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### **WHAT IS A HARDPAN AND IS IT BENEFICIAL**

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A majority of flatwoods soils found in Florida are classified as Spodosols. Spodosols are soils which contain a spodic horizon and is commonly known as a hardpan. The hardpan is typically between 6-12 inches in thickness and usually is found two to four feet below the soil surface. However, depending on the location it may at times be near the surface or deeper than four feet. A hardpan or spodic horizon is brownish to black in color and contains a large percentage of organic matter, iron and aluminum. As a result this soil horizon has a high nutrient holding capacity as compared to the surface soil.

Contrary to popular belief a hardpan is not always hard. It is true that during drought periods in the winter that the hardpan can become hard as cement, however during the summer as the rainfall rates increase the hardpan softens as it absorbs water. This permits root systems to grow into the hardpan thus permitting the plant to absorb nutrients which it otherwise might not be able to get.

Chemical analysis of soil samples taken from various soil horizons has shown that available phosphorus levels can be as much as six times higher in the hardpan as compared to the surface soil horizon which is typically analyzed prior to making fertilizer recommendations. In fact soil samples taken from the hardpan of a virgin field which had never been fertilized had extractable phosphorus levels greater than 50 ppm which is considered to be in the high range for phosphorus. This suggests that there are large natural reserves of phosphorus present in flatwood soils which may be available for plant growth.

Research studies conducted at the Ona Research Center has shown that forages such as bahiagrass have root systems which are able to penetrate into the hardpan and utilize needed nutrients such as phosphorus. As a result ranchers may be able to reduce phosphorus fertilization rate without reducing yields or quality of bahiagrass.

As a result of these and other studies, IFAS has recently revised the fertilizer recommendations for forages. For established stands of bahiagrass are three production options to choose from based on one's fertilizer budget, management objectives and land capability.

**High N Option**-Apply 160 pounds N and 40 pounds P<sub>2</sub>O<sub>5</sub> per acre if your soil tests low in P or 20 pounds P<sub>2</sub>O<sub>5</sub> per acre if it tested medium. Also apply 80 pounds of K<sub>2</sub>O per acre if soil tests low in K or 40 pounds of K<sub>2</sub>O per acre if soil tests medium in K.

**Medium N Option**-Apply 100 pounds N per acre. Also apply 25 pounds P<sub>2</sub>O<sub>5</sub> per acre if soil tested low in P and none if it tested medium. Apply 50 pounds K<sub>2</sub>O per acre if soil tested low in K or none if it tested medium. If you plan to make a late season cutting of hay, apply 80 pounds N per acre between August first and the fifteenth (about six weeks before the growing season ends).

**Low N Option** (for grazed pastures only)--Apply 50 pounds N per acre and no P or K. However if you follow this option apply P and K as recommended by a soil test every three or four years as an insurance factor. Do not use this option if you cut bahiagrass for hay since nutrient removal can be very large.