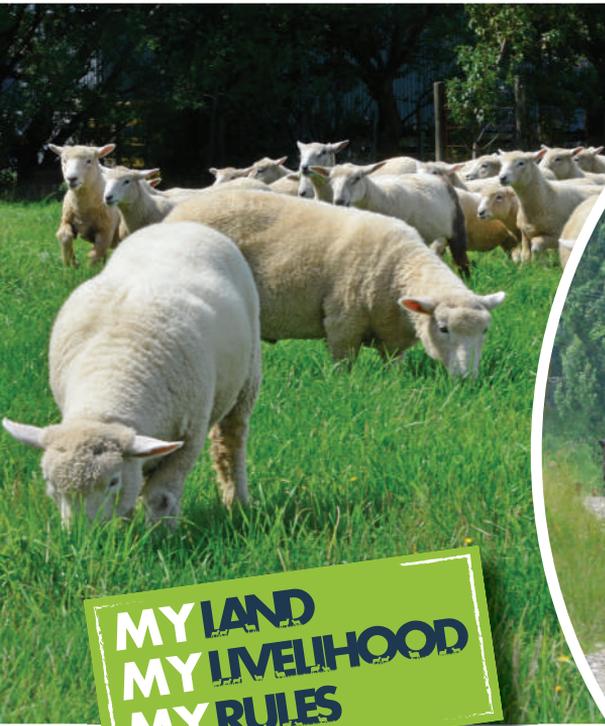


Code of
Good Farming Practices
for the control of
Sheep Measles

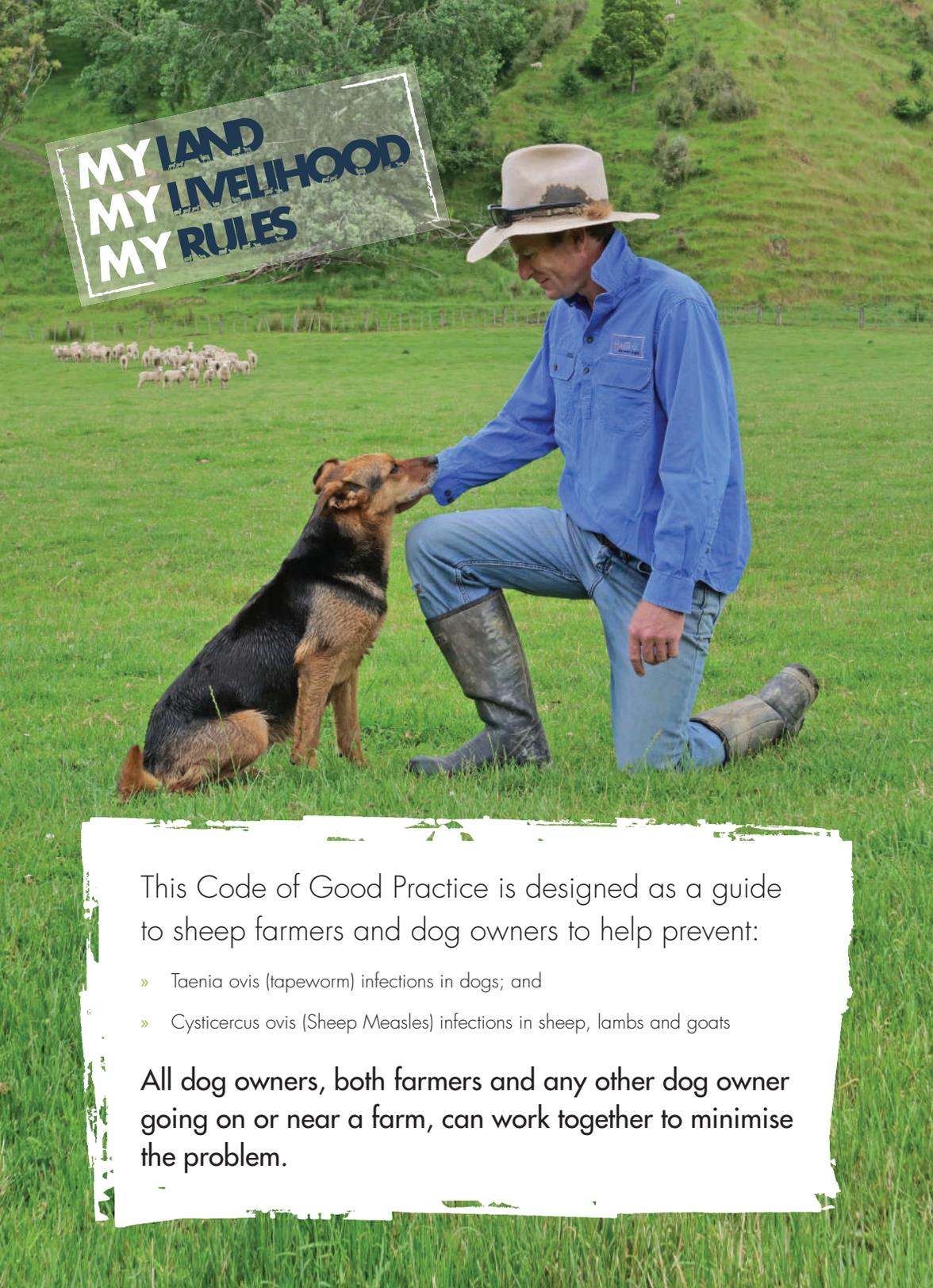


**MY LAND
MY LIVELIHOOD
MY RULES**



PROMOTE PROTECT PARTICIPATE



A man wearing a light-colored hat, a blue long-sleeved shirt, blue jeans, and black boots is kneeling in a green field. He is looking down at a black and tan dog sitting next to him. In the background, there is a herd of sheep grazing in a field, and a line of trees on a hillside.

**MY LAND
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MY RULES**

This Code of Good Practice is designed as a guide to sheep farmers and dog owners to help prevent:

- » *Taenia ovis* (tapeworm) infections in dogs; and
- » *Cysticercus ovis* (Sheep Measles) infections in sheep, lambs and goats

All dog owners, both farmers and any other dog owner going on or near a farm, can work together to minimise the problem.

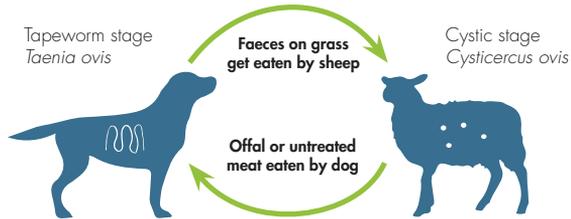
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THE ISSUE

What is Sheep Measles?

“ Sheep Measles poses no risk to human health but it does cause blemishes in sheep meat which are undesirable for consumers both at home, and most certainly for the export market. ”



1. A tapeworm, *Taenia Ovis* (*T.ovis*) infects the intestine of dogs. This is the “primary stage” of the parasite
2. The “intermediate stage” of this tapeworm is a parasite causing lesions in sheep and goats, also known as *Cysticercus Ovis* (*C.ovis*), or it’s common name, Sheep Measles
 - » The tapeworm in the dogs produces eggs, which are passed to pasture in their faeces, where are then ingested by sheep or goats
 - » After ingestion, the eggs penetrate the intestinal tract, are moved around the sheep or goat in their blood, then shift out of the blood to muscle tissues and form cysts
 - » These cysts are in turn infective to dogs
 - » Over a period of months, cysts are killed by the immune system of the sheep or goat and hard, fibrous or calcified lesions are left as defects in the carcass



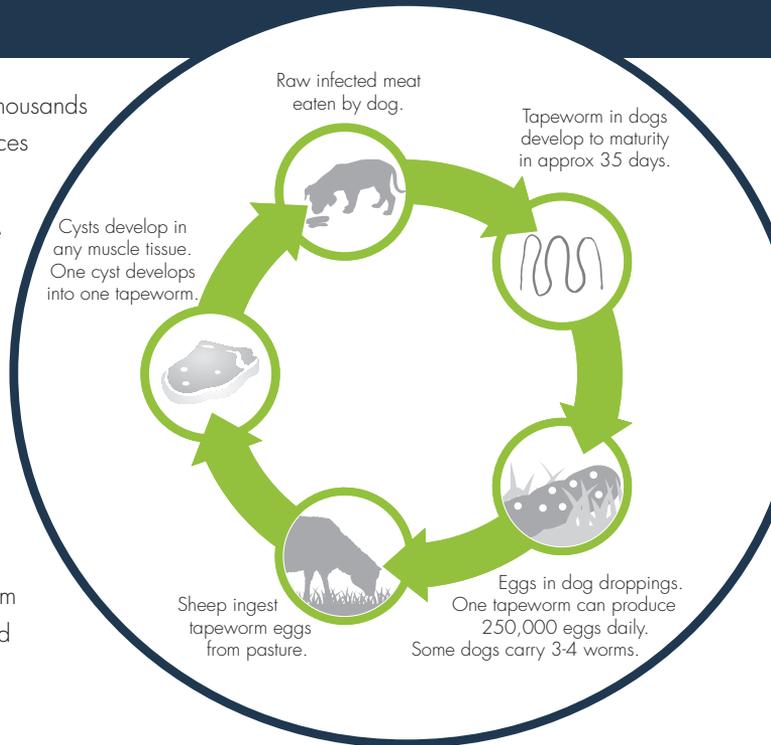
So how do Dogs get Infected in the First Place?

- » Dogs become infected by eating raw or untreated meat or offal infected with live cysts, which are very infective, and often difficult to see
- » Infection can be avoided by ensuring that dogs do not have access to untreated sheep or goat meat (meat scraps, offal, carcasses)



How do Sheep and Goats get Infected?

- » Infected dogs pass many thousands of (*T.ovis*) eggs in their faeces onto the pasture
- » Sheep and goats eat these eggs (which may survive for some months)
- » Eggs can also become distributed over large areas by wind and by flies
- » On farm dogs post the biggest risk, but infection also results from visiting farm dogs, neighbours dogs and visiting town dogs



Why should Farmers care about Sheep Measles?

Whilst currently New Zealand has relatively low levels of Sheep Measles, an outbreak can cause a lot of damage in an otherwise healthy stock. At the meatworks, this then results in downgrading or in extreme cases condemning of sheep or lamb carcasses. So there are real financial costs, for you, the farmer.

Many other countries have much less effective Sheep Measles management, and this sees an opportunity for New Zealand's "clean" sheep to be seen as superior by the consumer.

Reducing the Risk of Sheep Measles

There are a number of ways to reduce the risk of Sheep Measles on your farm. Please see the control measures on the following pages. Use all of these to maximise protection and reduce the risk of infection occurring.

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MY RULES

DOSING

Dog Dosing

“ Regular dog treatment is the most reliable and the most simple (and probably the cheapest) measure to implement. Dog treatments and dosing should be the basis of any on-farm control programme. ”

Drugs Available

All dogs resident on farm should be treated on a monthly basis with cestocidal (tapeworm) drugs containing the ingredient **Praziquantel** which is a highly effective drug for killing tapeworms. These should not cost more than \$1.00 or \$2.00 each (as opposed to All Wormers which you can expect to pay significantly more for).

The drugs, usually in tablet form, can be administered orally or given in dog food.

Praziquantel drugs come in two forms:

1. Straight Praziquantel tablets which target tapeworms and include **Droncitol** and **Wormicide** tablets
2. There are also “All Wormer” tablets such as **Drontal Allwormer**, **Endogard**, **Milbemax** and **Popantel F Allwormer**. All Wormers target roundworm, hookworms, whipworms plus tapeworms

For the best advice on tapeworm treatments, consult your veterinarian or animal health advisor.



Dosage Rates

Praziquantel can be administered to dogs at the rate of 25 mg per 10kg of dog body weight.

Droncit tablets contain 50 mg of Praziquantel. This allows one tablet per 20kg of dog body weight.

Note: some Droncit tablets come foil wrapped showing one tablet per 10kg of dog body weight, however these are for countries that have not yet got rid of Hydatids. For New Zealand you can safely allow one tablet per 20kg.

Wormicide tablets contain 100mg of Praziquantel so can be used at one tablet per 40kg of dog body weight.

- » Check package labelling to confirm the amount of Praziquantel in tablet
- » Under dosing will NOT kill the tapeworms in the dog's intestine

Why Monthly Dosing is Recommended

Dogs need to be dosed monthly to ensure no Sheep Measles tapeworms reach maturity. Why? ...

All Wormer treatment three monthly/quarterly = 90 days
 Sheep Measles tapeworm matures = 35 days
 This leaves a 55 day window where dogs could be shedding eggs.

Let's do the maths ... If you were JUST to use an All Wormer, this means:



Number of dogs	1	2	3	4	5	6	7	8	9	10
Unprotected days	220	440	660	880	1100	1320	1540	1760	1980	2200
Protected days	145	290	435	580	725	870	1015	1160	1305	1450

So a combination of an All Wormer and straight Praziquantel tablets provides maximum protection.

Month	1	2	3	4	5	6	7	8	9	10	11	12
	AW	P	P	AW	P	P	AW	P	P	AW	P	P

AW = All Wormer P = Praziquantel



“ Many vets offer a proactive service, whereby they keep a record of the number of, and weights of your dogs. They then proactively send you correct monthly dosages. This takes one job off your long list of to-dos! If your vet does not offer this, have a chat to them about it, or contact us. We can speak with them on your behalf, or advise you or others close by that will offer this service. ”

Other considerations:

- » Any dog NOT on a regular dosing regime that is accidentally exposed to untreated sheep meat, should be treated 2-3 days later with a Praziquantel drug. *(Note: This is to give any tapeworms present in cysts in the meat time to move out of the cyst so they can be then exposed to the drug, whereas within the cyst they are less likely to be destroyed.)*
- » **ALL NEW dogs** should be dosed at least 48 hours before coming onto the property. If NEW dogs enter the property without being treated beforehand, they should be dosed, quarantined for 3-4 days and all faeces destroyed. *(Treatment kills any T.ovis worms present in approximately 10 hours but does not kill T.ovis eggs left in the intestine)*
- » A suggestion is for ONE person to be made responsible for **treatment of ALL dogs** on the farm, rather than relying on each staff member to treat their dogs
- » In any on-farm dosing programme **ALL pet dogs** also need to be included. Often they have free run of the property and have access to household scraps. Pet dogs are commonly found to be the source of Sheep Measles, so it's imperative they are part of the dosing programme



Safe Dog Feeding

All sheep (and goat) meat needs to be treated before feeding to dogs.
Sheep meat treatment can be done in one of two ways:

1. Freezing Sheep Meat

When freezing, ice crystals form, rupturing the cell walls of any Sheep Measles cysts present, destroying them and making them no longer infective to dogs. For best results, follow these rules:

- » **Ensure core temperature of meat is down to -10°C or colder for at least 10 days**
 - If killing a number of sheep for dog food at one time it may take longer than 10 days to get down to -10°C. This depends on the size and efficiency of your freezer
 - Have a well-defined meat rotation and identification system to ensure that only correct meat is fed (-10°C for 10 days)
 - Meat should be placed in boxes or bags and dated
 - All staff should be aware of how this system functions
- » A dog tucker killing timetable should exist to ensure that adequate supplies of treated food are on hand at all times, including sufficient freezer space for all dogs on the farm
- » Freezer temperature should be checked regularly with a thermometer to ensure it is -10°C or colder
 - If the temperature is found to be warmer than -10°C, in addition to immediately fixing the freezer, all dogs should be treated with a suitable Praziquantel drug to kill any viable *T. ovis* worms that may have developed
 - Freezers should be defrosted regularly as a build-up of ice results in less effective freezer operation and increased power costs



Safe Dog Feeding

2. Cooking Sheep Meat

Where cooking is the preferred treatment option follow these rules:

- » **Cook thoroughly by heating to a core temperature of +72°C or more**
 - Cooking is complete when meat colour changes to brown. Tinges of red indicate inadequate treatment
 - Cut meat into pieces prior to cooking to enable heat penetration
(Do this in a dog-proof area to prevent dogs getting access to scraps)

3. Cutting up Sheep Meat

The cutting up of all sheep or goat meat should be carried out in a **dog proof area** to prevent dogs getting access to waste or offcuts:

- » for both bought and home-killed meat
- » for both dog food or human consumption

4. Offal Treatment (if feeding to dogs)

Offal from home kill must be treated before feeding to dogs by:

1. boiling for a minimum of 30 minutes or,
2. freezing to -10°C, or colder, and maintained at that temperature for at least 10 days
See page 17 regarding Hydatids

5. Alternative Dog Foods

- » All properties, should carry alternative dog foods in case of an emergency, such as freezer failure
- » These include commercially prepared foods that are generally safe for dogs as they have been cooked during the manufacturing process. For instance, dog sausage, dog biscuits, dry meal and tinned foods



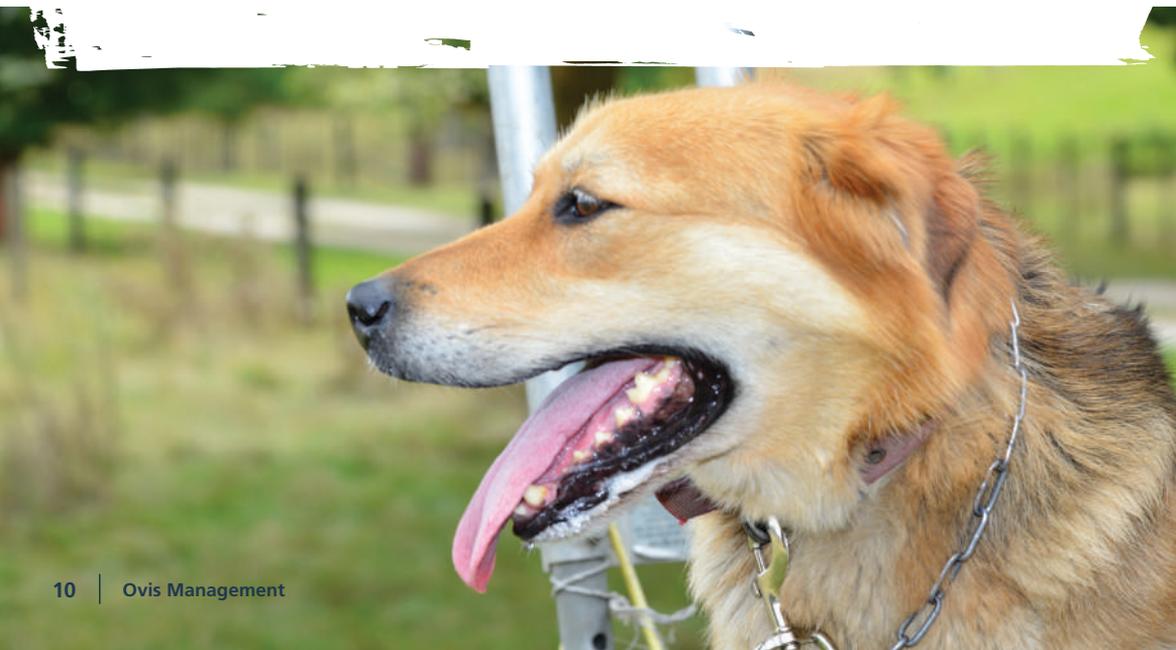
Dog Feeding Hints

6. Safe Meats that can be Fed Raw

- » Beef / Cattle meat should be cooked thoroughly or frozen at -10°C for 10 days in order to reduce the spread of Neospora
- » Safe meats however include that from horses, and rabbits
- » Possum meat is acceptable only if living in a TB FREE zone

Dogs should be fed regularly and amounts fed should be adequate for the work the dog is required to carry out. Basic recommendations include:

- » All dogs should be fed at least once per day and have access to fresh clean water. Hungry dogs tend to scavenge
- » Dogs doing hard work and in cold weather require extra food
- » Bitches in whelp or lactating, require extra food
- » Make family members and staff aware that they should not feed raw household meat scraps to dogs
- » Prevent dogs from having access to cat food if cats are fed raw sheep meat or offal
- » Sheep meat purchased from butcher shops, meat plants or abattoirs cannot be guaranteed free from *C.ovis* (Sheep Measles) cysts and must always be treated first



HOME KILLING

Home Killing

Some farmers are reluctant to kill “dog tucker” in a killing house but as sheep of all ages can be infected with Sheep Measles, it is important to use a secure dog proof site for slaughter - this includes sheep, mutton and goat.

- » All home killing facilities must be dog proof (for both tucker and human consumption) *See page 17 regarding Hydatids*
- » Make sure gates or doors are kept closed
- » If the floor is non-absorbent, all effluent should be drained into a dog-proof sump
- » Ensure that sheepskins are not left where dogs can get at them as attached scraps of meat could contain infective cysts
- » Do not allow dogs access to untreated sheep heads - cheek and tongue muscles are common sites for infection. Dispose of these as offal or freeze / cook before feeding to dogs

Offal Disposal

- » **Transport** offal in leak-proof containers with lids – then return containers for washing and storage
- » **Offal pits** should have a dog-proof lid to prevent stray dogs gaining access
- » If offal is **buried** other than in a specific offal pit, ensure it is well covered and cannot be dug up by dogs
- » **If burning**, do this in a dog proof area, as offal / carcasses are often stockpiled before being burnt



Disposal of Dead Stock



- » Dead stock attracts stray or unattended dogs that could scavenge on infected carcasses. Dispose of all dead animals as soon as practicable
- » Carcasses can be buried. If a pit is used, it should be covered or fenced to ensure it is dog proof
- » Carcasses can be burnt. Ensure this is done in a dog-proof enclosure
See page 17 regarding Hydatids
- » Make sure that in areas where dead stock are stored an effective fence is in place to stop dog access

Quick disposal of dead stock is one of the requirements under the MPI Controlled Area Notice No. 294.



DOG CONTROL

On Farm - Dog Control

- » Don't leave unattended dogs free to roam
- » Uncontrolled or unsupervised dogs can scavenge on dead sheep and become infected
- » Dogs do not respect boundary fences and a stray dog has the potential to infect many surrounding properties
- » All dogs require quality exercise every day whether working or not - so when they are running free they should be under direct supervision to make sure they cannot scavenge sheep or goat carcasses
- » Restrain or tie dogs up when they are not working or exercising under direct supervision
- » Attach short restraining chains to the collar while out working - this allows any dog that is inclined to wander to be chained to a suitable object when not in use
- » Feed dogs regularly (at least once daily) to help prevent scavenging

“

Visiting Dogs

Every dollar spent on on-farm control is at risk every time a foreign dog comes onto your property. In particular dogs from other sheep farms.

”

Foreign Dogs

- » “Foreign dogs” include any that you do not know the status of, in relation to Sheep Measles dosing. They include dogs belonging to:
 - pig or duck hunters
 - stock agents
 - lamb drafters
 - truck operators
 - dipping contractors
 - shearers
 - casual workers
 - musterers
 - neighbours
 - relatives
 - ‘Horse and Hounds’, ‘Dog Trial’ entrants, or any other such club accessing your land
 - or any other visitor with a dog
- » No dog should be allowed onto your farm unless the owner is able to produce some evidence of treatment e.g. a “certificate of treatment”
- » This should include the following information: dog owner’s name and address; details of all dogs treated (name, breed, colour, age and sex); number of tablets given; treatment date; the signature of the Veterinarian
- » Certificates should be valid for a period of one calendar month from the date of the last treatment

Purchased Dogs

- » Request that new dogs have a **current certificate** or are treated with a Praziquantel drug **at least 48 hours prior** to coming onto your land
- » If new dogs enter property without being treated beforehand, they should be **dosed and quarantined for 3-4 days** and all faeces buried or destroyed

Suggested dog treatment policy: No evidence of treatment – No access to property.



EXTERNAL RISKS

Store Lambs / Sheep

“ Introducing store sheep including lambs is another means of introducing infection onto the farm. It is not possible to detect Sheep Measles in live stock so it is very much a case of buyer beware!! ”

In relation to Sheep Measles, store lambs fall into two categories:

1. Infected lambs (prior to purchase)

- » Exposure to infected pasture is unlikely to result in more infection, as they will have developed a level of immunity
- » Sheep do not infect other sheep so apart from being eaten by dogs, they pose no risk to other stock

2. Susceptible lambs

- » Lambs from a “clean” environment will have little or no immunity to infection, so should they be exposed to infected pasture, they may develop a high level of infection

As it is not possible to differentiate between the two categories prior to purchase, it is important if you buy in lambs, to ensure that **your** dogs are free of Sheep Measles (T.Ovis) worms. Consider also, that it is your right to investigate the source - request certificates from that farm, to ensure that their dogs are dosed monthly.



Sheep Measles Storms

If susceptible lambs are exposed to contaminated pastures there may be a storm outbreak of Sheep Measles with large numbers of lambs condemned.

“ It is important that farms buying in lambs have an effective on-farm control programme in place to prevent susceptible lambs developing Sheep Measles Storms. ”

- » Ovis Storms are the result of lambs with low or no immunity being introduced onto infected pastures
 - » Lambs not exposed to Sheep Measles eggs on pastures develop no natural immunity, making them highly susceptible to infection
 - » Should these lambs graze heavily contaminated pastures, the absence of an immune reaction allows many eggs to develop into cysts
 - » The result is an “Ovis Storm” with large numbers of lambs heavily infected - meaning in turn, high condemnation* and downgrading rates during processing
 - » This of course results in severe financial loss to the farmer
- * Where more than 5 cysts are detected in a carcass at meat inspection, the carcass is condemned.



Hydatids (*Echinococcus granulosus*)

“ New Zealand is one of the few countries in the world to eradicate true Hydatids. ”

New Zealand was declared **provisionally free** from Hydatids, (which has a lifecycle similar to Sheep Measles), in 2002.

However, in case of reintroduction, under the requirements of the Biosecurity (declaration of a controlled area) Notice 294, to enable the limitation of the spread of hydatids:

- Offal derived from livestock must not be fed to dogs unless it has been treated by either boiling for a minimum of 30 minutes, or frozen to -10°C , or colder, and maintained at that temperature for at least 10 days
- Farmers must dispose of, as soon as possible, dead livestock in a manner that prevents it from being accessed by any dog



REMEMBER



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