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Cobalt Deficiency in Goats

Trace element deficiencies can have a damaging impact on herd productivity and whether you run a large herd or farm on a smaller scale it is important to be aware of your herd's trace element status.

Compared to cattle and sheep there is limited research in goat nutrition published in the UK and some requirement values are extrapolated from dairy cows or sheep.

In the literature cobalt deficiency is generally reported to be rare in goats, compared with cattle and sheep, as browsing is thought to provide sufficient levels. However, this year I have seen several cases of cobalt deficiency ranging from mild to severe which makes it worthy of a newsletter mention.

Why is cobalt important?

Cobalt is required by ruminants to synthesise Vitamin B12. Ruminants are unique in their ability to utilise the cobalt provided in their diet to synthesise Vitamin B12. Vitamin B12 is used in the breakdown of propionate, which is derived from the breakdown of plant celluloses in the rumen and is the main precursor of glucose in the ruminant. The clinical signs of cobalt deficiency are all due to the reduced levels of B12 and the breakdown of the glucose pathway.

Clinical Signs:

Clinical signs vary case to case and with the severity of the deficiency. Symptoms tend to be more pronounced in young stock, especially in weaned kids, compared to adults.

- Lethargy
- Reduced appetite (but can have a normal appetite)
- Severe wasting despite adequate nutrition
 - Similar to internal parasitism
- Coarse coat, failure to shed or sheds slowly
- Pale mucous membranes
- Tear staining of the cheeks
- Weakness and collapse
- Nervous signs: depression, head pressing, aimless wandering.
- Poor fertility and poor mothering



[recently diagnosed with cobalt deficiency]

Diagnosis

There is a significant interaction between chronic parasitism and mineral deficiencies such that it can be challenging to establish which is the more important condition. Therefore it is useful to be aware of the levels of parasitism in your herd by regular Worm Egg Count analysis and have a vet-approved treatment and control plan in place.

Diagnosis is based on presenting clinical signs in animals in areas with cobalt-deficient soil. Diagnosis is confirmed by blood test, which shows low plasma Vitamin B12 (less than 539 pmol/l). A minimum of ten samples is recommended for determining mean plasma B12, although this number is limited by cost and herd size. Samples should be taken as soon after the animals have been gathered as possible as values increase significantly within hours of confinement and so could give a false indication of mineral status.

Treatment:

Treatment is often instigated by initial weekly injections of a Vitamin B12 preparation for at least four weeks, during which a marked improvement should be noted. Following this it is necessary to continue with a form of oral cobalt supplementation

- Oral drenches: there are various cobalt-containing oral drenches available which contain cobalt alongside other trace elements. They tend to need to be repeated monthly but are straightforward to administer
- Boluses: cobalt-containing boluses are designed to lodge in the reticulum (part of the stomach) and provide a continuous supply of cobalt for three to six months depending on the product. Small goat breeds will require the lamb boluses, which are smaller (but may still be too large for very small pygmy goats).



Monitoring:

In problem herds it is advisable continue to monitor cobalt levels by checking plasma B12 levels pre-service in adults and post-weaning in kids. This can be done as part of a trace element screen.

Skin conditions are not uncommon in alpacas and can be due to a number of different causes including, bacteria, fungi, allergies, autoimmune disease, mineral deficiencies and parasites.

Of the various parasites causing skin conditions, mites are one of the most common and can have a detrimental impact on fibre quality and animal welfare.

Infection with mites is also known as mange. Alpacas are susceptible to sarcoptic, psoroptic and chorioptic mites, and can be simultaneously infested with all three. Neither chorioptic or psoroptic mange constitutes a zoonotic risk, however sarcoptic mange is a potential zoonosis.



Itchy Alpacas – Mites

Types of mites:

Chorioptic: Chorioptic mange is the most common mite infestation. Unlike the other types of mange, pruritus (itching) is usually absent or mild. Some animals can have heavy infestations but remain asymptomatic while others with a mild infestation may present with quite severe clinical symptoms. Early lesions are found on the ventral abdomen and medial thighs and spread to the axillae, face, ears, distal limbs and interdigital spaces. Lesions typically start as bald, scaly and crusty patches and progress to lichenified, thickened skin.

Sarcoptic: Animals with sarcoptic mange present with hair loss and pruritus. Lesions commonly start on the ventral abdomen, axillae and groin and may spread to the medial thighs, feet and face. With time the skin becomes thickened and hyper-pigmented. Secondary bacterial infection is not uncommon.

Psoroptic: Like sarcoptic mange, psoroptic mange is associated with hair loss and pruritus. Lesions generally affect the head, face and ears, and less commonly the shoulders, back and perineum. If the ear canals are infested then an animal might present with ear twitching, head shaking or a head tilt. Chronic infestation will cause thickened skin.

Diagnosis:

Diagnosis is made by the presence of mites in hair plucks and skin scrapes. Mites can be quite elusive and multiple plucks and scrapes may be required before mites are found. Biopsy can also be helpful in confirming the diagnosis. The absence of visible mites does not rule out disease.



Treatment:

- All animals on the property should be assumed infested and should be treated.
- Ivermectin injected subcutaneously every week for three to four weeks is considered an effective way to treat mange.
- Chorioptic mange can be more difficult to treat and may require topical treatment.
- Movement of animals to clean pasture and disinfection of buildings may aid in eradication (mites can exist in the environment for over two months).



Beef Farming in East Africa

With all the hot weather we have had recently I thought it would be fun to take a look at beef farming in East Africa. Most years my family and I make a trip to Tanzania, where for the last ten years we have run a street child charity. While there I also spend a chunk of my time on friends' farms filling in the gaps they have in their veterinary service. I have been interviewing a friend of mine, David Moyers, about his ranch.



David, tell us about the layout your ranch....

Igumbilo is a 4700 acre ranch in southern highlands of Tanzania. It is situated in an area of rolling hills between 8400 and 9300 feet above sea level (2550m - 2830m) on the Kipengere Plateau. The whole area is pristine montane grassland, with a tussock grass (*Festuca abyssinica*) and Red Oat grass (*Themeda triandra*) the dominant grass species. There are several paddocks amounting to about 15 acres covered in naturally occurring Kikuyu Grass (*Pennisetum clandestinum*). About half of the farm is suitable for grazing, with the rest composed of exposed rock piles, steep cliffs, deep valleys, wetlands and sensitive watershed habitats. The Rufiji Basin and Nyassa watersheds meet on the farm with a perennial stream of crystal-clear water in every valley.

What do your seasons look like?

The ranch has a pronounced wet and dry season. Reliable rainfall is received for seven months of the year but there is very little rain during the dry and cold months of June to September. During this time nightly frosts are frequent and temperatures sometimes fall as low as -2 at night. It is very much a temperate locality with a visual appearance similar to parts of the Scottish Highlands.

Why did you get started and what was your aim?

Igumbilo Ranch is owned by Lungu Ltd and was set up for the express purpose of acquiring the ranch to conserve the unique habitat found there, and secondarily to demonstrate that a carefully controlled extensive livestock operation run using sound ecological principles could be beneficial to biodiversity conservation.

There is a growing consumer demand in Tanzania for high-quality, organic, grass-fed beef. Currently, this is far greater than the supply and market needs are being met through imports from Kenya, South Africa and Australia. It is the goal of Igumbilo Ranch to supply this high-end market with locally produced beef.

What sort of cattle do you have?

Igumbilo Ranch is focused on producing quality beef cattle. We are in the start-up phase of building breeding herd numbers and improving the genetics and expect to reach full stocking at about 400 breeding cows in 2021.

We are currently in the process of producing pure Angus breeding stock through Artificial Insemination. The starting point was local zebu cows and the results for the F1 and F2 generations have been quite good. Hybrid vigour combined with the natural disease resistance of zebu cattle is very promising. Currently the herd size is 506 animals of which 290 are breeding cows and heifers.



Please could you outline your approach to nutrition?

We do not provide any supplemental feed to the cattle. The only supplements they get are CalPhos mineral blocks imported from Turkey. Most of the cattle do reasonably well through the dry season when the crude protein content of the dry grass drops to very low values. Others lose condition very badly. There is obviously a differential physiological response to this dip in nutrition with Zebu cattle losing the least condition and pure taurus losing the most. This is probably genetically based and when the herd reaches the targeted full stocking numbers we will cull animals that lose a lot of condition in the dry season. However, we have observed that Zebu cattle are not as picky feeders as the taurus and will eat any grass available. Taurus cattle will often refuse to feed if herded to a dry grass pasture that is not to their liking. The cattle that lose the most condition are grazed in the areas with the best pasture. These herds are kept in night paddocks in outlying areas of the ranch and grazed for around 12 hours per day with a stockman walking with them.

What are the main herd health issues you face:

Igumbilo Ranch is remarkably free from the most common cattle diseases that plague livestock keepers at lower elevations in Tanzania. This is as much due to the absence of certain vectors, such as Tsetse flies and Tabanid flies, as to the temperate weather and isolation of the ranch. We have not seen any Lumpy Skin disease, East Coast Fever, or Vibriosis either. This is probably due to the isolation of the herd and its closed status.

Endemic diseases in the southern highlands are Black Quarter, Foot and Mouth disease, Babesiosis, and botulism. We only vaccinate for Black Quarter using a Blanthrax vaccine that is also effective against Anthrax. We do not vaccinate against FMD as the vaccines are expensive and not always effective. Endoparasites are not a big problem in mature cattle but we do give an injectable de-wormer at least once a year. This is administered more frequently on a targeted basis in younger calves if they are showing external symptoms. Generally we try to find a dewormer that is also effective against liver fluke. However, this is an order of magnitude more expensive and we have never found fluke infestations in any of the cattle that have been slaughtered on the farm. So it is possible that there is no fluke present in the environment at such high elevations.

The tick load on the farm has been very low in the first six years of operation and we have chosen not to dip the cattle so that they can build up a natural resistance against tick borne disease. However, in 2018 we experienced an increasing tick load and saw five cases of Babesiosis. To combat this we sprayed cattle with dip using a backpack sprayer. We do have a spray race and will use that for dipping in the latter half of 2018 until the tick load again declines to manageable levels.

We continue to see one or two deaths per year, invariably in mature cows, that we ascribe to "Red Gut" (Botulism). Clinical symptoms are a fever and the cow stops eating. After several days we see a catastrophic decline in the animal and usually put it down. An autopsy usually reveals an internal mess with some organs already decomposing and melting into an unrecognisable mass.

We do not have the facilities for proper diagnosis of disease on the farm, nor are there labs locally that can help with this.

Pasture management is very different from the UK. Could you describe your system in Igumbilo:

Uncontrolled grass fires in the dry season are a constant threat. These are started by humans who use fires to flush out small game while hunting with dog packs. Fire is an essential natural process in these highland habitats, but natural fires started by lightning is of much lower frequency than annual wildfires started by humans. Furthermore, the intensity of fires after the start of the rains is much lower than those started intentionally at the peak of the dry season. During that time minimum humidity levels, maximum wind velocity, and buildup of dry biomass contribute to the development of high-intensity fires.

We are implementing a controlled rotational burning programme on the ranch that mimics a "natural" fire regime as closely as possible. We burn off at least 1/3 of the farm in May and early June as soon as the grass dries out enough to catch fire. Then we burn other areas as firebreaks where wildfires are prone to encroach on the farm a bit later in the year. In all cases the grass starts to regenerate immediately after the fire with the tussock grass (*Festuca abyssinica*) providing the bulk of the regrowth. This grass species is grazed extensively at this growth phase but is largely ignored later on in the season when other more palatable grass species have regrown and the tussock grass is starting to lignify.

Igumbilo Ranch receives an average of 1500 – 1900 mm of rain between November and May and the soils are heavily leached of minerals. We have not yet sorted out the timing and quantities of minerals that need to be supplemented and this remains an ongoing challenge to growth and fertility levels.





What would you say are your main challenges?

The main challenges that are faced in an extensive beef cattle operation in Tanzania are over-regulation of businesses and the high number of regulatory approvals needed to run a ranch.

Tanzania has only paid lip service to supporting the livestock sector and many essential drugs and vaccines are not available in reliable quantities or in a timely manner when most needed.

Furthermore, there are no breeders in Tanzania producing breeding stock Taurus beef breeds. The emphasis has been on Boran cattle for beef production, but this breed does not thrive in the cold highlands.



Please could you talk us through your breeding programme?

Although we are primarily using Angus semen for breeding we also have several Red Poll bulls that are used to breed cows that return to heat after TAI. The Red Poll x Zebu hybrids are also very nice animals with high growth rates and early sexual maturity.

We synchronise the breeding season using hormones so that the cows are calving down in the early rainy season when the grass is at its most nutritious. We allow for a lag time to make sure the cows have put on condition in late pregnancy before they calve, so that they start cycling naturally as soon as possible after parturition.

We have experimented with several TAI protocols and hormone treatments for synchronisation. This has proved to be challenging as there is a different response to hormones from zebu, taurus and hybrid cattle. This has caused us to miss the AI window on entire cohorts of cattle. After several years now we have settled on a 5-Day CO-Synch + CIDR protocol. This uses an initial injection of GnRH at insertion of the CIDR, an injection of PG on CIDR removal on Day 5, a second injection of PG 8 – 10 hours later, and TAI at 72 ± 2 hr with a final injection of GnRH. The published protocol for *Bos indicus* using this protocol calls for an additional injection of PG along with the GnRH at insertion of the CIDR. Then TAI is at 66 ± 2 hr. We synchronise cows in lots of 50 animals and, because we have a range from pure *taurus* and *indicus* along with hybrid *taurus x indicus* we usually start TAI around 68 hours after the last PG injection and continue until the batch is finished. Results have been fairly good with about 50 – 60% fertility in a good year.

