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Importance of Minerals and Vitamins in Animal Reproduction

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Abstract

Animal reproduction management is very important in order to get a calf per year from cows and a calf per 14 months from buffalo. All the nutrients in the diet have a special role in animal reproduction, but the most important role is played by minerals and vitamins. Without these minerals and vitamins, animal reproduction cannot take place properly. Minerals are part of various digestive enzymes and hormones and these hormones play an important role in animal production as well as reproduction. Vitamins and minerals like vitamin A, vitamin E, selenium, zinc, manganese, copper, molybdenum and iodine play a very important role in animal reproduction. Due to the lack of minerals and vitamins, the growth of calves is stunted, the calves do not mature in time, they do not come to oestrus, repeat breeding, abortions, and dystocia will be observed. This causes a huge financial loss to the animal owner. Therefore, in order to avoid these issues, it is very important in terms of animal breeding to use proper animal feed, nutritious green and dry fodder along with the appropriate amount of minerals and vitamins.

Keywords: Fertilization, Minerals, Reproduction and Vitamins

Introduction

Animal breeding/ reproductive management is very important to make the animal husbandry business profitable. Timely implementation of reproductive aliments will definitely help to reduce the dry period and increase productivity. Increased production per year reduces production costs and increases the economic profitability of animal husbandry. This is why we need to pay attention to animal breeding/ reproduction. We will see how certain minerals and vitamins can affect animal reproduction.

Vitamin A

Green fodder contains carotene, which is converted into vitamin A in the animal's body and stored in the animal's liver, muscles and milk. Deficiency of this vitamin results in

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stunted growth of calves, delayed puberty, low pregnancy rate, high perinatal mortality, high fetal mortality, blind and weak newborn calves and low libido in males. Vitamin A supplementation increases progesterone levels on days 3, 5 and 6 after oestrus, which helps the embryo to survive and grow. Adequate levels of vitamin A ensure better absorption of digested nutrients, better fetal growth and better calving.

Vitamin requirement in cows and buffaloes: 30000 to 50000 IU/animal/day

Sources: Yellow maize, carrots, green fodder

Vitamin E and Selenium

There is always a strong connection between selenium and vitamin E. Both of these act primarily as cellular antioxidants that help protect cells from some of the harmful effects of hydrogen peroxide and some other peroxides produced from fatty acids. Selenium's main function is to act as a component of cytosolic GSH-PX, which helps reduce peroxide levels, while vitamin E acts as a lipid-soluble antioxidant specific to cell membranes. GSH-PX normally destroys peroxides before they attack the cell membrane, while vitamin E acts in the cell membrane to prevent auto-oxidation, i.e. the chain reactivity of lipids in the membrane. Deficiency of Vitamin E and Selenium causes problems such as intermittent calving, late conception, mute or short-term calving, reduced pregnancy rate, ovarian cyst formation, reduced sperm motility, reduced uterine motility, cystitis and uterine engorgement.

Requirement of vitamin E in cows and buffaloes (depending on body condition): 150 to 375 IU/animal/day

Sources: Pulses, Green fodder, sprouted Wheat and grains, Oilseeds etc.

Copper and molybdenum

It is always better to consider copper and molybdenum together, as the interaction between the two elements can lead to the underutilization of copper. After some reaction between molybdenum and sulfur (sulphide), it is observed that thymolybdate is formed in the rumen. Thiomolybdate continuously reacts with copper to form insoluble copper thiomolybdate, so copper cannot be absorbed by the animal's body. Copper-molybdenum-sulfur complexation limits the use of copper. A low supply of copper from the diet is the main cause of copper deficiency. Copper-zinc, copper-iron and copper-phytate interactions lead to secondary copper deficiency and adversely affect animal reproduction. Especially in grazing animals, copper deficiency causes problems such as abortion and stillbirth, delayed or poor

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calving, reduced fertility, early calving, embryonic death and infertility. The requirement of molybdenum in animals is very low and its requirement is likely to be easily met from a normal diet. Copper deficiency is almost always a secondary deficiency associated with high molybdenum levels. Copper deficiency causes infertility and loss of libido in bull calves, as well as some reproductive disorders due to tissue damage and reduced spermatogenesis.

Animals require 5 to 7 mg of copper per kg of feed per day.

Sources of Copper: Groundnut meal, Cottonseed, Liver and Glandular Mill, Copper sulphate

Zinc

Zinc acts as a component of various metals and enzymes and helps in protein synthesis, nucleic acid metabolism, and carbohydrate metabolism. Hence, it is essential for active growth and division in cells like the gonad. Zinc deficiency severely impairs reproductive functions and can affect spermatogenesis and development of primary and secondary sex organs in males and all stages of the reproductive process in females from conception to lactation. If male calves are fed zinc-deficient diets, the testes will not grow properly and will be smaller in size.

Zinc requirement: 9 g per day for cows and buffaloes

Sources: Wheat middling, Zinc chloride, molasses, fish meal and yeast

Iodine

Iodine deficiency in cows and buffaloes causes problems such as miscarriage, abortion, failure to calve, irregular menstrual cycle and stillbirth.

Daily Requirement: 0.1 mg per kg of diet

Sources: Seafood, molasses, meat meal, bone meal and iodized salt

Manganese

Manganese deficiency results in reduced growth and reduced productivity. In males, the size of the testes decreases. Ejaculation problem occurs in cows and buffaloes and the calf does not grow well. Manganese plays a very important role in bone formation. Findings from studies have shown that manganese can cross the placenta and enter the fetus, and therefore the storage of manganese in the fetus depends on the mother's diet. Manganese plays an important role in the production and secretion of progesterone.

Daily Requirement: 16 to 25 milligrams per kg of diet

Sources: Wheat, green fodder contains sufficient Manganese.

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Calcium

Calcium deficiency in livestock can cause uterine motility retardation, prolapse, dystocia, and reproductive disorders.

Calcium requirement: 14 grams per day for body maintenance and 2.3 grams per liter of milk.

Sources of calcium: dicalcium phosphate, bone meal, meat meal, fish meal, limestone, green leguminous fodder.

Phosphorus

Due to the lack of phosphorus, the animal does not come in oestrus and the oestroal discharge becomes watery, and pregnancy is reduced.

Phosphorus requirement: 14 grams per day for body maintenance and 2.0 grams per liter of milk.

Sources: Bone meal, dicalcium phosphate, difluorinated phosphate, diammonium phosphate, grains, bran, oilseed cakes etc.

Conclusion

Along with feeding green fodder, dry fodder and concentrate, supplementation of minerals and vitamins is necessary to improve animal reproduction.

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