately this Florida lawn fertilizer approach won't work to renovate a very poor lawn which is on sand or shell and which soil tests have shown to be very low or low in phosphorus. I.e. they won't help out my lawn. This is especially true if the soil is alkaline and calcareous such as my soil is. Alkaline calcareous soils tie up Phosphorus. A lot of phosphorus. Completely renovating such a lawn requires a more drastic lawn fertilizer approach

## Florida Lawn Fertilizer: Plan for the Renovation of a Poor Lawn

If a soil test shows the lawn to be very poor in phosphate and the grass is in very poor shape this is a relatively inexpensive way to renovate it. It is necessary to bring the Phosphorus levels up and to get a self-renovating layered organic cycle going. Once a month spray a solution of two cups of Iron Sulfate per two gallons of water with spreader sticker added onto the foliage of the lawn. Spread the following Florida Lawn Fertilizer per acre on two week intervals:

1. Four bags 10-10-10 200 lbs. Mid-February
2. Four bags 12-4-12+4Mg 200 lbs. Palm fertilizer End of February
3. Five bags 10-10-10 250 lbs. Mid-March
4. Five bags 12-4-12+4Mg 250 lbs. Palm fertilizer Late March
5. Six bags 12-4-12+4Mg 300 lbs. Palm fertilizer Mid-April
6. Six bags of 12-4-12+4Mg 300 lbs. Palm fertilizer Late April
7. Six bags of 12-4-12+4Mg 300 lbs. Palm fertilizer Early May
8. Six bags of 12-4-12+4Mg 300 lbs. Palm fertilizer Mid-May
9. Six bags of 12-4-12+4Mg 300 lbs. Palm fertilizer beginning of October
10. Five bags of 12-4-12+4Mg 250 lbs. Palm fertilizer Mid-October
11. Four bags of 12-4-12+4Mg 200 lbs. Palm fertilizer End of October
12. Four bags of 12-4-12+4Mg 200 lbs. Palm fertilizer Mid-November



It is 12 applications with a total of about 8 pounds of Nitrogen per year per 1000 square feet, about \$1,450 per acre. This Florida lawn fertilizer program builds up the Phosphorus with 3 lbs. Phosphorus per 1,000 sq. ft. per year on a one time basis. Note that if soil tests show an adequate amount of Phosphorus the 16-2-8 50% slow release Nitrogen Fertilizer, 50 lbs., \$15.38 should be used to replace every other application of palm fertilizer in this schedule and no 10-10-10 should be used. It is important to avoid overlapping application strips with this approach as the turf can easily be burnt.

This last Florida Lawn Fertilizer program is an extreme program designed to renovate a very poor lawn on very poor soil with very poor phosphorus levels. This Florida Lawn fertilizer program maintains a level of nutrients equal to the lawn growth except for the four rainy season months and is designed to build a self-renovating, organically rich, healthy lawn. This last Florida lawn fertilizer program minimizes the amount of run-off and percolation by using small amounts frequently, thus vastly increasing the probability the Nitrogen and the Phosphorus will end up in the grass plant and not in a stream.

Grass will grow rapidly under both this Florida lawn fertilizer schedule and will need frequent mowing. This is the whole idea, the more mowing required the more organic matter gets put down on the lawn and the better the ultimate renovation will be. Avoid infrequent mowing where more than half an inch of grass is taken off. Taking off more than half an inch will check the growth of the grass. Also keep the height of the mower at the maximum of four inches, this maximizes the growth of the grass and keeps it healthy, shading out germinating weeds.

Avoid such "green without growth" recommendations such as only adding Iron, this is detrimental to the over-all objective of creating a self-perpetuating organic cycle by adding a lot of organic grass clippings. The idea is to maximize grass growth by constantly adding Nitrogen, Potassium, Phosphorus, Magnesium and Iron, in that order of importance. Note that these Florida lawn fertilizer approaches will only work in areas of the lawn where an automatic sprinkler system waters at least once a week for  $\frac{1}{4}$  to  $\frac{1}{2}$  inch of water (as measured by the "cup" method) to water in the lawn fertilizer. It is important to apply only  $\frac{1}{4}$  to  $\frac{1}{2}$  inch water once or twice a week, anything greater will tend to drive the lawn fertilizer below the roots of the grass.

### **Florida Lawn Fertilizer for Lawns which are "Established"**

An established or a renovated lawn has a good organic cycle going where the lawn clippings decompose and form a "bank" to adsorb and hold fertilizer nutrients. After a lawn is renovated in South Florida and has the organic level needed, then it is recommended to use the Florida lawn fertilizers as in the first section above. The organic matter and the fungi growing in it capture almost 100% of the nutrients that percolate down into the soil. They don't let it get to the streams and rivers. They then give the nutrients to the plants in return for sugars and other "foods" they can't produce. 80% of the nutrients of 95% of the plants in the world come from what is known as Mycorrhizae fungi. And these fungi only thrive where there is high organic matter in the soil.

### **The Environment and Florida Lawn Fertilizer**

Nitrogen and Phosphorus are both bad actors in our local streams and lakes. They are also responsible for the red tides which are hurting a 55 billion dollar tourist industry. It behooves everyone to use fertilizers as efficiently as possible. In poor sandy soil in Florida ALL dry lawn fertilizers do not work during the usual rainy season, the water just washes the fertilizer away in the sandy soils as soon as the pellet releases it. Whether or not the release is slow or fast is immaterial.

Only if a large amount of organic material is present to absorb the Florida lawn fertilizer will dry fertilizing in the rainy season work. And even that exception only applies to thunderstorms putting down less than 1/4 inch of rain. Really heavy rainstorms just cause the fertilizers to run-off over the surface of the soil into the streams. Golf courses fertilize in the rainy season but they use foliar fertilizers which are absorbed by the grass blades and don't have a chance to run-off.

It is especially detrimental to the environment to use regular Phosphorus lawn fertilizers during the rainy season. A quarter inch of irrigation water in the dry season will only push the Phosphorus into the soil, where it ultimately will be tied up by our limestone geology. In other words, in areas with limestone as a base (most of south Florida) Phosphorus doesn't "percolate" out to the streams and rivers like Nitrogen does. But put an inch of rain on a Phosphorus fertilizer and the Phosphorus will run-off across the surface of the soil into streams. This run-off of Phosphorus is very detrimental to the environment and should be avoided at all costs. Besides, why pay money for lawn fertilizing in the Florida rainy season just to have it wasted?

### **The Law for Labeling of Florida Lawn Fertilizer**

The law in Florida (Urban Turf Fertilizer Rule RE-1.003(2) FAC) applies to the labeling of Florida lawn fertilizer. It does not apply to the use of said fertilizers. It is not a usage ordinance. The Florida Urban Turf rule with respect to Phosphorus (P2O5) labeling is:

"A maximum of 0.25 lbs. P2O5 / 1000 sq. ft. per application & not exceed 0.5 lbs. P2O5 / 1000 sq. ft. per year. Application rates above these levels would require a soil sample of the application site to justify an increase in P2O5."

This rule is noteworthy in that the State label ordinance allows a label note enabling a homeowner to correct phosphorus deficiencies found by a soil test. It should be noted that because of complete bans on lawn Phosphorus enacted outside the State of Florida almost all Florida lawn fertilizer has no Phosphorus. The rule for labeling for Nitrogen is much more forgiving:

"A maximum of 0.7 lbs. of readily available nitrogen per 1000 sq. ft. at any one time based on the soluble fraction of Nitrogen formulated in the fertilizer. A maximum of 1 lb. total (N) per 1000 sq. ft. to be applied at any one time, not exceeding the annual Nitrogen recommendations in the Fertilizer Guidelines for Established Turf Grass Lawns in Three Regions of Florida."

The "recommendations" ( <http://edis.ifas.ufl.edu/ep435> ) currently allow up to seven pounds of total Nitrogen to be applied per year per 1,000 sq. ft. in South Florida to Bermuda grass. The state label ordinance does not restrict fertilizing during the rainy season. It only requires fertilizer labels to state "Do not apply if heavy rain is expected". "Heavy rain" is "expected" for the entire rainy season in Florida. It is not recommended to make any dry application of any Florida lawn fertilizer during the entire rainy season not only for the environment but because it is just a waste of good money.

## Local Florida Lawn Fertilizer Usage Ordinances

But in Lee County (not in Hendry County!) there is an actual lawn fertilizer usage ordinance. Many other Florida municipalities have enacted such lawn fertilizer usage legislation. As a result there has been a concerted effort by the lawn fertilizer industry on the State level to ban any local ordinances more restrictive than the State label ordinance on Florida lawn fertilizer. In other words the lawn fertilizer industry doesn't want usage ordinances. Environmentalists have thus far been successful in stopping the legislation banning local usage ordinances. So instead of a sane statewide law on Florida lawn fertilizer usage there are a whole series of different local lawn fertilizer usage laws being promulgated along the lines of the following ordinance:

1. Ban the use on lawns of any and all dry fertilizers containing Nitrogen or Phosphorus in June, July, August and September including palm fertilizers.
2. A maximum Phosphorus level to be 2% of the lawn fertilizer sold or used
3. Give an exception for Phosphorus where a soil test warrants such an exception (less than 10 parts per million of Phosphate).
4. A maximum of 1.0 lb. Nitrogen per application per 1,000 square foot
5. A maximum of four pounds Nitrogen per 1,000 square foot per year
6. Require that at least 50% of the Florida lawn fertilizer Nitrogen sold or used be a "slow release" form.
7. Allow exemptions for Phosphorus and Nitrogen usage rates for lawns from a period of thirty days after new seeding to ninety days after a new seeding.
8. Do not apply fertilizer near water, storm drains, or drainage ditches. Sweep any product that lands on an impermeable surface back onto the lawn or garden.

Each community ordinance examined has differed from this "typical" ordinance in at least one aspect, creating the potential for a lot of confusion. What is obviously needed is a uniform Florida lawn fertilizer law which sets the standards above and also adds:

9. Requires that the level of Potassium in a lawn fertilizer sold or used must be at least two thirds the level of the Nitrogen component (Nitrogen without adequate Potassium simply ultimately ends up in the streams. Potassium is necessary for the uptake of Nitrogen by the plant, per the University of Florida experts).

But such a statewide usage law is many years in the future. The important thing for LaBelle is that neither Hendry County nor the City of LaBelle have passed any ordinances with any of the restrictions mentioned above. Both of the recommended fertilizer schedules above are perfectly legal in Hendry County as Hendry County has no usage ordinance (the second Florida lawn fertilizer schedule above is also legal anywhere in Florida). So the local residents only get affected if they try to buy their lawn fertilizer in Lee County or from any retailer with stores throughout Florida. They have to buy their lawn fertilizer from Diamond R Fertilizer in LaBelle if they want to have a decent lawn.

They'll have to do this at least until someone somewhere wakes up and adds point 9 above to their lawn fertilizer usage ordinances. Because only if point 9 becomes a

widespread law will it be possible to buy a Florida lawn fertilizer that works from the major retailers. All the retail outlets and home improvement stores in Lee County are currently selling worthless lawn fertilizer because point 9 is not law. Even the lawn fertilizer sold by Diamond R has Potassium levels which are only 50% of the Nitrogen levels, not good enough to be a good fertilizer. This is why palm fertilizer from Diamond R Fertilizer was recommended in the Florida lawn fertilizer schedules above.

There is a "Model Fertilizer Ordinance" s. 403.9337 Fla. Statutes, which is mandated as a minimum standard for communities in nutrient-impaired watersheds (i.e. pretty much all of the State of Florida). The problem is that the "Model Fertilizer Ordinance" only addresses the training and professionalism of professional fertilizer applicators. It requires all professional applicators to be trained in "Best Management Practices" for lawns. It says nothing about the homeowner and sets no limits on fertilizing lawns per se. Hendry County apparently has met the State mandate and passed such a "Model Fertilizer Ordinance" but it is a really pointless exercise due to its very narrow scope.

### **Economics of Florida Lawn Fertilizer**

It costs \$58.00 for Florikan "pelleted time release" fertilizer (18-6-8 fifty lbs. at Diamond R on Commerce Drive in LaBelle). At the same location someone used to be able to buy the standard old rapid release Florida lawn fertilizer 16-4-8 for \$15.38. This Florida lawn fertilizer can't be bought anymore, even at Diamond R. Any 100% fast release lawn fertilizers can't be bought in the retail store (Wal-Mart, Lowes, Home Depot, Ace, Tractor Supply, etc.) because the local Fertilizer Laws have outlawed the usage of such lawn fertilizers by the homeowner. This actually makes good sense both from an economic and an environmental standpoint.

Outside the rainy season about 60% of a single application of the Florikote 18-6-8 will end up in the plant where as only about 15% of a single application of the fast release fertilizer will end up in the plant (they are both too low in Potassium). So four bags of the rapid release equals one bag of the pelleted slow release.  $\$15.38 \times 4 = \$61.52$ . And suddenly the Florikan 18-6-8 becomes the better deal!

The 12-4-12+4Mg Palm Fertilizer 50 lbs. \$22.75 has only fast release Nitrogen but it has sufficient potassium to allow upwards of 50% of the fertilizer to be utilized. So it works out to be a much better economic deal than the Florikan 18-6-8. If the palm fertilizer is spread out over three applications making it like a slow release it becomes by far the best choice at more like 75% utilization, it's just more work.

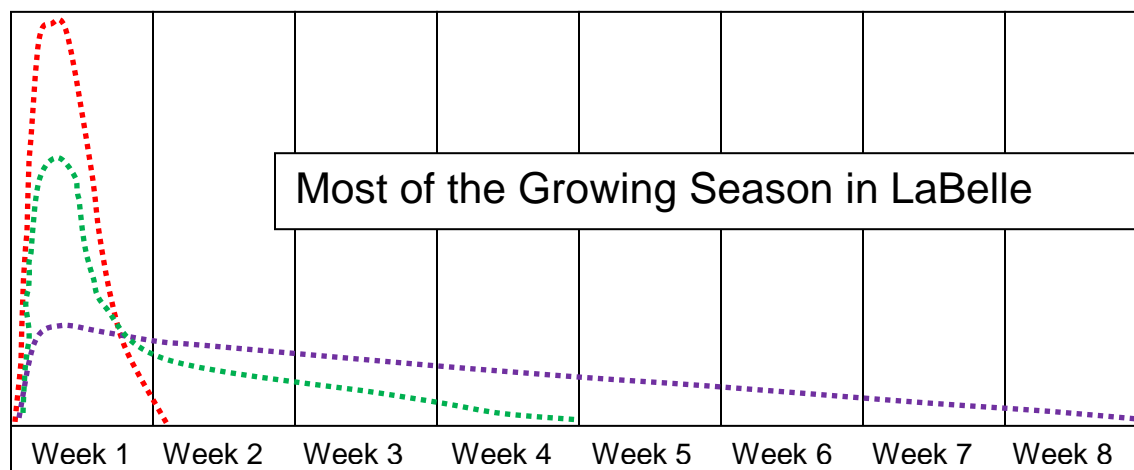
The \$40 Sta-green 42 lbs., 29-0-5 50-50 slow release sold at Lowes and elsewhere in Lee County is not such a good deal. Because of the lack of potassium in the product, very little, probably only about 30%, of the nitrogen can be utilized by the plants. The rest percolates out to the local streams. This becomes a very bad investment indeed. The same is true of all the lawn fertilizers sold at stores such as Lowes, Home Depot, Sam's Club and Walmart. Since about 40% of the Nitrogen in a 50-50 slow release sold at Diamond R in LaBelle will become part of the plant the 16-2-8 "50-50 slow release Nitrogen" at \$15.38 becomes a real bargain, actually a better deal than the palm

fertilizer as a single application. And a whole lot better than the 50-50 products sold in Lee County.

### What is "Timed Release" Florida Lawn Fertilizer?

Note that the concept of "timed release" has been somewhat skewed by Florida lawmakers. It would seem reasonable to consider "timed release" as a Florida lawn fertilizer where 100% of the Nitrogen, Phosphorus and Potassium are released over at least a two month period in a growing season, i.e. Florikan type pelleted products. But the various lawmakers consider a product where ONLY 50% of ONLY the Nitrogen is "not rapidly released" is "50-50 slow release", which is not a demanding definition.

Also note that all timed release Florida lawn fertilizer release roughly 70% of their fertilizer in the first 30% of the "extended release" time period, i.e. they don't release in a linear fashion. Based not on the manufacturer's claims but rather based on actual research, the following curves become evident for fertilizers for the heat and humidity of South Florida:



Dissolving Amount of the old "normal" lawn fertilizer-----

Dissolving Amount of "slow release" 50-50 fertilizer-----

Dissolving Amount of "pelleted time release" fertilizer (Florikan) -----

The first two lawn fertilizer curves above are only for the Nitrogen component. The "pelleted time release" curve is for all three components of the Florida lawn fertilizer. "Slow release" 50-50 fertilizers typically are formulated with 50% Sulfur Coated Nitrogen to somewhat slowly release only 50% of only the Nitrogen while the "pelleted time release" are 100% coated and have two different coating layers which really slows the release of all three constituents. Thus the difference in release rate and in price.

Since the "slow release" 50-50 lawn fertilizer isn't all that slow in its release but is being taught as "Best Management Practices" by law this might be considered just one more



illustration of politics gone amuck. But in fairness to the politicians another problem has to be considered. Fertilizer is in short supply. The capacity worldwide to produce true “pelleted timed release” fertilizers is very small.

If Florida were to require 100% “pelleted timed release” for all lawn fertilizing there simply would not be worldwide production capacity to support the requirements at any price and the price would skyrocket for what could be had. In the ten years since 2003 fertilizer prices have tripled in the USA as is. It would not be fair for Florida lawmakers to make it such that only the very rich could legally have green lawns. The middle class would simply buy the other types of fertilizers from agricultural supply stores and apply it illegally. Besides, there are no grades of 100% “pelleted time release” fertilizer where the level of Phosphorus is less than 2% of the fertilizer, a necessary prerequisite for mandating the use of 100% “pelleted time release” fertilizers.

### **Soil Testing for Florida Lawn Fertilizer**

It is extremely important to have soil tested by the county agent before starting a Florida lawn fertilizer program. The test will give Phosphorus and pH levels. The Phosphorus level is especially important. In our limestone filled soils it is not unusual to see 50% to 80% of any Phosphorus fertilizer applied end up tied up in the top layer of soil as what is called “hydroxy-apatite” and “dicalcium phosphate”. Fungi can slowly decompose these minerals and supply Phosphorus to plants, so only small amounts of phosphorus are required if organic level is high and there are these minerals.

Phosphorus mineral decomposing fungi only live in highly organic soil. If the home is over 20 years old and the lawn appears to have been fertilized on a regular basis, in all probability only small amounts of Phosphorus are required. But in any case the soil in Florida should be tested before doing any extensive lawn fertilizing and renovation.

Be careful of the amount of Phosphorus recommended by the testing report. By “Best Management Practices” (BMP’s) the maximum recommendation can only be 1 pound per year per 1,000 square feet. If the math is done, a soil very poor in Phosphorus requires at least a one year boost of 3 pounds of Phosphorus per 1,000 sq. ft. to bring it up to acceptable levels, especially if it is an alkaline calcareous soil. “BMP” does not equate to “Science” as politics affects “BMPs” when it comes to lawn fertilizer.

Note that Phosphorus is relatively immobile in the soil so soil tests for Phosphorus are meaningful and should be the guide as far as Phosphorus fertilization goes. Nitrogen and Potassium are both highly mobile in soils, especially Florida's sandy soils, so soil testing for those two elements is meaningless and isn't done.

### **Spreader to Use for Florida Lawn Fertilizer**

When spreading time released fertilizer it is important to use a broadcast (“rotary”) spreader where the fertilizer is flung out to all sides. If a “drop spreader” (where the fertilizer only covers the width of the spreader) is used the sensitive polymer coating on the timed release fertilizer can be cracked and the grass can be killed by an overdose of fertilizer. Of course broadcast spreading in beds by hand won't hurt anything. Also

don't mix any other materials with the time release, the tumbling and mixing action can abrade the time release polymer as can chemical interactions (Sulfur can also significantly speed up the release).

### **Options which don't Require Florida Lawn Fertilizer**

There is one very good reason besides the environment for options that don't require fertilization. The cost of Florida lawn fertilizer is ridiculous and will only continue to climb. The preferred option from a cost standpoint and an environmental standpoint is to replace lawn grass with other plants such as dwarf mimosa and peanut (actually an inedible relative of the standard peanut). Both of these plants are legumes and are actually harmed by the application of Nitrogen in any form. So the problem of Nitrogen run-off is solved.

But the plants require a relatively constant source of Potassium and monthly foliar feeding of Iron. And they need to be watered in the dry season, just like a normal lawn. Note that Potassium is not a problem in environmental pollution. Diamond R Fertilizer has K-MAG GR 0-0-22+11Mg Potassium /Magnesium fertilizer and Iron Sulfate. The Iron Sulfate needs to be applied at a rate of two cups per gallon as a foliar spray (add some spreader sticker from Ace Hardware). This is environmentally responsible and will give a very good looking lawn.

Note that a good mixed lawn of grass and peanut or mimosa becomes an impossibility, due to their differing fertilizer requirements it's either one or the other thriving. Mimosa can't take too much foot traffic and can't be mowed. Peanut can take a lot of foot traffic and can be mowed at two to four inches. Anything less than two inches isn't good for the peanut plants. Properly fertilized peanut can spread up to six feet per year.

Of course a yard can be turned into one big bed of native plants. The problem that arises is that the native and invasive weeds eventually make the yard so unattractive the homeowner will be fined by the City or County and the value of the home and neighbor's homes will decline.

A person can lay down thick layers of mulch around all the desirable plants and use pre-emergent herbicides every three months to keep down the weeds. A warning: some weeds just laugh at pre-emergent herbicides and need to be killed with herbicides as they come up. And pre-emergent herbicides are ridiculously expensive and difficult to obtain.

Then there are some people who simple don't fertilize or water at all. They only mow the grass and the weeds. With the poor soils in Florida and the summer rains this results in a very poor lawn filled mostly with weeds (like mine!). This works in some neighborhoods where most of the neighbors do the same thing. It doesn't work in upscale subdivisions, especially if an HOA is involved.

Also, competing for the best looking lawn in the neighborhood seems to be a middle class male tradition that can be very hard to break. It is kind of like preventing beer and football on a Sunday afternoon. A poor lawn also can hurt the value of the home and

the value of surrounding homes, a well grassed front yard is desirable for the vast majority of the population and ignoring that fact because of the environment is just sticking one's head in the sand.

In the interest of the environment I'm converting large areas of my lawn to plant beds using largely bromeliads and native plants which require little in the way of fertilizing. One large circular area in front has already been converted to rock covered mounds of agaves and bromeliads which require neither water nor fertilizer to look appealing.

### **Renovating a Smaller Lawn with Florida Lawn Fertilizer**

But I am not eliminating my lawn completely. I'm renovating much of my front lawn. I am still going to establish a good lawn in a relatively narrow area along the front of the house in order to preserve the "curb appeal" and value of the home and the value of my neighbors' homes. There are large areas of my front lawn which flooded this last summer and these areas have had up to six inches of soil put on them to prevent these areas from flooding again. These areas and other large areas where the turf is thin or non-existent are currently being reseeded with a mixture of Bermuda, Bahia, Centipede and Zoysia grass seed. I'm kind of doing a "survival of the fittest". This area will be fertilized to get it established per the guidelines above, with lots of Phosphorus.

### **Laying Down Sod**

Some people think that by laying down expensive sod they will have a good lawn automatically. I had a strip of Floratam St. Augustine laid down in my front yard two years ago on my very poor soil. It was fertilized and maintained by Tru-green, a professional lawn care service. Virtually all the St. Augustine is currently dead and gone. But then I wasn't impressed by Tru-Green. Sod would probably work if fertilized the first year or two with the Florida lawn fertilizer renovation program above.

### **Low Potassium Florida Lawn Fertilizer**

There is an urban legend floating around even among professors and agricultural agents who should know better that Nitrogen is the only element needed for a green lawn. As the data below makes clear, Nitrogen is enabled by Potassium. Without adequate Potassium, Nitrogen will not be taken up and utilized by the lawn.

Golf Course Superintendents are the undeniable experts when it comes to maintaining a good turf. It is their livelihood. The fertilizer budget for golf courses is huge and golf course turf managers aren't about to pay for Potassium that isn't needed. If the website [www.plantfoodco.com/solutions/proven\\_turf\\_programs.aspx](http://www.plantfoodco.com/solutions/proven_turf_programs.aspx) is examined, virtually all the current existing golf course fertilizer programs on this extensive website have Potassium levels equal to Nitrogen levels.

This equal use of Nitrogen and Potassium was confirmed by a 2005 Penn State/Golf Courses Superintendents Association of America survey of 2,561 Golf Courses, <http://www.gcsaa.org/common/templates/GcsaaSubNavigationLayout.aspx?id=5318&LangType=1033> which found virtual equal usage of Nitrogen and Potassium for all area of the golf course save the putting green and the "turf nursery", where the Potassium usage was significantly larger than the Nitrogen usage.

The University of Florida experts agree with this position. Quoting the experts from the University of Florida: "Potassium (K) fertilization is typically linked to Nitrogen (N) fertilization. In general, the higher the rate of N fertilization, the higher the rate of K fertilization. Research has suggested that in unstressed Bermuda grass a N:K fertilization ratio of 1.5 to 1.0 is sufficient to maintain healthy turfgrass."

<http://edis.ifas.ufl.edu/ss404> In the U of F Florida Lawn Handbook 3rd edition, it says: "To maintain healthy turfgrass, the amount of elemental potassium should be either the same or greater than the amount of nitrogen" p. 133.

The relationship between potassium availability and nitrogen uptake is explained on the site <http://www.ipipotash.org/en/presentn/bftktif.php>

- "K is a highly versatile and mobile nutrient in plants.
- K is involved in all major physiological processes, from the assimilation and the transport of assimilate to its conversion into storage products such as sugar, starch, protein and oil/fats.
- K also plays a prominent role in the N metabolism. (*underlining added*)
- As a cation, K accompanies the nitrate anion as it is transported from the roots to the shoot where the nitrate is reduced to  $\text{NH}_3$  to be incorporated into amino acids, the precursors of protein. K deficient plants have a repressed activity of the enzyme nitrate reductase.
- K accompanied by malate is then re-translocated from the shoot to the root, where the K-malate is oxidized, yielding  $\text{KHCO}_3$  which exchanges for  $\text{KNO}_3$ , and the cycle continues.
- Plants inadequately supplied with K fail to transport nitrate efficiently into the shoot.
- This leads to nitrate reduction and accumulation of amino acids in the roots which signals, via a feedback effect, to the roots to close down further nitrate uptake although nitrate might be present in the rooting zone (MARSCHNER *et al.*, 1996).
- Any surplus nitrate in the rooting zone of plants inadequately supplied with K is likely to be leached into the groundwater or lost to the atmosphere as  $\text{NO}_x$  gas.
- Accumulation of nitrate in K deficient leads to a reduced protein content.
- Furthermore, plants supplied with excessive N and/or inadequate K are more susceptible to pests and diseases and less resistant to soil-borne and climatic stress than plants with balanced nutrition, which also lowers the yield and thus, affects the fertilizer use efficiency."

Per the website <http://www.turf.uiuc.edu/extension/ext-fert.html> 3 to 6 % of the dry weight of grass is Nitrogen while 2 to 4 % of the dry weight is potassium. Obviously fertilizers should reflect these ratios. The Mississippi State University Extension Service recommends two parts potassium to three parts Nitrogen for grass

<http://msucares.com/lawn/lawn/fertilization/> "Turfgrass research scientists are in general agreement that turfgrasses prefer a 3-1-2 ratio (nitrogen-phosphorus-potassium). This ratio is commonly used in fertilizer recommendations. After the basic soil deficiencies identified by soil testing have been corrected, the 3-1-2 ratio is ideal for most maintenance programs."

Note that because of the "Best Management Practices" push nationwide this 3-1-2 maintenance ratio has shifted to more of a 10:1:10 ratio, at least for Golf Courses. The "Grass Master" website says "On established lawns, Grass Master recommends the use of a fertilizer with a ratio of 3:1:3 applied at a rate of about 1 lb. of actual nitrogen per 1000 square feet of lawn per application". The 2014 Lee County guidelines say "As for potassium, look for a fertilizer with at least half as much potassium as nitrogen (16-2-8) or equal amounts of nitrogen and potassium (15-0-15)". Southwest Florida Water Management District recommends "In general, select a fertilizer where the first and third numbers on the label are equal or in a 2:1 ratio and the middle number is zero or as low as possible." This is a high potassium Florida lawn fertilizer.

Since Potassium moves through Florida's clay poor sandy soil faster than Nitrogen and Florida gets a lot of rain to move it through the soil column one, can easily make the argument for at least equal amounts of Potassium to Nitrogen in a fertilizer in Florida. The sandy soils of LaBelle will measure less than 25 ppm of Potassium if lawn fertilizer has not been recently applied as there is very little "Cation Exchange Capacity" in LaBelle's low clay, low organic sandy soils. According to the University of Purdue, lawns with Potassium measured at 0 to 25 ppm need 6 pounds of muriate of potash per 1,000 square feet per year, that's a lot of potassium.

A local landscape expert, the late Joe Johnson, who was responsible for all landscape maintenance in Fort Myers Parks, gave his personal observation at a meeting of the LaBelle Garden Club. He had noted that the grass around palms which had been fertilized with palm fertilizer was always much greener than the surrounding grass which had been fertilized with conventional low Potassium lawn fertilizers. He recommended fertilizing lawns with palm fertilizer. Palm fertilizer has an N-P-K ratio of 3:1:3, with potassium equal to nitrogen. This is the origin of both Florida lawn fertilizer schedules.

There is not a single Florida lawn fertilizer product being sold in home improvement stores that can be recommended. The Florida lawn fertilizer products in home improvement stores do not have the quantity of Potassium required, period. For instance Sta-green 42 lbs., 29-0-5, \$40 at Lowes has far too little of Potassium and only the Nitrogen is in slow release form. Uptake and utilization of the Nitrogen requires a good Potassium level so the three fourths of the time the nitrogen is being released there isn't any Potassium to help with the Nitrogen uptake and use. Note also that this isn't good for the environment, if the Nitrogen isn't utilized by the plant because of Potassium deficiency, said Nitrogen just ends up in the local stream, per the mechanism delineated above.

This is 29-0-5 not a useful Florida lawn fertilizer. It will not produce a healthy thick lawn, period. As a result the unknowing homeowner will blame his poor soil and go back and buy more bad fertilizer and apply it. And this is exactly what the fertilizer companies want. They end up selling much more fertilizer in the long run and circumventing the intent of various state and local fertilizer ordinances. The fertilizer companies can't and don't play this game with professional turf managers of such areas as golf courses.

### **Low Phosphorus Florida Lawn Fertilizer**

And if a lawn soil is deficient in Phosphorus in Lee County there is a problem because only a few lawn fertilizers with a ratio of 1:4 phosphorus to nitrogen or lower are being sold in home improvement stores. Most of the Florida lawn fertilizers available have no Phosphorus in them! Good palm fertilizers are only sold in small expensive bags. High Phosphorus lawn starting fertilizers have too little Potassium again and cost far too much. Lawn fertilizing in Florida has become a difficult endeavor. Useful, cost effective Florida lawn fertilizer can only be obtained from stores supplying farmers and ranchers with fertilizers.

The sweeping statement is often made that soils in Florida don't need Phosphorus. Indeed, this huge generalization was the basis for the Phosphorus restriction in Florida lawn fertilizer label law. This simply isn't true. Phosphorus is only available to plants where the pH is between 6 and 7.5. Both above and below that pH range Phosphorus tends to be slowly tied up in the soil in forms which are not available to the plant unless the soil has a lot of organic matter in it. So the organically poor, alkaline, calcareous, uncoated sands and shell soils of much of South Florida need a constant, albeit small, supply of Phosphorus for growing all plants, including lawns.

If the lawn soil is poor in Phosphorus it requires a large infusion of Phosphorus (2 parts Phosphorus to 1 part Nitrogen to 1 part Potassium) in order to jump start the organic processes which allow a poor soil to be turned into a reasonably fertile organic soil capable of sustaining a lawn with little further Phosphorus input. Now once an organic rich lawn has become established and fully developed, the organic matter in the soil will facilitate the Phosphorus availability. Then the levels of Phosphorus in the Florida lawn fertilizer can be considerably reduced and a more "normal" lawn fertilizing program undertaken where the Nitrogen to Phosphorus ratio is about 10:1 or 2% of the Florida lawn fertilizer (whichever is lower).

This process of using high Phosphorus to renovate a lawn and then low Phosphorus to maintain it can be verified by simply looking at the fertilizer regimens that golf course superintendents' use. If the website [www.plantfoodco.com/solutions/proven\\_turf\\_programs.aspx](http://www.plantfoodco.com/solutions/proven_turf_programs.aspx) is examined, the formula for starting the turf (the "grow-in" program) has about twice the level of Phosphorus as it does Nitrogen.

The standard formulas for fairway maintenance has an average Phosphorus content only 10% of the Nitrogen content, which is in line with current "Best Management Practices" for golf courses in many states in the USA, including Florida. It is interesting that none of the golf course programs completely eliminate the Phosphorus, even though it stands to reason that many golf courses have soils which will test adequate to excessive in Phosphorus because of past practices.

Ninety percent of all Florida lawn fertilizer sold in home improvement stores in Lee County have no Phosphorus in them. This is because eleven others states have

outlawed applying Phosphorus to Lawns. The large fertilizer companies tailor their lawn fertilizer to the national market so they don't add Phosphorus across the entire nation. This is good for the environment but bad for people in Florida on sandy soil or shell soil where high Calcium and pH levels tie up the Phosphorus. They need a small amount of Phosphorus, 2% of the Florida lawn fertilizer typically.

The only high Phosphorus fertilizer sold in Home Depot is "Scotts Turf Builder 18 lb. Starter Brand Fertilizer 20-27-5 N-P-K". This is not a good Florida lawn fertilizer to use for new lawns as it has far too little potassium. A complete 10-10-10 from Diamond R is better, although not ideal. A better recommendation is to combine one application of 0-40-0 with one application of 16-00-26 STRX each at a level of 300 lbs. per acre (both fertilizers are available from Diamond R Fertilizer in LaBelle). This is the equivalent of one 600 pound per acre application of 8-20-13 which is ideal for a new lawn, either seeded or sodded, or a little over one pound Nitrogen and 2.4 pounds Phosphorus and 1.6 pounds Potassium per 1,000 sq. ft.

Under the Lee County ordinance new turf less than sixty days old is exempt from the Phosphorus provision of the Lee County law. It is interesting that most experts recommend waiting at least thirty days to fertilize new lawns as the tender new roots are easily burned. Besides, newly planted grass is watered very frequently which would wash away any fertilizer application. Sometime politicians don't think things through very well. In Cape Coral the high Phosphorus window is a more realistic period between thirty days and ninety days after seeding of a new lawn. It is also legal under the Lee County ordinance to raise the Phosphorus levels of a soil if a soil test warrants it, which gives the homeowner a way out of the restriction if their soil tests poor in Phosphorus.

### **Lawn Services for Florida Lawn Fertilizing**

I have been using "Tru-Green" professional Florida lawn fertilizer service to try and get my poor lawn back in shape. I have not been impressed. I informed them of the low phosphate level the soil test showed and asked them to apply a phosphorus fertilizer. They did not do that. They have applied no Phosphorus yet their advertising is that they tailor their application just for a specific lawn. The Potassium levels of their fertilizers are one third the Nitrogen levels, not a good situation. When they apply weed killers they apparently don't apply enough because the weeds don't die. The weeds don't even yellow or distort in any way. They made three totally useless applications of pure Potassium (no Nitrogen) during the rainy season. So I cannot recommend them, the results have been very poor and I've started doing my own lawn fertilizing and weed killing.

### **Micronutrients in Florida Lawn Fertilizers**

The application of the "micronutrients" Iron, Manganese and Zinc is especially important in an alkaline calcareous sandy or shell soil. These soils tend to tie up micronutrients, especially Iron. Golf courses use micronutrient foliar sprays regularly. I apply them as foliar feeding every four weeks all growing season long, including the rainy season. I

also use palm fertilizer which theoretically supplies all these micronutrients. But micronutrients in a fertilizer such as palm fertilizer typically don't reach the plant because interference from the Phosphorus in the fertilizer. So I still use foliar micronutrient fertilizing even though I'm fertilizing with palm fertilizer. See the section on "Foliar Fertilizing" on this website

The simple way to meet this micronutrient need is to add a foliar spray every month consisting of two cups of Iron Sulfate in two gallons of water with a spreader/sticker added (from Ace Hardware). Don't use soap or detergent as a spreader, it will tie up the micronutrients. Iron is the micronutrient in shortest supply with lawns. Note that if irrigating with river water or city water two cups of Epsom salts should be added to the Iron Sulfate as the river and the city water are very low in Magnesium. Local well water is high in Magnesium and thus doesn't need Magnesium to be added if the lawn is irrigated on a regular basis. But if one is using palm fertilizer it has Magnesium in it so Epsom salts don't need to be added no matter where the irrigation water comes from.

**Useful Fertilizers for Florida Lawn Fertilizer**

Useful fertilizers available at Diamond R Fertilizers, 1155 Commerce Dr. LaBelle,

20-20-20 soluble.....	40 lbs.	\$30.32
Iron Sulfate.....	50 lbs.	\$19.32
Epsom Salts.....	55 lbs.	\$17.38
10-10-10 #7003.....	50 lbs.	\$14.45
12-4-12+4Mg Palm Fertilizer.....	50 lbs.	\$22.75
16-2-8 50% slow Sulfur coated Nitrogen.....	50 lbs.	\$15.38
12-8-6 40% polymer coated Nitrogen.....	50 lbs.	\$24.15
16-00-26 STRX.....	50 lbs.	\$18.85
Sulfate of Ammonia 21-0-0.....	51 lbs.	\$18.35
K-MAG GR 0-0-22+11 Mg.....	50 lbs.	\$14.75
Can order from other warehouse		
Triple Super 0-40-0.....	50 lbs.	\$20.00
NUR 18-6-8 -180 Florikan Nutricote.....	50 lbs.	\$58.00

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