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## **Phosphorus Supplementation of Grazing Beef Cows**

**John Arthington**  
*University of Florida/IFAS*  
*Range Cattle Research and Education Center*



**For questions or comments regarding this publication contact**  
**[John Arthington](#)**

Phosphorus in Florida continues to be an important topic among crop and livestock production systems. Among all agricultural enterprises in Florida, beef cow/calf production systems have the greatest opportunity to limit phosphorus inputs and thus better maximize both economic and environmental impacts to the production system. In many cases, beef cow/calf production systems have the opportunity to be net-phosphorus exporters, thus contributing to the remediation of certain phosphorus-impacted landscapes. Typical phosphorus inputs onto a Florida cow/calf production system include, 1) pasture fertilizer, 2) purchased animals (i.e. replacement heifers and bulls), and 3) purchased feed or feed supplements. The import of phosphorus in pasture fertilizers typically encompass the largest amount of annual phosphorus coming onto a ranch landscape. Recent refinement in the University of Florida - IFAS pasture fertilization recommendations have assisted ranchers in indentifying situations when phosphorus application will be the most effective. For more information on phosphorus fertilization of Florida pastures, refer to <http://edis.ifas.ufl.edu/>.

Phosphorus contained within purchased feed and feed supplements is another source that contributes to the total ranch phosphorus input and, like fertilizer, is one input source that can be managed to maximize total ranch phosphorus balance. The best place to start when describing this concept is with the cow's phosphorus requirement. The National Research Council has compiled research in beef cow nutrition to provide a range of values for cow nutrient requirements. This report tells us that beef cows have a range in phosphorus requirement from as low as 13 to as great as 26 grams daily. This range is impacted by lactation, with the greatest requirement associated with high milk producing cows during the time of peak lactation. It is common for Florida's pasture forage to average 0.18 to 0.20% phosphorus providing 20 to 23 grams daily. Therefore, during many months of the year no additional phosphorus supplementation is needed. As a producer, you can only be certain of your pasture phosphorus content by testing hand-

clipped samples in a forage testing laboratory. This process is simple, affordable, and effective. When assessing your results, always remember that cows have a natural and effective ability to select higher quality forage than you will select in a random, hand-clipped forage sample. Therefore, provided adequate pasture forage is available for selection, you can expect cows to consume forage with a 20% greater forage phosphorus concentration than appears on your test results. While cows are grazing this pasture, producers typically also offer salt-based mineral supplements that are fortified with phosphorus sources. These mineral supplements can vary from 2 to 12% phosphorus. Although individual cow intake of mineral supplement certainly varies, a common range is 2 to 4 ounces daily. At this rate, cows will consume an additional 2 to 10 grams of phosphorus daily (2 and 12% mineral supplements, respectively). In most cases, this strategy of relying on forage and supplemental inputs to address cow requirements is a logical option.

Beyond the provision of free-choice, phosphorus containing mineral supplements, there is another important source of phosphorus typically offered to Florida cowherds, which includes energy and protein supplements. Typically, these supplements are offered in the winter and early spring months when pasture forage is often lacking in both quantity and quality. Many options are available to producers and their selection among these choices will certainly vary in their phosphorus contribution. In many cases, producers will choose to select a commercially formulated feed supplement offered by one of several livestock nutrition companies. In almost all cases, these supplements are further fortified with additional minerals and vitamins, including phosphorus. This source of phosphorus is a very important consideration to the overall phosphorus nutrition of the cowherd. Because these supplements are typically offered in the winter or early spring, they come when most Florida cows are in early to mid-lactation, a time when their phosphorus requirement is the greatest. Therefore, although forage phosphorus may be limiting, the supplemental phosphorus from winter feed supplements typically will meet the cow's requirement. Appreciation of the mineral offering of fortified energy and protein supplements is an excellent opportunity to realize considerable savings in a beef cow/calf production system, whereas cowherds provided mineral-fortified supplements almost always can do without their typical free-choice salt-based mineral supplement. In many of these situations, offering cows straight, free-choice, white stock salt (no added minerals) will be effective and economically sound. Further, some commercially available winter supplements also supply all the sodium (salt) requirements of the cow, which allows producers to realize further supplementation savings.

Table 1 provides simple examples of calculating total phosphorus intake of grazing beef cows. These examples illustrate how each of the three major feed sources can contribute to total phosphorus intake. Although forage phosphorus concentration cannot be easily manipulated, understanding its input and contribution to the cow's total phosphorus intake is important when attempting to make economically sound supplement purchases. Example 1 and 2 illustrate a marginal forage phosphorus concentration (0.17%) complemented with either a phosphorus-fortified winter supplement and low phosphorus salt-based mineral supplement (#1) or the reverse (#2). In both examples, the forage, supplement, and mineral phosphorus inputs meet or exceed a cow's greatest phosphorus

requirement.

To better understand your specific phosphorus inputs, take an opportunity to test the phosphorus content of your forages, visit with your county livestock extension faculty, and consult with your feed supplement representatives. Each of these resources can assist you in making phosphorus supplementation decisions that are both economically and environmentally sound.

<b>Table 1. Sources of phosphorus intake for grazing beef cows (example 1,000 lb cow)</b>		
Example	Phosphorus content	Total phosphorus
<b>Example 1: Fortified Winter Supplement</b>		
Forage (21 lb)	0.17%	16 grams
Fortified winter supplement (3.75 lb)	0.70%	12 grams
Salt-based mineral (4 oz)	2.0%	2 grams
	<b>Total</b>	<b>30 grams</b>
<b>Example 2: High-Phos Salt Supplement</b>		
Forage (21 lb)	0.17%	16 grams
Unfortified winter supplement (3.75 lb)	0.11%	2 grams
Salt-based mineral (2 oz)	12.0%	7 grams
	<b>Total</b>	<b>25 grams</b>