



Specialists In Soil Fertility, Plant Nutrition and Irrigation Water Quality Management.

**ASK THE PLANT®**  
TO GET THE MOST FROM YOUR PLANTS  
DYNAMIC CROP NUTRITION®

# FORAGE GRASSES

**AGRONOMY NOTE**



**NUTRITION NOTES**

**IMPROVED GRASSES** – Bermudagrass – Coastal – Tift-85 – Jiggs – Bahiagrass, etc. –

| Nutrient Removal Rates in Pounds per Acre |                     |     |                               |                  |    |    |
|---|---------------------|-----|-------------------------------|------------------|----|----|
| Grass                                     | Yield – Tons / Acre | N   | P <sub>2</sub> O <sub>5</sub> | K <sub>2</sub> O | Mg | S  |
| Above Grasses                             | 5                   | 250 | 70                            | 210              | 25 | 20 |
|   | 10                  | 500 | 140                           | 420              | 50 | 40 |
| Fescue                                    | 3.5                 | 135 | 65                            | 185              | 13 | 14 |
| Bluegrass                                 | 4                   | 120 | 60                            | 120              | 14 | 10 |
| Ryegrass                                  | 5                   | 215 | 85                            | 240              | 40 | 32 |

EFFICIENCY of applied fertilizer recovery by the first crop of plants ranges from 60-80% of N: 5-25% of P<sub>2</sub>O<sub>5</sub> (S + Humic Acid can improve P uptake): and 55-70% of K<sub>2</sub>O.

**Production depends upon supplying adequate nutrients or risk mining subsoils which is not sustainable for top yields or quality.**

**WATER** can be the main limiting growth factor; however, a properly fertilized plant will use water more efficiently to produce higher yields per unit of water. ***A balanced fertilizer program can produce 3-5 times more yield and higher nutritional quality with each unit of water.***

**SOIL TILTH** -- (Condition/structure) affects water, air and root penetration for Maximum Economic Yields (MEY) and quality. Subsoil tilth (structure) is improved by biological activity when fed humic substances and energy (sugar / amines); And the use of soil inoculants for diversity to help feed plants by solubilizing Calcium, Sodium, and Magnesium and other nutrients to improve cat-ion exchange and leach harmful salts.

**ORGANIC MATTER** (humus slow release nitrogen) is the foundation of any soil fertility or plant nutrition program. TPSL® tests measure only the humic (well decomposed - available) portion. To build OM is a long-term process. Use manure, composts, crop residues and other humus products for fast results in the soil-building program. Supplemental products such as Humates, Organic Formulas, Ligno-sulfonates, soil inoculants, fish products, vegetable meals, etc. may also be beneficial.

**SOIL INOCULANTS - Activators** (in the absence of adequate soil humus or in sterile conditions) such as BIOLOGICAL SOIL INOCULANTS/COMPOST TEAS containing naturally occurring beneficial soil micro-organisms and/or enzymes, hormones, polymers, wetting agents, Carboxyls, enzymes, hormones, Silicon, etc. can improve nutrient uptake and the soil's physical condition (tilth) for better plant performance, disease resistance, water use efficiency and salt leaching. Feeding microbes with humic substances, carbohydrates, and other organic materials aid soil tilth and releases soil nutrients while helping some bacteria fix N from the air. [A combination of products may be best for diversification. Follow product labels on your own test plots to determine the most effective products.]

**USE MOLASSES (sugars) and/or amines (proteins) for energy sources to aid biological activity.**

**BALANCED NUTRITION is the next step: Inventory your long term in-depth Soil Nutrient Bank.**

**REPRESENTATIVE COMPOSITE SOIL SAMPLE** - Be sure to sample top soil at 0-12" for beds, gardens and field cultivated areas, or 0-6 inches for undisturbed (turf, pasture, con-till, etc.) areas- take several uniform cores (slices) from several random areas, put in a clean container (*be sure to include crust from soil surface - discard dry mulch*), thoroughly mix; then discard foreign materials (plants, rocks, etc.) and send in *at least one pint* of soil that is a composite of several cores thoroughly mixed that are representative of the major root zone of your growing area or the problem spot being sampled. *Also, furnish detailed history of soil treatments and crops on each area. If you see a difference (color-slope-texture-growth) it should be tested separately.* Average test differences – not soil samples!!! See our ***How To Take A Good Soil Sample*** instruction sheet for full details.

**SUBSOILS** - While most plant roots feed in the 4 to 12" depth, the next 12 - 24" may also be a major contributor. -- For the most accurate soil test recommendation, annually sample the topsoil (0-6" or 0-12") separately and then the next 12" increment of the subsoil. Subsoils when run with topsoils cost about 1/2 as much as topsoil. Subsoil

tests evaluate sustainability (mining, or building) for long-term performance. --- Test Top and subsoil samples annually to determine if mining or building-up of subsoils is occurring. --- Test three and four-foot depths at 3-to-6-year intervals to check on the deeper rebuilding progress.

**CALCIUM** is the most important mineral as a building block for healthy soils, plants and animals. Even acid-loving plants also need a supply. TPSL<sup>®</sup>'s CO<sub>2</sub> *Plant Natural*<sup>™</sup> Soil Test that mimics the plants' extraction method, plus the water soluble Ca (H<sub>2</sub>O-Ca) is the best way to evaluate actual plant available Calcium. High Ca soils **OFTEN have low available (H<sub>2</sub>O-Ca)**. Ca is also essential for biological activity, especially with legumes. Soluble Ca (H<sub>2</sub>O) is also essential to leach harmful salts.

SOLUBIZE Ca and Mg to the available form with acidification from regular Sulfur use and/or biologically (feed microbes with humus products and molasses) more available (H<sub>2</sub>O Ca) should be beneficial.

**NITROGEN** - Plants drink and feed on N daily and require different quantities at various physiological stages of development. Use the **ASK THE PLANT**<sup>®</sup> regular program of plant analysis for what, when and how much nutrients are needed for highest profits.

**FORAGE NITROGEN** - It takes about 40 lb/ac of actual N to produce a ton of forage - a little less in Spring and more in the hot Summer. Improved Bermuda grasses, Bahia, Dallis, and some other adapted varieties with good soil moisture in the spring can respond upwards to as much as 200 lb/ac of N when maximum forage is needed. In summer only up to about 80 lb/N/ac for each harvest maybe effective. Quality (Protein) while peaking at 21 days after fertilizing decreases rapidly after 28 days. Yields increases rapidly up to about 42 days but by then it is mostly crude fiber: Yields and Quality are affected by many management choices. Yields in organic programs may be less but of higher consistent quality. **QUALITY COMES FROM LEAVES**. Not all grasses have enough upright growth to make good hay. Harvesting and feeding each 28 days by grazing or haying should be the target.

**NITROGEN:** For grazing apply 40 to 60 lb/ac of actual N. After grazing, as grass loses its vigor and quality, harvest for hay or shred excess for recycling as leaves contains the quality, not stems. For intensive grazing, this should be at 21 to 30 day intervals. Use 50-50 rotation on a two-week interval as a simple management method.

**NITROGEN:** Is the major need of grass. Legumes can supply some. Yields may be limited by lack of Nitrogen, especially for improved grasses such as Coastal Bermuda grass. A good economical source of humates, composts or manures are also needed for higher yields.

**LEGUMES** require adequate amounts of Ca-P-K-Mg in that priority. Then with good inoculation of the RIGHT symbiotic bacteria (Rhizobium) can fix atmospheric nitrogen for the plant's use. Some species of legumes are more tolerant of soil acidity but respond to good mineral fertilization with the above. To maintain legumes, strive for a 100 lbs/ac P<sub>2</sub>O<sub>5</sub> with TPSL<sup>®</sup> soil test in top 6" - 12".

**PHOSPHATE:** Average Grass production needs a minimum of 60 to 80 lb/ac of P<sub>2</sub>O<sub>5</sub>. For highest yields and quality use a 3-to-1 ratio of N to P<sub>2</sub>O<sub>5</sub> each time N is applied. Organic / Sustainable programs rely on build-up of phosphate reserves with mined rock phosphate or manures. **Phosphate remains more available in acid soils.**

**Phosphate and Micronutrients tie up rapidly in highly calcareous soils.**

**Sulfur**, placed with the PHOSPHATE in alkaline soils, can increase the availability and uptake of P by the roots. Any amount of S can be beneficial and there may be increasing benefits above the 1-to-1 S-to-P ratio each time.

**Humic Substances** such as Humic acid with the P can increase uptake, Soil inoculants (conditioners) should also be beneficial.

**Plant Growth Regulators** (hormones) or **ENZYMES** (growth stimulants) have increased root development, earliness and yields. They can be applied with starter P or foliar. Apply according to label, 2-4 oz/ac is usually adequate for the first application.

**Soil Inoculants** (of naturally occurring beneficial soil microorganisms) can aid the uptake of plant nutrients.

**POTASH** - Improved grasses can feed off the subsoils until that Potash is exhausted, then the grass will winter kill in irregular spots at first, show early water stress, have thin narrow blades, be subject to leaf spot disease and low protein even with high rates of N. Grasses utilize about as much K<sub>2</sub>O as N, some use more K than N. ---- Use equal amounts of K and N each time N is applied for top quality and yields when soils test low.

**POTASH AND MAGNESIUM** - Apply as much K<sub>2</sub>O as actual N each time Nitrogen is used. Use 1/3 of K<sub>2</sub>O from K-Mag {0-0-22 + 11Mg + 22S}. (That is: a 50:50 mix or 100 lbs of 0-0-60 mixed with 100 lbs of K-Mag).

**MAGNESIUM** is essential for quality forage and better animal performance.

**POTASH** improves the over all health of the plants and with moisture stress helps to get better water use efficiency for better quality and yield.

**MOST ECONOMICAL CROPS and FORAGE PRODUCTION** comes from an intensive well-balanced program on a few acres. Larger area can then be in a long range improvement program with lower inputs. Call to discuss.

**QUALITY FORAGE** comes from the leaves as stems are mostly crude fiber. Shred regularly or harvest for hay before six weeks when protein drops rapidly. Shredded forage builds Organic Matter which then converts to Humus.

**COPPER** - is essential to animal health, many soils are deficient. – TPSL<sup>®</sup>'s Comprehensive Soil Test report gives generic Copper recommendations in terms of pounds of Copper Sulfate (CuSO<sub>4</sub>) per acre. There are many products available today that may furnish Copper in more efficient compounds, such as chelates, etc. The supplier of these alternative products will be able to translate our generic recommendations into quantities of their products.

**OTHER MAJOR MICRONUTRIENTS** – Don't ignore Iron (Fe), Zinc (Zn) or Manganese (Mn) – all have significant functions in the plant to aid nutritional uptake and conversion – and assist in disease and insect fighting.

**SULFUR and BIOLOGICALS** use regularly in fertilizers and irrigation water to increase soluble Calcium and Magnesium, thereby improving soil physical condition (tilth) to aid water and root penetration and the leaching of salts. Sulfur in alkaline soils will increase nutrient availability especially Phosphate and Micronutrients.

**SULFUR** - use up to 80 lb/ac (2 lbs/1000 sq. ft. of area) over the entire growing season in high pH, highly calcareous soils. It is best when split into two or three applications a year. S lasts only 45-90 days in most cases.

**MOLASSES** (or Sugar) as an energy source aids soil microbes to convert excess caustic nitrate (NO<sub>3</sub>) to beneficial amine (NH<sub>2</sub>) N and slows the release. --- Foliar apply a 1 to 2 quarts solution of sugar (Molasses is best) per acre to help fruiting and slow excess vegetation. Use the higher rate when you have thicker foliage. **Always apply together with a surfactant to avoid leaf burn spots.**

**FOR NUTRITIONAL FORAGE and Maximum Economic Yield** - Use TPSL<sup>®</sup>'s **ASK THE PLANT<sup>®</sup>** full analysis of a representative sample at harvest and during development for best evaluation of what plants are getting and need.

*A **Sustainable Balanced Plant Nutrition Program** is required for Optimum Profits -  
There are no magic cures or miracle formulas – just a total program of sound scientific management.  
Don't guess about your inputs – use TPSL<sup>®</sup> **Plant Natural<sup>™</sup>** Soil Tests and  
**ASK THE PLANT<sup>®</sup>** plant nutrition monitoring programs.*

**You Can't Afford Not To Know<sup>®</sup>**