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Forage Fact # 17

Phosphorus - Important to Healthy Animals & Plants

Phosphorus' importance:

- * Component in forming teeth & bones
- * Associated with skeletal formation
- * Involved in protein synthesis
- * Role in plant and root growth
- * Involved in nitrogen fixation
- * Role in seed production & flowering

For more information call:

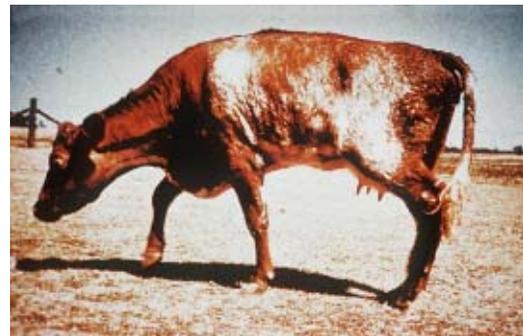
- * Brian Clarke, Sunrise
(250) 789 9254
- * Chuck Sutherland, Groundbirch
(250) 780 2221
- * Judy Madden & Mike McConnell, Dawson Creek
(250) 782 7875
- * Mike Cowger, Montney
(250) 787 1790
- * Sandra Burton, Farmington
(250) 789 6885

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P.O. Box 908
Dawson Creek, B.C.
V1G 1L6

Animals need phosphorus ...

In animals, phosphorus plays a role in forming bones, teeth and metabolic reactions. It is associated with skeletal formation and protein synthesis. Phosphorus forms an insoluble complex with calcium, thereby reducing calcium absorption. So for optimal growth a 2:1 or 1:1 calcium to phosphorus ratio is recommended in feed.



Cow deficient in phosphorus.

Detecting a deficiencies ...

Signs of deficiency in animals and humans include: loss of or abnormal appetite, reduced horn growth or decrease in horn strength, rickets, reduced body growth, weakness, and/or death.

Plants need phosphorus ...

Phosphorus plays vital roles in plant growth and health. Phosphate is the form of phosphorus available to plants for uptake. It plays a key role in plant and root growth, maturation and nitrogen fixation. It forms the tissues in the stalks and it helps prevents lodging in cereals. It is also involved in flowering, fruiting, and seed production. It is used in plants to form part of an ATP compound used in most energy driven plant processes, such as nutrient uptake and photosynthesis.

Detecting deficiencies ?

Poor growth and plant health can indicate a deficiency. Plants that lack phosphorus can be identified by comparing them to healthy plants. Phosphorus deficiency causes delayed maturity, decreased flowering and poor seed quality. Unhealthy plants will be stunted and spindly, with dark blue/green foliage. Phosphorus moves easily throughout the plant, and it will move from the older leaves to newer ones.



Plants without adequate phosphorus levels appear stunted, have reduced tillers and/or a poor root system (see plants on left).

A suspected deficiency can be confirmed by soil and tissue sampling.

**Peace River Forage Association
of British Columbia**



Crop removal of phosphorus by different crops: (in lbs/acre)

* Alfalfa	38
* Barley grain	35
* Barley straw	8
* Oats grain	27
* Oats straw	17

Correcting a deficiency

Phosphorus can be applied to forage fields in several ways. A deficiency can be corrected organically with manure, green manure, mulches or compost.

Commercial phosphorus fertilizers also are available. Broadcasting is the most efficient method of fertilizer application on established perennial crops. Recent data show deep band applications of P₂O₅ in old alfalfa stands is also an effective management tool. Fertilizer loss and the immobile nature of phosphorus can be compensated for by placing fertilizer within the root zone instead of by broadcasting.



Stunted plants are deficient in phosphorus.

Crop requirements for P

Several of the forage crops commonly grown in the Peace River area have high phosphorus requirements. Legumes such as alfalfa often show dramatic response to improvement in P status in the soil.



Alfalfa plant on left is deficient in phosphorus.

Phosphorus Content in Feed

	Content (100% dry matter basis)		
	Calcium	Phosphorus	Ratio Ca:P
Forages			
Alfalfa	1.60	0.31	5:1
Orchardgrass	0.31	0.26	1:1
Red Clover	1.45	0.23	6:1
Smooth Brome	0.36	0.19	2:1
Timothy	0.40	0.16	3:1
Seeds			
Barley	0.08	0.45	1:6
Oats	0.10	0.37	1:4
Wheat	0.09	0.39	1:4

Can there ever be too much phosphorus?

Yes, too much phosphorus can have serious consequences for water sources and animal health. When excess phosphorus enters lakes and streams, it encourages plant growth. Lakes may become murky and possibly unsuitable for drinking by livestock and humans. High phosphorus levels can lead to calcium imbalance, resulting in mobilization in calcium from bones, leading to bone diseases (i.e. osteoporosis). An excess interferes with availability of copper & zinc to the plants.

Summary comments

As your storage bank of nutrients such as of phosphorus is depleted, yield and quality of forages and feed decline. Poor quality feed eventually can lead to deficiencies in animals. Phosphorus plays a vital role in plant, animal and human health and should be managed appropriately.

“We must invest in our soils if we wish to continue to produce high yield and high quality crops.”
Bob Tubb,
Tomslake

Compiled by: Julie Robinson and Sandra Burton in Fall 2002

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