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All animals have internal parasites, but good management of controlled grazing with feeding of minerally balanced pastures, crops and silage when necessary, make them healthier and allow them to live with some worms with fewer ill effects and less drenching. Before drenching for worms, check that animals need the drench, and that they are not just lacking something. Low selenium is a major cause of scouring.

LimeMagPlus increases earthworms which eat the animal manure more quickly which decrease parasite breeding.

Good farmers don't wait for severe parasite symptoms before doing anything about control, they have a preventative schedule worked out to control worms without building up drench-resistance. If treatment is not done until it can be seen that animals are suffering, it has been left too late for profit, animal welfare, and because they'll be spreading eggs.

Mobs should be checked regularly for extremely thin animals and poor doers. Because you see them daily it can be hard to identify condition changes so take digital photos fortnightly of a thin one, an average one and a fat 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 being thin. It could be an undershot jaw which was not a problem when grazing long grass, but can limit consumption under over-intensive grazing on very short grass. Other causes are faulty or missing teeth, carrying twins, damaged liver, facial eczema, mineral deficiency, hardware killer (eaten wire or nails), a disease such as Johne's which is usually associated with severe scouring and rapid losing weight, heredity (some families are naturally thinner than others), just plain inability to compete, or it can be worms. Drench only if you are sure that there is worm infestation.

Avoid over-doing the hard grazing of sheep (making them clean up pastures) just because of the good job they can do. In humid conditions internal parasite larvae become host infective about five days after the dung is dropped, so sheep should not be left in a paddock for longer than five days, except when lambing, so are spread-stocked on pasture at least 7 cm long. This allows them to get a fill fairly quickly without grazing close to their droppings, and to produce more milk.

Earthworm and beetle activity in manure substantially reduces fly and parasite breeding. Uneaten cattle pats in pasture two weeks after grazing show that there are no earthworms or beetles, so fly and parasite larvae will breed in the manure. In dry conditions earthworms will be dormant, but not beetles.

The worst enemy of an animal is another of the same breed that carries the same parasites and likes the same feed. Grazing other animals before and/or after sheep and goats improves their health and speed of growth, and reduces their parasite infestations.

### Things that increase worm infestation -

- A lack of earthworms to eat the sheep droppings quickly, and stop the parasite cycle.
- Staying in one paddock for longer than five days.
- Grazing pasture short so they have to graze close to their droppings.
- Pasture with high moisture levels.
- Warm conditions.
- Returning to paddocks too soon. Using other animals to graze paddocks in between can lengthen the return time and make them freer of larvae.
- High numbers of the same animals per hectare.
- Not drenching on time.
- Not weighing and dividing animals by weight before drenching, so that the lighter ones get too much and the heavier ones not enough drench, which can increase drench resistance.
- Any ill health conditions.
- Last, but the most important - mineral deficiencies, especially Ca, Co, Cu, Se and/or Na.

### Causes of drench-resistance -

Some chemical drenches lose effectiveness as they get older. If this happens with worm drenches,

worms can build up resistance. These drench-resistant worms then multiply and cause a serious problem.

Under-drenching because the weights were not correctly assessed. If the average weights are used for all, the larger ones will be under-drenched, which will allow some worms in them to become drench-resistant. Those thriving without drenching should not be drenched. Breed from them.

The same drench product used for too long. Drench types should be alternated. Work out a drenching plan with your vet.

High endophyte grasses giving symptoms of internal parasites.

Lush pasture and changes in diet giving symptoms of internal parasites.

Low Se, cobalt and/or copper levels giving symptoms (scouring) of internal parasites.

Insufficient LimeMagPlus causes a multitude of problems too long to record here. See Elements > Calcium.

### **Avoiding drench-resistance**

Low cobalt, copper and/or selenium levels, all at the same time, are disastrous for ruminants, as are single deficiencies, but to a lesser degree. Measure pasture tissue at least annually, then fertilise (preferably) and/or drench (last choice) with deficient minerals accordingly.

Check which worms are present and drench against them only - never use a shot-gun method (fire at all and hope to get it right). It helps to change drenches annually, but not more often and to drench only those sheep needing it. Work with your vet to check what worms you have and do a drench test to see whether you have a drench resistance problem. Do faecal tests regularly to know when to drench for worms. Get liver tests of mineral levels from the first draft of lambs going to slaughter to supplement the remaining ones, when drenching, by pasture spraying, licks (not very effective) or in drinking water if possible.

Manage sheep to reduce internal parasite infestation and to delay drench resistance by carrying out the following. I doubt that it can ever be completely prevented, because some of everything usually survive.

1. Measure the pasture's 17 mineral levels and fertilise with 15 to ensure that soils, pastures and animals don't suffer mineral or trace element deficiencies or excesses. The two missing are iodine, that is too expensive to fertilise with, and aluminium, that is never needed, but, if over 100 ppm, may need more Ca and P to lower it.

2. Grow a variety of grasses with legumes. A grass only pasture will not supply enough calcium or magnesium. Tropical grasses will never supply enough Ca or sodium.

3. Drenching sheep with deficient elements is not satisfactory because most elements are needed daily and because what animals need is also needed by soil life and some pastures. Some elements can be supplied in bullets or injections (last resort). The ideal way for cattle is to feed a soluble mineral mix through a dispenser on the water pipe line, but won't work with sheep because they don't drink regularly enough and sometimes natural stream water is the only source.

4. If licks are fed to sheep, ensure that plenty of lick sources are provided to avoid smothers, which is when mineral deficient sheep crowd to get at the minerals, and smother those under them. This doesn't usually occur when pastures are correctly fertilised, but can occur with low sodium which animals need, and, if lacking, can crave. Don't place lick troughs near fences or gates.

5. Drench lambs no more than necessary. After deworming always move animals to fresh paddocks.

6. Drench those needing it sooner, rather than later - after they have infested pastures, and don't drench those that don't need it. Keep records of those you drench, or those you don't, from which to breed.

7. Weigh animals before drenching to use the right amount of drench to reduce resistance developing, which is happening in many countries. If there is a difference in the weight of animals, draft them into equal weights, so that they get the correct amount of drench.

8. Fewer worm larvae are found in pasture above 10 cm (4 inches) or at lower heights where there are no animal droppings. Organic farmers who can't use chemical drenches help achieve worm control by grazing fewer animals per hectare, grazing taller pasture and using longer rotations.

9. Dry weather reduces larvae hatchings, but worm eggs can remain in dry conditions in dung for some time, and then create an infestation explosion after rain.

10. Cattle worms don't affect sheep, and vice-versa, so if possible graze cattle as well. Rotate them

around the sheep paddocks, and make them graze paddocks short before moving them. This can be achieved by having enough cattle and paddocks to move them daily or at least every two or three days. There is no set ratio of sheep to cattle, but the more cattle you have the fewer parasites the sheep will have. Too few cattle in a large paddock will not graze the pasture evenly short. Sheep, and especially lambs, without cattle being used as larvae consumers, need more drenching for internal parasite control, even with the best controlled grazing and the best pastures.

### **Vaccination**

Some NZ scientists believe that one day they might develop a vaccination against round worms. Don't hold your breath, correct your soil and pasture mineral levels now, and you might not need it.

**White segments** in dung can be from tape worms, for which there is treatment.

**Soil eating.** Mineral deficiency, especially salt. Parasites can aggravate mineral deficiencies and vice versa.

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

**Blood low in sodium.** Deficient in pasture or internal parasites.

**Eyes anaemic.** Internal parasites, low iron, sick, starved, mineral deficiencies,

**Eyes sunken.** Internal parasites, low magnesium if accompanied by a staring look, damaged liver.

**Anaemia, slow growth and deaths.** Barber's pole worm (*Haemonchus contortus*).

These are 20 to 30 mm long and clearly visible in the fourth stomach. Adult females have a barber's pole colour and can lay thousands of eggs every day. The males are smaller.

They are bloodsuckers that can have a severe impact on sheep, causing anaemia, by which time the infestation will be high, production losses will have occurred and even deaths.

Sheep with heavy infections lack stamina, have pale gums and conjunctiva, and may also have bottle-jaw or constipation. If sheep are showing these signs, the faecal worm egg count will be high, and weight gains and wool growth can be reduced to zero, or negative. When in large numbers, barber's pole can kill sheep and red masses of worms will be visible in the stomach, which can be brown because of bleeding from the stomach lining.

It takes around three to four weeks from when a sheep eat the larvae to when worm eggs appear in dung samples. If the sheep are drenched, they can be used to "clean" paddocks for weaners for a three to four week period without fear of recontaminating a clean pasture. A sustained action drench can work for longer.

Working with your vet, investigate resistance and whether other parasites are present, and then treat accordingly.

Barber's pole worm (*Haemonchus contortus*)

It is most commonly found in all sheep production districts in Queensland and the northern half of NSW where summer rainfall is common or dominant. Barber's pole worm is less of a problem in the winter rainfall areas of Australia, but localised pockets exist in all states. It is a bloodsucker and can have a severe impact on all classes of sheep.

Barber's pole worms are quite large (20 to 30 mm) and clearly visible in the 4th stomach or abomasum. Adult females have a characteristic barbers pole appearance like red and white twisted wire. The male is smaller (around 15 mm).

Barber's pole worm photo kindly supplied by Associate Professor Nick Sangster, University of Sydney, Australia.



### **Condition and ewe health at tupping**

The pasture growth curve for tupping should be allowed for. This may mean lambing at any time of

the year, not necessarily spring, provided ewes can be mated to lamb to coincide with maximum pasture growth.

### **Fertility of rams**

Have them checked before buying and/or using them.

### **Toxins**

See Animal Health, Toxin Caused Sickesses.

### **Shelter**

Provide it naturally, and lamb covers if necessary. There are commercial woollen ones or use plastic bags off loaves of bread, etc. In large flocks natural shelter systems need to be provided.

### **Overfeeding**

In the weeks before lambing causing lambs too large for easy lambing. Have early ewes and those with twins (scanning is worthwhile) separate from late lambing ewes.

### **The shepherd's ability to help ewes and mother lambs**

A trick some use while helping a ewe lamb is to cover the ewe's eyes so that she is relaxed rather than nervous and upset. Covering can be done with anything held on with an elastic band or belt with velcro. Ewes frightened by the shepherd and/or dog can leave the lamb out of fear. Once the ewe is caught, tell dogs to Get Out, and then Sit.

Most ewes stay at their lambing site for from a few hours to a few days - unless disturbed. During this time the ewe and lamb become "bonded" through smell and recognition. Nothing must be allowed to break this cycle. If the lamb moves away it should be returned. On hills and near fences lambs can become separated because the ewe remains at her lambing site. Once older and bonded, most ewes will follow their lamb. During the first few hours it is easy to bond a foster lamb at the ewe's lambing site.

### **Overcrowding**

Mob stocking must be avoided during and immediately after lambing. Interference by other ewes is more likely when too crowded. Ewes a few days from lambing can steal a lamb. Set stocking over most of the farm, so that they are thin on the ground, reduces miss-mothering.

Another way of avoiding this is to have all lambing ewes together in several paddocks, and to just open the gates so that the ewes which haven't lambed drift through on their own. Leave the gate open so that any lambed ewes which go with the mob by mistake can go back. This system reduces the lambing beat area.

With this system the mob must not chew the pasture too short before moving, or the lambed ewes will go hungry. Also hungry lambed ewes are more likely to move to the new paddock, and could leave a new lamb behind.

I read that ewes with triplets in USA consumed over 7% of their body weight, which is amazing for a ruminant, and they didn't lose weight, so feed ewes with twins more than those with singles.

Losses at lambing can vary substantially. Select ewes for lamb survival traits and buy rams from breeders who also do this. Check all rams' teeth, feet, and testicles to ensure both are there, and for size (must be large), and the penis (no adhesions or deviations).

Testicle size in rams is important and affects fertility. The circumference should be about 27 cm (10.6 inches). Size is an indication of sperm production and emphasis should be placed on it when selecting rams.

Prepare your rams by feeding ample high protein and energy for two months prior to joining, but avoid over-fat rams, which are less active and more prone to heat stress, which can cause temporary infertility. Shear rams so they are carrying three to four months' wool at mating.

The handling of rams also affects fertility. Do you know why testicles hang free? They and semen must be kept cool or fertility drops. Rams should have access to shade and must not be crowded for long. There are cases of unshorn rams transported in warm conditions not fertilising ewes in the first year, but doing well the next.

If transporting has to be done, shear them, especially around the testicles, which in all animals have



to be kept cool. Don't buy a ram at a summer sale if it has not had the wool shorn off the testicles and/or been kept cool. Then don't take rams home jammed up in a vehicle for hours where they can get hot, shorn or not.

### **Sizes & breeds of sheep**

The way to improve your flock is by using the best breed for your farm and the market.

There are twinning breeds and single lambing breeds and families. Some farmers like just one good well fed lamb and breed for this. Today's market requires larger lambs, so this has merit now, but who knows what tomorrow's market will want.

Most sheep breeds are affected strongly by latitude which affects length of day and hours of sunshine during the mating period, seasons, etc., and a little by altitude (better at low). In New Zealand, lambing percentages in the south (longer days in summer) are always way above those in the north (down under remember). In Invercargill (bottom of South Island) you can read a paper outside at 10 pm. In Northland (35° south) 120% can be aimed for, while in Southland (45° south) 150% can be achieved. These percentages are with 2,000 ewes run by one person, or no more than two during lambing.

### **Lambing**

Low lambing percentages, 15 kg carcasses at slaughter and 6 kg of wool per sheep per annum, are no longer profitable in New Zealand. 200% lambing, higher than 18 kg lambs and 8 kg of wool should be the aim. However, in rough terrain (steep hills) and bad weather (cold driving rain and blizzards), one larger lamb born per ewe can be better than twins and then losing one. Sheep grazing for many decades on steep land creates small terraces like these which are not good for lambing, and can start erosion as shown.

Lamb losses on steep hill country can occur on footpath created slopes when ewes lamb there and newly born lambs tumble down and break legs, especially when copper levels are low. Read Copper.

This photo shows what Jared Seymour between Tokoroa and Taupo did with a bulldozer, by going up and down a terraced hillside, which he changed to like below right.

Fine wool producing sheep such as Merinos can be profitable when fine-wool prices are up, even with low lambing percentages.



### **Sheep horizontal foot paths on steep hills**

After the removal of NZ subsidies to farmers in 1985, which were only about 7% to sheep farmers and less to others, NZ sheep numbers dropped from 61 million to 45 m, after which lambing percentage increased from 98% to 115% and lamb carcass weights increased by an average of 3 kg.

In countries where they get up to US\$100 per lamb, sheep can be more profitable than beef. The value of land is based on its cost to production ratio. Cheap land which is poor (low fertility, very hot, cold, and/or dry) can be expensive land. High cost land which is highly productive can be cheaper.

Shelter increases lamb survival. Trees and hedges running at right angles to the wind flow are best. If ewes are shorn before lambing (not too close to lambing and be careful with them) they'll seek shelter in which to lamb, but if not shorn they won't, so more lambs can die. Apparently going into the paddock with shelter two weeks before lambing gives better results, possibly because they find the shelter areas.

As with cattle, their condition at the previous lambing affects the current lambing percentage, because eggs for the next mating are made at lambing. Thin animals make weak eggs which either don't

hold or die after conceiving, so reducing lambing percentages.

Check rams with the breeder and as many of his previous customers as far back as you can.

Some sheep breeds, particularly in Scotland and Norway, have eaten seaweed for thousands of years. It has many minerals, especially salt and iodine, so when not getting seaweed those sheep in particular can suffer. Fertilising with about 40 kg per hectare of coarse agricultural salt twice a year helps. Fertilising with iodine is costly (about NZ\$50,000 per 1,000 kg) and, being very water soluble, it leaches rapidly, so is uneconomic, in fact a waste. All sheep (and animals) need sodium. It reduces the incidence of bearings, especially when potassium is too high, which is mostly in New Zealand after using soil testing and fertiliser company recommendations. They like selling potash at NZ\$950 per 1,000 kg. A pasture mineral analysis reveals the high K levels from using NZ soil test recommendation figures. See Elements > Potassium and Salt. The latter cushions the effect of high K for soils, pastures and animals.

Some breeds of sheep can suffer from excess copper, which adversely affects the absorption of other elements, especially zinc and molybdenum.

A lot can be achieved with breeding in relatively short times, as one sheep farmer did by developing sheep with short tails and no wool on the crutch, belly or face (no docking or crutching required and reduced susceptibility to fly strike) and with 4 teats to help feed multiple lambs more equally.

This shows that there is no need for any form of Genetic Engineering (GE) or Genetic Modification (GM). The problem will be that the companies that are making fortunes from GE crops are the same ones who will lobby politicians and the public with the same untruths, such as production will increase so poor farmers will be helped, and poor people will get cheaper food, but the opposite has been the cases.

A Lincoln University study found that medium framed ewes were more efficient per hectare than big ones, because the slightly smaller ones allowed an 18% increase in numbers of ewes per ha, giving more lambs, which were, however, 2 kg lighter, and took two weeks longer to reach slaughter weight. The larger ewes usually had more twins, but selection for twinning can be bred into a flock.

The market would also have to be considered. Some like big chops from big sheep and some small chops. There are nearly 300 different breeds of sheep, some with quite different characteristics.

They are listed alphabetically from Acipayams originating from Assaf, wherever that is. They are crossed and used for meat, milk and wool production and are found in the Ege region of Turkey, to Zoulays in the upper Moulouya valley of Morocco. Some originated from the Tousint and Berber breeds.

Some (fine wool Merinos) produce wool which fetches thousands of dollars a bale and some breeds are useful for grazing in orchards because they don't chew at the bark of trees. Some breeds won't eat hay until they have grazed the pasture to the roots.

Decide which you want, and do your research.

Some, such as New Zealand Romneys, have been bred for easy care over 150 years, so require little if any foot trimming, less dagging and lambing time care. There are other New Zealand and Australian breeds that have also been bred for easy care. This doesn't mean "no care".

Some breeds in the northern hemisphere need their hooves trimmed several times a year and are penned in barns for lambing. Some Texels from some countries and a few other breeds have a stiff gait and conformation problems that hamper their ability to walk and graze over large areas.

Some breeds of sheep need very little copper. Know your breed's requirements and know the levels in the pasture they are grazing. Grazing sheep and beef together can be a problem.

### **Small sheep for orchards**

There are orchard miniature sheep called Baby dolls and they're grazing on Yealands wine estate in Marlborough, NZ.

### **Breeding for resistance**

Until the 90s, very few sheep breeders did much about breeding for parasite resistance and/or immunity, mainly because there are so many other things to breed for, and chemicals had been so effective, cheap and easy to use. Until recently, resistance to drenches, and the problem of chemical filled animals and pollution, were of no concern - now they are.

Animals with resistance secrete compounds when roundworms are present which paralyse them so

they are then passed out. A symptoms of this happening is scouring. DON'T drench them unless they are losing weight or have a 'drench-required' egg count.

A way to keep stock reasonably free of internal parasites is to buy animals that have been bred for resistance, and breed for resistance and use the best possible pasture management and forage crops.

In 1937 researcher Stewart in California found wide differences between Ostertagia egg counts within and between sheep breeds, with Romneys the lowest by far. It is a pity that more research has not been done on this more recently, but, with chemical companies sponsoring much of the research now, they are unlikely to sponsor this type of research.

Selecting and breeding for resistance is a solution that more farmers are now using, but remember that healthy animals are more resistant to all problems. Healthy animals start with healthy soils and correctly fertilised and mineral balanced pastures, which today can include herbs such as chicory and plantain.

### **Dags**

These are a nuisance caused by loose manure sticking to wool. Dags are worse with internal parasite infestation, endophyte, lush pasture and when rapid (less than 10 days) changes of feeds occur. With grazing sheep changing diets are frequently not easy to prevent, when they are changed from pasture to crops and back, but plan to do it gradually, by limiting the time on the new feed, and returning them to the previous feed for as many days as possible.

Dagging (removing of dags) is necessary to reduce fly-strike and wool waste. An easy way of doing this is by digging a hole next to the race, standing in it and having the side of the race open upwards so that the sheep can be dagged without having to bend over.

Select and breed from sheep with minimum wool in the dag area. Wool-free faces and legs have been bred into some sheep, so also breed from clean tailed sheep.

Merinos grow a lot of folds in their skin around their backsides. These attract manure and then flies, which lay eggs which become maggots that can kill the sheep in days. Some farmers cut off the folds which practice is called muesling. Some New Zealand farmers have selected and bred the folds out of their sheep to eliminate the dirtying and fly problem.

Meanwhile do all the things that reduce loose droppings -

Ensure adequate selenium levels.

Grow safe endophyte grasses.

Ensure pasture copper levels are above 7 ppm and below 12 ppm.

Ensure all minerals are balanced. See <http://www.grazinginfo.com> > Pasture Analysis.

Low cobalt will guarantee high worm infestation, so scouring. "After pasture tissue testing a farmer added cobalt to his fertiliser mix and his lambs grew faster to prime. Cobalt is essential for ruminants to synthesise vitamin B12 which they have to have. If Co is very low, ruminants can get sick and die."

If rotating, give the new pasture in the afternoon when nitrates are lower. See Animal Health > Nitrate Toxicity.

When you go on to a farm where they do all these things, the sheep and goats are brighter, whiter and cleaner.

### **Tails, docking & dagging**

Selenium strengthens muscles, reduces internal parasite infestations and improves general health. All these reduce the necessity for docking and dagging. Fertilising with Selcote Ultra at one kg per hectare per annum at a cost of only about \$8 if mixed and spread with LimeMagPlus or Phosphorus Nutrient Planner. Organic farmers are not allowed to use Selcote Ultra because of its excellent patented slow release technique. The organic approved Selenium chips are fast release so the pasture levels go too high, then after six to seven months, too low, unless applied at least twice a year, at lower rates of 0.5 kg per hectare.

Dags need not be such a severe problem. Plantain has been found to reduce them. Faecal egg counts decreased after a months on pastures containing plantain. See -

Plantain establishes well from oversowing. Mid September and mid March are the times to broadcast it onto short fertile pastures before grazing. Aim for ahead of a week of rain - good luck!

Sheep can completely graze out some plantains. Lancelot, a shorter variety has been developed for sheep, and Tonic, a taller one for cattle.

Superstrike coated or similar, are claimed to be best for oversowing, but I've seen micro-organisms killed by Superstrike, and poorer results after germination.

Seed costs about NZ\$18 a kilogram, but it is very small, so 0.2 kg per hectare gives 10 seeds per m<sup>2</sup>.

Mature sheep can be tolerant of internal parasites, but this can break down if short of feed for too long, especially just before and after lambing, when they have the extra load of the growing lambs, then having to produce milk.

Comparing animals for drench resistance must be done between same-age ones, because older animals build up natural resistance.

When drenching for worms, some need to be drenched, some don't. Identify those not needing drenching, don't drench them, mark them and breed from the best.

It is best to graze those not needing drenching separately, and to select the best from them to develop an internal parasite resistant flock. I know that this means having more paddocks, but good controlled grazing and good farming require plenty of paddocks. High power fencing allows this at a reasonable cost.

Not only organic farmers should be putting in effort to overcome the use of chemicals to control parasites. All farmers should realise that they have a duty to help, but all farmers must avoid animals suffering in the aim of being organic. I've seen animals suffering with the aim of building up resistance. Some have been covered in lice, infested with worms and deficient in minerals. After analysing pasture and fertilising with the deficient minerals, all parasite infestations and ill effects are less severe.

Some of the so called chemical-free organic farmers are actually townies who own a bit of land and try to run stock "naturally", sometimes with cruel and disastrous results. Some can't identify the symptoms of sick, infested or hungry animals, let alone the differences to know when to take action, so some animals suffer. Paying a vet a hundred dollars for a visit can seem out of the question, but can be essential and cheaper than a cruelty fine.

Organic bodies should address this problem of what animal rights people would call neglect developing into cruelty. See Organic Natural.

Some sheep are carriers and infect pastures which then infect lambs. Some excrete 2.5 times more than a weaned lamb, so try to wean lambs on to pastures previously grazed by cattle or harvested.

Under rotational grazing, try not to return lambs to paddocks in less than three months. For many this won't be possible, so one grazing system could be grazing lambs, adult ewes (preferably resistant ones), young cattle, adult cattle and then lambs again. Another system could be drenched lambs, cattle, and lambs again.

In NZ humid conditions, four to six weeks isn't always long enough between lamb grazings. There is no strict grazing rotation that suits all, but the longer before sheep (especially lambs) graze any paddock again the lower the worm infestation will be. If possible, rotations should be longer in warm and wet conditions, and can be faster in cold and dry conditions.

Selecting for resistance may not be wholly accurate, because, when some in a group don't get parasites, it could be from their avoiding grazing close to droppings, perhaps from having a stronger sense of smell. If this is the case, and all had equal dislikes, they would have to graze closer to droppings and get parasites, or go hungry.

Harvest the high fertility paddocks for hay and silage, never the worst.

In small flocks where only one ram is necessary, he may prefer one ewe all day, so try to use two rams, or move him around if you see this preference occurring.

When selecting for fertility, what one needs to know are the percentages of empty (open) ewes, the first service conception, each ewe's number of lambs at birth, lamb mortality at birth, between one and three days, four to fourteen days, two weeks to weaning, number of lambs, and weights per ewe at weaning.

Then one can decide which is the most important to work on to achieve the greatest reward. Also record the weather, because times of losses can vary each year.

Obviously in large flocks (by NZ and Australian standards) doing all the above may not be possible, but one should still do some figuring. Ear tags help speed recording the details, or use different coloured raddle (rain-proof, but not wool damaging, chalk) to mark ewes and later sort them. Write down the colour codes so you don't forget them. Try to use the first letter of the colour to equate the first letter of the code; for example orange would be one lamb, turquoise (blue) for two lambs weaned,



or use one mark for one, two for two and three for three. Mark the lambs too.

There are fertility improving products available, but the best is calcium and cobalt, followed by the other minerals, with nitrogen and potassium at the bottom. Lambs won't finish on low cobalt pastures and cobalt won't be adequate if organic matter is low, and organic matter will be low if calcium is low.

### Flushing

Full feeding on good pasture increases conception rates. Feeding adequately until lambing results in lambs more able to find the teats, survive and get a good start in life. To achieve excellent flushing, high ewe milk production and fast growth of lambs, pastures need not be over 2,000 kg DM per ha (10 cm or 4 inches). Use cattle or harvesting to keep the pasture at the right quantity and quality for sheep.

### Infertility

Genetics has a major effect on fertility, and so does feeding.

The stress of insect damage on lucerne can make some varieties develop oestrogen, which can adversely affect animal fertility, as occurs when feeding too much red and/or subterranean clovers.

Some red clovers contain phytoestrogens (some new ones don't) which affect conception rates, but usually only if fed in large amounts. Some subterranean clovers (*Trifolium subterranean*) have phytoestrogen, levels of which vary between cultivars. They don't cause abortions and male reproduction is apparently unaffected.

While cattle will usually (but not always) eat clovers first, sheep will sometimes leave them, especially if long, possibly to avoid oestrogen giving them what is called 'Clover disease'. Oestrogen levels vary in different clovers.

### Growth rates

Lambs should be fed like poultry farmers feed broilers, i.e., fully. Ones which are the first on the market in spring or early summer usually fetch the highest prices. Monitor and record lamb prices per kg of live weight every year, and calculate the optimum selling time by feed available, price and weight, NOT just by weight. Selling early ones a bit lighter (even if the market wants heavier ones) can earn more per kg, and that determines your profit, not total price per lamb. Also the remaining lambs can then grow faster because of less competition, less animal pressure and more feed.

Lambs need short lush pasture with adequate mineral levels. Lamb growth will be slowed if protein, phosphorous, copper, selenium, manganese and/or cobalt are low.

An interesting point is that lambs finished on pastures with a lot (>40%) of white clover dress out at 50% live to dead weight, instead of the average 45% on most pastures with clover.

Obviously insufficient pasture will slow growth. A frequent problem in New Zealand, where controlled grazing is second nature, is inadequate pasture being fed. Unless you are well experienced in eye assessing pasture dry matter levels, you should measure them with a PastureGauge, otherwise you will find it difficult to judge quantities eaten. See Pastures, Feed Budgeting.

Feeding - kg (lb) dry matter of lush perennial ryegrass & clover pasture per ewe per day

|                        | With one lamb | With two lambs |
|------------------------|---------------|----------------|
| 1st week after lambing | 2.2 (4.8)     | 2.7 (5.9)      |
| 3rd week after lambing | 2.9 (6.4)     | 3.8 (8.4)      |

When 'pasture only' wintering, aim for an average cover of 1,400 to 1,700 kg DM per ha (12.5 cm or 5 inches) at the start of winter and 900 to 1,100 (7.5 cm or 3 inches) at lambing in late winter or early spring.

A farmer in Iowa, USA, wrote, "Perennial ryegrass and white clover (*Trifolium repens*) won't survive in our low organic (>8%), low fertility, dry, hot conditions, but, when the conditions are right here, there is not a better pasture. Animals bloom on it and ewes feeding twins can gain weight." Briefly, ryegrass needs clovers to give continuous nitrogen to thrive, and clovers need calcium, serpentine, boron, cobalt,

### Milk production & weaning weights

Ewes in good condition and well fed from immediately after lambing on right length green grass and

clover pasture produce more milk, so give higher weaning weights. The lambs, once grazing, obviously also grow faster on good pasture. For ewes and lambs the more clover the better they do.

After ewes are in lamb, limit their pasture if necessary to save it for later, when they should be fed better to get stronger lambs and make more milk.

### **Lamb weight gains**

|                   | <b>Grams per day</b> | <b>Ounces per day</b> |
|-------------------|----------------------|-----------------------|
| Good Pasture      | 180                  | (1.2)                 |
| Poor Pasture      | 100                  | (0.8)                 |
| Lucerne & Chicory | 300                  | (2.0)                 |

### **Grain Feed (GF)**

Sheep chew grain before swallowing it, cattle don't, so it need not be rolled for sheep. GF is not necessary when adequate good pasture is available. If feeding it decreases animal intake of pasture, it should normally not be fed, unless building up pasture for winter or dry weather.

### **Cobalt (Co)**

Ruminants need a continuous supply of Co for the production of vitamin B12. Sheep need more than cattle, young animals more than old, and some sheep breeds more than others. Without vitamin B12, ruminants can't produce glucose for energy, so become lethargic and lose their appetite, and then become more susceptible to other problems, including worm infestation. Severe digestive problems from poor quality feed or silage chopped shorter than about 5 cm (both longer or lacerated are preferable) can also lower vitamin B12 levels, because of regurgitating difficulties with short feed. Consuming too much soil when trying to lick up the short-cut silage from the ground also cause digestive and mineral deficiency problems.

Lambs can't be finished (fattened) on low Co pastures. Parasite infestation will be higher, irrespective of grazing management, because of lambs low in Co suffering ill-health.

Blood levels can improve within two days of changing from pasture with low to adequate levels, but liver levels take longer to improve. In a trial, Co supplemented lambs had fewer internal parasites and excreted fewer worm eggs. Co supplementation has prevented Phalaris staggers in sheep (RHM Langer), and some believe that grass tetany increases when Co is lacking,.

Measure blood or liver levels and inject deficient animals with vitamin B12, and fertilise deficient pastures with Co. Injecting with Co is of no benefit, because it is needed by rumen micro-organisms daily.

High Co levels in pastures are not usually a problem for sheep, but over-dosing can kill, so must be avoided. 1 mg Cobalt per kg (0.000016 oz per lb) of body weight has killed calves. Fertilising with it is better.

Summer and fast growing pastures, especially if nitrogen boosted, have less Co than slow growing ones. Clovers have about twice as much Co as most grasses.

Different species have different levels. For optimum growth and ruminant health, minimum levels should be as follows - mixed pasture 0.13 ppm, clovers 0.2 ppm (whites have more than reds), Cocksfoot (Orchard grass) 0.1 ppm, Kikuyu 0.15 ppm, Perennial ryegrass 0.12 ppm, Timothy 0.09 ppm, Winter ryegrass 0.12 ppm. Levels are lower when soils are dry. Sandy soils retain less because it is held in organic matter.

If green growing pasture (75% grass and 25% clover) levels are about 0.08 ppm, apply cobalt sulphate up to 500 g per ha (0.5 lb per a) with fertiliser. If much lower, apply up to 1 kg per ha (1 lb per acre). Always check pasture levels before applying any. 1 kg costs NZ\$45.00, but can be worth it.

Clovers can't fix N without some cobalt, so when Co is low, nodulation is poor. Excess calcium, magnesium, manganese, iodine or iron, and fast growth, can lower Co uptake by plants.

Levels can become depleted in soils which are intensively farmed for a long time, especially under high rainfall and high N, P, K use, because they lower organic matter levels in soils. Measuring Co in soils is not a good indicator of plant levels because of many interactions.

Soil contains a lot more Co than pasture, so extreme care must be taken to avoid soil polluting tissue samples. If the pasture analysis shows iron of about 300 ppm or higher, it can be assumed that the pasture sample has been contaminated with soil, so the pasture Co figure will be shown as higher than it

really is.

Co deficiency symptoms are easier to see in cattle. They are runny eyes and having a pot belly. See Elements > Cobalt.

L:Cu nmol/kg

### **Copper (Cu)**

Breeds vary in their need for copper. See Breeds of Sheep below.

Copper gives colour to hair. In Australia, some black sheep grazing copper-deficient pastures turned grey.

The black Aberdeen Angus cattle need more copper than light coloured cattle.

Romney lambs grazing copper fertilised pastures for 176 days had liver Cu concentrations as high as 7,750 umol (450 mg), but showed no clinical signs of Cu toxicity. (ND Grace). See Elements > Copper.

Avoid grazing lucerne (alfalfa) pre mating because of the oestrogenic effects, plus lucerne is high in copper, which most sheep don't need. Excess copper supplemented during mating cows lowers their conception rate, so could also do so to sheep. Note that it is excess Cu, not the optimum amount in good soluble mineral mixes.

A deficiency can affect wool adversely and cause lambs to break bones on steep hills, and suffer swayback. Fertilising with 3 kg of Copper Sulphate per hectare in steep hills in Poverty Bay, NZ, stopped broken legs.

Radio NZ Rural News spoke about not knowing the reason for the large number of sheep that have died on a farm. It could be copper poisoning. A Scottish sheep breed brought up on very low copper soils for generations, die when moved to pastures with copper levels above 8 ppm. 7 ppm is the optimum level for most sheep, but cattle need 12 ppm or more. 20 ppm doesn't harm cattle.

The Scottish breed needs pastures to have less than 4 ppm.

All farmers should measure ryegrass levels of 17 elements twice a year at a cost of only \$140.

It tells what is available in the soil, what the pasture is obtaining and what the animals are eating.

I've been doing it since 1958. The establishment still don't. Fertiliser companies use soil tests because they tell farmers to apply more phosphorus at \$400/tonne and potash at \$800/t. 99% of New Zealand soils need more calcium at \$25/t plus freight, which fertiliser companies don't handle, and it synergisms to make the calcium work. It makes locked up P in soils available, and improves soils and animal health.

The calcium where sheep are dying could be too low, as is the case in 99% of the 500 farms I've measured.

### **Iodine (I)**

Iodine deficiency can cause small wool-less lambs. Drench with 250 mg per ewe in the fourth month of pregnancy. A little too much can be toxic.

### **Flies**

Fly strike and lice can also be problems. Dipping and spraying are the easiest way to control these, but the cost is increasing and the effectiveness is decreasing. More important, however, are the world's anti-feelings about chemical residues. Withholding periods must be adhered to and alternatives sought. New safe non-toxic chemicals would be well received, but are difficult and expensive to develop.

Some farmers in Australia, where flies can be very bad, set 30 traps, emptying and replacing the smelly bait once a month. There is a big difference in the efficiency of fly traps so ask around and check them before buying too many of one kind.

Also get parasitoid wasps which have been imported into NZ to attack blowfly larvae.

In warm humid weather, with blue bottle flies, lush grass, selenium deficient, coccidia and wool covered long tail sheep, fly strike will be more likely.

Docking was considered essential to stop tails being covered in dung and attracting fly strike. Be sure to dock long enough to cover the entire vulva of the ewe and about the same for a ram lamb. Short docks can lead to increased prolapses. Anything that obstructs seeing the vulva and udder is a negative, and a ram having to service ewes with long dirty tails is not advisable. See Pests > Flies.

## Sheep and cattle

Grazing beef cows with sheep is reported to reduce the predator problem. Doing so will also reduce worm problems in the sheep (a major problem) and cattle.

Someone on the Internet wrote "Sheep should not ever be run with cattle. This practice causes extreme self esteem problems in your cows. Another problem we've seen is cattle running right through and destroying fences. They just can't bear to be in the same pasture as sheep."

I know that parts of the Net are a bit like talk-back radio - a haven for garbage, but some people do make wrong judgments and believe all sorts of tripe. After all there are still people who believe that the earth is flat!

The above statement about cattle and sheep is completely untrue. There could be some other management fault. Any change to animal management must be made sensibly. If cattle have never previously seen a sheep they may react for a while, so graze them on adjacent paddocks to start with.

In New Zealand there are 45 million sheep and 6 million beef cattle, and many are grazed together resulting in both doing much better. The worst enemy of one animal is another of the same species.

Morley (1980) found that 400 cattle and 2,000 sheep grazing on one farm reduced worm infestation; however types of worms and their persistence have increased since then. With parasites becoming resistant to chemicals, using other animals such as cattle to help has a future. Some organic people say that about 1 grown cattle beast to about 4 ewes changes internal parasites from a large problem to a small one.

The increased weight gains from species diversity, through less pasture refusal near manure and lower parasite loads, outweighs any theoretical losses due to different sward length preferences. This is another case where theory fails and what appears to be a wrong practice actually wins.

Also beef and wool prices go up and down like yo-yos, so having both can cushion the downturns, but you need to learn shearing (shear one in a few minutes - the NZ record is 900 lambs in nine hours - yes one EVERY 36 seconds!) and learn wool sorting to save costs and get top prices. See Shearing.

## Grazing versus housing or confinement

I've assumed that all readers are graziers, but in the northern hemisphere there are thousands of farmers who house their sheep for most of the year. The costs of doing this are high and the size of the barn limits the number of sheep one can farm.

When feeding sheep mainly on grain there are many health problems, when grazing, there are fewer, but they are different, so they have to be learned about.

When I got Henry Swayze of Tunbridge, Vermont, USA, to change from winter housing to 100% grazing, he was able to increase his flock size from 50 ewes with lambs (limited by barn size) to 250. His workload and costs dropped and his profits increased. His pastures and animal health improved. Pneumonia and feet problems almost vanished. Farming became a pleasure and his farm became more valuable.

I visited Professor Toni Vidrih in Slovenia in 1980 and appointed him the Gallagher importer/distributor. Sheep were all housed then. Now, thanks to pioneer, Toni Vidrih, more are grazed and left out all winter. For examples of wintering sheep in snow by Toni and Matej Vidrih, see the web pages below. If you have any questions of them, mention my name and I'm sure they'll help you. I've been there a few times and they've been here (NZ) a few times.

<http://www2.arnes.si/~surtvidr/clanki/clanek18.htm>



Not many things are all good. When grazing one must watch for and treat against internal parasites. The higher numbers of sheep that can be farmed with controlled grazing mean that there are more to check and treat when necessary, but the extra profit makes it worthwhile.

Make your decisions on profit figures, not on the number of buildings on your farm. They cost, depreciate and have to be cleaned, maintained and replaced.

Why, when an animal has four feet, a mouth and a manure spreader, should people want to use their own feet, machinery and the world's fuel to tend them?

Sheep can graze very selectively, biting the few green leaves out of old or snow covered pasture when cattle would have to tear off the whole lot, leaves and stems, consuming poorer feed quality pasture. They can also lamb (see extreme left) and do well in snow covered land as shown here in Slovenia, courtesy of Toni Vidrih, a client since 1982.

Most sheep will eat snow to get their moisture, but check them all in case they need water until they learn to eat snow.

Make sure that the hay is of good quality or they are more likely to become constipated. Molasses or Molvinate diluted in hot water and spread on the hay will help reduce this, but keep watching for it.

## Wool

Wool is a wonderful product, that is why armies and the wealthy use it, but less and less is sold each year and at lower prices, mostly because it is not promoted generically. The only people who will promote things generically are the producers, so it is no good sheep farmers complaining about a lack of promotion and low prices - it is their fault. Wool producers should form a world wool marketing organisation and get promoting. They also have to grow the type of wool the world wants. In 2000, Merino fine 19 to 20 micron wool fetched good prices, when unwanted wool could hardly recoup the shearing cost. One bale of Merino 13.1 micron fetched NZ\$120,000 which at the time was US\$80,000 for ONE bale of about 170 kg (374 lb).

There are vast differences in wool. Some is unsaleable.

Everyone has to have clothing and wants clothing which is attractive and comfortable (wool), but costs little (synthetics). The requirement for long life which wool gives is not one for most of today's generation, but quality and comfort are what older people like, so promotion should be aimed at them and the wealthy.

Some of wool's benefits are -

- Not polluting.
- Gives rain protection, warmth and coolness.
- Absorbs only a fifth as much moisture as cotton when being washed, so takes less drying.
- Is difficult to burn, so is safer for childrens' night gowns, which can catch alight near fire places or electric bar heaters.
- Doesn't crease.
- Doesn't take on the odours that some materials do.
- Doesn't create static electricity, so doesn't give shocks to people walking over it in dry weather, as happens with synthetics.
- Shocks adversely affecting computers from people touching them occur only on synthetic carpets, not woollen ones.
- Woollen carpets are far superior to synthetic ones, don't give shocks and last longer. The dust mite story doesn't apply if the house is kept dry. Air-conditioners are excellent in this respect.
- Makes excellent home insulation, provided it is made fire and insect proof.
- Woollen garments hang comfortably on one's body, and have a nice feel.
- Knitting wool is easier and smoother to knit with than synthetic yarn.
- Woollen garments are better for babies.
- There are now machine washable and dryable wools.
- It soaks up oil from fuel spills.
- Fine (down to 13 microns) wool is in demand, and can fetch ten times more than coarse wool.
- Wool car seat covers don't give shocks when one gets out of a car.

These factors put woollen garments into the top shelf range, which is fine. If you want to make money, cater for the rich, but you must market - nothing happens or sells on its own.

The only disadvantages of woollen garments are that they have to be handled a little more carefully.

Synthetics take fuel to produce them, flare up in a flash and create fumes when burned - unless fire-proofed, when some can still smoulder.



Wool has not benefited from the marketing it deserves.

### Wool quality

The best way to make a profit out of wool is to produce the very best. Wool from different breeds of sheep varies considerably. Merinos produce very fine wool for the very best clothing, while some sheep have coarse wool which is used for carpets. A cause of felted wool is lice, which can chew wool causing it to break off, and lousy sheep rub a lot, causing the fibres to felt. You may need a magnifying glass to see them.

Breeds vary in their need for copper. See Breeds of Sheep below.

Wool being cotty causes the fleece to bind together and have poor crimp. Low copper and/or low zinc can cause it.

In low cobalt areas fleeces can be steely, lack lustre and be dull, and sheep will have more internal parasites. Analyse the pasture, and if necessary apply up to one kg of cobalt sulphate/ha per annum.

### Shearing

New Zealanders don't believe me when I tell them that in 1984 a Scottish sheep farmer told me that five of them shored 13 sheep on a good day using a non-stoop system, with four helpers each holding a leg of the sheep standing on a table, while one used hand clippers. This was 1984, not 1884.

The first sheep I shored in 1948 with hand shears took so long I won't mention the time, because New Zealand professional shearers won't believe that it could possibly take that long. In 1954 when I came to New Zealand I couldn't believe that a sheep could be shorn in a minute. The current world shearing record is about 900 lambs in a nine hour day, and it goes up almost every year. This is about 36 seconds per lamb - 900 times in a day! Mention this to your hairdressers when they take about ten minutes and charge about \$10.

Sheep need to be shorn at least once a year, or twice a year depending on the length of wool which is in demand at the time, and depending on your cash flow. It is important that ewes don't lamb in early spring in the open with a long wool cover, because they will not feel the cold, so will not seek shelter so their lambs will suffer. Long woolled sheep are prone to becoming cast (unable to stand up), and/or caught up in thorn type weeds.

When shearing before winter, it is advisable to use hand blades or a winter comb with a lifter plate, which leaves 25 mm (1") of wool to provide protection against sudden cold, which can occur at any time, even in mild areas. Shear well before winter, not just before blizzards.

Don't shear within 60 days of dipping (longer for fine wools) because the wool scouring water at factories can pollute waterways, kill useful insects and disrupt the waterways' food chain.

Top quality wool quality is important to compete with synthetics, and to supply the processors and end users with a superior product. Strong wool without cotting and without yellowing, help make fade free garments. Correct feeding after leaf analyses and then applying with adequate sulphur and protein helps achieve this.

### Marketing

It is useless producing items which can't be sold or are sold at a loss. If things are not marketed they will not sell, and if they are marketed as a bottom shelf item they'll sell cheaply. If on the top shelf they sell well and at top prices.

At present one has to decide which to aim for, the best lamb or the best fine 13 micron wool. Maybe in the future someone will breed a dual purpose sheep which produces both, but at present the good lamb breeds don't produce fine wool.

In North America I believe even older sheep are marketed as lamb. Anyway "Lamb" is a bad name.

Can you imagine a child wanting to eat Lamb - that Mary had, or that they might have hand fed after the mother died. They may have had a soft toy with the name "Lamb".

Americans love big chunks of meat, so lamb chops in



restaurants should be listed on the menu as "A dozen young delicious Ovine\* chops," and should be cooked only slightly and quickly, not into the rocks that some restaurants serve. Americans like their meat tender and still bleeding. Ovine chops cook very quickly.

\*Why ovine? Because the only lambs many children know about are their pet lamb or toys they have had, or in the case of New Zealand rural schools, lambs they reared to compete in lamb and calf club competitions, as shown here. Our grand daughter Rita Hames showing her prize wining lamb and winning ribbons around her neck at the Paparoa (Northland) School Pet Day. It came when it was called and was more like a puppy than a sheep.



A problem lamb producers in New Zealand have is our meat industry.

In 1989 I wrote in National Farming News that the then marketing and publicity official didn't even know what was happening under his nose. He replied, dwelling on the negative and tried to justify the lack of action in the meat industry, and didn't comment on my positive and helpful suggestions.

I remember pointing out to a Waikato sheep farmer in about 1964 that the share (%) farmers received for lambs was declining, and showed no signs of increasing, I based this on the fact that the first frozen lamb exported by New Zealand farmers returned them 80% of the Smithfield British market price. In 1964 it was about 50%, and the last figures I saw it was only 14%. As in many things, middlemen are fleecing farmers.

The drop in New Zealand lamb production will certainly help slow this trend for a while, but to do so permanently will mean improving the quality of lamb processing and **marketing**. To reduce freight rates, a system of reducing the moisture content to reduce the weight may have to be found.

Unfortunately the company that started making beef jerky (dried meat) failed - partly because it used little initiative. People don't want to fight with their food, they want to just pop it in their mouths. The beef jerky I tried was tough, thin and almost "cutty" in the mouth. Surely round and smooth would have been better, like the original South African biltong they tried to emulate, and like chewing gum - which I don't use, but most cricketers do!

For any farmer to sustain their standard of living they must market their farm produce off the top shelves, and it must be better than the competitors' product.

### Shade & Shelter



This form of shade at Ruakura Animal Research Centre near Hamilton is the best because, as the sun moves, the animals get up and graze again, and then lie down in a fresh place. The well sheltered dairy farm above and right belongs to Jim Finlay near Hamilton.



This photo on the left needs no explanation.

Some of the Poplars below left have been harvested for feeding or planting.



The tall pointed orchard shelter trees are Matsudana Willows trimmed by the Waikato contractor on the right. Their roots grow quite a distance so adversely affect orchards unless the



roots are trimmed.

Henry Swayze in Vermont USA found that his sheep kept in barns had more footrot, coccidiosis, pneumonia and dirty wool than after I had him change to having them on pasture all year from 1981. This doesn't mean grazing allows these problems to be ignored, but they are far less with good controlled grazing than with confinement; however flocks have to be bred to be resistant by selection. New Zealand's easily managed sheep and cattle have developed from a hundred years of selection in large flocks of thousands. Footrot can break out, especially in flocks not bred to be resistant to it.

Henry's farm had many valleys and trees for shelter in their freezing conditions. The sheep learned to seek shelter and eat snow for moisture.

Customers are now becoming more concerned about their food coming from well cared for animals, so farmers have to be even more caring.

When asked about shelter, a New Zealand farmer said that, when lambing between May and September, when temperatures vary from freezing at night to 25 degrees C (77 F) at midday, new-born lambs benefit from shelter when the temperatures are below 13 degrees C (55 F) and the rain is continuous, so the lamb is wet for days. It can be 13 degrees C and lambs can be born in a shower, but if the rain ends and the lambs get dry, they are usually OK. Triplets succumb to hypothermia much faster than singles, and breeds vary in cold tolerance of the dams and the lambs. Half bred Texel lambs are more tolerant of cold wet weather. The Dorset is moderately tolerant, but fine-woolled sheep and Finn sheep are not.

Pneumonia can occur in any climate. To reduce the incidence when grazing, requires reducing stress, and spreading lambs over a wider area.

I was told that Cornell University grazed sheep outside all winter in 1999 and 2000, with satisfactory results.

Animals grazing through soft snow with properly stockpiled high quality pasture can do better than those fed average quality hay. Cold dry conditions preserve pasture quality, but dry pasture deteriorates after rain falls on it. Old dry pasture in warm wet conditions loses quality.

Round bales can be rolled out down hills to dry ewes (make sure they are out of the way) and ewes generally lamb on any left-over hay, rather than on the snow. There can be higher death rates from hypothermia, but a better lambing rate and overall health than when in a typical over-crowded barn all winter. Wind protected areas are essential. Large bales can be used for shelter if there are no sheltered valleys or trees.

People become accustomed to reasonable heat and so do animals, so they can thrive without shade as long as their mineral balance is OK, cool water is available and temperatures are under 35 degrees C. The beauty of single trees is that, as the sun moves, the animals move, so mud or dust are not created. See Shelter Cold Heat and Barns.

One could feel sorry for sheep standing in summer heat, but they might feel sorry for us with unprotected skin. If you don't believe this, shave your hair off to bare skin and stand in the sun.

There are over a billion sheep made up of hundreds of different breeds in the world. They descended from wild sheep in the hot, dry Middle East, 10,000 or more years ago.

Areas can get cold at night so sheep need insulation without wasting energy on warming up and cooling down.

## **Predators**

Grazing beef cattle with sheep can reduce the predator problem, and, if other methods are used in conjunction, the problem can be further reduced, but seldom eliminated. Using good high power six-wire electric fencing, and intensive grazing which requires many paddocks, helps. During lambing the ewes can be grazed in the centre paddocks so that predators have to go through several hot fences to get to the sheep. Cattle can be grazed in the outer paddocks as a deterrent.

When sheep or goats (wild dog food) are grazed extensively (spread out), they are much more vulnerable to being taken than when grazed intensively as a larger closer mob. Also the protectors (guard dog, donkey or llama) are then more effective. Not all donkeys will work. Some will try to play with lambs by picking them up with their teeth. They have to be held while using a dog to work the sheep because the donkey may also go after your dog.

A farmer wrote, "We keep a donkey in every paddock and we don't have any predators at all that we



know of.”

Whether to change from extensive to intensive grazing with the costs of fencing, lanes and water, depends on the number of losses. Do your sums first.

Protectors are best on their own because more than one encourages them to become bonded to each other rather than to the animals to be protected. Also use five or six wire high power fencing with the bottom wire low enough that no predator can get under it. If the terrain is rough put the bottom wire even lower and have it earthed. Then about 150 mm (6”) above it run a live wire. Ensure more than 3,000 volts on the whole fence all the time, and keep all wires electrified so that predators learn that every wire is hot. Electric fencing requires a whole book. These are available at no cost from Gallagher dealers.

Two longhorn cattle with a flock have been reported to keep coyotes out. Obviously more would be necessary with a big flock. The more cattle you have with your sheep, the better your sheep will do. Cattle tend to eat the longer grass and certainly reduce sheep internal parasite problems.

Llamas and donkeys help against coyotes. Keep only one with each flock or herd of whatever (cattle, goats, sheep, emu, etc.), but some have success with several together. Most prefer females as guard animals, but castrated males can be used. Remove the guard animals at kidding or lambing, or some can attack the lambs.

A guard gelded llama with sheep can discourage two-legged predators. When people he doesn't know enter a paddock with his sheep he should herd the sheep away from the people, stalk the people, hiss, spit and scream at them, putting people off and alerting the farmer.

Scarecrows work for only a day or two, then predators cease to be scared of them, unless they are moved daily and their clothes changed. Do it in the evening and put your worn shirt on it and take the previous day's shirt home to wash. Predators down wind will keep away so place it on the windward side of the paddock.

Taste aversion has been reported by some to work. It is done by placing 25 grams in half a kg (one ounce in one pound) of lithium chloride in meat of the animals (dead lambs can be used) or poultry to be protected. After eating it, the dog is violently sick for a day and apparently avoids the animal from which the meat came. However, some report that dogs soon learn to avoid dead animals and attack live ones. In countries where farmers are allowed to kill the attackers, they use strychnine or similar on bait, but be careful that you don't kill your dog or people.

Marlborough (NZ) farmer Pete Davison uses an Italian breed of dog, the Maremma, to protect his sheep from marauding dogs and poachers. The Maremma has been bred to protect sheep from wolves, and is fiercely protective of the flock and its master. He barks at anything strange, even vehicles, and being white, blends in with the sheep, which allows him to move through them without worrying. It can also do some working dog jobs such as leading and backing. It befriends the sheep and doesn't seek human attention.

Keeping guard dogs where they should be can be a problem. They may like to wander or guard a larger than necessary area, or even your neighbour's sheep too. If necessary, use an electronic collar and keep well away, but where you can see what the dog is doing, then zap it if it tries going through a fence or over a gate. Multi-wire electric fences help keep them in.

Another problem an adult dog can have is not allowing the owner near the sheep, destroying the bonding between dog and owner. Starting with a puppy overcomes this, but learn more about problems from dog suppliers, users and from the Internet at <http://www.flockguard.org/> and <http://www.lgd.org/>

Coyote killing collars on the necks of sheep apparently work well, and only kill the predator that attacks sheep. Poisonous gas is released when bitten. They are not available in all areas so have to be sought.

I think it is best to use several systems, rather than relying on just one, and don't try to have one dog care for a large flock of sheep or control several predators.

If all farmers in an area control predators, they should not be a large problem, but are likely to be a continuing small one.

Despite all the information, there are cases where even with using all the above precautions, packs of dozens of wolves have killed guard dogs and almost all the sheep. Whether - the electric fences weren't well enough constructed, the dogs and llamas were not good enough, or the wolves so hungry, or what, we don't know.

### **From Oogie McGuire, CO, USA, who agreed to its publication.**

"Of all guarding animals the worst animal for killing or injuring sheep is the donkey, the worst in terms of losses of their charges to predators was the llama, and the best overall when both numbers of sheep lost to predators and numbers of sheep injured or killed by the guardian are looked at is guard dogs. And that did not even take into account that recently shepherds who are actually working these dogs are becoming more active in the breeding, and continuing the thousands of years old methods of breeding and selection that resulted in the dogs being what they are.

"Our 4 dogs cost us US\$1,200 to maintain last year or \$300/dog. Average purchase price for each dog was \$500. We lost one old dog at 14 years due to age and I am on the list for another puppy. Due to my situation we expect to have a working lifespan on our dogs of about 10 years. Even if I eliminate the first 2 years as not working (not entirely true in our case, our last puppy was working well at about 8 months but needed backup of the other dogs for our large predators) I still have a total lifetime cost per dog of about \$3,500. I sell butcher sheep at \$120 each, the dog only has to save 30 cull sheep over its lifetime to pay for itself. If the dog saves me a few breeding quality animals the payoff is a lot sooner, as few as four sheep will pay for the dog. In my area, with our predator pressure and with predators I am not allowed to kill and with trapping totally restricted so I cannot trap except for one 30 day segment each year, dogs are the only predator control that will work. Range flocks locally who did not have enough dogs per band (a band is 1000 ewes plus their lambs) were losing as many as 30 sheep a night to predators. 3 nights of that and I'm out of business! We already have 8 ft tall fencing which is a predator deterrent but will not stop them so adding more fencing is not really an option. Before dogs we lost sheep to mountain lions that can clear an 8 foot tall fence with a sheep in their mouth. Bears too, will and have, gone over or through the fences before the dogs. Before we had the dogs I had bears in the driveway between the house and the sheep pens and the mountain lion was actually in the tree next to the house. Last year we had 13 bears on our mesa, we did have one sow plus 2 cubs come into the driveway, stop and get repelled back by the dogs. Our resident coyote pack has been killing lambs at the neighbours (they only have one guard dog) and has also taken deer in our back pasture but has not bothered our sheep flock at all. The resident bobcat who has a den on the property has also learned to give the sheep a wide berth. The only predator we have that the dogs are not really effective at is the eagles, so we lamb under trees to reduce problems from them.

"I don't breed guard dogs, but wouldn't farm sheep here without them."

End

See Animals Other > Dogs Working Guard Pets

### **Further reading**

The 400 (A4) page book called The Sheep, Health, Disease & Production, (ISBN 0112-9643) from the Foundation for Continuing Education of the NZ Veterinary Association, Massey University, Palmerston North, New Zealand (1993) is the most complete book I know of on sheep, but it is long, scientific and heavy going.

Use FlockMaster from [www.meatandwoolnz.com](http://www.meatandwoolnz.com) or [flockmaster@agresearch.co.nz](mailto:flockmaster@agresearch.co.nz)

USDA bulletin 'Livestock Guarding Dogs'.

Use Pasture Minerals Analysis spreadsheet and Lime and Fertiliser Nutrient Planners spreadsheets.

Running a Small Flock of Sheep 2nd edition 2006. Australian CSIRO Publishing. <http://www.dadirect.com/>

Vaughan Jones, ONZM Queen's honour 2013, for services to the farming industry.

Dairying 99% Honours Award 1948. Waikato Most Improved Dairy Farm Award 1959. M.Mkt.I.

International Agricultural Consultant, Journalist, Author of 260 chapter GrazingInfo eBook.

Managing Director of GrazingInfo Ltd with information compiled since 1970.