Symptoms and Treatments

At the outset it should be said that area deficient in these elements can only be confirmed by soil and pasture analysis and even then, expert advise should be sought in interpreting the results of such analysis. Some areas are well-known for these deficiencies, such as coastal zones where leaching due to high rainfall may occur (e.g. selenium and cobalt) but other areas where iodine deficiencies occur include parts of Victoria and Tasmania, Northern NSW and the Hunter Valley. Cobalt deficiency has been recognised in varying degrees in areas over the whole of the South-East, parts of the Murray, Mallee and Coastal South Australia.

Cobalt Deficiency
This is slow insidious disease which, if not corrected, can lead to ill thrift and death.

The deficiency may be seasonal, appearing one year and not the next on the same property and may be seen at any time of the year.

Deficient Areas: As mentioned about, the soil types involved are mainly calcareous sands, especially near the coast, the sand over clay of the upper south east of South Australia and parts of the Eyre Peninsula, and heavy black clays.

Recognition: Common symptoms of cobalt deficiency are loss of appetite and subsequent poor growth rate or weight loss, anaemia, scaly ears and watery discharge from the eyes. Young animals are more susceptible than adult stock.

In some areas cobalt deficiency is complicated by the additional deficiency in copper and treatment is ineffective unless both copper and cobalt are provided.

Cobalt Deficiency is Vitamin B12 Deficiency
Cobalt is of no direct nutritional value to animals. It needs to be converted by micro-organisms in the rumen into the essential vitamin B12. This is then absorbed by the animal and used to maintain normal body function. Symptoms of cobalt deficiency are symptoms of vitamin B12 deficiency and are associated with low serum vitamin B12 levels.

Vitamin B12 can be supplied directly by injection. Oral doses are not recommended because only a small fraction of the vitamin B12 is absorbed.

The most common use of vitamin B12 is to treat unweaned animals because young growing animals have the greatest requirements for vitamin B12. They are born with a reserve in the liver, the animal depending on the vitamin B12 levels of the mother during pregnancy. This reserve is used to meet the young animal's requirements over the first six to eight weeks of life because the amount of vitamin B12 obtained through the mother's milk is negligible.

The rumen of the newborn animal does not function until six to eight weeks of age and in that time is not able to convert cobalt from pasture into vitamin B12. In cobalt-deficient areas the reserves of vitamin B12 in suckling animals are exhausted at this stage. A vitamin B12 injection maintains adequate levels of this vitamin and prevents a check in growth rate.

Treatment in Kids (and Lambs)
Sheep and goats can be treated similarly with an injection of 2mg vitamin B12 under the skin sufficient to sustain kids and lambs up to weaning when a cobalt bullet and grinder can be given. To maintain optimum growth on severely deficient areas, a second 2mg injection should be given eight weeks after the first injection.

Treatment in Mature Animals
Consider vitamin B12 injections as a supplement for adult animals where administration of a cobalt bullet and grinder is not practical, for example

- in a sheep trading situation in cobalt-deficient areas
- in areas where the deficiency is marginal and occurs only at certain times of the year
- where cobalt bullets coat with an insoluble calcium layer
- in areas of low carrying capacity

An injection of 2mg of vitamin B12 should be sufficient for up to four months in weaned and mature age animals grazing acutely deficient pastures.

Injection Site
All vitamin B12 injections should be given subcutaneously, i.e. under the skin. This reduces the chance of any carcase blemish due to injection. The vaccinator and needles should be thoroughly cleansed and sterilised before use.

For all grown animals inject in the site of the neck (just behind or below the base of the ear).

Injections can be given to lambs and kids under the skin on the neck on the opposite side to the enterotoxaemia vaccination site.

Alternative Provision of Cobalt for Conversion to Vitamin B12
Many different methods of administering cobalt have been tried including drenching, misting of pastures, salt licks and dissolving in drinking water. Information is available from the Department of Agriculture Fact sheets for the following treatments:

- Cobalt Bullets
- Cobalt Drenching
- Cobalt Fertiliser
- Salt licks containing cobalt
- Cobalt in supplementary feed
- Cobalt in drinking water
- Cobalt sprayed (misted on pasture)

Cobalt, Selenium and Iodine deficiencies in goats

The above information was provided by Jock McFarlane, Research Officer, Dept of Agriculture; Mike Riley, Animal Health Adviser; Dr Geoff Judson, Chief Scientist Veterinary Sciences Division, South Australia.

Selenium Deficiency
Selenium has been shown to affect sheep, cattle and goats in a variety of ways. It was shown to be involved in the prevention of white muscle disease, infertility, in the survival and growth of the young and even in the loss of molars and, occasionally, incisor teeth. Indeed selenium deficiency has been firmly established as affecting chickens, pits, rats and even may well be involved in some human conditions.

Selenium deficiency and the onset of white muscle disease in young small ruminants is well known as is the fact the selenium deficiency is related to ill-thrift. Selenium deficiency ill-thrift can vary in degree from almost imperceptible reduction in growth to relatively high levels of mortality. Post-weaning depressed growth rates in grazing animals can be due, in part, to selenium deficiency.

Selenium has an affect on fertility. Deficient does cycle and mate normally but the embryo fails to implant. Embryonic death occurs 3 – 4 weeks after joining.

Selenium supplementation can be administered by top dressing pastures, oral dosing, injection or rumen pellets. Top dressing is still in the experimental stage in Australia.

Until recently dosing was the simplest and most convenient, using a solution of either sodium selenate or sodium selenite. 4.6g sodium selenate or 2.2g sodium slenite dissolved in one litre of water will give 200 x 5ml doses (each with the required 5mg of selenium for adult animals. Kids less than 3 months old should only get 1ml of solution.)

If very young goats (1 – 2 weeks old) are given PK test selenium injections death can occur and some of the survivors will show overshot jaws as a result of abnormal bone development early in life.

The time that selenium should be administered to goats in selenium deficient areas can be summarised as follows:

1. 5 mg of Se to does one month prior to joining.
2. 5 mg of Se to does one month prior to kidding (passed on to kids).
3. 1 mg of Se to kids (or 5 mg to does) at the 2nd kid vaccination. This vaccination, 4 weeks or so after the first, can be Pk.tet.Se.
4. 5 mg of Se to kids at weaning (16 weeks) and further doses 3, 6, 9 and 12 months later as necessary up to joining age (but see below).

Recent improvements in the manufacture of selenium pellets have greatly increased the use of this more convenient and logical method of supplementation. Each kid is given a rumen pellet at weaning, making life a lot easier.

NOTE: Selenium when overdosed is a very toxic substance. Do not give selenium to very young animals. Check carefully that the property is, in fact, in a selenium deficient area.

From information provided by Professor John Evens
(see Page 2).

Iodine Deficiency
Very common in grazing stock and goats are particularly susceptible.

Iodine is related to the functioning of the thyroid gland. The thyroid gland manufactures thyroxine. Thyroxine (which contains iodine) is involved in a large number of functions related to the health and production of the animal before and after birth.

The foetus has an active thyroid from mid term onwards. Thyroid hormones are required for the normal development of the foetus. Thyroxine does not pass from mother to foetus. The foetus has to make its own. The iodine status of the doe during gestation is therefore very important. (Iodine does pass from doe to foetus across the placenta.)

Thyroid glands are efficient I_2 trappers. The thyroid hormones affect growth and development in the foetus in a number of ways.

1. In brain development and relating to teat finding, etc at birth.
2. Deficiency in the foetus results in bones not being properly made.
3. Deficiency affects the growth of teeth.
4. Deficiency affects proper development of the skin.
5. Deficiency may also be involved in lung disorders in new born kids.

It is evident, therefore, that thyroid hormones are very much involved in the normal growth and development of the foetus and thyroid gland deficiencies can result in a higher proportion of weak or still born kids being born than would otherwise be the case.

Thyroid gland hormones can also have affects on body chemistry and functional affects such as metabolism of fats and carbohydrates and stimulation of the body warming mechanisms in cold snaps.

Prevention
Supplementing with iodine can be
a. By feeding out as a supplement in troughs
b. By feeding out a proprietary salt block containing iodine
c. By drenching a solution of potassium iodide (20g to 1 litre of water) and dosing all animals with this solution at the rate of 10 mls per 20 kg of body weight. Drenching should take place 4 weeks before mating, 6 to 8 weeks before kidding and 2 weeks before kidding. The last option is considered by many to be the best strategy as it gives the iodine at times when it is required and ensures that all animals get it.

by Professor John Evans.

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