

Solutions are now known. Learn, apply and benefit from them.

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With health, the most important thing is correct diagnoses. If this is not accurate, the correct prevention and cure are not possible.

Good stockmanship and animal husbandry is seeing and correcting problems before animals suffer and reduce your profit. Dairy farmers are the best at it because they see their animals twice a day and notice the moment an udder is not full or if overall milk production is down.

Pre 1980 I used to think that New Zealand grazing animals were healthy. When consulting in USA I saw the sheen on the best fed dairy cows which were fed total mixed rations (TMR) with minerals and realised that ours needed minerals and trace elements. Also when I encouraged US dairy farmer clients to change from confinement to grazing, their cows produced reasonably well on grazing lush high protein grass and legume pastures, but didn't look as well so were not as healthy.



If your animals and pastures look like in this photo, they are both unhealthy and low producing, as are many others in the world. Her sad eyes indicate low magnesium, hair on neck = low cobalt, low tail and dung on it = low selenium, no sheen = low sodium and zinc, and a dry nose = low sodium. Solmin soluble minerals can correct them all.

I paid attention to analysing pasture tissue and fertilising with elements that were shown to be lacking, impossible in soil analyses. I also developed the first soluble mineral mix, fed through on-line dispensers I developed, in the drinking water which improved their coats, condition, conception rates, milk fat and protein percentages and cow temperaments, and reduced milk somatic cell count levels. It contains sea salt, magnesium, sulphur, zinc, copper, selenium, cobalt and iodine. Some areas need boron, but fertilising with it is best, because legumes and some crops, especially maize, need it.

Supplying minerals through the water means that all get the right amount because large animals need more and drink more, so get more. Also high producing cows need more and drink more. The problem with licks is that some consume too much and some eat none.

Minerals in water don't help sheep on lush pasture because few of them drink, especially if able to graze dew covered pasture, so fertilising correctly, drenching and mixed dry licks are the only way for them. Sheep desperate for minerals can smother each other in their rush for salt in particular, when they are first given it as a lick. It is better to fertilise with it.

Eighteen months after analysing the pasture for the late Bill Chynoweth, then liming and fertilising correctly, and feeding Solmin through a dispenser, his Pukeroro Stud cows and pastures improved to these in this photo.

Note the seeding (pasture self thickening) dense ryegrass around its back left leg, and the clover pasture. The cow's tail held high (you can see light under it), indicates optimum selenium. No hair on the top of the neck indicates optimum cobalt so adequate vitamin B12. No yellow jaundice on the small white patch under the front legs indicates no facial eczema or high potassium or high phosphorus causing liver damage.



Happy marks

One (shown on this cow) to four near-horizontal lines of raised smooth skin and hair on the left sides of cattle, like on this healthy cow, are a good sign and indicate that the animals are content,

healthy, well-fed with soluble minerals on correctly limed and fertilised pastures. However, not all cattle in a happy herd have them. Hungry, malnourished, nervous ones won't have the marks, sometimes called 'welt' marks, but so I prefer to call them 'happy marks'. If there are no happy marks on any animals in a herd, then animal stress in one form or another could be a problem and should be investigated and corrected.

Minerals

Pre-1980, I used to think that New Zealand grazing animals were healthy. When consulting in USA, I saw the sheen on their best fed dairy cows, which were fed total mixed rations (TMR) with added minerals, and realised that ours needed minerals and trace elements. Also, when I encouraged US dairy farmer clients to change from confinement feeding to grazing, their cows produced reasonably well on lush grass and legume pastures, but didn't look as well. The farmers thought it was because they weren't getting concentrates, but it was the minerals mixed into concentrates that they were lacking.

I began to pay more attention to analysing pasture tissue and fertilising with elements that were lacking, and also developed a soluble nine-mineral-mix, fed through dispensers in the drinking water. These improved their coats, condition, conception rates, milk fat, protein percentages and temperament, and lowered milk somatic cell count levels. It contains sea salt (sodium and sea minerals) with magnesium, sulphur, zinc, copper, selenium, cobalt and iodine added. Some areas need boron, but fertilising with it is best because legumes and some crops, especially maize and brassicas, need it. The same applies to calcium, phosphorus and potassium. **Never** feed any of these. If deficient, apply them to the soil.

These thin calves were being well fed, but growing slowly, with clean tails, showing that worms were not the cause, nor was it Se deficiency, because tails and pin bones were clean. The swollen goitre, at the bottom of the jaw indicated lacking iodine. The long hair (mane) on the neck was from low Co, as was the slightly large paunch. The rough hair indicates low Na and Zn. Their hair colour is OK, so Cu is not lacking.



They were on peat where farmers knew to fertilise with Cu at 5 kg per hectare, but not other deficient elements. Read more about each element in Minerals.

The Pukeroro herd, which was fed only on grazed pasture and home-grown, high feed value maize silage (See Forage Crops > Maize), produced double the New Zealand average annual milk production, and almost the Northern Hemisphere confinement concentrate fed herd average, showing what can be achieved from perfect pastures and grazing. Pukeroro animals grazed correctly limed and fertilised pastures and got 50 grams a day of Solmin in the drinking water.

There is a lot on synergism (influencing of each other) involved with minerals. This means that one deficiency or excess can influence another, so a perfect balance is essential. Solmin achieves this far better animal health than any other mineral mix because it has nine added minerals and many more from the salt.

Water

The Pukeroro cows lived and produced well for up to 15 lactations, because Bill Chynoweth did what I suggested and had an excellent vet in the late Dr Harry Dewes. All farmers, not just dairy farmers, please read Dairying > Shocks Affecting Animals. Shocks can be in the water system which Harry found at Pukeroro, causing cows to not drink as much as they should have and causing him to lose \$30,000 worth of milk over four



years, from the time when he moved his electric fence unit into the pump shed. The earth wire touched a water pipe, which then acted as an energiser earth and conducted shorts from all water troughs when animals drank. Watch out for this.

Supplying minerals in the water through an on-line tank dispenser (not a metering one) means that all animals get the right amount every day because large, high producing animals need more and drink more, so get more. The problem with licks is that some consume too much and some take none.

Minerals in water don't help sheep on lush pasture because few of them drink, especially if able to graze dew covered pasture. So, fertilising correctly, drenching, and using mixed dry licks are the only way for them. When sheep are first given a lick, if desperate for minerals they can smother each other in their rush for salt in particular. It is better to fertilise with all elements. See > Minerals in Soils, Pastures and Animals > Salt for full information.

This photo shows the results that can be achieved with minerals. These heifers are the same age and from the same herd. The one on the left was grazing pastures on better mineral soil, fertilised the old fashioned superphosphate way. The one on the right grazed pastures on a recently developed two metre deep peat farm (very poor low mineral soil) that I developed, managed and fertilised with correct fertilisers. The owner saw the difference, so brought them all over to this farm. Neither got fed supplements, but the one on the right had DeLaval Solmin in the drinking water, so had not been drenched for worms. The other had been drenched.

On our second farm, we contract-grazed one hundred mohair goats. On arrival, they looked dreadful, but on our correctly limed and fertilised pastures, with Solmin in the water, their coats changed from a brownish, rough texture to being smooth and white. Goats and deer on typical shallow-rooted ryegrass pastures need minerals more than other animals because they evolved on browsing deep rooting shrubs, which have a higher mineral content than typical ryegrass pastures. Sowing the best plantain and chicory, both of which have deep roots, increase the pasture's mineral content.

Goats suffer hoof problems, which can be accentuated by low zinc levels. Fertilising with zinc at only 6 kg per ha (5.4 lb per a) reduces zinc deficiency, adding it to the drinking water helps more, and walking across a Hoofmat™ containing zinc sulphate helps harden their hooves. See Animal Health > Hooves, Footrot & Lameness.

Develop healthy animals

Many animal health problems are genetic so some farmers have bred herds that are resistant to bloat, some infections and illnesses. While others who, for example, have drenched their dairy cows daily with pluronics to control bloat for about thirty years, have ended up breeding a herd prone to bloat, which has to be drenched daily. We contract-grazed heifers from such a herd and they would bloat repeatedly, while none of the other 450 heifers and steers on our farm did. On the other hand, with careful selection over decades, a herd can be developed that will be resistant to problems.

Some sheep farmers have developed facial eczema resistant flocks. If they (and all animal farmers) knew about liming, with its synergistic elements that I discovered in the 1960s, they would have saved themselves thousands of dollars. See Animal Health > Facial eczema.

The cost of getting blood and liver tests on an annual, or even twice yearly basis, is low compared with the possible health problems, loss of animal growth and production, from animals that are deficient or over-supplied with an element.

With judicious selection over decades a herd can be developed that will be resistant to problems, but the low cost of improving pasture's mineral content gives a profitable return and improves soils. Even earthworms and soil microflora become healthier and increase in numbers.

We found that feeding a soluble mineral mix was also profitable because animals ate less pasture, and needed a lot less or no parasite control. How we knew this was because we reared 160 dairy calves each year on an automatic feeder. We divided them into two mobs of 80 and rotated them daily on one hectare (2.47 acre) paddocks. Those getting Solmin in the drinking water left a higher residual, needed less or no treatment for parasites, and grew faster.

As animal numbers increase, the individual identification of health problems becomes more difficult, and infections increase.

Look at your herd as a whole, and individually. When healthy, the heads of most should be above their back level. Check animals that have their heads hanging lower than the average because it is

usually a sign of low selenium and being unwell. If unhealthy, record their tag numbers and don't breed from them.

Study each animal individually from nose to tail. Good stockmen enjoy admiring their animals and don't consider this a chore. Finding just one limping, and removing a stone or twig from between a hoof before it is damaged and takes weeks to heal, can be worthwhile. The limp might not be caused by a physical problem. It could be an endophyte toxicity stagger, in which case, move the mob to leafier pasture, avoid seed heads and avoid grazing too short. See > Endophyte, which is mostly in ryegrass and fescue seeds and stems. There are endophyte-safe varieties available such as Bealey NEA2. Again, breed from the animals which show no toxicity signs.

Avoid animal stress

Stress of any form reduces profits.

- Animals should not be calling or walking the fences wanting something.
- Most should be lying down and relaxed within two to three hours of going into new pasture. At least half should be chewing the cud.
- They should not be licking each other vigorously (a sign of needing salt).
- They should not be lining up waiting for water, or to be moved to a new paddock.
- The worst enemy of an animal is another of the same breed. It carries the same parasites and likes the same feed. Grazing other animals before and/or after goats improves their speed of growth and health.

A Boer goat on Wilfried Egli's farm in Switzerland is shown here eating some old grass to get roughage. High-power fencing like this one can control animals to such a degree that they can be underfed (starved). Avoid doing this.



Goats prefer grasses to clovers, so can get hungry after eating all the grass. Note the uneaten clover. Cattle following them can eat the clovers, and do very well. Goats are not fans of short lush perennial ryegrass; they prefer the longer coarser grasses such as cocksfoot (orchard grass) and prairie grass.

When moving animals to a new pasture, walk in front of the mob. Your leading them to the new paddock will make them associate you with good things.

Don't let them run. Running can be bad for animals. Somatic cell counts and mastitis in cows increase, and may also do so in ewes and goats. Legs can break, hoof problems can develop, abortions can occur, and gates and fences can get smashed. If you can't hold them back along the lane, then have your dog with you to help, but be aware that a stropky animal might charge a dog next to you and bowl you over. Animals, other than calves and horses (but not those heavy in foal), should not be allowed to run. Keep them calm and relaxed. Sometimes it is advisable to let weaned calves and young heifers run down the lane, which they love doing. This gets rid of their energy, rather than have them run around the new paddock they enter and trample the grass.

When you get to the paddock they are to enter, stand in the paddock where the animals spread out so each can be seen as they pass you. Take your notebook and watch for cycling ones at the same time. Keep a look out for ones which have aborted. They are likely to be on their own in the paddock, in which case, walk over to her to try and find the calf. She'll also have an empty look through not having eaten, and can have a discharge.

If an aborted cow is with the mob, walk the paddock with your dog to search for the foetus. If the dog finds it give it a biscuit and say slowly and clearly "foetus". After a few times the dog will go searching each time you say foetus. Carrying a biscuit is always a good idea to give to your dog as a reward, or just when you call it. Bury the foetus and all soil with blood on it, in case it is infectious.

Health symptoms

- The nose should be moist, with no mucous running from the nostrils.
- Eyes should be bright and looking at things, not sunken, half closed or drowsy, unless the animal

is lying down or snoozing.

- Ears should be expressive, not hanging, unless a tropical breed.
- Cud chewing should be fast and enthusiastic, with dribbling saliva.
- The head in most breeds should be held above the back line.
- Hair should be clean, have sheen, good colour and lustre, and not be shaggy. Even in winter, well-fed healthy animals with adequate minerals don't have long shaggy, dull, lack-lustre hair.
- Coat colours should be bright. If the whole animal has a jaundiced yellow look, its liver may be damaged. See Jaundice, below.

Animals (and people) vary in their requirements for minerals. Some can show deficiency symptoms, while others don't. You have to decide whether to fix them or cull them. At the same time, be aware that a visually deficient one can indicate that others are sub-clinically deficient, thus costing you in production. Don't keep replacements from the deficient one.

Watch for ringworms, lice, fleas and ticks. The best places to check for lice are between the back legs where they join the body, on the neck and under the udder between the teats. Some lice can only be seen at night with a torch. Bare skin on the neck can be caused by lice or low zinc, making the skin itchy so the animal rubs on posts which thins or removes the hair.

Dirty hair from filthy conditions and overcrowding is unhealthy. Licking others for sodium can infest them and others.

Goats confined to intensive sown pastures need to be supplemented with more minerals than sheep or cattle and more than goats grazing scrub or brush and grass. Goats have always been brush browsers so have obtained more minerals from the deeper rooting plants than is available from typical shallow rooting grasses and clovers. Pasture tissue analysing the levels of the 17 essential elements and applying the deficient ones improves animal health.

Blood analyses

Element levels in blood change after exercise, stress, heat, cold, minerals in licks, and concentrates with premixes or drinking water. So, in some cases, analysing livers can give more accurate figures, especially for copper. L:Cu $\mu\text{mol per kg}$ levels in grown animals should be about 900, but 2,000 can occur. New born calves should have 3,000 because there is almost no copper in milk, so they have to have enough in the liver to last until eating. The brighter red the colour of blood, the more oxygen it carries. The darker its colour, the less oxygen it carries. Arterial blood is generally a brighter red because it has recently passed through the lungs. Venous blood is generally a darker red because it has passed through the capillaries where the oxygen is transferred from the blood to the tissues.

Thin animals

Each mob should be checked regularly for extremely thin animals and/or poor doers. Because you see them daily it is hard to identify condition changes, so take digital photos fortnightly of the thinnest one, an average one and the fattest one. The decision should be made whether to keep the thin ones and fix them, or cull them. If they are to be kept, then check the cause of their thinness. It could be an undershot jaw which was not a problem when grazing long grass, but can be under controlled grazing on short grass, faulty teeth, carrying twins, worms, damaged liver, mineral deficiency, hardware killer (eaten wire or nails), a disease such as Johne's which is usually associated with scouring, hereditary (some families are thinner than others) or just plain inability to compete.

Very thin suffering calves can improve by putting them at two per paddock around the farm because it removes competition with the others for feed.

There will always be some fat and some thin animals in any mob, so they may need dividing into two or more mobs. If not, and they are all fed sufficient for the thin ones, feed can run out, and milk fever and ketosis can be problems with the over-fat cows.

Vaccines

These are available for some so discuss this with your vet. Immunology is not new. In 1718 an English physician Edward Jener documented the fact that milkmaids who contracted cowpox were then immune to smallpox. German scientists in 1890 were the first to illustrate the mechanisms of immunity

by showing that blood serum taken from animals immunised against diphtheria could be used to transfer this immunity to other animals. Without vaccinations few of us would be alive today, but despite this there are still people who refuse to be immunised!

Be your own vet

The cost of a veterinarian visit can be high relative to the profit, and there are also areas where vets are not available, or so far away that the total cost of a visit can be more than the value of the animal. For these reasons farmers need to do as much as possible themselves.

There are many suggestions for home-made mixtures of how to cure or prevent animal sicknesses. Before trying these on any food-producing animal, remember that in most countries, products which are not approved and registered with the authorities are not allowed to be fed to or used on an animal producing human food.

The first job is to have a supply of medicines in stock, and the second is to identify sicknesses before animals have become too sick to recover. Know when and how to use medicines, even organic ones, and train your staff to also be proficient in all aspects.

An antibiotic works against bacteria. Coccidiostats are antibiotics which target a bacterium. Antiviral vaccines target viruses. Some have withholding periods before milk production or slaughter for human food. Use a new or clean needle for each animal when doing injections in mobs where animals have been brought in.

In New Zealand, the Agricultural Compounds & Veterinary Medicines Group controls all items fed to food producing animals. A registration number must be displayed in all advertisements and on all containers.

Overcrowding can be disastrous as the small ones suffer. Animal farmers should keep mobs as small as practical, and check them regularly and thoroughly for diseases and ailments. The farmer has to be the predator that in nature would catch and cull the sick ones.

Vets should know the symptoms of all diseases, but they can be a long way away, and with some diseases, urgency of identification, and action are imperative, and correct diagnosis is critical. If not accurate, preventing and curing are not possible. Good stockmanship and animal husbandry is seeing and correcting problems before animals suffer and reduce your profit. Dairy farmers are in an ideal position because they see their animals daily and notice the moment an udder is not full, or, if overall milk production is down.

Brief symptoms & causes

The following ill health problems listed alphabetically. They show the symptom, followed by possible causes. Obvious causes, such as the death of a dam or offspring caused by a breech birth, are not included.

The laws of most countries require immediate notification of contagious diseases. If an animal dies for no known reason, treat it with care and phone your vet and appropriate government department. Have both their phone numbers where staff can access them.

Be mindful that a sick animal can show several symptoms from one cause, or one symptom from several causes. Many symptoms and problems are much worse when there is more than one cause affecting the animal, which is often the case. Veterinarians are trained to diagnose, but not all can diagnose all things. Use the information below, and if in doubt, seek a second opinion, because wording in a book can't always be interpreted accurately. Don't stop with a single answer, look for more than one cause. An example is that lack of selenium can be a cause, but feed levels can be high. However, selenium doesn't work if vitamin E is lacking, which is in green feed, but not in dry feeds.

Abomasum displaced or twisted

Too much grain, especially if fed in one meal, or finely chopped feed shorter than 75 mm (3") and not enough longer coarse material. Sudden diet changes. Rolling over cast or downer cows.

Abortions & premature births

Stress, including electric shocks, contagious abortion, very high or very low manganese, and high nitrates suffocating the foetus. Mummified calves born with brain defects and/or scours can be from

bovine viral diarrhoea (BVD). Ask your vet about vaccinating for BVD. Also see birth problems and foetus loss below. Trials showed that ewes underfed before mating had smaller, premature lambs.

Anaemia

Low cobalt, low iron, parasites, poisoning or any continuing sickness. Some pastures can be low in iron and cause anaemia.

Anoestrus

Low phosphorus, cobalt, copper, selenium, manganese and/or under-feeding, especially on deficient pastures.

Anthrax

This can start with an animal being lethargic, then recumbent, and dead by nightfall. Swelling in the neck area and increased salivation can occur.

Eating Anthrax meat, or even contact with the blood, can also kill people very quickly. Africans drinking blood from affected animals have died in a day. Immediate symptoms are abdominal pain and diarrhoea. Intense itching can occur before parts of the body swell.

Anthrax bacteria can survive in soil for a long time. A figure of 50 years has been documented.

Appetite loss

Low iron, zinc, sodium, magnesium, cobalt, and/or low vitamin B12 usually caused by low cobalt. Unpalatable high-nitrate pasture from extremely high selenium or being sick from something else such as grass staggers. See Elements > Cobalt. Animals not grazing pasture might not be from lost appetite, but from excess DAP fertiliser and/or high potassium (K), low salt and/or low calcium levels.

Back arched or hunched

Bloat, endophyte toxicity, rickets (low calcium, phosphorus and/or vitamin D), old age with low selenium, and/or a hereditary cause. Keep in mind that almost everything is hereditary, so don't breed from individuals that need any special care. Muck stuck to its tail, and an arched back on this old cow belonging to clients Phil and Charlotte Hanes, in Virginia, USA, are signs of low selenium, which a pasture analysis confirmed. The hair growing on the top of its neck indicates low cobalt.



Bark of tree eating in large amounts

Lacking zinc or other minerals. Small amounts eaten can be a sign of boredom or needing variety.

Blackleg

This is an acute disease of cattle and sheep, characterised by swellings of the heavy muscles, black spots on the legs, and smell. Livestock can die shortly after infection, so a vet should be used.

Most cases occur in cattle between six months and two years old. Contaminated soil and pasture can be a source of organisms. In Zimbabwe in 2002, more than 5,000 cattle died in one province in one month under drought conditions, when animals were grazing closer to the soil.

It is found worldwide and does not affect humans.

Blue tongue

Symptoms include inflammation of the mucous membranes, congestion, swelling and haemorrhages. Sheep are generally the worst affected, while cattle and goats may not show clinical

signs, but can carry the virus and transmit it to other ruminants.

It is a non-contagious, insect-transmitted, viral disease of ruminants. It is not transmitted by direct contact between animals without the insects and is not known to affect humans.

The virus is present in many countries between 40°N and 35°S.

I've have no experience with it. Information can be found by Googling for blue tongue.

Belly pot-like

In calves on milk or just weaned, indicates a lack of rumination and/or low cobalt. Later on in life it could also be from internal worms.

Birth Problems

Born with back feet pointing backwards can be low manganese, or front feet pointing backwards can be low selenium.

Bloat

Excessive blowing up of the left side of ruminants body, occurring after hunger then a gorging of feed, especially high-nitrate short sappy ryegrasses and legumes (not legumes containing tannins). High K and/or low Na pasture. Worse when pasture is short, lush, wet or frosted, because less saliva, which contains a bloat inhibitor, is consumed. It result in death if extreme and not corrected in time.

If an animal is bloated most of the time, it may have internal damage from something like a nail, leading to inefficient digestion. See Digestive Problems below.

Blood low in sodium

Deficient in feed or suffering internal parasites.

Blood coloured bright red

Cyanide causing prussic acid toxicity.

Blood coloured brown

Nitrate poisoning. See Nitrate toxicity. Thin pale blood can be anaemia.

Bones breaking

Low calcium, magnesium, copper, zinc and/or sodium. Running on uneven ground.

Breathing difficulty

Prussic acid toxicity, endophyte toxicity, nitrate toxicity. See Nitrates.

Breath smells

Ketosis, if breath smells like nail varnish. Bloat.

Breeding problems (see infertility)

BSE (bovine spongiform encephalopathy)

BSE is one of a group of brain wasting diseases known as transmissible spongiform encephalopathies (TSEs). It was first identified in Britain in 1986. Brain cells develop holes, resulting in the loss of control of limbs, trembling, wide-eyed staring, swaying of the head, and erratic behaviour, including charging, hence the term 'mad cow disease'.

Because of media publicity and human perception, BSE can cost animal farmers dearly, so they should be well informed to act quickly.

BSE is claimed to have spread through UK cattle by feeding meat and bone meal made from infected ruminant sources.

Other TSEs include: chronic wasting disease (CWD), that can occur in deer and elk; scrapie, that has been known for about 250 years to occur in sheep and goats; and MSE, that was noted to have occurred in mink in the late 1980s.

100% grazing animals are highly unlikely to get BSE, but CWD has spread through wild grazing deer. Organic and 100% pasture fed cattle have never been found to have BSE.

Humans consuming infected animal parts can get creutzfeldt-jakob disease.

Masses of BSE information is at www.mad-cow.org.

Calves, lambs, kids born dead or dying soon after birth

Low iodine (especially in goats in areas well away from the sea like central America and Switzerland that causes rain to have sodium and iodine) and/or low selenium and, if animals are not on green pasture, so low in vitamin E. Have the livers of the calves analysed for Cu (should be L:Cu umol per kg 3,000 and half that for adults) and get a pasture tissue mineral analysis by Hill Laboratories, 1 Clyde St, Po Box 3205, Hamilton, NZ. Phone +64-7-858-2000. Email mail@hill-labs.co.nz. Or by Agri Energy Resources, 21417 1950 E St, Princeton Ill 61356, USA, Ph 815-872-1190, or International Ag Labs, Box 788, Fairmont, MN. 56031, USA. Ask for a Pasture Tissue Test of 17 minerals. Go to www.grazinginfo.com and see the free Spreadsheets > Pasture Analyses.

Calves, lambs and kids born without hair and/or thick puffy skins, weak, unable to suck, with oedema in head, tongue and neck

Low iodine.

Calves not growing

Born from deficient cows, didn't get enough fresh colostrum, dam had insufficient milk, under feeding, poor quality milk replacer, poor quality unpalatable feed, overcrowding, low minerals (especially calcium), rumen not developed or not functioning correctly through lack of hay and/or pasture. Parasites.

Calves born as dwarfs, sometimes deformed

Feeding too much silage or haylage on their own during pregnancy. The acid in these feeds may be the cause. If some pasture is not available for them, then feed hay with the silage and haylage.

Calving ahead of time

Leptospirosis, hunger, bad weather.

Calving taking longer than normal

Large calf, reverse presentation, low zinc and/or low sodium, milk fever or other metabolic illness.

Calving paralyses

Dystocia (difficult birth), insufficient or excess phosphorus fed prior to calving. Old age. Also see downer cows. Calves from downer cows get no colostrum, so can die.

Carbon dioxide

The body automatically breathes to expel carbon dioxide from the lungs, but doesn't have an automatic system to detect and compensate for the absence of oxygen, except breathlessness, which can lead to insufficient brain oxygen, then to unconsciousness or death.

Cast ruminants

Uneven ground with hollows making it difficult to stand up from them, aggravated by being weak from sickness or low Ca, Mg, Na, phosphorus and/or Zn.

Catarrh

Virus infection, mineral irregularities, especially low or excess iodine and/or low or excess selenium. Feeding palm kernel extract (PKE) which is dusty and with its very high manganese level, increases the incidence of catarrh and lung problems.

Chewing at anything

Pica, which is a craving because of low potassium or other minerals.

Coat (see hair)

Coccidiosis

Dung on pin bones is caused by anal soreness and itching, causing the tail to move excessively and spread the dung which is black from blood. If actual blood can be seen, the infection is serious. Symptoms can be confusing, accentuated by parasites and other problems, so have your vet do a diagnoses. However, several vets have denied that these symptoms (black dung on the body both sides of tail) have been from coccidiosis, even though tests have shown so and, after treatment, the scouring has stopped, and the animal's health has improved. Some proprietary pellets have a coccidiostat added which inhibits the protozoa, but coccidiosis can strike after calves are suddenly taken off them, so one should change gradually over a few weeks to allow animals to build up resistance. Very black manure, caused by blood in it, like in this photo, is a sure sign of coccidiosis which treatment has always fixed.



Conception rates low (see cycling and infertility)

Constipation

Ketosis, dry poor quality feed, water lacking or too hot or poor quality. Animals can die from blocked bowels caused by chewing and swallowing plastic twine and/or plastic electric fence wire. Sisal twine doesn't cause this because it gradually decomposes.

Convulsions

Grass tetany.

Coughing

Bloat, catarrh, parasites (worms) or obstruction in throat, low or high selenium, low or high iodine, and/or dust.

Cud not being chewed

When not actually grazing, more than 50% of ruminants should be chewing their cud. If not, suspect digestive problems, feed too short (short grass or fine-chopped silage which can't be regurgitated), very acid silage and/or too much grain, concentrates or similar grain feed (GF) relative to pasture, silage and hay.

Cycling poor (infertility)

Thin, low phosphorus or copper, mineral imbalance, insufficient energy, insufficient coarse feed, acid feed, too much GF causing rumen pH drop. Feed more good pasture. If pasture quality is poor, feed high energy feeds such as top quality long-cut maize silage, top quality hay, 2 kg (4.4 lb) per day of kibbled barley or maize, and/or milk once a day for a while. If necessary, remove affected animals from the main mob to feed them more. CIDRs help, but their developer agreed that if ample mineral-balanced pasture and soluble minerals were fed, CIDRs may not be required. See Infertility.

Cysts on ovaries

Stress, insufficient water intake through water being dirty, hot, cold or frozen, or any other things that reduce water consumption, such as shocks when drinking, so they drink less.

Digestive problems

Endophyte toxicity, excessively lush short pasture, sudden change of diet, poisoning, excessive amounts of GF, salt or bloat oil. Johne's disease. Very short feed, such as fine chopped silage to less

than 7 cm (3") long that occurs especially with maize silage, will be difficult to regurgitate and take down enough saliva, which is the first digestive juice containing essential sodium. Salt and bicarbonate of soda can help. Barley straw is cheap and can also help, but is not essential for more milk production. Going right back to the 1950s, the saying was "when there's muck (the loose runny stuff you refer to John), there's milk". Feed 1 kg DM of roughage before grain. If the animals rush to it, you'll know they need more roughage. See Scouring.

Disoriented

Nitrate toxicity. See BSE, Ketosis, Listeriosis and Walking slowly.

Downer cows

Milk fever (usually just before or just after calving), grass tetany (usually a few days or more after calving), ketosis, low phosphorus, sodium, cobalt and/or zinc (Zn blood levels of some can drop during calving), pinched nerve, cracked pin bones from low boron (painful like osteoporosis fractures or broken ribs), being unfit, weakness from cold and/or hunger, many other deficiencies and sicknesses, causing a lack of ambition and/or willpower. Farmers analysing their pastures for the 18 elements, and fertilising accordingly with slow release fertilisers, should not have more than 1% go down, and none stay down.

Dung dry

Over-mature poor quality hay, cereal, maize (corn) stubble or pasture which can kill ruminants. Provide ample clean water, easily digested and/or green feed, and/or molasses, with the necessary soluble mineral mix to aid digestion.

Dung containing white segments

Tape worms.

Dung in 2 to 3 metre zigzag lines in pastures

Low selenium. See Scouring.

Dung loose

Low selenium, high manganese, acidosis, short lush pasture, coccidiosis (is darker from blood from intestine damage), Johne's disease.

Dung has bubbles

Johne's disease, copper deficiency. Large bubbles can be magnesium deficiency or magnesium excess! Small fine bubbles and a bad smell can be salmonella.

Dark coloured dung at rear of body below pin bones caused by tail being swished a lot (see coccidiosis)

Dystocia (difficult birth)

Over-fat, unfit through lack of exercise, weakness. Lacking zinc prolongs calving duration. Small amounts of high energy pasture prior to calving decreases the risk.

Ears cold

Milk fever.

Ear tips damaged

Facial Eczema, frost bite, fescue endophyte toxicity, dog bite, animal rustler removing ear tags!

Eczema (see facial eczema and spring eczema)

Eyes anaemic

Parasites, low iron, starved, mineral deficiencies.

Eyes runny

Low cobalt, low zinc, pink eye, cancer and/or excess iodine. Low zinc causes vitamin A deficiency resulting in night blindness. Supplying zinc has reduced night break-outs through electric fences. See Pink eye.

Eyes sunken

Internal parasites, low magnesium if accompanied by a starry look, damaged liver.

Eyes staring

Low magnesium.

Eyes sleepy

Milk fever, low magnesium.

Eyes wild looking

Grass tetany, low magnesium.

Eyes showing excessive white

Stressed cattle open their eyes wider. Beware of them, they may charge you.

Facial eczema

Late summer and autumn eczema on hairless parts of body, spreading to many parts in bad cases. Sheep can be badly affected because they graze close to the ground where spores are highest. Mild cases cause animals' skin to be slightly jaundiced. The skin on the brisket and just behind the front legs becomes a yellow-brown colour, which is a sign of a damaged liver, which can be from something other than facial eczema. The stronger the colour and the larger the area, the worse the liver damage. Early signs of facial eczema infection are trying to lick tender parts, seeking shade and being restless. Facial eczema damage can be identified in livers at slaughter so should be checked at least each year in culls. Vets can check facial eczema damage at slaughter. See the chapter on Animal Health > Facial Eczema.



Fat cows

Breed, poor genetics, over feeding with high-carbohydrate feeds and insufficient protein. Cows that were thin in early lactation, then fat and dry by mid lactation, could have been low in zinc in late winter and early spring. When feeding a good soluble mineral mix, this should not occur.

Feet sore (see footrot and hooves)

Fertility low (see cycling poor)

Flies on animals

When stressed, animals mill around each other, become dirty, sweaty and smelly, so attract more flies, than when clean and rotationally grazing on clean balanced pastures and getting balanced soluble minerals in their drinking water. Flies are attracted to breed in acid, wet organic matter, like at the base of long grass, uncovered silage and its effluent in soil, in moist soils around leaking and overflowing tanks, around concrete where animal manure is washed off it into soil, and in animal manure, including that spread too thickly on cultivated fields.

Fly eggs and parasite breeding areas in cow pats can be minimised by having optimum numbers of the right earthworms (mainly caliginosa) in temperate areas and dung beetles in hotter areas. They can consume the pats within days, removing fly breeding sites. Earthworms can spread a pat into the soil to a half metre (20") radius, creating lush pasture growth, instead of it sitting in one place and killing the

pasture.

Flies on well-managed controlled grazing farms are far fewer than on confinement farms with their heaps of manure. Herman Hempel of Eldridge, Missouri, wrote in the Stockman GrassFarmer that, after changing from confinement to grazing, flies almost disappeared and they had done nothing to control them.

This uneaten cow pat on the old pasture shows that there are no earthworms because calcium is low. The dandelions and the clovers with small leaves confirm low Ca. It should be 0.8% in ryegrass leaves about 20 cm high. Lime doesn't kill dandelions, but when white clovers thrive, they cover the bare patches before the dandelions. Applying the correct amount of lime, serpentine and trace elements has increased clovers on hundreds of farms and reduced flies, plus reduced the need for worm drenching.



There are no small dung beetles in the cow pat in the first photo below because worm drenching has killed them and will kill the imported large dung beetles, so fly and parasite larva will breed in the cow pats. The dark green parts in the second photo below are from urine because clovers aren't thriving to make nitrogen.

An Australian walk-through fly trap works on the principle of brushing 95% of flies off the animals as cattle walk through. Cattle can be taught to go through the trap on their way to water or fresh feed, providing fly relief and a nice scratch. The brushed off flies rise to the clear plastic dome, which gets hot so they die, drop to the ground and are eaten by earthworms and/or ants. It has world-wide patents and is made by Country Industries, 24 Leonard Crescent, Brendan, Queensland 4500, Ph +61-7-881-1609.

Dairy cows walking through a trap before milking reduces fly irritation during milking. If stable flies are a problem, make sure that there are brushes which rub the front legs as cattle walk through.

Parasitic wasps do a good job at controlling flies naturally. They are small and don't harm people or animals, but they search out fly pupae because that's where they deposit their eggs. Eggs hatch, the flies are killed and new wasps emerge to kill more flies. Although they won't eliminate flies, parasitic wasps will help to reduce fly populations. The wasps can be purchased from commercial suppliers. Watch for adverts for them or in North America contact Rutledge Enterprise, 4311 Aztec, Pasadena, TX 77504. Tel. (281) 487-0825 or Beneficial Insectary, 14751 Oak Run Road, Oak Run, CA 96069. Tel. (800) 477-3715. (916) 472-3715. Parasitic wasps are best released in spring or summer. Spraying flies can kill the wasps, so don't spray.

Dung pats like these in the pasture show that calcium is lacking because there are no earthworms spreading the dung.

Use all control and prevention systems, and encourage your neighbours to do the same, because flies travel for miles, especially with the wind.

Aim to move stripped grazed animals into the prevailing wind so flies attracted to the smell of animal droppings are blown away from the animals, rather than towards them. Moving animals daily reduces the fly nuisance, but it doesn't get rid of them.



Adult flies can be discouraged from congregating around buildings by eliminating long grass and weeds, where they like to rest, and by avoiding water running off concrete into soil, sometimes with manure, where flies then breed.

Foetus loss

Low selenium, thin at calving, so having weak eggs which hold for a short time then die, causing cycling returns. Any stress, such as from endophyte, excessive heat or cold, especially when sodium and other body temperature control elements are low, or elements such as potassium are in excess. Diseases such as bovine viral diarrhoea (BVD). Ask your vet. Also see Abortions.

Foot (hoof) & mouth disease

For much of the 19th century FMD was common right across the UK, and still is in much of Africa and Asia. FMD was as much a part of British farming as bad weather and poor harvests. However, it did not destroy UK farming; animals recovered and life continued. They did, however, implement the instant destruction policy about 50 years ago.

Today, global reputation is everything and the media tell the world overnight, so it is imperative that FMD is recognised immediately and eliminated.

Symptoms in livestock usually begin with a temperature, followed within 24 hours by the appearance of blisters and ulcerations on places such as the tongue, lips, gums, dental pad, skin of the hooves, bulbs of the heels, and teats. Occasionally, ulcerations appear inside the nostrils, or on the muzzle or vulva. Visually, these ulcerations are the equivalent of large cold sores. The illness causes lameness, decreased appetite, a drop in milk yield and productivity, and of course, increased care costs. Afflicted animals almost always recover, usually within a week or two. Death occurs in only five percent of cases, and the meat is fit to eat, but who would!?

Agricultural lime is used to reduce the spread of diseases such as foot and mouth. In early 2011, Japan controlled their outbreak fairly quickly with lots of agricultural lime. On TV the area was white with it. Good bugs like sweet soils, bad bugs like acid soils. See Calcium.

It can be hosted by horses without ill-effects. Humans can suffer mild skin irritations.

Foundering - horses

This occurs mostly in horses, many of which over-eat. As with humans, over-eating strains and kills. Reduce the lush pasture fed by controlling grazing or fertilising less, grazing pasture when longer and sowing coarser less palatable grasses.

Footrot (see > Hooves, Footrot & Lameness chapter)

Infection can enter a damaged part of the hoof and a foul smelling discharge can occur. This is rare in correctly-fed grazing animals, unless lanes and concrete are rough with stones or too cambered, which twists and opens the hoof, daily walking distances exceed two miles (3 km), or if the herd has a genetic disposition of weak hooves. It is more common in animals standing on concrete for long periods and grazing pasture in muddy soils, with soft hooves and low in zinc. Hoofmats contain copper sulphate to reduce infections and zinc sulphate to harden hooves. See www.sweetmans.co.nz and www.shoof.co.nz for international distributors. Agricultural lime or lime chips on lanes also reduces it.

Correctly-fed means grazing pastures which are analysed annually for the 17 essential minerals and fertilised to balance them, plus being fed a soluble mineral mix appropriate for the area. This is best provided in the drinking water by an in-line dispenser. Licks won't achieve good results because they are not eaten equally by all animals. Cafeteria self-help minerals don't work for many reasons. One is that magnesium oxide is so bitter that even animals needing it won't eat it.

Early treatment is important. If not treated, the infection can go deeper and into a joint. See Lameness, Laminitis, Hooves sore and Walking.

Grass tetany (see hypomagnesaemia)

Growth slow

Malnutrition, parasites, element deficiencies including low protein, low manganese (rare in NZ, high manganese from a lack of LimeMagPlus and high in water is a common problem), low phosphorus, cobalt and/or calcium. If your animals are not growing at the speed they should, check your pasture leaf mineral levels for deficiencies of any of these elements - boron (B), calcium (Ca), cobalt (Co), copper (Cu), iron (Fe), magnesium (Mg), nitrogen (N) (causing low protein), phosphorus (P), potassium (K), selenium (Se), sodium (Na), sulphur (S) or zinc (Zn). Check excesses of aluminium (Al), manganese (Mn), nitrogen (N) (causing nitrate toxicity), phosphorus (P), potassium (K) or selenium (Se). See full details of each mineral in Elements in Soils, Pastures, Crops & Animals.

These deficient looking heifers gained almost no weight for two months after moving to this Te

Puke, Bay of Plenty, NZ farm, despite being well-fed with pasture (as can be seen), simply because the soil lacked calcium. This caused the soil organic matter to be low, therefore low Co. Hair growing on tops of neck confirms it. Na, Zn, B and Se were typically low. The faults were caused by so-called adequate pH level, as per the NZ Department of Agriculture's typically wrong advice, so lime had not been applied. Se and Co, even if applied, soon leaches out of the low organic soil.



The pasture was hard to break off, so each bite gave a squeak, caused by too much K and low Ca. Coarse agricultural salt makes pastures softer and more palatable. Note the lack of clover because of no Ca.

High Al because of low Ca can cause animal health problems. Al is antagonistic to Ca and P and visa versa, so high Al causes low Ca and P absorption by animals, which lowers Mg absorption and increases K levels in pastures, which then increases grass tetany (hypomagnesaemia) and can cause other animal health problems. Excess Al lowers Ca levels in pastures, which impairs bone growth, so slows the growth of young animals. I saw this on a farm where, following AgResearch advice, lime had not been applied for decades because the pH was not below 5.7. Their Waikato clients' yearlings, grazing there from 1 June to 1 August, had been given ample pasture and hay from the same farm, but had hardly grown. They had to be moved to a farm that had adequate Ca levels, after which, they grew immediately. Wrong advice from MAF, LIC, some consultants and fertiliser companies, is costing farmers millions collectively.

Hair

If born with no hair - low iodine. Dry, brown or colourless hair - low Cu and/or Se. Rough hair, long hair on the neck like a mane, runny eyes and pot bellies - low Co. Long, dry or lustreless hair - low Na. Not losing winter hair and malnutrition - low Na, Cu and/or Se. Hair standing on end during temperature changes, even on healthy animals in warm weather - low Na. Thin and patchy hair - low zinc. Unhealthy hair may mean a damaged liver.

Head held low

Unhealthy, malnutrition, Se deficient, parasites. Don't judge average head height by those raising their heads to look at you.

Heat stress, seeking shade, panting

No water, hot water, eczema, lacking Mg and salt (temperature controllers) and/or other minerals, flies, endophyte fescue or perennial ryegrass. See Tongue hanging out.

Head repeatedly to one side when lying down

Beginning of milk fever.

Heart beat rapid

Grass tetany, prussic acid toxicity.

Hooves sore

Toxicity from endophyte fescue which causes swelling between the dew claws and hooves, which eventually slough off. See Footrot, Laminitis and Walking.

Hooves cracked or soft

Low Zn, old age. See Footrot, Laminitis, Hooves sore and Walking.

Hypomagnesemia (grass tetany)

Sometimes called grass staggers, it can look like just lameness. Mg levels low in blood (Mg blood levels rise once GT sets in). High K or Na, low legume content (legumes have 30% more Mg than grasses), short grass, little sunshine. See Footrot, Laminitis, Hooves sore, Leg joints swollen and Walking.

Hypothermia

Low Na, Mg and/or iodine.

Infertility

Low P, Ca, Se, Cu, Co, Mg, Mn and/or iodine. See Cycling poor.

Jaw swelling

A swelling under the jaw at the back of the tongue can indicate internal parasites. A fever and oedema type swelling under the jaw can be from Johne's disease. A larger swelling can be TB, woody tongue or a damaged jaw. See Woody tongue.

Jaundice

Yellow/brown skin on the brisket and behind the front legs is a sign of a damaged liver from toxins or poisoning of some sort, such as ragweed, spring or facial eczema.

Johne's disease

Johne's disease is currently the most common and most costly of all diseases affecting cattle farmers, so the more you can learn about it, the better. Keep up to date with the information in this chapter and do a web search for "Johne's" in your area every six months.

Also known as paratuberculosis, it is a serious, incurable, ruminant-wasting disease that causes a thickening of the intestinal wall, which blocks the normal absorption of food, so animals eat normally, but can't absorb nutrients, resulting in diarrhoea, wasting and death.

It is in most countries and in 8% of beef herds and 22% of dairy herds in the United States, costing farmers \$1 billion a year. The US Department of Agriculture says at least 45% of US dairy producers don't know about the disease, so this percentage could be higher in many countries.

It is difficult and expensive to eradicate, so the mob should be tested, divided into clean and infected, and farmed on different parts of the farm, with no manure going on the clean area, which should be upstream of the infected mob. Infected neighbouring animals upstream can infect those downstream.

Before purchasing animals, ask about the status of the seller's mob. Purchasing from farms which have been testing for a number of years is far less risky than buying from unknown mobs.

Recent research has indicated that the disease is more frequent in higher rainfall areas, and on farms where soils are more acid and lacking in essential minerals. Agricultural lime lowers acidity.

The following is not a definite cure, but is interesting. If others get success from it, I'd like to hear from you please.

A farmer had Johne's in the dairy herd quite badly, with about three cows showing signs each year. I was asked in 1998 to consult, and it was agreed to go organic and do once-a-day milking all year. Like most diseases, stress is a contributor. Once-a-day cows are much less stressed, healthier, maintain better condition and have a higher conception rate. In New Zealand, 90% of farmers using automatic milking choose to milk just once a day. It was also found that none came to be milked between about 3 and 6 am, so this herd is milked at 8 or 9 am.

The pasture was analysed for the 17 important minerals. Calcium was very low, as could be seen in the pasture (few and small clovers, perennial ryegrass was hard and pulling, few earthworms, tight soil with low organic matter content). LimeMag was applied at 3,000 kg per ha, then later fertilised with reactive phosphate and the other organically approved trace elements needed. These included Ulexite slow release boron, cobalt, copper, magnesium, salt (coarse agricultural), selenium and zinc. Tonic

plantain, a deep rooting herb, was over-sown by hand at 1 kg per ha. Seaweed and some approved minerals were added to the water.

Bloat, which had been a problem for ten years, stopped and more pasture than ever was grown. Metabolic problems decreased, AND there has been no Johne's for eight years. The farmer had been careful to isolate all cases immediately and dispose of them as soon as possible, and to not feed suspect milk to the calves. Dairy farming has become a pleasure. This is only one case, so no guarantee at all that it can be repeated, but worth trying. Very few people will admit to having Johne's, so it is hard to find cases to treat.

Joints stiff

Low P, high fluoride. Swollen joints can occur in alpacas from low P (they come from fertile dry land so can suffer on wet Waikato land) and low Vitamin D. See Walking.

Ketosis - pregnancy toxaemia in ewes.

Breath sometimes smells sweet and sickly, like nail varnish remover. Cows sometime lick themselves and others (needing salt?) shake, stagger, froth at mouth, face and ears twitch and cows are nervous.

Caused by high protein, low-digestibility feeds, low-energy feed so animals are not able to consume enough energy to match requirements just before or after calving, or being over-fat and using the energy from the fat rather than eating enough, stress and/or adverse weather.

Low magnesium, cobalt and/or phosphorus can accentuate it as can some other deficiency and/or illness. Once affected, a loss of appetite occurs. If unsure, do a urine test. Fully feed after calving for at least two weeks. One cow with ketosis indicates more could be suffering, which means low production. Vets supply quick acting glucose, which should be followed by a long term supply of good food. If insufficient lime has been applied, and nitrogen has been applied, energy, molybdenum and boron can be low and nitrates high, all of which help cause ketosis.

It occurs 6-10 weeks post calving and affects high producing cows when there are demands on their body, when even a high dietary intake of energy is insufficient for the animal's needs. The animal starts breaking down its own fatty acids and producing ketone by-products. Body fat deposits are depleted and there is a rapid loss of body condition.

Ketosis is often a secondary disease associated with metabolic diseases. Metabolic imbalances usually lead to a decline in appetite, which increases the risk of suffering from ketosis.

The following can bring it on: cows being in season and left in the yard with no feed, messing around with other cows instead of eating or a late technician getting to the paddock after most of the pasture has been eaten.

Ketosis can be confused with grass tetany or milk fever. Read their symptoms

Kids born without hair and/or thick puffy skins, weak, unable to suck, with oedema in head, tongue and neck

Low iodine. Low Se accentuates it.

Knees faulty

Usually the front ones, bending the wrong way or knock kneed, can be low Se.

Lameness

Physical damage on stones, twisting on concrete and other hard surfaces, a stone, twig or wire in hoof, standing on hard surface for too long, acidosis (usually in spring), rumen pH drop, low Zn, low or high Se, or low B, causing a stiff gait, endophyte toxicity from perennial ryegrasses or fescues (high endophyte, usually in summer). Hypomagnesemia (grass tetany, sometimes called grass staggers) can look like just lameness. See Footrot, Laminitis, Hooves sore, Leg joints swollen and Walking. Lameness is a three page item so will be fully covered in the future.

Leg joints swollen

Low or excess P. Ca can alleviate it. See Laminitis.

Lambs or goats born without hair and/or thick puffy skins, weak, unable to suck, with oedema in head, tongue and neck

Low iodine.

Licking others and things

Low Na and/or minerals, but if another animal is licked gently, it can be affection. Ketosis cows sometime lick themselves.

Lice

Animals that are underfed, unwell and possibly deficient in sulphur can be more prone to lice infection. Lice breed in dust, covers and barns.

Limping

This can occur from a number of ailments, such as grass staggers from endophyte, or grass tetany. In both cases it looks like a limp, but it is a stagger. Metabolic problems can initially look like a limp. Hoof problems can also be a cause.

Listeriosis (*listeria monocytogenes*)

This is a bacterial infection of animals and birds which affects the nervous system. It usually affects just a few animals in a mob because it is from something eaten, not from another animal. It is most common in animals that graze close to the ground, and in sheep fed poor quality silage with a pH above 5. It can be transmitted from animals and soils to humans as meningitis and glandular fever. Human-infected listeria can be picked up in milk after it has been pasteurised, and raw un-pasteurised milk can carry it from a listeria-infected animal or be picked up later which, with listeria, is easy at any stage.

An affected animal may stand on its own or walk round in circles, one side of its face may droop, slobbering can occur, eating becomes difficult, nervousness develops to convulsions, coma and death within a few days. Brain damage occurs, so treatment is seldom successful.

It is in many soils, so feeding silage or hay on bare soil or short pasture, or grazing short pastures can infect an animal. Dirty troughs, dung, mould or soil infected silage, balage, or haylage can carry it. Silage can be blamed when it came from feeding it on polluted soil or very short pasture, so when animals lick up the last of finely chopped silage or grain, they pick up the bacteria. Feeding along fence lines, or on the other side of temporary fences, are the best ways to pick it up. Change to silage before pasture has finished, and gradually at 10% per day over ten days to avoid digestive upsets and stress. Over-wilting silage increases the chances of mould which, combined with a high pH, can allow the silage to harbour the bacteria. Good vacuum silage, where moulds seldom exist and pH is usually optimum, is safest, provided no soil or dung pollution occurred. Avoid feeding from a wide silage face, which takes days to feed across, because moulds will grow on the face. Long narrow stacks are best. If vacuum silage is not made, avoid feeding the top and edges, which can be mouldy. Round bale silage can have mould on the ends, but the listeria bug also has to be present. Hay that is not dry enough can also grow mould.

As well as listeriosis, mould can cause animal sneezing, shivering, coughing, dirty runny nose and watery bowel movements.

Liver fatty

Being too fat at calving.

Lung problems

Any dust, residue from PKE and all feeds with mould. Low Se and low Co. See Catarrh.

Mastitis

This is too vast a topic to abbreviate. See Dairying > Mastitis.

Metritis (inflammation of the uterus)

Low Ca.

Milk production drop

Lack of water, lack of Na, Mg and other minerals. Heat, cold, wet, fear, stress, facial eczema from eating excess spores one to four days prior (lesions can appear ten days later). See Stress.

Milk fat % low or fluctuating

Cows thin, weather changes, sudden feed changes, sappy low energy pasture, mineral deficiencies. Analyse blood.

Milk fever

Low Ca, Mg or over weight. Low Na can cause milk fever symptoms which are not milk fever. Feed Mg before calving and Ca immediately after, or graze long grasses before and pasture with legumes immediately after calving. Snake bites can cause symptoms similar to milk fever. Some snakes are not poisonous. Look for the tell-tale fang marks, usually in the front of the body. There are treatments for some snake bites, but with some snakes, death is rapid.

Mouth frothing (salivation)

Grass tetany, nitrate poisoning, endophyte toxicity, phalaris staggers, prussic acid toxicity, low or high iodine, poisoning and/or throat blockage. See Ketosis and Listeriosis.

Mouth hard to open

See hypomagnesemia (grass tetany).

Movements uncoordinated

Low Mn, endophyte toxicity, BSE.

Muscles twitching

Ryegrass or fescue staggers from endophyte toxicity. Nitrate toxicity, prussic acid toxicity.

Muscles stiff

Grass tetany.

Nervousness

If the animal keeps well away from you, it could be ketosis or grass tetany. Nervousness during milking can be from mineral deficiencies, too much concentrates, faulty milking machine, slippery floors, parlour design, shocks, poor management, feeding too much palm kernel extract (PKE) or genetically nervous.

Night blindness

Vitamin A deficiency, which can be brought on by low Zn levels.

Nitrate toxicity

Symptoms include, abdominal pain, scouring, weakness, mouth breathing, frequent urination, muscle tremors, drooling of saliva, frothing at the mouth, blue discolouration of the mouth, reluctance to move, blood cells brown instead of red (check vulvas or eyes), disorientation - caused by high nitrates, usually in over fertilised pasture or crops such as oats and sorghum, collapsing, coma, death.

It can be accentuated by low sulphur and/or low molybdenum levels in soils. Cattle can continue eating high nitrate feed that can cause death from a lack of oxygen. Pregnant ones that survive nitrate poisoning, may abort up to two weeks later due to lack of oxygen to the foetus.

Nose dry

Sick, low mineral status, especially low Na, milk fever, parasites and/or stressed.

Nose discharging mucus (catarrh)

Virus infection, mineral irregularities, especially low or excess iodine and/or low or excess Se. Recently, I've found that feeding PKE, which is dry and dusty and with its very high Mn level, increases the incidence of catarrh, phlegm running out of nostrils and then lung problems.

Oedema

Accumulation of fluid in tissue. Around the udder is from high energy diets, high K and/or Na, and/or over stimulation, especially with GF before calving. First calvers older than two years are more likely to suffer from it than ones calving by two years. In the head, neck and tongue at birth it can be from low iodine levels.

Parasites

Internal parasites (and other ailments) can affect animals so severely that mineral deficiencies occur through starvation and/or inability to absorb or synthesise them, resulting in anaemia, getting thin, not growing, scours, swelling under jaw, dry nose, low Na in blood, soil eating and/or sunken eyes.

Pinkeye (ophthalmia)

Is a highly contagious, painful inflammatory infection of the eye that can cause loss of sight. It is more prevalent in breeds with light colours around the eyes, possibly because flies and insects are attracted to the light colour, and is most common in summer. Wear a white shirt in fly areas and see how many settle on it than on your face. The white hair around the eyes of Herefords can attract pinkeye, but the white can, and has, been bred out by some. Young cattle are more likely to be infected because older animals can develop immunity. Purebred tropical breeds are not affected.

Eyes start by running, with increased blinking, then go reddish and can even burst. If not treated, a white spot forms and visibility is impaired or lost. Runny eyes, caused by other problems, can also attract pinkeye, sometimes because Zn and/or Co are lacking. Those minerals, dispensed in the water, help reduce runny eyes, or fertilising with half a kg of Co sulphate per ha, or 6 kg of Zn sulphate per ha, can correct mild deficiencies. Supplementing with them corrects severe deficiencies. Not all infected eyes develop clinical pinkeye, but can be carriers.

Isolate infected animals in a safe paddock they know - mortality from pinkeye is usually only by physical misadventure. Give them shade if possible and make sure that they can find water. Infected animals should be treated and grazed separately on short pasture, down wind to reduce flies being blown to clean animals, until a few weeks after running of the eye stops. In bad conditions, a high percentage of a herd can be affected. Avoid infected animals from grazing long grass because it spreads the bacteria. Farms which have changed to controlled grazing (no long grasses), balanced fertilising, and fed soluble mineral mixes have noticed less pinkeye.

Controlling the fly population tends to reduce the incidence of pinkeye. Insecticide ear tags have proven to be effective for some, while others claim that they aren't, which is understandable because of the speed with which a fly can land, infect and take off. It is not transmitted by air.

Operate a closed herd if possible. Check bought stock and the farm from which they come for opaque, runny and damaged eyes. Check neighbours' stock. Flies can travel for miles if blown with the wind. Isolate bought animals for a few weeks and monitor them. Be selective where you graze out your animals and from where you take in grazing animals.

In bad areas, spray animals against flies in the beginning (not after many are infected) to reduce them acting as carriers. See your vet about vaccinating against pinkeye before an outbreak occurs. Reports indicate that some vaccination products are better than others, so ask around. In South Africa, injecting with 5 ml of vitamin A & E twice a year has reduced it and reduced placenta retention (not cleaning).

Placenta retained

Occurs mostly after aborting. High K or Na, low Ca, Se, Cu and/or iodine, too short a dry period, low protein intake and after twins. More than 5% of retained placentas in a herd indicates severe problems. Supplementing with Se reduces it.

Pneumonia

Infection, chilled, especially if already sick and/or low in iodine.

Respiration fast

Grass tetany and endophyte toxicity. AR37 is the most disliked endophyte by animals, and has the worst effect on them, while NEA2 is the most liked. Cows eat more and produce up to two litres of milk more per cow per day.

Restless

Facial eczema effects coming on.

Rubbing

Lice, or low Zn causing scaly skin to itch.

Rumen pH drop

Too much GF and/or insufficient coarse feed, resulting in poor digestion, acidosis, stiffness, lameness, drop in milk, displaced abomasum.

Saliva excess (see mouth frothing)

Saliva deficient

Insufficient salt and other minerals. There should be plenty of saliva on the concrete under cows mouths in the parlour.

Scald (bare skin) between hooves

Low Zn, aggravated by long wet grass.

Scouring (also see coccidiosis)

Scours (excessively loose dung) can be caused by lush sappy pasture, especially when grazing high nitrate, very short pasture or the mouldy base of long grass. Boron slows excess moisture uptake by plants, so reduces the "thin soup", high nitrate, sappy pasture problem that causes scours during fast growing pasture periods. Adequate Se when on sappy pasture also reduces scours.

Sudden changes of diet over a few days, rather than over the recommended ten days, internal parasites, such as worms or coccidiosis, intestine damage from bad prolonged coccidiosis when young, or excessive Cu damaging intestines. Low Se and/or Johne's disease. Intestine damage which can be from bad prolonged coccidiosis when young.

Dung stuck mainly to the tail is usually from internal worms, but can be from digestive problems, when endophyte and/or nitrates levels are high. It could also be salmonella (usually smelly and with small bubbles), yersiniosis, Johne's disease, bovine viral diarrhoea (BVD) and other viruses, vitamin B1 deficiency, metal ingestion, high molybdenum levels in pastures, low Cu levels (bubbles can then also occur in dung), excess Cu damage to gut through too much Cu supplement, even many years before, insufficient or too much salt, lead poisoning, ill thrift from any deficiency or nervousness (stress), grazing lime or toxic fertiliser on pasture, which damages the gut, or bloat.

Low Se, causing weak muscles, is a frequent cause of dung stuck to tails because animals can't lift their tails, which becomes worse after dung starts sticking to it. Se deficiency occurs mostly in high rainfall (>40 inch) areas where soils have a low pH. It seldom occurs on dry high pH soils.

Two to three metre long zigzag droppings in paddocks (not in lanes caused by normal walking) by some cattle is almost always a sign of Se deficiency. Even if Se has been applied with fertiliser, and in a soluble mineral mix, supplementing with one ml of Selovet 5/cow/day usually fixes it within a week or two, and the milk protein percentage usually goes up by 0.2, say from 3.6 to 3.8%. If you are unfamiliar with Selovet (Se) or any other item, you can do an internet search for information and suppliers. It is a New Zealand product available in Canada and some USA States.

Scouring in young animals

Insufficient colostrum causing weak immunity, infection, dirt, faulty milk replacer, cold drafts, over-feeding, bucket feeding instead of using teats with small orifices to ensure ample saliva is consumed with the milk. Calves eating pasture containing 0.5% P can scour badly. It should be 0.4%. 0.44% can adversely affect some animal's health.

Sensitivity increased

Grass tetany.

Sensitivity decreased

Milk fever.

Shade seeking

Sickness, heat, facial eczema, spring eczema, endophyte toxicity.

Shaky

Ketosis, endophyte staggers.

Skeletal imperfections

In calves - low Mn.

Skin bare

Ringworm if small, distinct and round. Lice if large and erratically shaped on neck and between back legs. Low Zn if uneven patches around the body. See Scald.

Skin thick and wrinkled like elephants' hide

Low Zn.

Skin scaly

Low Zn.

Lice can damage skins.

Skin jaundiced

Yellow-brown colour under brisket and front legs and/or up the side of body, which is easily seen in white holsteins and can be from liver damage caused by facial eczema, continued high nitrates, ragwort or other toxicity and/or poisoning.

Soil eating

Mineral deficiencies, especially salt. Parasites can aggravate mineral deficiencies and visa versa. There are minerals in subsoils that we don't know about, but animals do. Read Cultivation to see what subsoil brought up by chisel ploughing does to clover growth and eliminating bloat.

Spring eczema

In bad cases, eczema (hair and skin loss) can cover the body. Any toxin can bring it on. It can affect stressed animals when they are producing at their maximum. Being a photosensitivity problem, animals seek shade.

Eczema is accentuated by high chlorophyll intake from very fast growing grass, especially after using an excess of nitrogen fertiliser and accentuated by deficient minerals, especially Zn. Mycotoxins can be in pasture or grain. Avoid mouldy pasture (smell the base of grasses) and the grain. Some sprays on some animals and on some pastures can be a cause, especially if too concentrated and if all the farm is sprayed. Farmers who weed-spray their farms get more spring eczema than those who don't, or just spot spray. Feeding a complete mineral mix like Solmin reduces eczema damage.

Livers and other organs can be damaged by a range of toxins such as prussic acid from sorghums, nitrate poisoning, excess nitrogen causing excess protein, high or low Cu (molybdenum scours), endophyte toxicity, liver fluke, weeds such as amaranthus, ragwort, and even toxic grasses such as

panicum summer grass, which is a prostrate grass with dark green leaves and almost red stems.

Staggering or swaying

Nitrate toxicity, ketosis, low Mg, low Na and/or low Ca. Excessive Mn. Endophyte staggers. Phalaris staggers, especially if soil is low in Co.

Stress

This can be caused by one or a multitude of problems. Identifying them is not easy and is one reason why this article has been written. Check the visual symptoms and, if still unsure, get the pasture tissue, animal's blood, (liver for Cu) and hair analysed for excesses and deficiencies. Find a laboratory by using Google to search for 'hair analyses laboratory'.

Stressed cattle open their eyes wide, showing more white. The Agricultural University of Norway gave one group of 12 Norwegian red cows an open box of fresh grass and gave another 12 a similar box with a transparent perforated lid that prevented them from eating the grass that they could see and smell. The eye-whites of the frustrated group - animals with no other reasons for stress - were over twice the normal size.

Stress causes include lack of water, heavy metals and hardware poisoning. A stressed animal can kick at its stomach, walk gingerly, eat less, produce less, scour, have smelly dung from eating less and from an upset rumen. High Mn levels in water, feed and/or supplements, lack of some minerals and/or electric currents or shocks in parlour, yard or water troughs can cause stress.

Sucking udders

Calves' natural desire is to suck and make saliva. Nothing can replace this. To satisfy the need to suck, don't use buckets to feed them; use teats with small holes so calves are satisfied by the time they have finished sucking in their milk. A few animals continue the habit of sucking each other, if they've been allowed to when a calf. See Dairy > Calf rearing.



Tail covered in dung

Internal parasites, such as worms. To avoid drench resistance, weigh the animals and ensure that the drench rate is accurate. If caused by coccidiosis, dung is dark coloured from blood and spread onto body just below pin bones. Damaged intestines from a toxin, low Zn, too much lush sappy pasture, sudden change of diet, tail so heavy with dry manure that it can't be lifted sufficiently, accentuated by low Zn and/or low Se, causing weak tail muscles. Long zigzag droppings in paddocks are from low Se. Some animals always have dirty tails for no apparent reason. Their villi (fingers in intestines) could have been permanently damaged when young by coccidiosis or excess Cu being fed or drenched at some stage. See Scouring.

Tail fallen off

Endophyte toxicity, bad vicious dog which needs muzzling or disposing of, tip frozen through freezing and/or poor circulation. Dung allowed to remain on tail which cuts off circulation.

Teat scabs

Low Zn, physical damage, pox.

Teeth grinding

Nervousness, worms, indigestion, any sickness like milk fever, grass staggers and/or brain damage from high manganese and/or very low vitamin B.

Teeth growing too long, especially in sheep

High molybdenum, especially on peat where there is no grit in the soil and pastures to wear teeth.

Molybdenum has a hardening effect.

Teeth loss

Time of life or hard grasses.

Temperature low

Milk fever - body and ears feel cold.

Temperature high

Heat, low Na, virus or other infection.

Thin animals

Breed, modern genetics, which encourages cows to milk well, parasites, under-feeding, internal metal damage, toxicities and/or mineral deficiencies.

Ticks (see > Tick borne diseases (Theileria) chapter)

Tongue hanging out

Something stuck in mouth or throat, thirst, catarrh, endophyte toxicity, phalaris staggers, poisoning, heat stress, excess soluble mineral mix in water. See Stress.

Udder licking, or trying to

Facial eczema symptoms starting on teats and udders.

Udder red, blistering or peeling

Damaged liver caused by inducing, facial eczema, or spring eczema. The latter can be caused by high nitrates, grazing pastures which have been weed sprayed or sprayed against facial eczema with a fungicide.

Udder swelling under skin in front and spreading forward

See Oedema.

Urinating frequently

Nitrate toxicity.

Urine drinking

Low Na and/or minerals, which can also cause them to eat soil and dung. Bulls sometimes drink cow's urine for other reasons.

Walking unsteadily in circles

See Ketosis and Listeriosis and BSE.

Walking slowly or stiffly, lacking energy, indifferent to surroundings

Laminitis, acidosis, low pH, foot problems and/or endophyte staggers. Facial eczema animals can also kick at their stomach. Milk fever type symptoms can be because of low Ca, low or excessive Mg, low P, high fluoride, low Na, over-weight and/or phalaris staggers if the soils are low in Co. Uncoordinated movements can be from low Mn, which is almost never in New Zealand. Muscular dystrophy (progressive wasting of muscles), scours and walking stiffly can be low Se and/or low vitamin E, if not getting green pasture or are not getting good pasture silage. Staggering from low Mg - see Grass staggers. Check for ketosis in springing (freshening) or newly calved, high producing cows. See Disoriented and Nitrate toxicity. If relying on snow for water, which is pure water with no minerals, animals can suffer mineral deficiencies compared with drinking spring, well or stream water. See Lameness.

Wool cotty (fleece bound together) with poor crimp

Low Cu and/or low Zn.

Warts

A virus-caused, rough, dark brown lump on skin, more likely when some minerals (Ca in particular) are low. Applying LimeMagPlus to pastures has cured existing warts and stopped warts forming on many farms. Vets don't believe a virus can be prevented by agricultural lime until they see it happen. Read Elements > Minerals > Calcium.

Wild & timid animals

Scared animals can become like kittens when their pasture is correctly fertilised and Solmin minerals are fed through the drinking water, especially if under correct fertilising and grazing, because they then associate humans with getting fed. I know of no other minerals that have done the same.



This Angus-cross-Holstein heifer grazing 100% pasture on three metre deep low fertility Rukuhia peat just south of Hamilton, that was correctly fertilised, became tamer when fed Solmin soluble minerals in the drinking water. This visiting learner client, not known to the animals, was amazed. When animals are mineral deficient, they are more likely to be nervous and act stupidly. Adequate Mg, in particular, quietens animals.

This photo, in November 2008, shows how tame what were nervous animals became after only two months on correct LimeMagPlus soils and Solmin in their water. While I was photographing, she walked up to me. See Beef Profiting for more.



Good grasses with 25% clover, correctly limed and fertilised, are a good feed, but can lack Na and iodine, because it doesn't matter how much salt is applied to soils, pasture can't take up enough, especially from tropical grasses such as Kikuyu and Bermuda. Also, fertilising with iodine is uneconomic because of the cost (NZ\$80,000/tonne), and because it leaches so quickly. Feeding salt and iodine, and the seven other deficient elements in the drinking water, is the solution. See Mineral Feeding.

Iodine deficiency problems have been mentioned a lot. Milking cows sprayed with emolument and iodine teat spray can help because it is absorbed through the skin, but they and others should get it in the drinking water from Solmin which increases the iodine level in milk from zero, if on bad minerals with manganese, to where it should be, i.e., 70 to 90 ppm. Fonterra should take note of this because Chinese mothers have rightly complained that New Zealand's milk is too low in iodine for their babies.

All dairy farmers should complain to Fonterra for not doing what I have shown several of their staff since 2013, i.e., how to correct iodine and change milk from heavy metals loaded to clean and pure better than the best organic milk.

Tranquillity is a necessity for healthy animals. Big Chief Sitting Bull admires some of his offspring calmly in the tranquil surroundings of good pasture and shelter. This bull is the only cattle beast I have seen that sits. When in the front paddock on Puketaha Road, near Hamilton, motorists stop and photograph him.



Ducks & pasture

This was taken in May 2008 when I started consulting for Barry Brunton, showing the weedy uneven coarse pasture and shabby lustreless ducks eating maize on unpalatable grass, no clover and lots of weeds caused by the toxic superphosphate based fertilisers. Their lack of lustre shows they are very unhealthy, which he didn't realise.

Now look at the ducks in the photo below - two years after LimeMagPlus was applied, which improved the soils, pasture, animals and ducks. Correct liming with



deficient elements gives palatable pastures that are grazed more evenly than superphosphate based fertiliser as he had used in the past. These ducks can't fly, so they didn't have access to Solmin in the water troughs - theirs and the pastures improvement was solely from two years' of LimeMagPlus.



The ducks were free-range, but didn't go more than 50 metres from their pond. They can't fly so ate only this pasture and the maize. Typically, the farmer didn't think they had changed, so was amazed after seeing these two photos. People who see things every day, seldom register changes.

Look at the evenly growing and well grazed (sign of optimum fertility and high palatability) weed-free pasture with no bare patches and dung pats which were eaten by earthworms shown below. LimeMagPlus and when needed, Gafsa reactive phosphate with deficient elements added, encourage earthworms that increase and eat all the thatch (dead grass), so facial eczema ceases without feeding zinc, provided all aspects of correct farming are applied -. Read Animal Health > Facial eczema.

The cattle were fed Solmin in their water. Not all is absorbed by animals so the earthworms benefit from some in the manure. Have you ever seen healthier or larger caliginosa earthworms.

The increased number of earthworms dispose of dung pats in two weeks when moist, but take longer in droughts.

No earthworm killing urea or other nitrogens were applied.

The two best white clovers, plantain and Bealey NEA2 ryegrass were oversown in one of the LimeMagPlus applications.

Who would have thought that soft agricultural lime, serpentine and trace elements based on pasture leaf mineral analyses, would give feathers with such sheen, lustre and health to ducks eating only pasture and getting only two handfuls of maize (corn) daily, with no minerals except what was applied with the lime and reactive phosphate fertiliser.



No nitrogen or potassium had been applied for three years.

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