

**Hoof problems are easily controlled with care & forethought.**

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Hoof damage costs a lot in lost milk production, later conceptions, vet visits and operations (\$6,000 in 2012/3 on one 400 cow herd), drugs, discarded milk after using antibiotics and time moving or separating lame cows to a close paddock.

If the lane is causing lameness, calculate the total cost of time, vet bills, lowered milk production at the time and subsequently, medicines, and the likelihood of missing a mating and possibly being culled. They could total \$300/cow (Clive Dalton figure), which may make you will feel better about spending money on fixing the lane.

Lameness in animals grazing correctly drained, limed and fertilised pastures is rare unless lanes are rough with stones or too cambered, or walking distances of more than about 3 km/day, or if the herd has an excess of North American genetics with sickle-hocked legs. It is more common in confinement animals standing on concrete for long periods. Laminitis can occur in cattle fed too much grain based feed (GBF) and/or grazing high-nitrate pastures.

Grazing herds above 1,000 cows, cause an increase in hoof problems. On large farms, graze the weaned calves and heifers at the back of the farm.

Correctly fed, means grazing pastures that are analysed twice a year for the 15 essential minerals and limed and fertilised to correct the levels, and animals being fed Solminix of nine soluble minerals which I designed for New Zealand in 1984. Surveys and results show it is the best fed in the drinking water via an online or trough dispenser. Licks don't achieve good results because they are not consumed equally by all animals, whereas drinking water is. Big animals need more and drink more.

### **Costs**

Lameness can lose \$300 per cow, from treatment, reduce milk production, vet visits, discarded milk, antibiotics, and time. There is also the pain that animals suffer, which, under the Animal Welfare Act, could lead to a fine, if not correctly handled. See Feeding Minerals & Supplements > Solminix & Minerals Feeding.

### **Preventing Problems**

Lameness increases with herd size, walking distance, mud, moisture, rough lanes and pressure to walk jammed up along lanes, so they can't see where they are putting their hooves. Mud is bad in that it softens the hooves and spreads infection.

Agricultural lime chips that are too small to do hoof damage, and pack down well on lanes, help reduce infections. They must be packed down, and not so loose that they get in between hooves, or be transported on to concrete. Coarse sand must include clay to pack down and not wash off the lane in heavy rain. The far end of lanes, and short ones serving a small number of paddocks, can be left in grass, or have bark spread over them.

Races and lanes should have only just enough camber to ensure that rain runs off and that potholes don't form. Too much slope causes hoof and leg damage when cows have to walk on the slope, which twists and opens the hoof and can cause tearing in the tender hoof joint. Infection can then enter the slit. The twisting action on legs walking long distances on a slope can also affect leg joints.

Soft and split hooves are sometimes from feed being low in copper, zinc, calcium, phosphate, selenium, protein and/or from a damaged liver. Scald (exposed skin at the top of the hoof join) as shown is a sign of low zinc levels in the diet.

Feed grains, palm kernel, etc., after grazing and at least twice a day, rather than in one feed on an empty rumen. If it has to be fed during milking, then give the cows pasture, lacerated or long-cut silage, or hay, before milking.

No hair between an animals two toes, shows a lack of zinc which increases the chances of hoof damage. White hooves like this one are more susceptible to problems than black ones.



### Cowmat Testimonials

• Hoof problems in wet conditions can be a problem, but were not on the Van Vugt farm at Eureka, east of Hamilton, where they had a cowmat at each entrance to their herringbone. Sharemilker Stuart Van Vugt fills the cowmat from the wash down hose, then sprinkles a kg of zinc sulphate over it before each milking. “We now have no hoof problems in our 190 cows”, he said.

Howard Porteous of Matamata wrote -

• “Hoof problems have been a pain for the cows and me”, says “but using a cowmat this season has resulted in very few”.

• “One cow had to have a stone removed from its hoof, which despite being damaged needed no treatment, other than walking over the copper laced cowmat, and it healed.

• “This season we have hardly had to use penicillin injections for foot rot which has saved money and the pain of bucket-milking treated cows as well as the loss of milk.

• “It took a while to train the cows to it. We placed it just outside the exit race for a few days and then gradually moved it in.”



As farms get bigger, cows have to walk further, so hooves need more protective care, which can be achieved by the cowmat technique.

The manufacturers, Sweetmans Ltd, have developed the same principle in the form of Wheelmats to disinfect vehicle wheels and mudguards to keep foot and mouth off farms.

Peter Sweetman believes that farms should have one in stock in case foot and mouth arrives, which Simon Upton says will not be if, but when! The rate at which diseases and pests are arriving, he could be right.

The UK government’s main advisor on the spread of foot and mouth disease, Professor Roy Anderson of Imperial College, London, said that spread was mainly by people and vehicles (Reuters).

Some countries are having incoming passengers walk over disinfectant mats at airports with the aim of keeping foot and mouth out.

For further information contact Sweetmans Ltd, Box 158, Huntly, Ph 0800-808-081 or [sweetmans.of.huntly@xtra.co.nz](mailto:sweetmans.of.huntly@xtra.co.nz) by email.

### Causes

Lameness is caused by bacteria entering tissues following cuts, severe bruises, punctures, abrasions, or twisting on concrete, lane slopes,

Some find that high endophyte levels in some perennial ryegrass and old fescue grasses cause stress and increased hoof problems. Endophyte can kill horses, so, before blaming unbalanced feed-caused laminitis for the ill health of animals, make sure that it is not something else, such as endophyte toxicity, which also causes Fescue Foot or Fescue Lameness, which looks like limping. Many times I’ve had farmers complain that an animal is limping, but they can’t find anything wrong with the hoof, because the limp is actually a high endophyte stagger. Safe endophyte such as NEA2 and low endophyte, or endophyte free grasses and mixed pastures are the least infectious.

Lanes that are too crowned up to the middle like this one cause hooves to get twisted when walking on the slopes, so when they can, cows walk in the centre or in shallow drains as shown. Rotten rock and large stones like these damage hooves. Even these in the right photo damage hooves. They should be like this closer photo shows. Crushed like this costs more per m3, but very much less than larger stones per m2 spread on the lane.



Having to turn sharp corners on concrete strains hooves. Lanes should have round curves, not right angle ones as sometimes seen where the race joins the lane and shown here.

### Symptoms

The first sign of foot rot is usually slight lameness. It may affect only one animal which can make an animal be off-colour, nervous and/or shaky.



Lameness is usually followed by swelling of the foot, spreading of the toes, and reddening of the tissue above the hoof. The swelling may develop into an abscess, which, when broken, will release a discharge with a bad smell. The animal may have an high temperature with a loss of appetite and body weight. If the infection is unchecked, it can invade deeper tissues of the foot and possibly one or more joints, causing chronic arthritis.

Hooves normally grow just like our nails do. Look at a person's nails and you get an idea of their health, digestion and mineral deficiencies. If nails are thin, lack sheen, have blemishes, lines or grooves length-ways, are chipped or split, they are most probably low in zinc. If thumb nails curve down towards the front like an inverted teaspoon they are possibly low in iron.

Don't keep replacement from cows with hoof problems.

Footrot is sometimes a seasonal problem, occurring during periods of extreme moisture, frozen or muddy yards, or severe drought which can cause the hooves to crack, allowing bacteria to enter the hoof. White hooves are softer than black ones, so are more likely to suffer. If not treated, infections can go deeper and into a joint.

The older and ineffective practice of analysing soils, to determine fertility and element requirements, is a major cause of high potassium, and low calcium, zinc and molybdenum, levels in pasture, but is decreasing in favour of pasture tissue analyses of ryegrass only, because analysing it or another grass only, is the way to monitor most elements accurately, and to show what nutrients the pasture is getting out of the soil, and what the animals are eating.

Acidosis can bring on laminitis, so see Animal Health, Acidosis.

Organisms common to the environment, such as streptococci, staphylococci, corynebacterium, and various fungi, have also been found in foot rot lesions, especially when moisture is present. The bacteria enter tissues and begin the infections when cuts, bruises, punctures, or severe abrasions break the skin.

Hooves are worn, which is normal, by walking, but not worn much by standing which causes weak, deformed hooves that can turn up and may need trimming.

Where cows are on concrete before milking for long periods of time and for on/off grazing, lameness can occur, especially if stones are carried in from lanes in hooves. There is no give in stones on concrete so the hoof suffers. Ensure that lanes use soft lime chips or small quarry chips shown above, not hard stones, and if necessary sweep or wash them off concrete.

### Laminitis

This is swelling of the sensitive part of the hoof, cutting off blood flow to the bone part of the hoof, which then becomes soft and weak, and easily bruised or damaged by small and large stones, and by twisting, as on rough uneven stony lanes and ones with too much camber (the slope down from the centre), or by twisting and turning right angles on a hard surface. Causes include anything that gives poor digestion and acid rumens (pH below 6).

Laminitis occurs mostly in cows in confinement and/or fed excess grain-based feed, or short-cut silage, hay, etc., as a total mixed ration (TMR). The problem is worse if too much is fed to hungry animals over a short time. TMR short feed is swallowed quickly with little chewing, and not regurgitated as much as it should be, so less saliva is made.

Saliva is the first digestive juice and contains sodium. Adequate sodium in the ration, or if fed as a



supplement with minerals through the drinking water, increases saliva manufacture by ruminants, and gives a healthier rumen and up to 12.5% more milk production in sodium deficient areas. Dairy farmers who start feeding Solminix soluble mineral mix as a drench, or, better still, dispensed in the drinking water, notice a substantial increase in saliva dropped where the cows stand at milking and chew their cuds. Adequate mature pasture or forage crops fed with the grain, and lacerated silage which is long-cut and bruised, help reduce the problem.

If grain is fed, and the silage is fed separately from it and is finely cut to under 5 cm (2 inches), there can still be problems. It is best to feed pasture before feeding grain at milking, and to feed finely cut silage after grazing pasture. Long-cut silage (8 cm and over) is usually OK, and much better for animals in many respects, because they don't guzzle it and can regurgitate it. Feeding a couple of kg of good normal length hay spread over 24 hours can reduce the problem, but it is better to remove the cause, and feed mature pasture and lacerated or long-cut silage.

Laminitis and acidosis can also occur when grazing pasture which is too short, because it is swallowed without much chewing and again, may not be regurgitated completely. This can occur in sappy first-grazing spring pasture in snow-covered areas, and in milder climates when the second grazing round starts, after the longer winter saved pasture has all been grazed, especially if sunshine is lacking and too much nitrogen has been used. It can also occur following dry summer periods on short lush pasture grown rapidly after autumn rains.

Digestive disturbances, and so laminitis and/or acidosis, can be aggravated by any sudden change of feed, instead of it being changed gradually over about ten days.

Laminitis can also be a secondary problem of animals sick from any cause, including stress - from hunger (long periods without feed, caused by being hungry before milking and then off pasture for hours while being milked), mineral deficiency, cold (not eating during cold winds causing animals to stand tail to wind and not eat for hours), heat (not eating due to having to walk long distances in heat), being in season (on heat, cycling), etc. A lack of sodium adversely affects animals' ability to control body temperature, so they then suffer more in cold and heat.

Increase the feed, even if it means buying in good silage, hay or other bought feed, but limit the latter. Any prolonged hunger or digestive upset can cause cracks in hooves.

Hooves normally grow just like our nails do. Look at a person's nails and you get an idea of their health, digestion and mineral deficiencies. If finger nails are thin, lack sheen, have blemishes, lines or grooves length-ways, are chipped or split, they are most probably low in zinc. If the thumb nail bends down towards the front like an inverted teaspoon, they are possibly low in iron, but some people have hooked nails by inheritance. Hooves (and horns) are indicators and are worn by walking, but not by standing, which makes the front turn upwards and then need trimming as in northern hemisphere when cows are on concrete for most of their lives.

### **Confinement**

Where cows are left on concrete yards for on/off grazing wet pastures to reduce pugging, lameness can occur, especially if a few stones are carried in from the lanes in hooves. There is no give when standing on stones on concrete, so the hoof suffers. This can also occur in milking cows carrying stones on to concrete yards, so ensure that lanes have small lime chips or quarry dust, not stones.

Bugs that cause lameness don't like an alkaline environment and lime will improve the pH considerably. Lime will not reduce lameness caused by physical claw damage from stones, twisting, sharp concrete or long periods of standing on concrete. Animals are not designed for concrete surfaces. Grind it smooth and add grooves in areas where slipping can occur.

Standing off pasture to well drained sandy soil or a pad of peelings, chips, bark or shavings, is far better because, as well as being soft, animals will lie down on it, which they seldom do on concrete, unless there is bedding and space, as in Northern Hemisphere barns.

At first assessment one might believe that all hoof problems are from confinement, but there can be other reasons such as long and soft hooves accentuated by -

- High nitrates in feed or water. Nitrates in the drinking water should not exceed 10 ppm. There are nitrate measuring paper strips available, and of course labs can measure it. Fertilising with artificial nitrogen increases nitrate levels, as does all forms of N, including from legumes.

- High nitrogen and high potassium in the pasture. Nitrate levels in pastures decrease in the

sunlight from sunrise to sunset, then increase over night, so, if possible, feed pastures in the afternoon. On cloudy days nitrates don't change as much. Potassium levels in the food should really not be much above 1.5%, however fast growing pasture requires about 2.7%, but no more. Many pasture levels exceed 3.6% potassium, so become slightly toxic to animals.

- Standing on concrete for long periods.
- Insufficient exercise, especially with horses. Exercise increases circulation and blood flow to hooves.
- Too much salt, causing moisture build up under the skin (oedema), which reduces blood flow, causing soft, weak and deformed hooves.
- Tenderness and deformed hooves then cause changes in weight bearing surfaces, which aggravate the problem of long hooves putting pressure on the soft back area.
- High molybdenum (Mo) with low copper (Cu) levels in pastures can cause teeth to grow too long, so may also contribute to long hoof growth. The way to check these levels is to get pasture tissue analyses, and then fertilise accordingly. Briefly, the higher the Mo is above 1.5 ppm, the more Cu is needed.
- Ruminants being a long time without feed upsets the rumen and digestion. With all animals, hunger ill-effects are aggravated by guzzling thereafter.
- Sappy pasture travels through the digestive system quickly, so needs to be replaced more frequently, especially with high producing, high consuming cows. Aim to keep off-pasture milking times to no longer than an hour and a half. If longer, give the cows a fresh feed an hour or two before bringing them in to milking. Dividing large herds in two or more helps.
- Horses don't have a rumen so need frequent SMALL meals, but not too much in total.
- Routine hoof trimming, as done in the Northern Hemisphere, can increase lameness. Don't trim hooves unless they need it. Some will grow a little long, but then no longer.
- Reducing mud in lanes, around water troughs and in yards, can reduce the incidence of foot problems and footrot. Frozen ground in the same areas should be smoothed or covered with straw or shavings to limit twisting of the hooves.

Walking over Hoofmats or Cowmats containing zinc sulphate at 1 kg per 20 litres of water will harden hoofs. Copper sulphate at 1 kg per 20 litres of water will reduce infections.

Hoofmats with zinc are recommended for hoof strengthening, and with copper for Hairy Wart and Strawberry Foot. See [www.shoof.co.nz](http://www.shoof.co.nz)

### **Damaged Hooves**

Dairy farmers in the Northern Hemisphere using confinement systems on concrete sometimes use professional hoof trimmers who do the rounds of farms twice a year, whereas in New Zealand it is seldom necessary. At the most we would have only 2% of our herd with hoof problems.

Treat hooves during fine weather rather than during wet weather.

Hooves should be kept trimmed on heavy cows and bulls to help reduce the stress on the soft tissues of the foot.

Many farmers know that feeding zinc sulphate helps harden hooves, and research in USA proved this. There are parts of US extremely low in zinc. Do you know if you are in a low zinc area? Analyse your pasture and if Zn is below 30 ppm apply at least 8 kg per ha (7 lb per a) of zinc sulphate.

### **Cowmat Saves Pain & \$'s**

"Hoof problems have been a pain for the cows and me", says Howard Porteous of Matamata, "but using a Cowmat this season has resulted in very few".

"One cow had to have a stone removed from its hoof, which, despite being damaged, needed no treatment, other than walking over the copper laced Cowmat, and it healed.

"This season we have hardly had to use penicillin injections for foot rot, which has saved money and the pain of bucket-milking treated cows, as well as the loss of milk.

"It took a while to train the cows to it. We placed it just outside the exit race for a few days and then gradually moved it in."

A big advantage of Cowmats, compared with foot baths, is that the Cowmat at the entrance to the bails to give the copper or zinc sulphates longer to work before walking in mud and pasture again.

As farms become bigger, cows have to walk further, so hooves need more protective care, which can be achieved by using Cowmats.

A Hoofmat or Cowmat at the entrance as shown does a better job than a foot bath, and can be easily cleaned and loaded, so doesn't get so dirty. The diluted product in 30 litres of water is poured over it and then does about 300 cows.

Ensure that everyone on the farm knows about the correct diluting of products used, because there have been cases of hooves and surrounding skin being damaged by insufficient dilution.

Wash or scrape any dung off the top after each milking and wash and replenish the liquid regularly. Less liquid is required than in foot baths, so water and products are saved, reducing costs and work. It should be removed when not required, to save wear.

Old cows, and those prone to lameness, may need to be always grazed in close paddocks. Walking long distances on a stony, rough or muddy ground, or bunched up in a mob so they can't see where they are putting their hooves, will increase lameness.

I believe that farms should have a Hoofmat or Cowmat in stock in case foot and mouth arrives, which ex MP Simon Upton said that will not be if, but when, and the rate of pest arrivals in the last few decades, proves it. China, Korea, some of South America currently have it wide spread, and Japan has had it, possibly getting it in straw from China.

UK government's main advisor on the spread of foot and mouth disease, Professor Roy Anderson of Imperial College, London, said that there was no evidence of airborne transmission. Spread was by people and vehicles (Reuters). However, this doesn't tie in the infection spread in the UK during their outbreak.

Some countries have incoming air passengers walk over disinfectant mats at airports, with the aim of keeping foot and mouth out.

### **Treatment**

Most of this section is on prevention because treatment of infections is expensive. If you are not experienced, call a vet. In all lameness, the sooner treatment is effected, the less the problem will be and the sooner it will mend.

Soft and split hooves are sometimes from feed being low in copper, zinc, calcium, phosphate, selenium, protein and/or from a damaged liver.

Many New Zealand farmers know that feeding zinc helps harden hooves, and research in USA showed this. There are parts of USA and most of New Zealand extremely low in zinc. Do you know if you are in a low zinc area? Analyse your pasture and, if Zn is below 30 ppm, apply about six kg/ha (5 lb/a). Use Calcium Nutrient Planner or Phosphorus Nutrient Planner spreadsheets.

Old cows and those prone to lameness may need to be always grazed in close paddocks. Walking long distances on a stony, rough, muddy lane, or in a bunched up mob so they can't see where they are putting their hooves, will increase lameness.

In all lameness, the sooner treatment is effected the less the problem will be, and the sooner it will mend. Lamé cows that are grazing can lose condition rapidly.

Keep them in a close paddock with plenty of mature pasture, and/or hay and silage, with water containing minerals. A Shoof (shoe for a hoof) may be necessary to spread the weight and reduce pain. See [www.shoof.co.nz](http://www.shoof.co.nz)

Check for small stones, nails, wire or thorns in the hoof.

Early treatment is necessary to prevent animals from becoming chronically lame. Penicillin, penicillin dihydrostreptomycin combinations, oxytetracycline (terramycin, liquamycin) or sulfonamides (sulphamethazine) are usually effective at treating foot rot, when given at recommended dosages and treatment started early. See your veterinarian, who should know the major local causes.

The two hemispheres' dairy farming practices are opposites, partly because of the weather differences, and partly because of the different price structures, based on subsidies and none in New Zealand.

Most Northern Hemisphere dairy cows have a minimum of grazing, with cows spending most of their life on concrete, while New Zealand has 100% grazing on pasture and only minutes to two hours twice a day on concrete for milking, and a few hours for some on concrete pads on puggy soils during wet periods. The best and most common pads are of chips, peelings, bark, shavings or sawdust, with preferences in that order.