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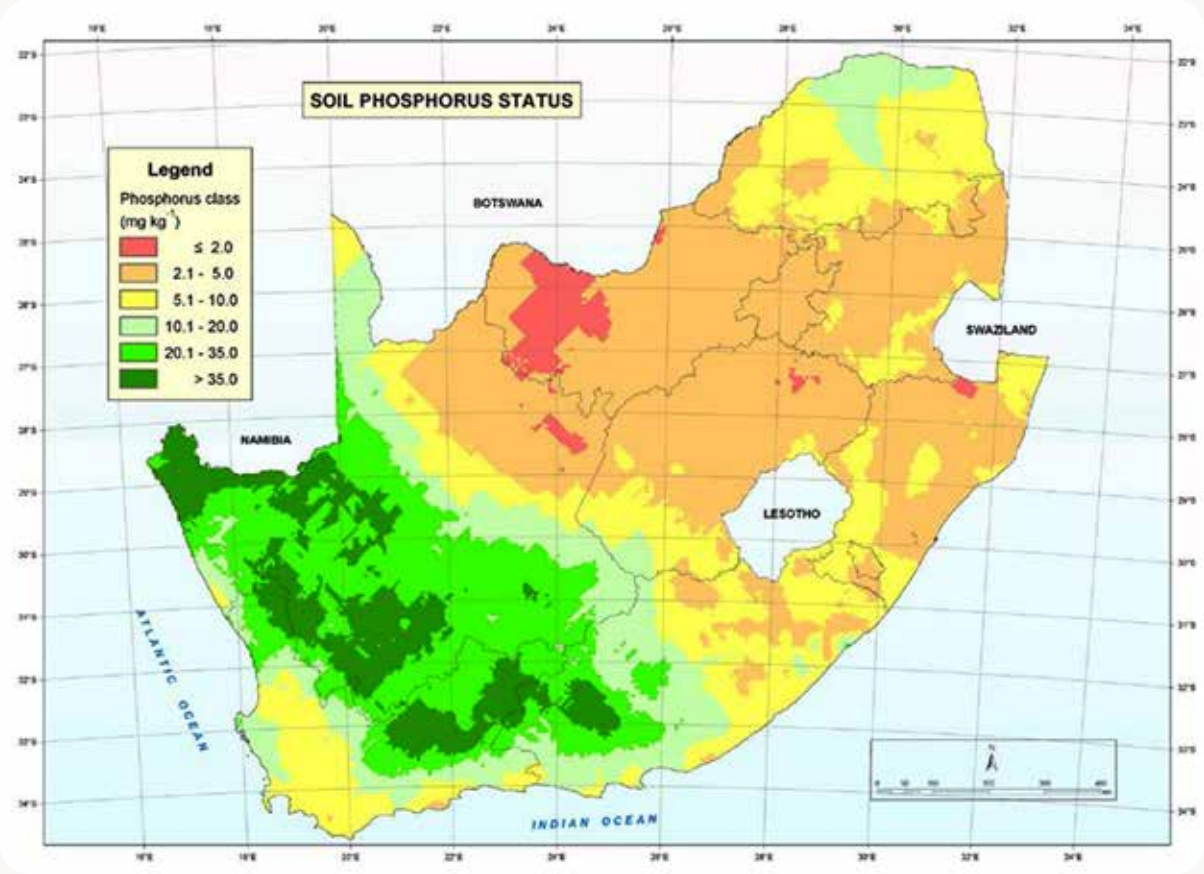
The BENEFIT of *phosphate* supplementation on PRODUCTION and REPRODUCTION

Natural grazing (veld) which is actively growing and green, generally requires lower levels of supplementation, with the main limiting nutrient to production being phosphorus and trace minerals.

Cattle grazing pastures with a low soil phosphate status, obtain insufficient quantities of phosphate from the grazing (Dixon *et al*. 2020). The effect of a phosphate deficiency in cattle is noteworthy: reduced appetite, which leads to a deficiency of phosphate and other nutrients.

Fig. 1 below depicts the soil phosphate status of regions within South Africa. A soil phosphate status of <5mg/kg is considered to be deficient in phosphorus, hence supplementation on grazing with this status will lead to positive results.



Phosphate deficiencies

Acute phosphate deficiencies in cattle result in the following symptoms:

- Pica: Chewing of abnormal items such as bones
- Poor body condition score
- Poor growth and development of young stock
- Botulism

Phosphate is used by cattle to develop a strong skeletal system and teeth, it also plays a role in the metabolism of fat, protein, and carbohydrates, stimulates milk production and improves feed conversion.

Cattle on the farm which have the highest phosphate requirement are:

- Young stock - for bone and skeletal development
- First calf cows - for growth, pregnancy and milk production
- Late pregnant animals - for foetal development
- Lactating cattle - for milk production. To produce 1L of milk, roughly 1.5g of phosphate is required.

Insufficient phosphate from grazing, results in cattle mobilising phosphate from their bones in order to rectify the deficiency.

Minerals should also be balanced within the diet. The calcium-to-phosphate ratio is of importance, if either calcium or phosphorus is too high, the absorption of the other mineral will be affected. Phosphorus supplementation is only effective if cattle are not deficient in protein and energy.

Research conducted by de Waal *et al.*(1996) on the Armoedsvlakte in Vryburg demonstrated the benefits of phosphorus supplementation in cattle herds within South Africa. Cows that received phosphate supplements throughout the year, weighed 33kg more than those which received phosphate supplementation during one season. The summary of results is provided in **Table 1** on the next page.

» **Table 1.** The effect of differing phosphate levels provided over a 6 or 12-month period, on the reproductive performance of beef cows on the Armoedsvlakte (Adapted from *de Waal et al., 1996*).

Treatment	Months of Supplementation	Level of P supplementation (g/h/d)		Calf % (1985-1989)	Weaning % (1985-1989)
LP 6	6 months (Sep-Feb)	5		73.3	71.1
MP 6		10		84.1	77.3
HP 6		16		85.2	74.1
LP 12	12 months	Mar- Aug 3	Sept-Feb 5	77.8	70.4
MP 12		6	10	83.0	77.4
HP 12		9	16	86.0	86.0

The Benefit of Different Phosphate Sources

When buying any phosphate product, producers must differentiate between the various sources available. Traditionally, bone meal was considered an organic source of phosphorus for grazing cattle to abate phosphorus deficiencies. However, several diseases caused by bacteria, namely Salmonella and *Bacillus anthracis* (which causes anthrax) reared their heads, causing great financial losses. Due to these diseases, regulations were placed that bone meal intended for use in animals must be sterilised through a steaming process. Should bone meal be considered as a source of phosphorus, producers should keep in mind that variation exists between various bone meal sources, and the bioavailability of the phosphorus within the product can range from 50-80%.

Dicalcium phosphate/Monocalcium phosphate

In the animal nutrition industry, inorganic sources of phosphorus are used when producing phosphate products, namely monocalcium phosphate (MCP) and dicalcium phosphate (DCP). Monocalcium phosphate is a rich source of phosphate with the highest bioavailability (80%), which promotes animal performance when used in rations or supplements. The differences between various phosphorus sources are indicated in **Table 2** below:

Voermol Superfos is optimally balanced

Voermol uses the highly bioavailable source of phosphate, Monocalcium phosphate, in the production of **Voermol Superfos (V17422)**. In addition to the phosphate source, organic trace minerals, which support enhanced reproductive performance, health, and fertility, are included in Voermol Superfos. Organic trace minerals are more biologically available to the ruminant, as they utilize an alternative absorption route than inorganic minerals.

Phosphate source	Calcium (Ca) (%)	Ca-bioavailability (%)	Phosphate (P) (%)	P-bioavailability (%)
Sterilised bone meal	30	95	12	65%
Dicalcium phosphate (DCP)	21	94	19	75%
Monocalcium phosphate (MCP – P21)	16	95	21	80%

» **Table 2.**