Section 5 How to prevent and control disease

11 Infection

Animals have infection when they have *microbes* or *parasites* that cause disease inside their body or on their skin.

Microbes and parasites

Many diseases are caused by very small *microbes*, for example, *bacteria* or *viruses* that are too small to see. Some microbes are very strong and often cause disease even when there are few of them, for example, *rabies* (p. 260). Weaker microbes only cause disease when there are many of them, as when animals are kept in a dirty place where microbes can breed.

Some *parasites* are tiny but many are large enough to see. Some live inside an animal's body, for example, *worms* (p. 218) and some live on the skin, for example, *ticks* (p. 156).

Parasites take their food from animals and cause harm.

Strong, healthy, well fed animals can fight off many microbes or parasites.

How does infection spread?

These are the ways that infection usually spreads from sick animals to healthy ones:

By touching other animals

On contaminated things

Some diseases, especially skin diseases, e.g., *ringworm* (p. 180), spread when animals touch things such as bedding, feed bowls, or ropes *contaminated* by infected animals.

Infected animals contaminate things by touching them or leaving faeces, urine or *discharges* on them.

By people
People spread infection on their clothes or their hands and feet, and on dirty injection needles.

Through the air
Animals get infected when they breathe in air with microbes in it. Some microbes, for example, *foot and mouth disease viruses* (p. 279), can be carried hundreds of kilometres in the air.

From the mother before an animal is born
Baby animals can get some diseases before they are born if their mothers are infected. They get the infection through the *uterus* or from the *vagina* while they are being born.

In food and water
Discharges, urine or faeces from infected animals often contaminate food or water that other animals eat or drink.

On pasture
Pasture gets infected with *worm* eggs and *larvae* by the faeces of animals with worms. Animals get infected when they eat worm larvae or eggs with the plants they graze.

By insects
Flies (p. 158), *ticks* (p. 156) and other insects carry infection from infected animals to healthy animals.

Wounds
Animals get some diseases from infection that gets into a wound, for example, *black-quarter* (p. 144), *rabies* (p. 260).

At mating
Some diseases only spread when animals mate, for example, *dourine* (p. 297).

Carrier animals

Some animals that look healthy are infected with microbes or parasites. These animals are called carrier animals because they carry infection in their body and can spread it to other animals. They can stay infected for a very long time. They are often animals that have had a disease and recovered.

Immunity

Immunity is an animal's ability to fight off infection. When animals are infected with microbes they produce special chemicals in the blood called *antibodies* that kill these microbes. (Antibodies are made by the *white blood cells*.) Animals that have become immune to a disease are ready to fight off infection with that disease if it happens again.

Animals become immune to a disease when:

- They are infected with microbes and suffer disease. Or when they are infected with microbes but fight them off and do not suffer disease.

- They are *vaccinated* for a disease (p. 353).

This kind of immunity is called *active* immunity because the animals produce their own antibodies. It lasts a long time, sometimes even for the animal's life.

Animals also become immune to a disease when:

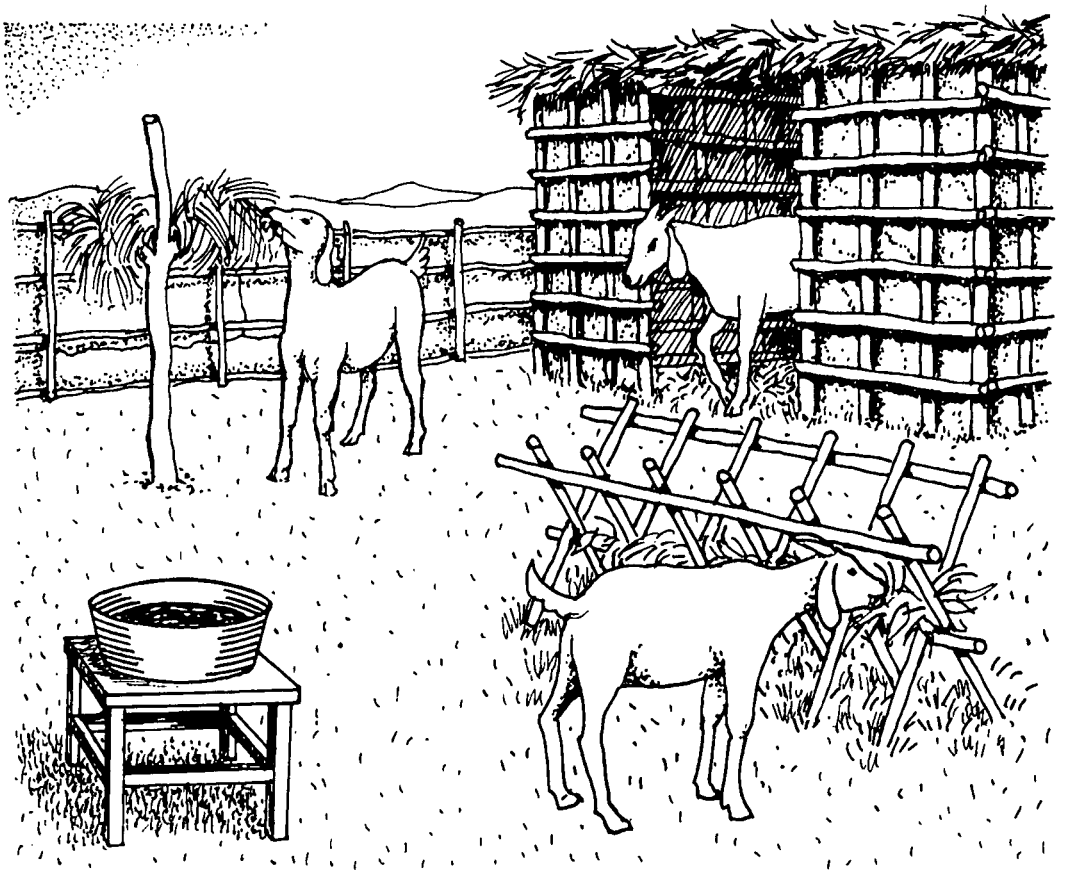
- They get some immunity from their mother through the *uterus* before they are born.
- They drink the first milk (*colostrum*) that comes from their mother (p. 62). Colostrum has antibodies from the mother in it.

This kind of immunity is called *passive* immunity because the animals do not produce their own antibodies. It does not last long – no more than six months and often only a few weeks.

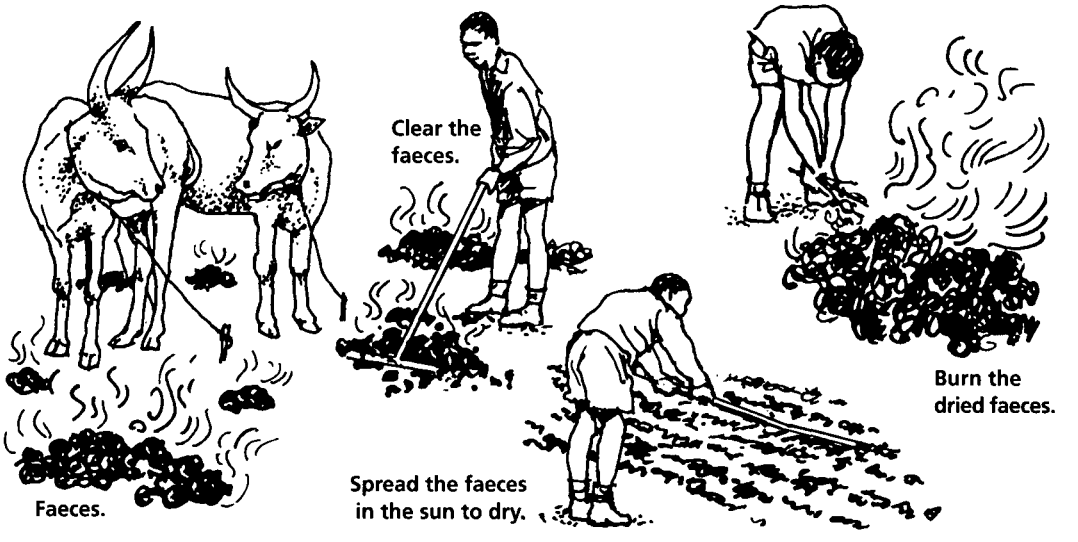
How to prevent infection

It is usually best to **prevent** disease so that animals do not become sick and unproductive. But some animals will always become sick and need treatment. If a disease is difficult or expensive to prevent it may be better to wait for the disease to happen and then treat it, especially if it does not happen often or is not very serious. **The most important way to prevent animals from getting disease is to feed them properly and give them plenty of water to drink.**

- Give animals clean food. Put food or water bowls high up so that the animals cannot drop faeces in them.



- Keep animals in clean dry places. Microbes and parasites like wet, dirty places. When many animals are kept close together in one place it is especially important to keep them clean. Clean out houses where animals live, frequently. Remove the dirty bedding. Wash the walls and floor well; use soap and water or disinfectant (p. 324) if possible. Put gates and equipment out in the hot sun. Make sure water can drain away from houses and enclosures.
- Remove faeces from animal enclosures often. These people in Sudan tie their animals up in the same place every night but they clean away the faeces every day. They spread the faeces out in the sun to dry and they burn them.



- Avoid keeping animals too crowded together. Too many animals in one group always leads to disease. Animals have social rules and behaviour like people do. If you take too many animals away from a group or add too many to it all at once the balance of a group of animals changes. Disease and other problems often follow soon after changes like this.
- Move enclosures and temporary houses often to avoid a build up of infection and parasites.
- Move animals away from pasture they have used for a long time and let the pasture rest for a few weeks. The hot sun soon kills worm eggs. Put young animals on clean ground where other animals have not been for a long time.
- Use medicines for infections and worm medicines properly (p. 311).
- Vaccinate animals for the important diseases in your area.
- Be careful with the bodies of dead animals because disease can come from them. Bury or burn the body of an animal that dies of a very infectious disease.
- Do not mix your animals with others that you know are not healthy (see page 109). But mixing your healthy animals with other healthy animals can be useful to help them to get immunity.
  Example: In Kenya, when there is little grazing near home, people often go to look for more distant pasture. They check the pasture and look to see if the animals in the places they visit have disease. If the animals there are sick they do not take their own animals to this pasture.
  Example: These people in Somalia (p. 92) are fetching water in pans from a well to stop their animals getting disease from other animals that drink at the well.
- Work together with others and with control programmes (p. 93) to prevent disease.

Women fetch the water in Somalia.

How to avoid stress

Stress reduces an animal's strength and its ability to fight off infection. Animals are stressed by things like:

- Having an injury.
- Having a disease.
- Giving birth.
- Being poorly fed or not having enough water to drink.
- Being kept crowded in unsuitable houses.
- Being caught and handled by people or moved a long distance.
- Being moved to a different place and mixed with a different group.
- Being vaccinated or given medicines.

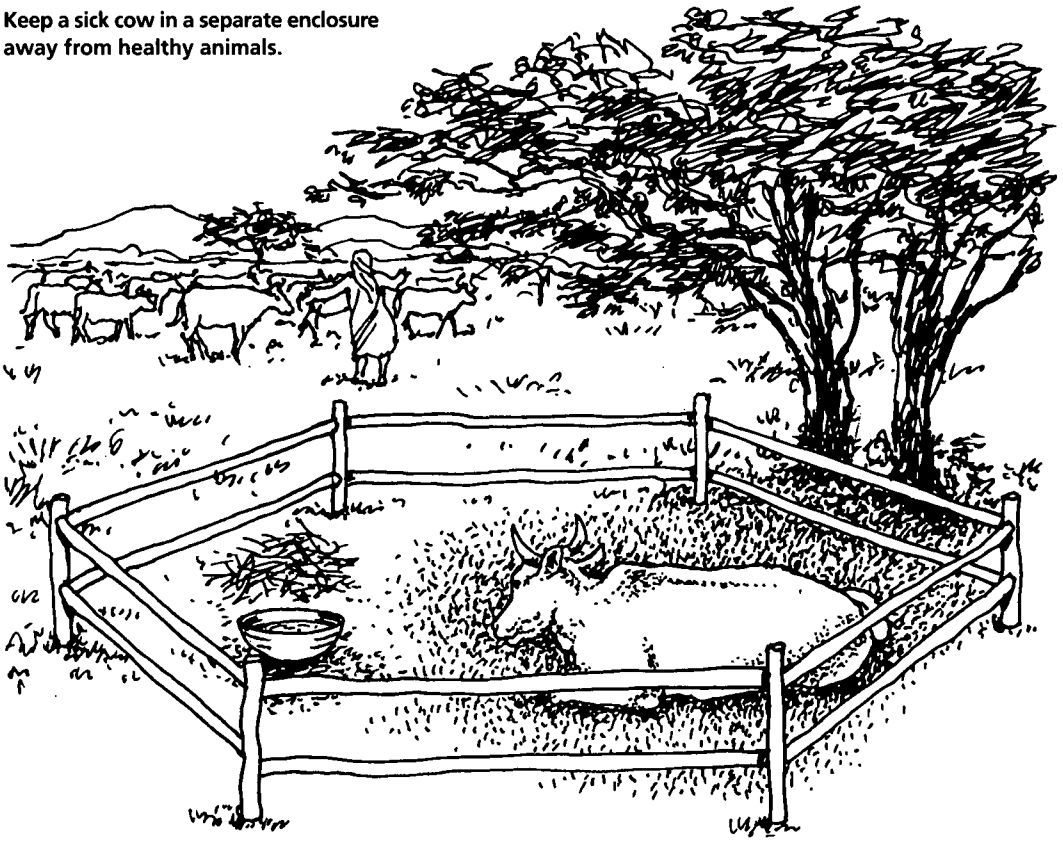
Animals get infection and suffer much more from diseases when they are stressed. **Avoid stressing animals, if possible, to keep them healthy**. Recognise when animals are stressed and reduce any stress they suffer if you can.

How to control infection when animals are sick

- Watch animals carefully and treat sick animals as soon as possible. If more than one or two animals become sick, treat other animals in the same group even if they look healthy. This way you can save the life of many animals and stop disease spreading to others.
- Separate sick animals from healthy ones quickly. Keep them on their own at least 50–100 metres away from healthy animals. Diseases are spread a long way by flies or through the air.

  It is best to move the healthy animals to a clean place away from sick animals. Moving sick animals away is not so good. They may leave infection behind them. The healthy animals will be in a place that is still infected and may get disease.
- Keep a sick animal outside an enclosure that has other animals in it at night, even if the animal grazes with the others in the day time. Animals that are grazing are not so close together as they are at night in an enclosure. So disease does not spread so easily between them when they are grazing.
- Avoid letting people who work with sick animals mix with healthy animals. They can bring infection with them.
- Control flies near sick animals if possible (p. 103) to stop them spreading disease.
- Do not bring in new healthy animals until a disease problem has stopped.

Keep a sick cow in a separate enclosure away from healthy animals.



- Do not move sick animals over long distances, they will infect healthy animals they pass on the way.

Disease control programmes

Some diseases threaten so many animals and people that governments have programmes to control them or to get rid of them. **Work together with others to help these programmes**. When animals in your area are not sick it is tempting not to help. But unless all the people in your area work together, the disease will not be controlled and your animals can get disease another time.

These are some ways that programmes try to control disease:

- They advise people to take precautions, such as isolating sick animals, destroying bodies of dead animals or boiling milk from sick animals before people drink it.
- They try to control the movement of animals to stop infected animals spreading disease and to stop healthy animals moving to a place where there is already disease.
- They *vaccinate* animals to protect them against the disease. So they do not become sick and spread it to other animals.
- They kill infected animals. Good governments, who ask animal keepers to kill animals as part of control programmes like this, give the animal keepers money to *compensate* them. Programmes that ask animal keepers to kill animals with no compensation do not often work.
- They do tests to find out if animals have been vaccinated properly or if they carry infection. They need to take samples – often blood samples – to do these tests. These tests are important to make sure that control programmes work.

12 How to control parasites inside the body

Roundworms and *flukes* often make animals sick but you do not see them in an animal's faeces. Only the eggs come out in the faeces and they are too small to see. *Tapeworms* (p. 101) do not often make animals sick even though you can see them in an animal's faeces. **It is the worms you cannot see that usually cause disease.**

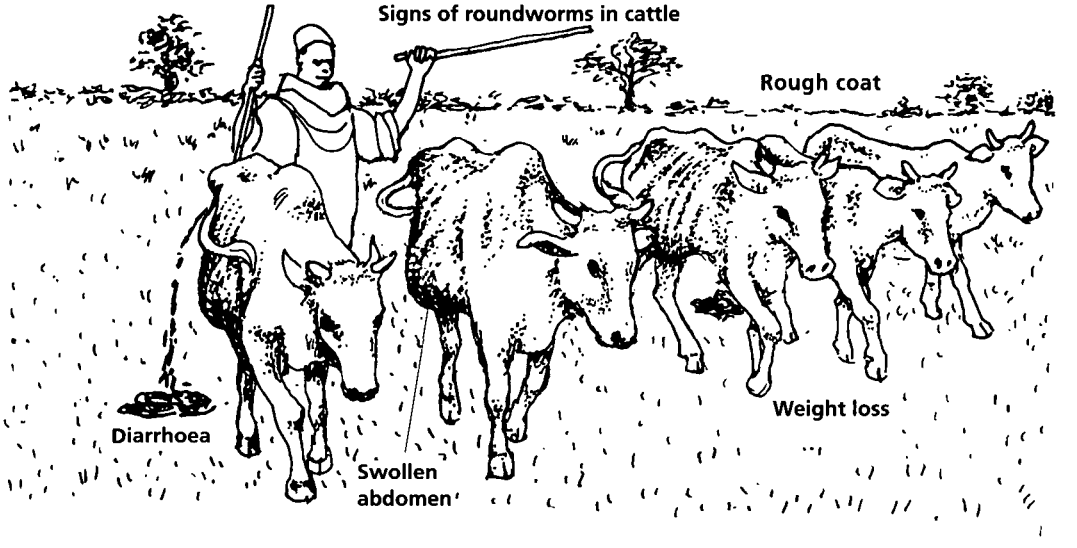
Skilled workers can check animals' faeces with a microscope for most worms. They do not need to check faeces of all the animals in an area. If they find worm eggs from a few sick animals, it is likely that other animals in the same area have the same worms. Get skilled help from someone who knows about the *parasites* in your area (at least occasionally) to help control worms or flukes and to plan the most effective time to use worm medicines. **Work with others to include all the animals in your area to make a programme to control worms or flukes.**

How to control roundworms

In most places worms (roundworms) make animals sick more often than anything else does.

Most worms make animals thin and stop them growing. They often cause *diarrhoea* (p. 211). Animals usually get worms from the pasture they graze. This is often because pasture is not looked after well and there are many worm eggs and *larvae* on it. For details about worms that cause problems like these see: *worms* (p. 218), *ascaris worms* (p. 220).

Some kinds of worms cause other problems, for example, *earworm* (p. 153), *eyeworm* (p. 150), *heartworm* (p. 199), *hookworm* (p. 221), *hump sore* (p. 174), *lungworm* (p. 200), *whipworm* (p. 221), *worm nodules* (p. 185).



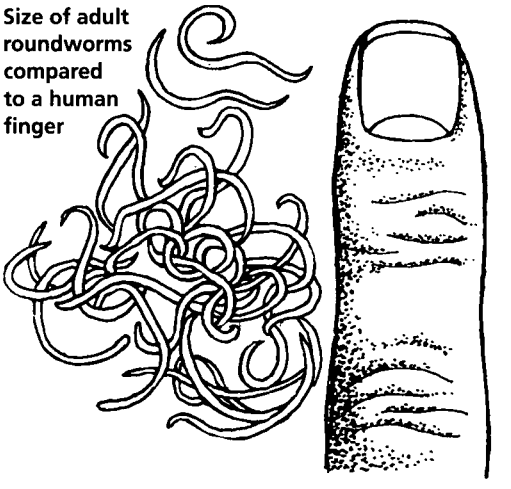
How do worms live?

Many types of roundworms cause disease but most of them live in a similar way. The worms that make animals sick most often are called *Haemonchus*. Learning how worms live helps you to understand how to control them.

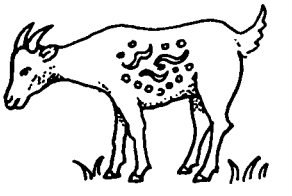
It is usually adult worms that make animals sick. Most adult worms are thin and white or red/brown. You can usually just see them in the stomach or intestine of a dead animal. They produce eggs that come out in an animal's faeces about three weeks after an animal was infected. (One worm can produce up to 15,000 eggs every day.)

Worm eggs develop into larvae in the faeces on the ground. The worm larvae move out of faeces onto the leaves of plants after about four weeks. The larvae move up to the top of plants when it is wet and down to the ground when it is dry.

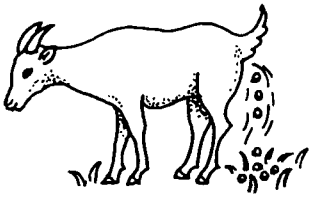
Animals get infected with worms from pastures with worm larvae on them. They get infected more easily when the pasture is wet. Worm larvae develop into adult worms in an animal's stomach or intestine. The larvae usually develop quickly into adults. Then animals become sick soon after they graze pasture with worm larvae on it. But in cold or dry times some worm larvae take a long time to develop. They do not become adults that make the animal sick until conditions are warmer or wetter. When this happens animals only become sick after the cold or dry time is over.



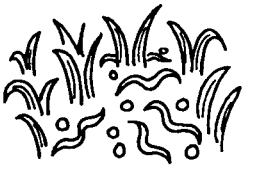
Size of adult roundworms compared to a human finger



Adult worms in the stomach or intestine produce eggs.

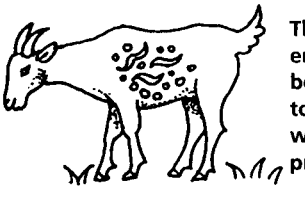


Eggs drop to the ground in faeces.



Eggs hatch in the grass and larvae come out, grow and change.

Animals eat the larvae with the grass.



The larvae enter the body, change to adult worms and produce eggs.

How to reduce problems caused by roundworms

1 Feed animals properly

Animals that are properly fed can fight off many worms.

2 Manage pasture to reduce the number of worm larvae on it

- Do not keep too many animals on a small area for a long time. Pasture quickly gets large numbers of worm larvae on it when animals with worms graze on it. Then the pasture becomes dangerous and other animals easily get worms from it.

- If you keep many animals in a small area, keep young animals separate from older animals. Put forage into troughs to stop animals grazing the pasture that has probably got many worm eggs on it.
- Cut long grass. Then sunlight will kill many worm eggs in faeces on the ground. Use the grass you cut as forage. Worm eggs and larvae are near the ground so the forage will not have many worm eggs or larvae in it.
- Put young animals onto pasture before adults. Adult animals with worms may not look sick but their faeces may have many worm eggs in them. They quickly make a pasture dangerous for other animals, especially in wet seasons.

Safe pasture

To reduce the number of worm eggs and larvae on a pasture so that it is safe for animals to graze:

- Do not put animals on the pasture for 10 weeks when it is dry. Most worms on the pasture will die and it will be safe to graze again.
- Pastures that have had forage or other crops cut from them have few worm larvae on them. They are safe to graze.

How to use safe pasture

- Separate young animals from adults at the beginning of a wet season.
- Treat the young animals with worm medicine and put them on the safe pasture. Treat all the animals that will use the same pasture. Otherwise animals you do not treat will leave worm eggs on the pasture. They will soon infect the animals you have treated.

Grazing different animals together

When you graze different kinds of animals together they do not get worms from each other. Sheep and goats get the same types of worms. But the worms that cattle or horses get are usually different. Worms from one kind of animal usually cannot live in another kind. When one kind of animal grazes a pasture it eats worm eggs and larvae from other kinds of animals without becoming sick. This cleans the pasture of many worm eggs and larvae that would make the other kinds of animals sick.

It is a good idea to graze a pasture with one kind of animal for about two months, then graze it with another kind. For example, a pasture that has been grazed by sheep and goats is safe for cattle or horses to graze. The pasture may have many sheep and goat worm eggs on it. But the sheep and goats will have eaten many cattle worms or horse worms and cleaned the pasture for these animals.

3 Use worm medicines to control worms

Always treat the whole of a group of animals that graze in the same place at the same time. **Do not just treat one or two animals in a group**. But you do not need to treat all the groups of animals that graze in different places. It is cheaper to treat only the groups of animals that most need treatment.

The most important groups of animals to treat are:

- Young, growing animals.
- Animals which are being specially fattened for meat.
- Pregnant sheep and goats. This will stop them giving worms to their young.

If you are starting a programme to control worms you will need to treat all the young grazing animals.

When to give worm medicine

- Give worm medicine to young animals at the beginning of a wet season. Treat sheep and goats under two years old and cattle under three years old (adult cattle do not usually need treating with worm medicine). This will stop them from getting sick. It will stop worm eggs coming out in their faeces onto the pasture.
- Treat them again at the end of a wet season. This will reduce the number of worm larvae inside the animal in the dry season that follows. In a dry season animals may have little to eat. They can suffer badly from worms if they are infected with many worm larvae.
- In places where it is wet for much of the year and there are many worms, you may need to treat animals several times.
- Treat any new animals that come to join a group as soon as they arrive.
- Some people give their animals salt (p. 231) to eat or take their animals to salty pastures at least once a year to help reduce the number of worms. This is not as effective as using modern worm medicines properly.

Resistance to worm medicines

In cool, wet places where people have used many worm medicines for a long time, worms have become *resistant* to some medicines. These medicines do not work any more in these places. In most dry places this is not a problem. You need skilled help to decide if worms in your area have become resistant. Skilled workers can test to see if worms have become resistant but the tests are complicated.

Avoid making worms become resistant to medicines even if it is not a problem in your area yet:

- Use worm medicine as few times as possible. Try to use worm medicine less than three times a year.
- Give the correct dose of worm medicines (pp. 313, 336). Check that dosing guns give the right amount.
- Do not bring animals from an area with resistant worms. They will bring resistant worms with them.
- Change the type of worm medicine you use each year.

When a worm medicine does not seem to work it is rarely because worms are resistant to it. It is more likely that:

- The animals have been given too low a dose.
- The pasture has many young worms on it and animals get infected again soon after they have been treated.
- The problem is caused by a parasite, e.g. *liver flukes*, or by something else, such as infection with *microbes*, that the worm medicine does not treat.

When worm medicines do not seem to work any longer, get a skilled worker to check the faeces again.

Different animals and worms

Goats Goats normally eat bushes and plants above ground level where there are no worm larvae. But, especially in wet places, they eat grass and plants near the ground and get infected with worms. They get severe disease. Goats get the same kind of worms as sheep do. Treat them with the same medicines.

Camels Camels usually do not suffer much from worms because they live in dry places where there are not many worm larvae on the pasture.

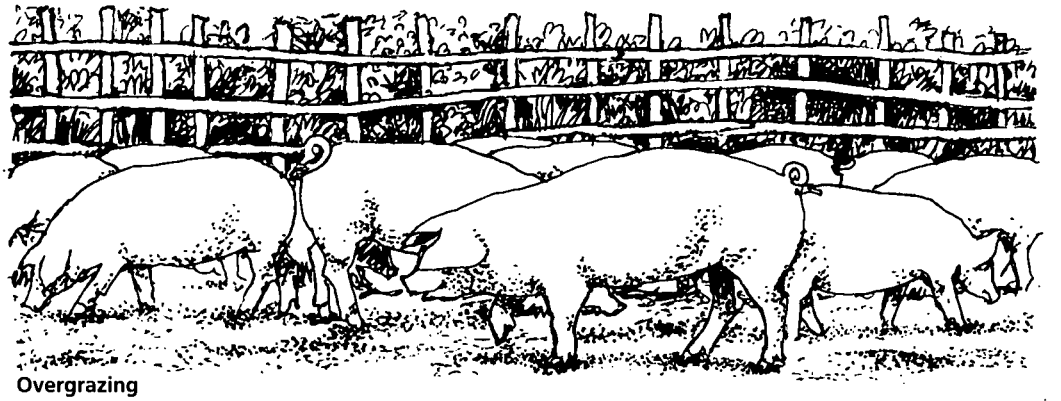
Horses, mules and donkeys To treat these animals take the steps shown below:

- If animals live on the same pasture all the time or live in buildings, remove the faeces every day and make a pile of them (p. 44).
- Let other animals graze pasture after horses. Cattle, sheep and goats do not get the same worms as horses. They clean the pasture of horse worms without becoming sick.
- Give worm medicine regularly every three months (p. 336).

WARNING

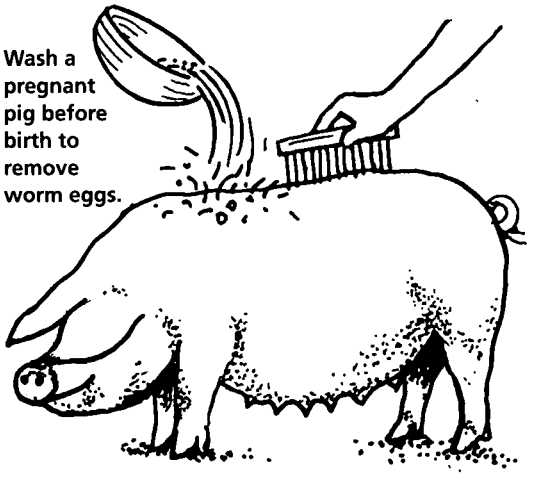
Some medicines that are good for horses are not good for mules or donkeys. Follow the medicine maker's directions carefully.

Pigs Pigs usually suffer from worms because they live on the same small area, such as a roadside, for a long time. The ground soon has many worm larvae on it.



Overgrazing

- Move pigs to a clean piece of ground every two weeks in a wet season. They can safely stay longer at dry times. Cultivate the ground where the pigs have lived. Grow a crop on it or use it for different kinds of animals before putting pigs back on to it.
- In a wet season wait about three months before you put pigs back on ground they have already used. In a dry season wait two months – worm larvae die much sooner when it is dry.
- Treat pregnant females a week before they give birth. Use a worm medicine that kills all kinds of worms (p. 336). Wash the female just before she gives birth to remove any worm eggs on her skin to stop new-born pigs getting worms.
- Clean faeces from a pen where a female gives birth, every day. Keep baby pigs and their mothers separate from other pigs.
- Give worm medicine to treat all pigs regularly for worms (p. 336)



Wash a pregnant pig before birth to remove worm eggs.

Dogs Dogs get several different kinds of worms, such as *ascaris worms* (p. 220), *hookworms* (p. 221) and *heartworms* (p. 199).

To control most of the worms that dogs get:

- Give worm medicine to pregnant dogs before they give birth.
- Give worm medicine to young dogs when they are three weeks old. Give them worm medicine again when they are six weeks, nine weeks, 12 weeks and six months old. Then give them worm medicine once every year.
- Clean away faeces from the places where dogs live all the time.

Birds Birds that are free to wander about often get worms. They get worms (like animals do) from pasture *contaminated* with worm eggs and larvae from the faeces of birds with worms. Birds also get some worms that live inside snails or insects that they eat.

- Move birds to clean ground often.
- When large numbers of birds live in the same place keep adult and young birds separate.
- Give birds clean food and water.
- Clean out their houses. When one group of birds is moved from a house clean out the faeces and *disinfect* the house before you put new birds in.

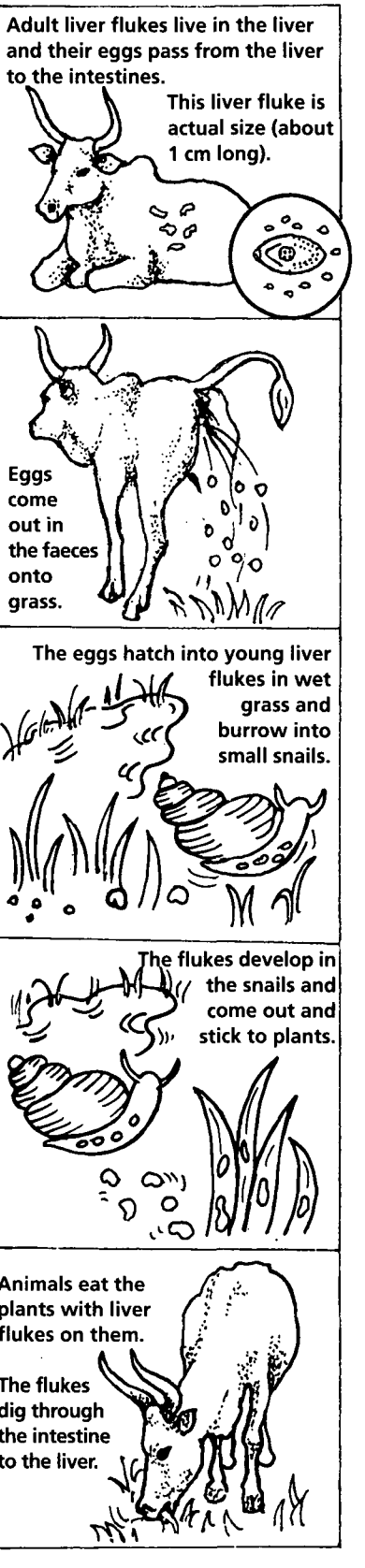
How to control liver flukes

How do liver flukes live?

Adult *liver flukes* (1–10 mm) live in an animal's liver. They each produce up to 20,000 eggs every day that go from the liver into the *intestines*. The eggs come out in an animal's faeces about two months after the animal was infected. The eggs hatch in wet places to produce young forms of liver flukes. These young liver flukes are too small to see. They burrow into small snails that live in slow moving water such as irrigation ditches. Young liver flukes develop inside the snail for about six weeks. Then they come out of the snail and stick to plants around the edge of water.

Animals get infected with young liver flukes when they graze near water and eat plants with young liver flukes on them. (Some young liver flukes can live in hay if it is not well dried.)

Young liver flukes grow in an animal's intestines. They dig through the intestine and go to the liver to develop into new adults.

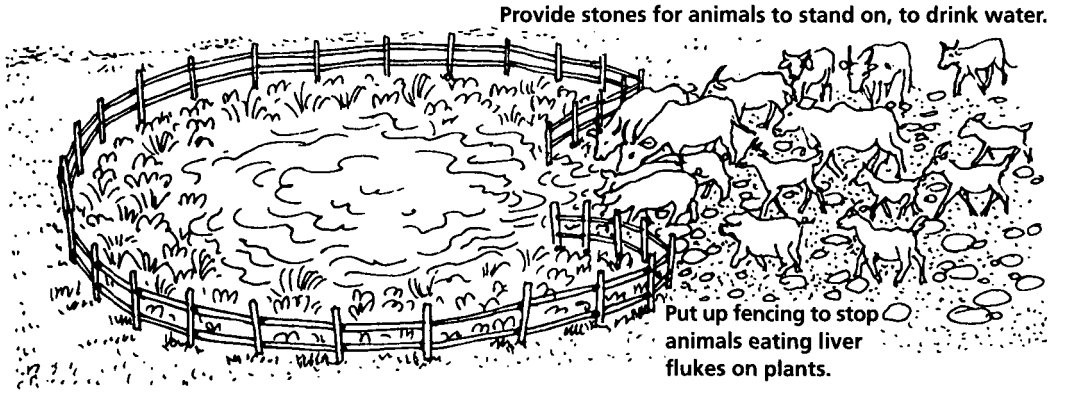


How to reduce problems caused by liver flukes

Get skilled help from someone who knows the parasite problems in your area, if you can, to plan a programme to control liver flukes. Encourage other animal keepers in your area to work together to reduce the danger from liver flukes.

1 Stop animals getting infected with young liver flukes

- Keep animals away from wet places where snails carry liver flukes. Put a fence round these places to keep animals away. Draining the wet places where snails live works but it is usually expensive.



- Clear plants away from the place where animals drink. And put stones or concrete for animals to stand on when they drink.
- Use pipes rather than open channels for irrigation water.
- Avoid grazing in places that have been flooded. Wait at least two months after they become dry before grazing these places if you can. Or wait until the grass is dry and make hay from it. If you have to graze wet places, where there are snails, put older cattle to graze there first and sheep and goats last. (Older cattle suffer less severe disease than sheep and goats.) Be ready to treat animals that become sick with worm medicines.
- Use water from bore-holes or wells or take it from fast-moving rivers rather than ponds or irrigation ditches. Put animals' drinking water in a trough or bowl.
- Use forage from trees because it does not have young liver flukes on it.
- It is difficult to kill snails that carry liver flukes with chemicals. You have to do it at least every year. It is expensive. Some people use plants, such as *Phytolacca dodecandra* to help kill snails. People plant *Eucalyptus* trees so that leaves fall into the water to kill the snails. Scientists have found many kinds of *Eucalyptus* leaves that kill snails. **Beware planting *Eucalyptus* trees in places where there is little water**, they take a lot of water out of the ground.
- People are trying to use kinds of snails they can eat but that do not carry liver flukes, to compete with snails that carry liver flukes and reduce the number of them.
- Some people keep ducks, especially in rice fields. Ducks eat what is left after the harvest and they eat snails.

2 Use worm medicine to control liver flukes

- Use worm medicine (p. 336) to kill adult liver flukes and stop pasture becoming contaminated with liver fluke eggs.
- Give worm medicine at the end of a dry season. This stops liver flukes developing and contaminating pasture when it becomes wet.

- Give worm medicine 1–2 months after you think animals have been infected with young liver flukes. Animals are most likely to get infected in wet seasons when they graze wet pasture near water.
- Places that are wet for a long time often have many liver flukes. In some wet places you have to treat animals three times a year.
- Medicines that kill young liver flukes are expensive. Plan a programme to control liver flukes using cheaper medicines, e.g. oxyclozanide, that kill adult flukes (p. 338).

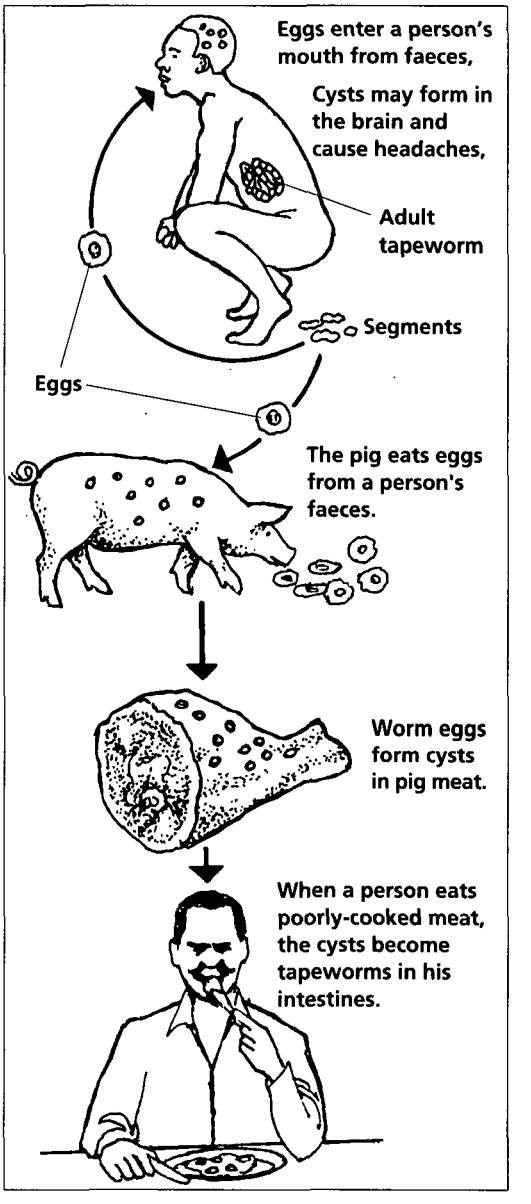
How to control tapeworms

Most adult *tapeworms* do not make animals sick even when it is easy to see them in an animal's faeces. But *tapeworm cysts* can make people sick (p. 7).

How do tapeworms live?

All tapeworms have two *hosts* (animals that they live in). Adult tapeworms are made of segments and are often long (over 5 m). They live in the *intestines* of animals and people. These animals or people with adult tapeworms inside them are called *final hosts*. Segments of the tapeworm fill up with eggs. When a segment is full of eggs it breaks off and comes out in the faeces. You can see segments of some types of tapeworm in the faeces. They look like big white/brown grains of rice. The segment breaks up on the ground and eggs come out.

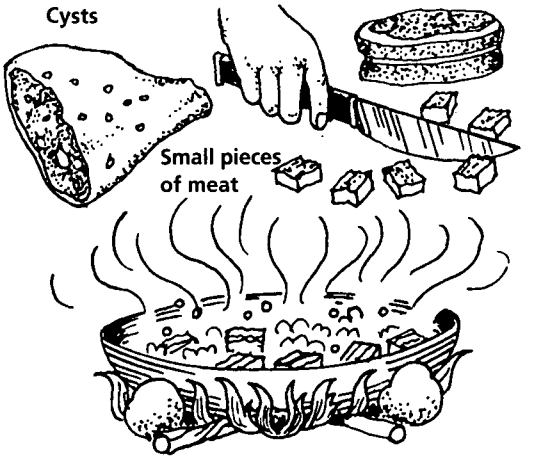
Another animal or an insect eats the tapeworm eggs. The eggs hatch in the intestines and develop into larvae that dig through the inside of the body. They stop somewhere in the body and develop into a *cyst* full of fluid with tapeworm larvae in it. This animal or insect with a tapeworm cyst in it is called an *intermediate host*. Animals or people (*final hosts*) get infected with tapeworms when they eat meat or insects with cysts in them.



Ways to control most tapeworms

- Keep dogs, pigs and other animals away from the bodies of dead animals (and dead people). Especially keep meat with tapeworm cysts in it away from dogs.
- Avoid eating meat with tapeworm cysts in it.
- Look carefully for tapeworm cysts when you kill animals for meat. Do not burst the *cysts*. This would release baby tapeworms. Bury or burn any cysts you find.

- Cook meat so that it all gets hot enough to kill tapeworm cysts. Meat that has been cooked enough to kill tapeworms is brown all the way through and no longer red/pink and bloody. Cook meat from pigs especially well. The meat needs to be very hot for several minutes to kill tapeworm cysts. It is easier to make meat hot if you cut it into small pieces.
- Cook waste food that is fed to pigs.
- Treat people with worm medicine when they have tapeworms (p. 8).
- Treat dogs for tapeworms in places with *hydatid disease* (pp. 7–8).
- Dig proper deep pit *latrines* for people to use. Encourage people, including children, to use latrines and not to leave their faeces on the ground where pigs and other animals can eat them.
- Wash your hands after handling dogs. Make especially sure children wash their hands after handling dogs and before they eat.
- Wash vegetables before you eat them.



Ways to control hydatid disease (p. 7)

In some places there are control programmes for *hydatid disease*. **Work with these programmes to save peoples lives, especially the lives of children**. As part of a control programme skilled workers check dogs' faeces with a microscope for tapeworm eggs.

- Warn people that they can get infected with tapeworm eggs by touching dogs that have tapeworms.
- Give worm medicine to dogs regularly to kill tapeworms. Some old worm medicines kill tapeworms but do not kill the eggs that come out in a dog's faeces. Use a medicine, such as praziquantel (p. 338), that kills the tapeworms and stops eggs coming out in the faeces. Mebendazole (p. 337) also works but not as well. Treat all dogs every two months in an area where this disease is a problem.

13 How to control parasites outside the body

How to control flies

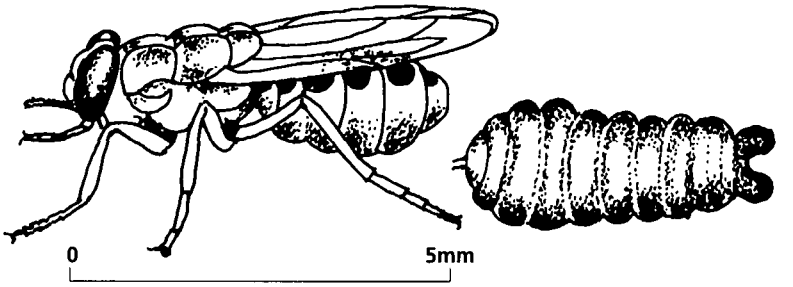
- Make sure that houses for animals are clean and dry. Clean away faeces, rotten bedding and old food.
- Treat wounds quickly.
- Be aware of when and where there are many flies. There are usually more flies in wet seasons. Flies are usually most active early in the morning and in the evening. They are less active when it is very hot in the middle of the day or very cold at night.
- Graze animals at night when there are fewer flies around. In daytime avoid shaded places where many flies live.
- Try to avoid wet, muddy places where many flies breed.
- Use ***insecticides*** to repel or kill flies (p. 339).

Many insecticides kill flies. It is more difficult to *repel* flies. It is difficult to keep enough chemical on an animal to repel flies for more than a short time. Some insecticides, especially pyrethroid insecticides (p. 344), repel flies effectively. These chemicals stay on the animal for some time and kill insects that land on the animal. Some modern insecticides come mixed into plastic collars or ear tags that slowly release insecticide and go on repelling and killing flies for some time.

How to control tsetse flies

Tsetse flies [*Glossina*] are usually dark yellow/brown, about 5–15 mm long. The wings cross over each other when the fly is not moving. Tsetse flies only live in Africa south of the Sahara, where one kind lives on open rangeland, one by rivers and another in forests.

Tsetse flies bite all kinds of animals and people and spread *trypanosomosis* (p. 295). Animals are irritated by the painful bites of tsetse flies. Each fly feeds on an animal for about a minute every 2–3 days. Male and female flies bite but usually not at night. Female tsetse flies do not lay eggs. Eggs become larvae inside female flies which lay live larvae on dry, sheltered ground. The larvae cannot live in sunlight and dig into the ground. They



Tsetse fly **Larva of tsetse fly**

become new adult flies after about 25 days. Female flies live for about three months and each produce 5–10 larvae.

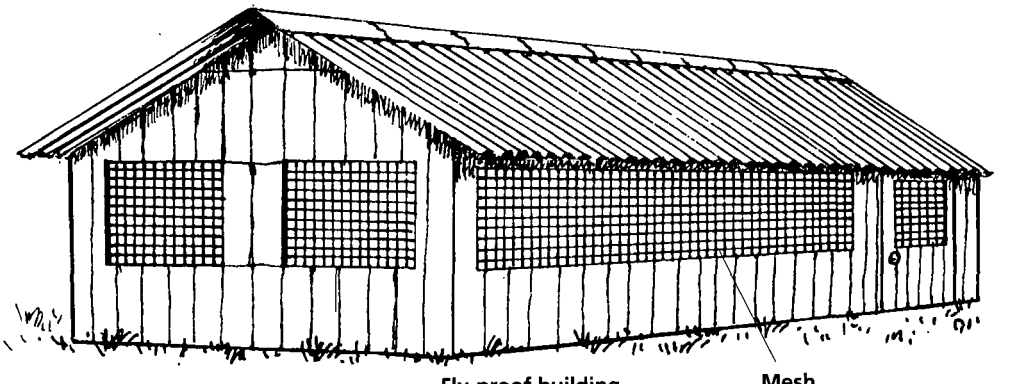
Most people now agree there are three good ways to control tsetse flies:

1 Use **traps** that attract and catch tsetse flies but **do not use insecticides**.
2 Use **traps** that attract flies and kill them **with insecticide (targets)**. These are more expensive to use because of the cost of insecticide.

   To use traps effectively, work together with skilled workers and others in your area to organise a programme. You need to use enough traps or targets – at least four every square kilometre – over a wide area to make it safe from flies. Using traps to control tsetse flies is cheaper than giving medicine to prevent *trypanosomosis* (p. 334). It is easy for people who distribute medicines to distribute these traps.
3 Use **'pour-on' insecticide** on animals. The animals attract tsetse flies and the insecticide kills them. Deltamethrin is the best insecticide for this (p. 342).

Other ways to control tsetse flies cost more or are less effective:

- **Smoke**. Some herders burn special plants to produce smoke to keep tsetse flies off their cattle. It does not always work.
- **Clearing bush.** It is almost impossible to clear enough bush to be effective.
- **Repellents.** People rub animals with different things to repel flies. They usually do not work. Tsetse flies are difficult to repel.
- **Killing wild animals.** This doesn't work because tsetse flies that were living on the wild animals all move onto the cattle. This makes the fly problem worse for an animal keeper.
- **Spraying the ground** with insecticide is costly. It needs to be done over a wide area. It may only work for a short time.
- **Releasing** *sterile* male tsetse flies (these are flies that have been treated so they are not able to breed) is too costly because it needs so many sterile flies.
- **Using natural enemies** of the tsetse fly. The 'Robber Fly' attacks tsetse flies but it does not kill many of them.
- **Fly-proof buildings** with mesh over the windows and doors, protect animals from tsetse flies. They cost a lot to build. They do not work if animals go out to graze so you always have to bring forage to the animals, who have to stay in the buildings.

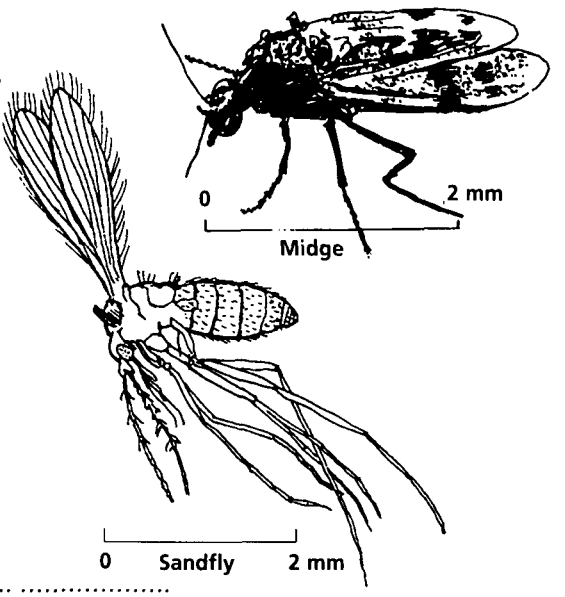


There are always as many tsetse fly larvae living underground as there are adult tsetse flies. Even if you kill all the flies in an area, underground larvae survive. They soon become adult flies that come out of the ground. **You need to go on killing tsetse flies for a long time to make an area safe**.

How to control other flying insects

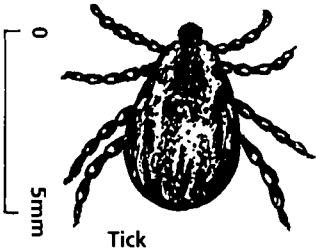
Midges [*Culicoides*] are very difficult to control. They breed in very large numbers from larvae that live in soil or plants anywhere wet and warm. Move animals to a high windy place to avoid midges.

You can repel **mosquitoes** (p. 344) with pyrethroid insecticide like you repel flies. **Sandflies** [*Phlebotomus*] live near the ground, especially near termite mounds and the holes made by small animals. Control them by spraying insecticide in these places.



How to control ticks

Adult *ticks* have eight legs. They are small and dark until they fill up with the blood they suck from an animal. After they feed they swell with blood and are easy to see – up to 1 cm across. Each tick can take about 2 ml of blood during its life and animals can have many ticks on them. One horse in Kenya had 16 kg of ticks on it.



Tick

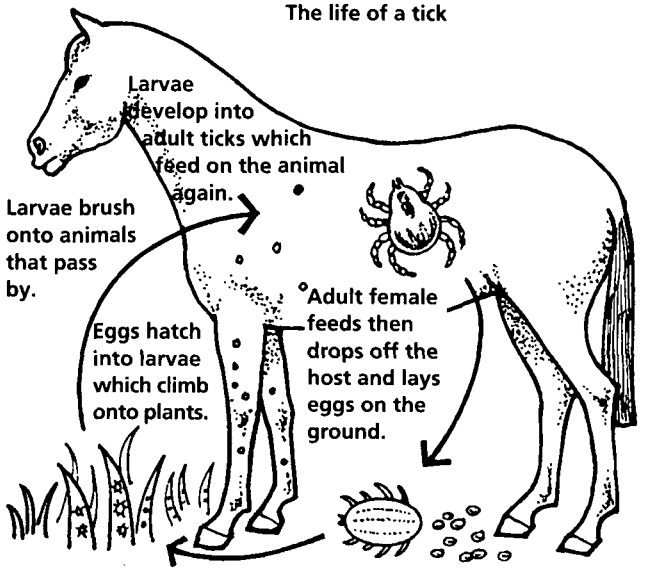

Tick full of blood

How do ticks live?

One-host ticks

Example: **Blue Cattle Tick [*Boophilus*]**

Adult ticks bite through an animal's skin and feed on its blood for several days. They mate while they live on an animal. Male ticks stay on the animal for some months after they have mated, then they die. Female ticks drop off and each lays thousands of eggs on the ground. Several weeks later the eggs become small larvae with six legs – you can just see them, they look like grains of sand. The larvae climb up plants



and are brushed on to animals that pass by. On an animal the larvae develop into *nymphs*, then into adults that feed on the animal again. Some ticks live on more than one animal:

Two-host ticks

Example: **Red-legged Tick [*Rhipicephalus*]** ....
Adult ticks feed on an animal. The female ticks drop off and lay eggs that become larvae which attach to an animal. The larvae feed on one animal and become nymphs that fall to the ground. The nymphs become adults and attach to another animal, then the females drop off and lay eggs again.

Three-host ticks

Examples: **Bont Tick [*Amblyomma*]** .... **Yellow Dog Tick [*Haemophysalis*]** .... **Bont Legged Tick [*Hyalomma*]** .... (These can also be one or two-host ticks.)
Adult ticks feed on an animal then drop off and the females lay eggs that become larvae which attach to an animal. The larvae feed on one animal and drop off to become nymphs on the ground. The nymphs attach to another animal, feed and drop off to become adults on the ground. The adults attach to a third animal and feed, then the females drop off and lay eggs.

Soft ticks

Soft ticks only feed for a short time and do not stay on an animal for long. They need to feed often and usually live close to where the animals sleep. Soft ticks do not have a hard shell on their backs like hard ticks.

Control of ticks

It is difficult to make a good programme to control ticks and needs the help of a skilled worker who knows which ticks live in your area and which diseases they carry.

How to control tick problems without killing ticks

Do not remove all the ticks from animals, especially from young animals. It is usually a good thing for animals to have some ticks on them to ensure that animals develop *immunity* to the diseases they carry. The best way to control ticks and the diseases they spread is probably **not** to kill the ticks. Try to get a balance between ticks, the diseases they carry and *resistance* that animals have to these diseases. (This balance is called *enzootic stability.*) It is a cheap and effective way of avoiding the problems caused by many diseases that ticks spread.

Animals become immune to diseases in areas where young animals get bitten by infected ticks. Although animals in these areas are infected with *microbes* that cause disease, they have developed enough resistance not to become sick. Some governments encourage people not to kill ticks to let enzootic stability build up over a wide area. But this needs many people to work together over a very large area for a long time. It is difficult for people who have been used to controlling ticks for many years to learn to stop controlling them and understand how to live with them.

If enzootic stability happens naturally there is no need to dip or spray animals to kill ticks. But this does not always happen. Ticks may cause severe problems that you need to control. There are sometimes good reasons to control ticks:

- Animals might move to an area where ticks spread an infection the animals have never had. They will have no immunity to this infection and could get severe disease from infected ticks.
- Some diseases, such as *East Coast fever* (p. 276) are severe and so easily spread that even one tick can spread them. In areas where diseases like this happen it is especially important to get skilled help because it is very dangerous to allow ticks to infect your animals.

Try to avoid importing animals from far away. Local cattle are more likely to resist ticks and the diseases they carry than imported breeds.

To reduce the number of ticks on pasture:

- Move animals away from pasture which has many ticks on it.
- Avoid pasture with many ticks on it for as long as you can.
- Cut the bushes and cultivate the land with ticks on it. Burn dry grassland.
- Keep chickens or other birds in places where there are many ticks, such as around watering places. The birds eat the ticks.
- Remove plants from around animal houses.
- Clean animal houses regularly.
- Keep clean animals away from animals with many ticks on them.
- Some people grow Neem trees [*Azadirachta indica*] near to animal houses to help to repel ticks but it does not always repel them.

Ways to kill ticks

You can control ticks almost completely with insecticides (p. 339) but that is expensive. It is also risky because if control stops for any reason the animals have no *resistance* to diseases that ticks might suddenly infect them with.

Dipping and spraying

Dipping animals in insecticide or spraying them to kill ticks works but is expensive. Dips and sprays contain large amounts of dangerous chemicals. Carefully follow the instructions for using them (p. 340).

Oily dressing

Some people use a mixture of engine oil and nicotine on ticks to kill them (p. 341).

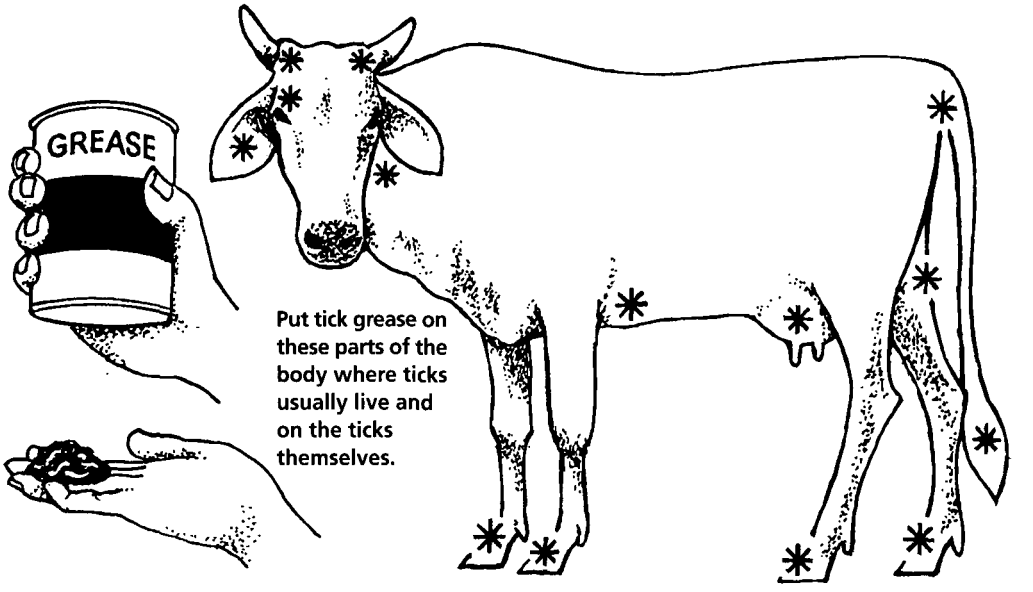
Salt

Some people who do not have chemicals for killing ticks use salt. They wash the whole animal with salt water, using a handful (50 g) of salt in each litre of water. Or they take the animals into the sea or a lake with salty water.

Tick grease

Tick grease is easy to put on by hand and works when there are not too many ticks on an animal. Put it on the parts of the body where ticks usually live and put it onto the tick itself.

In Kenya some people keep wild antelope. They get rid of ticks without handling the animals. They smear tick grease on to branches that the animals rub against. This way the animals get some tick grease on to themselves.



Remove ticks by hand

In many places people take ticks off by hand. This is a good way to reduce the number of ticks. It is easy to remove a few ticks. It is a cheap way of dealing with ticks that does not need any imported chemicals. But it is more difficult to remove many ticks that are close together. When you pull the tick off **do not leave its head and mouth-parts buried in the skin**, they may cause infection and an *abscess* (p. 186). This is important when you take ticks off the teats. An abscess can destroy the whole teat. Avoid leaving the mouth parts behind by killing ticks with insecticide before you remove them.

- When there are many ticks kill them by wiping with a cloth covered in insecticide (p. 341). When they die they will fall off. A cloth soaked in kerosene also helps make the ticks fall off.
- Look at the udder of a milking animal carefully every day and remove any ticks on the teats.
- When using chemical on the teats avoid letting baby animals suck straight away because the chemicals can poison them.

Resistance to insecticides

Insects, including ticks, can become resistant to insecticides if the same chemical is used too often or for too long. When insects have become resistant to an insecticide, that insecticide will no longer control them. In places where people have gone on using the same insecticide chemicals each year, ticks have become resistant and the chemicals do not work any more. The main ways to avoid insects becoming resistant to insecticide chemicals are:

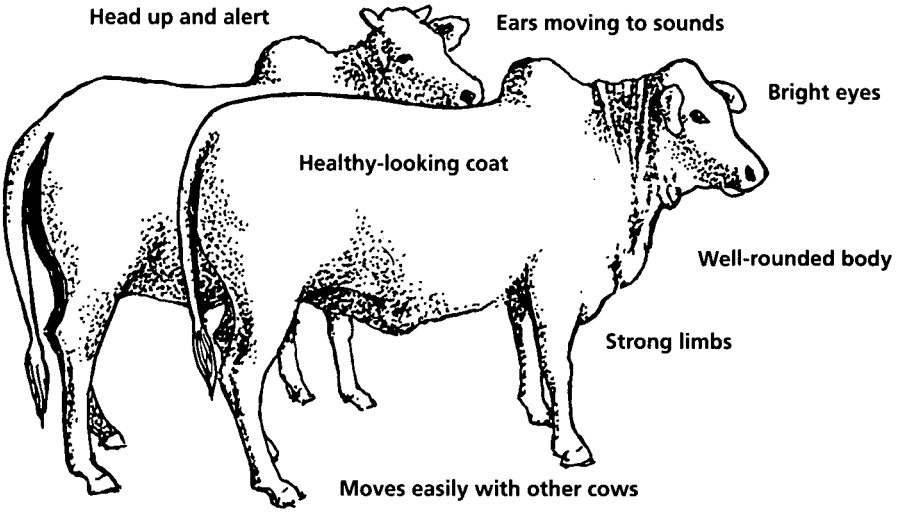
- Use insecticides as little as possible.
- Change the type of insecticide you use every other year. In one area where people have been using three types of insecticide dips and changing from one to another every two years they have avoided problems of resistance. The chemicals still work, even now after they have been used for more than twenty years.
- Use insecticides that go on acting for a long time, (persistent) chemicals, especially carefully. Get skilled advice about which insecticides are best to use and how to use them to avoid causing resistance.

Section 6 Signs of disease

14 What does a sick animal look like?

It is important to understand what a normal healthy animal looks like before you can decide what is different about a sick animal.

- Healthy animals are alert and hold their heads up. They have bright eyes and look around actively. They move their ears when they hear a sound.
- They have well-rounded bodies and strong limbs and move easily with others in a group.
- They move their ears and tail to frighten flies away.
- They have a healthy-looking coat. Healthy cattle and buffaloes lick their coats and you can often see the lick marks.

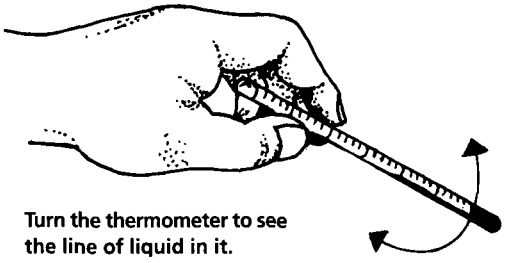


Body temperature

When an animal is sick it may have a body temperature higher or lower than normal (p. 110).

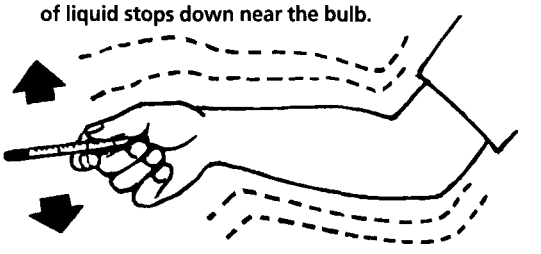
How to measure the body temperature of an animal

- Turn the thermometer until you can see the silver or coloured line, the place where the line stops marks the temperature.
- Hold the thermometer firmly and shake it so that the line stops down near the bulb of the thermometer.

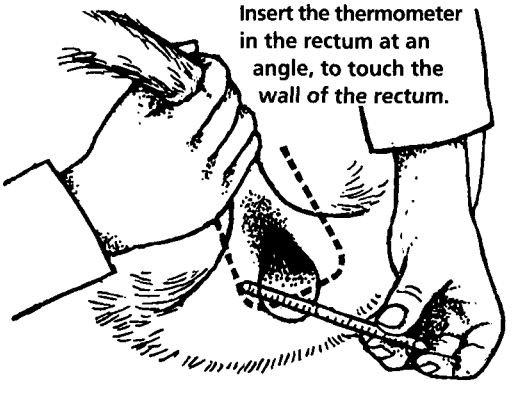


Turn the thermometer to see the line of liquid in it.

Shake the thermometer so the line of liquid stops down near the bulb.



- Get someone to hold the animal, or tie it up. Lift the animal's tail and push the thermometer into the *rectum*. It slides in more easily if a little vegetable oil is put onto the thermometer. Push it in as far as you can but do not let go of it. Keep the thermometer touching the side of the rectum for at least a minute. Do not hold it in the middle of some faeces. They are cooler than the body.
- Take the thermometer out, wipe it clean and turn it so you can see where the line stops and read the temperature.



Insert the thermometer in the rectum at an angle, to touch the wall of the rectum.

Keep the thermometer clean. **Do not leave it in the hot sun or put it in hot water or it will break**.

If you do not have a thermometer you can estimate the temperature of an animal quite well by feeling an animal's back with your hand or, especially a pig, by feeling its ear. Do the same to a few other animals that seem healthy to see if this animal feels warmer. This does not work when all the animals are hot because of the sun.

Normal body temperature

Healthy animal	Minimum		Maximum	
	°C	°F	°C	°F
Camels*	35.0	95.0	41.0	105.8
Cattle, buffaloes	37.5	99.5	39.5	103.1
Horses, mules, donkeys	37.5	99.5	39.0	102.2
Sheep	38.5	101.3	40.0	104.0
Goats	38.5	101.3	40.5	104.9
Pigs	38.0	100.4	40.5	104.9
Rabbits	38.5	101.3	39.5	103.1
Dogs	38.5	101.3	39.5	103.1
Birds	40.5	104.9	43.0	109.4

Very young animals usually have a temperature about 1°C higher than adults.

* A camel's temperature is much higher in the afternoon and evening. A camel has a fever if the temperature is over 37°C at sunrise or over 39°C at sunset. In the middle of the day healthy camels can have a temperature over 41°C.

Many thermometers have both °F (Fahrenheit) and °C (Centigrade or Celsius) scales on them (p. 10). In this book temperatures are all measured in °C (Centigrade or Celsius).

To convert Centigrade to Fahrenheit:
Multiply the temperature in Centigrade by 9 then divide by 5 and add 32.
Example: 38°C × 9/5 + 32 = 100.4°F

To convert Fahrenheit to Centigrade:
Take 32 from the temperature in Fahrenheit then multiply by 5 and divide by 9.
Example: 98°F – 32 × 5/9 = 36.6°C

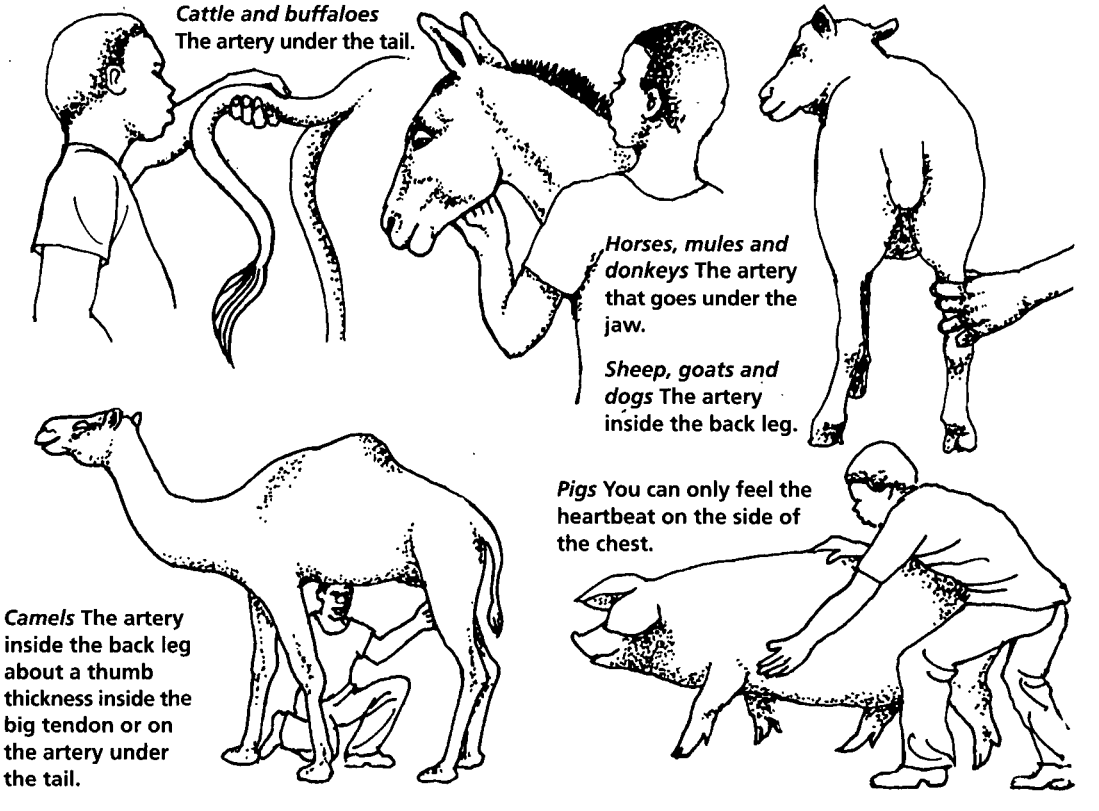
Breathing and heart rate

Animals normally breathe in three separate movements: breathing in, breathing out and a short pause. Count the number of times the chest moves in **or** out in a minute and compare the answer with the table below.

Very young, very old, very fat or pregnant animals breathe faster than this. Animals resting in the shade breathe much slower than those standing in the hot sun. Sick animals often breathe faster or slower than normal (p. 112).

Measure the heart rate after an animal has rested for at least five minutes and compare the answer with the table. You can tell how fast the heart beats by putting your hand on the chest directly over the heart and feeling it. Feel the left side of the chest just behind the leg. Make the animal stand with the left leg a little in front of the right.

Each time the heart pumps it pushes blood though the *arteries*. You can feel this as a pulse by putting your fingers over arteries just under the skin at different places on the body:



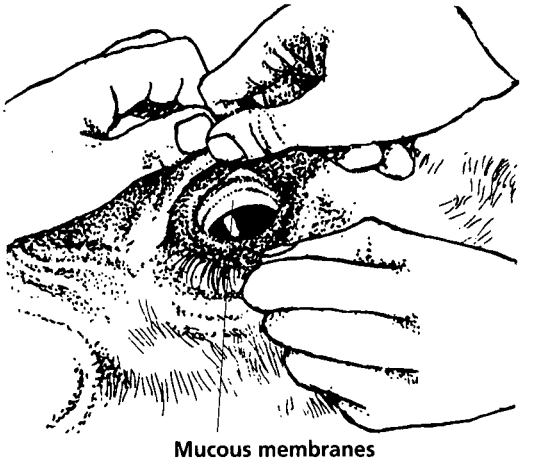
Remember that young animals have a faster heartbeat. Exercise or pregnancy make the heart beat faster. Sick animals often have a faster or slower heart rate than normal.

Approximate normal heart rates and breathing for different animals

Healthy adult animal	Heartbeats per minute	Breaths per minute
Cattle, buffaloes	55	12
Sheep, goats	75	12
Horses	35	12
Mules, donkeys	55	12
Camels	40	10
Pigs	85	15
Dogs	110	20
Rabbits	200	50
Birds	280	25

Mucous membranes

The thin skin that lines the inner surfaces of the body is called a *mucous membrane*. Mucous membranes are thinner than normal skin and are always wet with mucus. They give a guide to what is happening inside the body because they are so thin that you can see blood vessels through them. Some mucous membranes are easy to see, for example, inside the mouth, at the *vulva/vagina* and inside the eyelid. The easiest place to look at mucous membranes is inside the eyelid because in other places they are often coloured brown/black like the skin is.



Mucous membranes

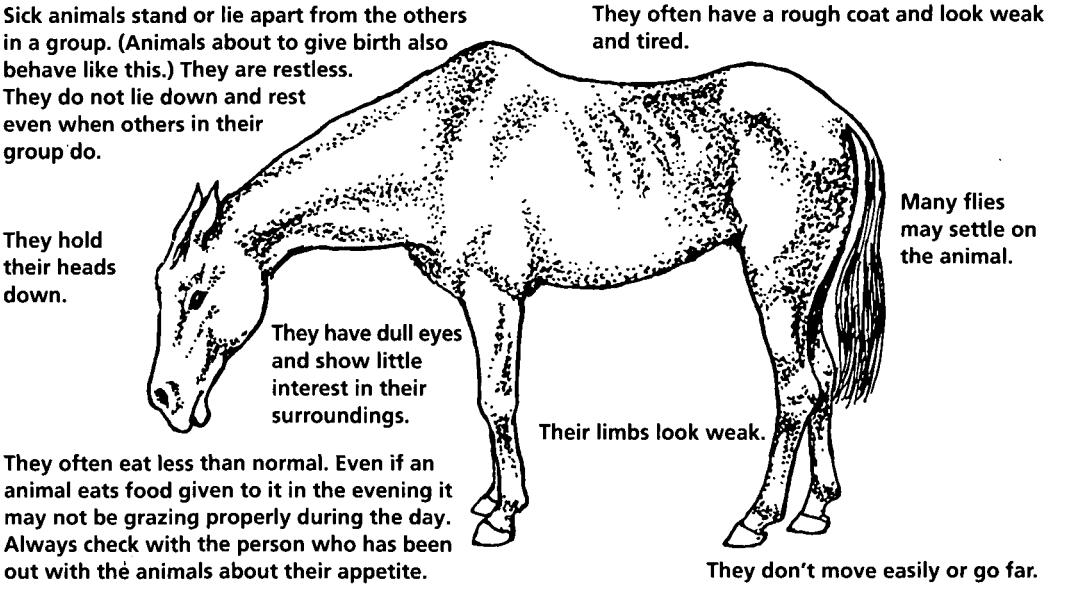
Normal healthy animals have pink/red mucous membranes – look at some healthy animals to learn what they look like.

When an animal is sick the mucous membranes may become pale/white, yellow, very dark red or red/blue or brilliant red. These are common signs of disease. Pale mucous membranes are a sign of *anaemia* (p. 268) and of many diseases. Animals have yellow mucous membranes when the liver is damaged, for example, by *liver flukes* or when *blood cells* are damaged by diseases such as *anaplasmosis* (p. 271). Dark red or red/blue mucous membranes are sometimes a sign of a particular disease but they may look like this for many reasons. Brilliant red mucous membranes are a sign of *cyanide poisoning* (p. 304).

15 How to look for signs of disease

People usually notice that an animal is sick because it starts to behave differently. It is important to **keep checking your animals** so you can notice any change in behaviour early on.

The drawing below shows many of the signs that an animal is sick.



Ask about sick animals

Find out about the animal before you do anything else. Listen to what people say they have seen wrong with it. If it is your own animal ask yourself the same questions. It is helpful to organise in your mind – or even on a piece of paper – a list of questions you want answered. **Make a note of the answers**, then if you need to get skilled help it will be easy to tell others about the problem.

Ask questions that do not suggest answers

If you ask 'What were the faeces like?' people will tell you what they saw and you will get good information.
If you ask 'Did the animals have diarrhoea?' people will probably say 'Yes' even if they do not know. This does not help you.
If you ask 'Have your goats been eating grass?' people will answer 'Yes' or 'No'. But *if you ask* 'What have your goats been eating?' you will get more information.

Ask questions like these about the animal itself:

- Why do you think the animal is sick? ... Which part of the animal has the problem? When did people first notice these signs? Have you seen signs like these before? ... When? ... What disease do you think the animal has?
- Is there anything else about the animal that is not normal?
- What does the animal eat and drink? ... Has it been eating and drinking normally?
- How old is the animal? ... What sex is it? ... Is it pregnant? ... When did it last give birth? ... Was it castrated?
- What kind of place does the animal come from?
- Has the animal been in contact with other animals? ... Which animals?/wild animals? ... Where?
- What treatment has been tried already? ... What vaccinations have been given?
- Is the animal part of a group?

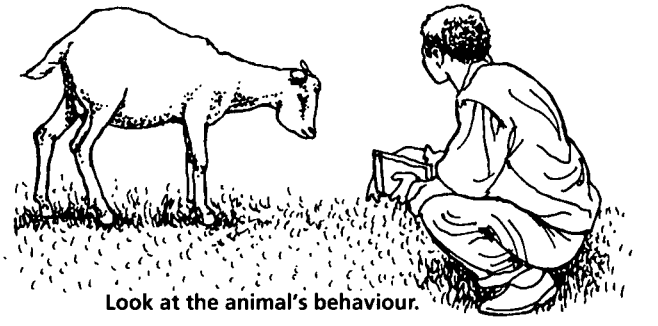
Ask about other animals in the group:

- Do other animals in the group have the same problem? ... How many others are sick? ... How many have died? ... How old are they?
- Have other kinds of animal got the same problem?
- Have any new animals come in to this group?

If you have asked the right questions and listened to the answers you will get strong suspicions about what is wrong before you even look at the animal!

Look at sick animals from a short distance away

Before you disturb the animal, look at how it behaves.



Look at the animal's behaviour.

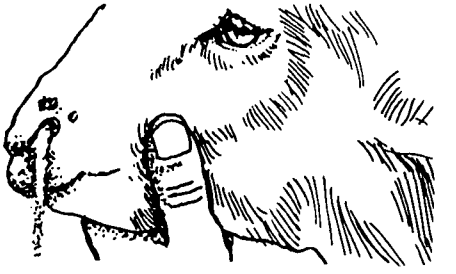
- Is the animal excited, aggressive, or calm?
- Does the animal look distressed or in pain? ... Is it kicking at itself?
- Is it breathing easily and normally – or does its breathing look distressed? ...How fast is the animal breathing? ... Is it breathing deep slow breaths or shallow short breaths? ... Does its abdomen move as well as its chest when it breathes out? ... Does it show pain by grunting, especially when it breathes out?
- Is it biting, rubbing or scratching itself?
- Is it shaking its head or grinding its teeth?
- Does it move normally and respond normally to other animals and things?
- Is it with its group or alone?

Examine animals from nose to tail

(Some people prefer to start from the tail, after they have taken the temperature.)
First take the animal's temperature (p. 110). An animal with a high temperature above the normal maximum (p. 110) has a fever. This is usually a sign of *infection* (p. 88). An animal with a low body temperature below the normal minimum (p. 110) could:
a) be starved of food,
b) be bleeding a lot, especially inside where you cannot see it (p. 67),
c) have lost a lot of fluid and be *dehydrated* (p. 267),
d) be very close to dying.

Nose

- Is there a *discharge* coming from the nose?
- Are there any blisters or sores on the nose?
- Does the breath smell bad?



Mouth

- Is there much *saliva* coming from the mouth?

WARNING

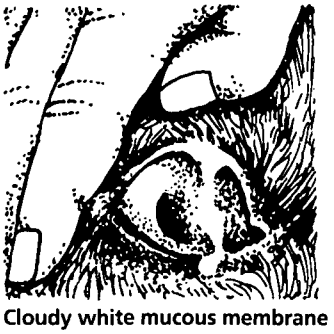
Animals that have much saliva coming from the mouth might have rabies (p. 260). Avoid handling the mouth of an animal you think might have rabies.

(Healthy male camels in the mating season and any healthy camels after they have eaten salt have much saliva coming from the mouth.)

- Are there any blisters, sores, wounds or objects in the mouth?
- Does the animal grind its teeth? This is often a sign of pain.

Eyes

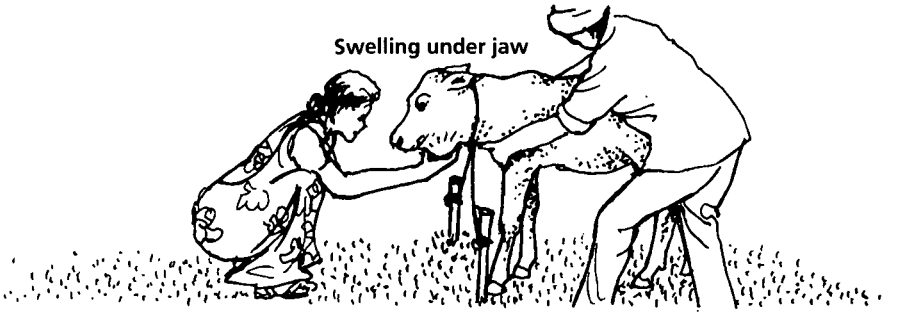
- Is there a discharge coming from the eyes?
- Is the centre of the eye cloudy white/blue?
- What colour is the *mucous membrane* inside the eyelid (p. 112)?



Cloudy white mucous membrane

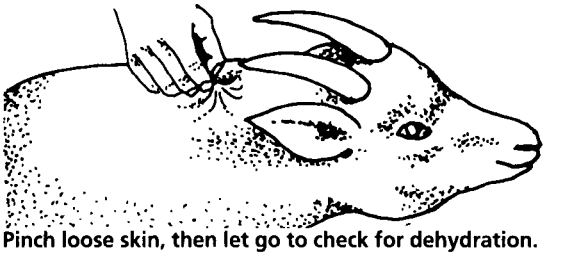
Head and neck

- Is there any swelling under the jaw?
- Are there any other swellings? These may be *lymph nodes* (p. 41)

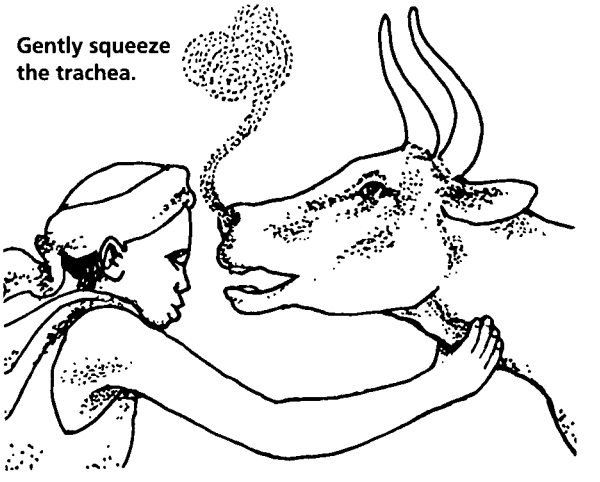


Body

- Feel the animal's heartbeat (p. 111).
- Pinch a fold of loose skin and let it go. Does the skin go back to normal immediately? If the fold of skin only goes back to normal slowly it is a sign of *dehydration* (p. 267).
- Is the animal coughing? ... Gently squeeze the *trachea* (Do not squeeze harder than would be comfortable if it was done to you). Healthy animals do not usually cough when you do this, but animals with infection in the lungs or trachea do cough.
- Put your ear to the side of the chest to listen to the lungs. If you can hear bubbling or rasping or liquid noises it is a sign of lung disease, for example, *pneumonia* (p. 195).

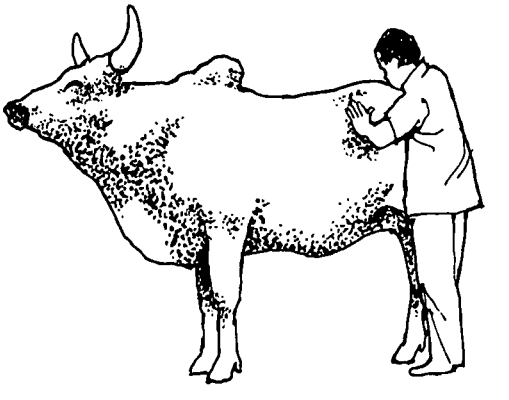


Pinch loose skin, then let go to check for dehydration.



Cattle, buffaloes, sheep and goats

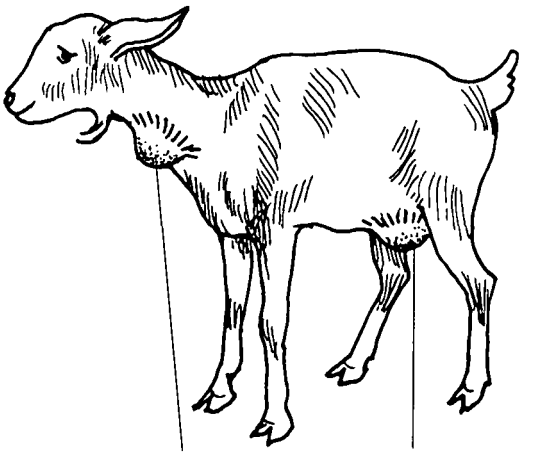
Push with your hand just behind the last rib to check that the *rumen* is contracting normally. You should feel the rumen contract about once every minute (p. 35).



Check the rumen is contracting normally.

Skin

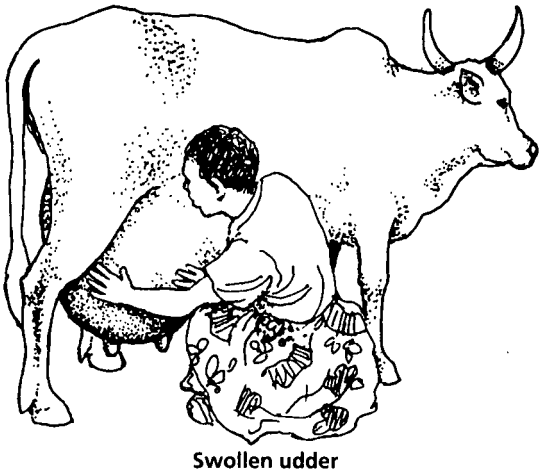
- Are there any sores or blisters on the skin? (p. 191)
- Are there any swellings under the skin? These may be *lymph nodes* (p. 41).
- Is the coat normal and healthy? Are there any places where the wool, hair or feathers are missing? When animals, especially camels, are sick for a long time they often lose hair.



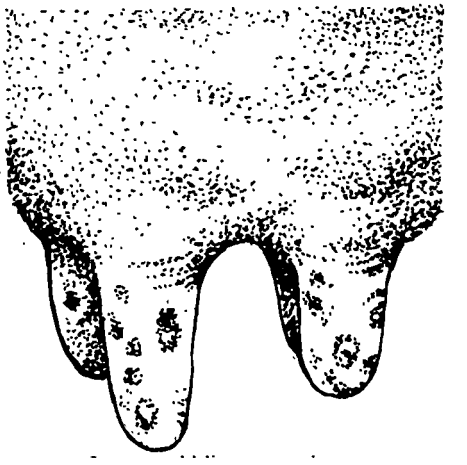
Swellings under the skin

Udder and genitals

- Is the udder swollen or hotter than normal?
- Does the animal resent the udder being touched?
- Are there injuries on the teats?
- Is the animal producing less milk than usual?



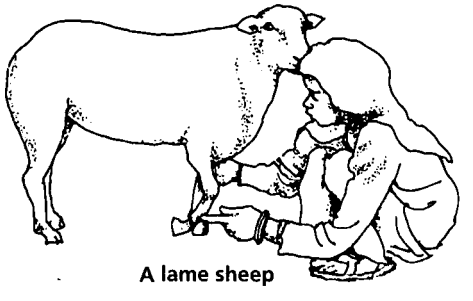
Swollen udder



- Is the milk normal? ... Is it red or thin and watery? ... Are there lumps in the milk?
- Is there a *discharge* from the *vulva*? ... from the *penis*?

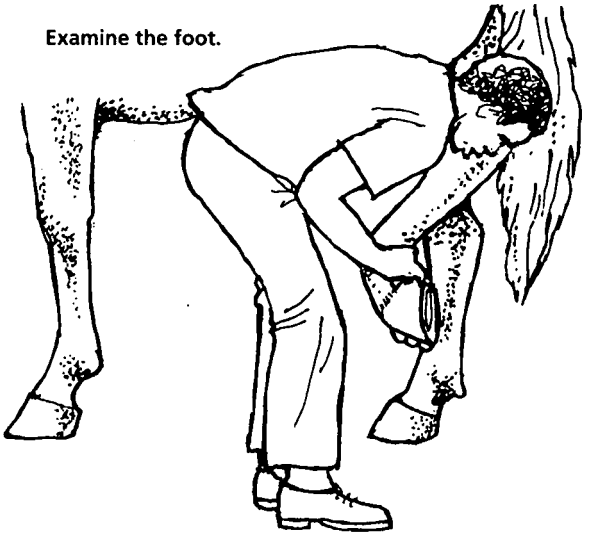
Legs and feet

- Is the animal lame? ... Which leg(s)?
- Examine the foot and the rest of the leg for wounds, heat, swelling or pain.



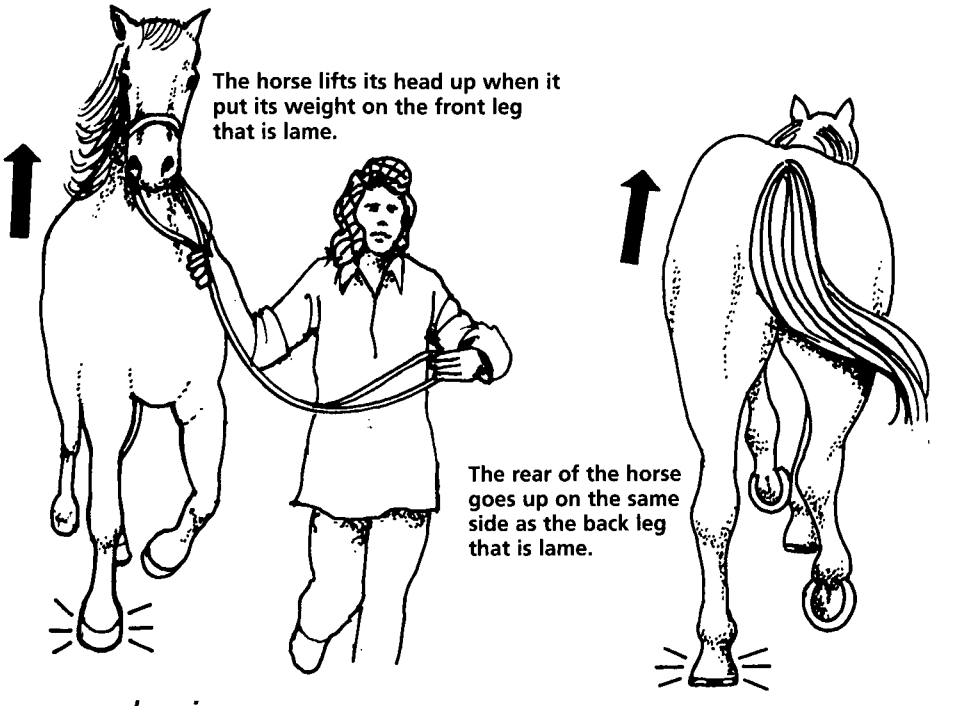
A lame sheep

Examine the foot.



Horses, mules and donkeys
How to tell which leg is lame.

- Get somebody to lead the animal, making it trot towards you.
  If the animal is lame on a front leg it will raise its head when that leg hits the ground.
- Get the person to lead the horse, making it trot away from you.
  If the horse is lame on a back leg you will see the back of the horse go up on that side as the lame leg hits the ground.



Faeces and urine

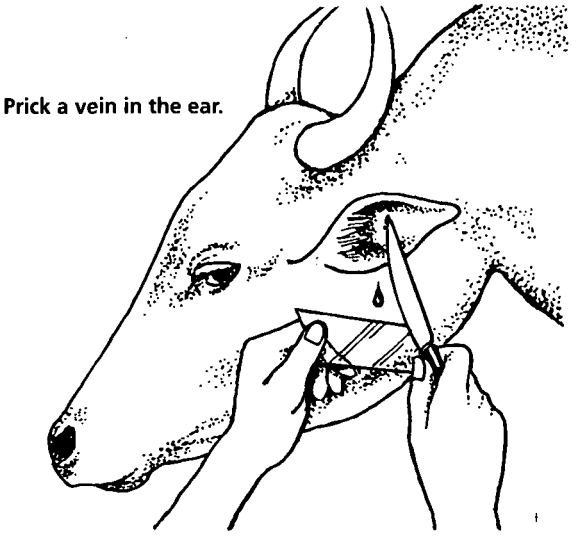
- Does the animal pass urine and faeces normally?
- Does the animal look distressed when it passes faeces or urine?
- Are the faeces normal? ... Are they dry and smaller than normal? See *constipation* (p. 212) ... Are they watery and passed more often than normal? ... Is there blood or mucus in the faeces? See *diarrhoea* (p. 211).
- Is the urine normal? ... Is the urine very dark? See *dehydration* (p. 267) ... Is the urine red? ... Is the animal passing little or no urine?

The urine of healthy horses and rabbits is often cloudy.

How to make blood smears

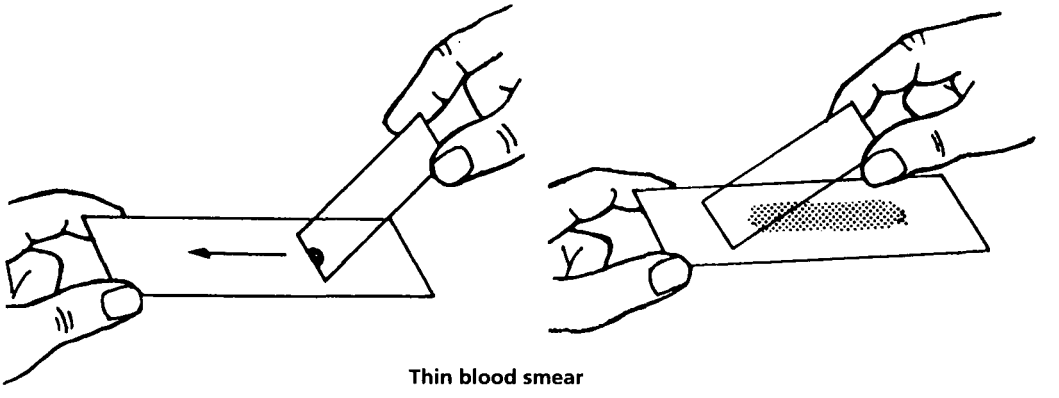
Skilled workers often need to examine blood from a sick animal with a *microscope*. They need a smear of blood on a glass microscope slide. (Skilled workers with microscopes can often provide the microscope slides for you and show you how to do this.) They either need a thin *blood smear* or a thick *blood smear* on the slide.

To make a blood smear for them to examine use a clean needle or blade to prick a *vein* and get a few drops of blood. You can take the blood from any vein. The vein in the ear is easiest. You only need a drop or two. You can also take blood from a dead animal. You will need to make the blood smear quickly before the blood clots. Make two smears in case one is broken or lost or the smear is too thin or too thick.



Thin blood smear (e.g. for babesiosis [p. 248])

- Put one drop of blood at the end of the microscope slide.
- Touch the drop with another microscope slide like this.
- Push the drop of blood along the bottom microscope slide using the top one like this. It will spread a thin smear of blood over the bottom one.



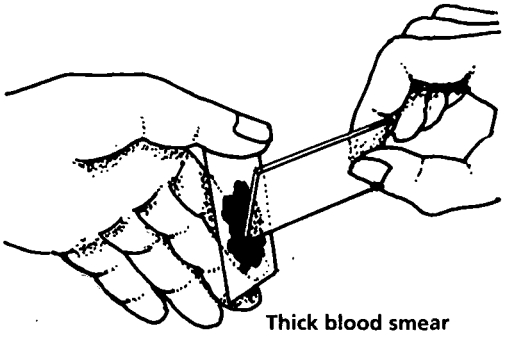
Thin blood smear

- Wave the bottom microscope slide in the air to make it dry. Hold the microscope slides by the edges and do not touch the blood smear.

Thick blood smear (e.g. for trypanosomosis [p. 295])

- Put a drop of blood on the middle of a microscope slide.
- Spread the drop out with the corner of another microscope slide or with a clean blade or even a clean matchstick.
- Hold it in the air to dry it.

Put the two smears back to back with the blood on the outside and wrap them carefully in clean paper. Do not forget to



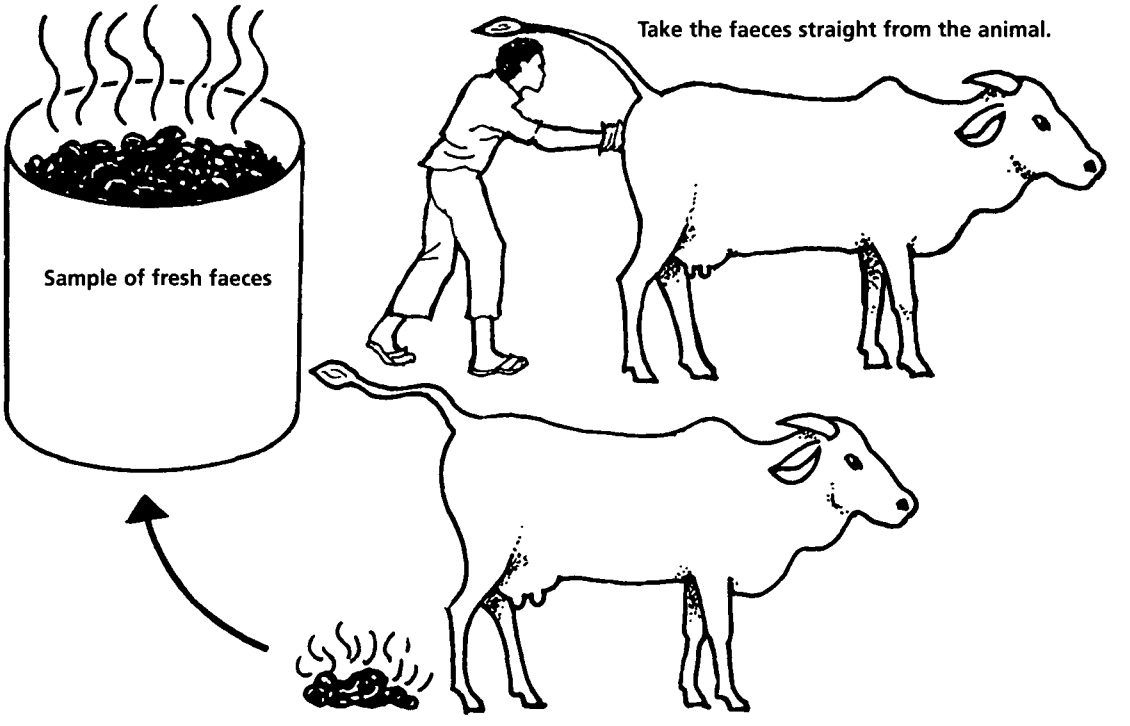
Thick blood smear

send details about the animal the blood smears came from with the samples.

(Skilled workers sometimes need to take other samples, such as samples of blood they take from a vein and put in a container, to examine.)

How to take a sample of faeces

Take a **small** sample of fresh faeces (10–20 g). Put the sample into a small container so that it is nearly full. Take the sample from the middle of some faeces. Try not to get soil or dirt mixed with the sample. You can take the sample straight from inside the animal. Cover or seal the container before it goes to a laboratory for testing.



Examining a dead animal

WARNING

Do not open the body of an animal you think has died of anthrax (p. 141).

Examining the body of a dead animal may help you to find out why it died. This can help you to treat other animals that are still alive and stop them dying too.

It is difficult to examine the body of a dead animal and you will usually need skilled help. Do not open the body yourself if you can get a skilled worker to examine it. You may destroy useful signs that the skilled worker will look for.

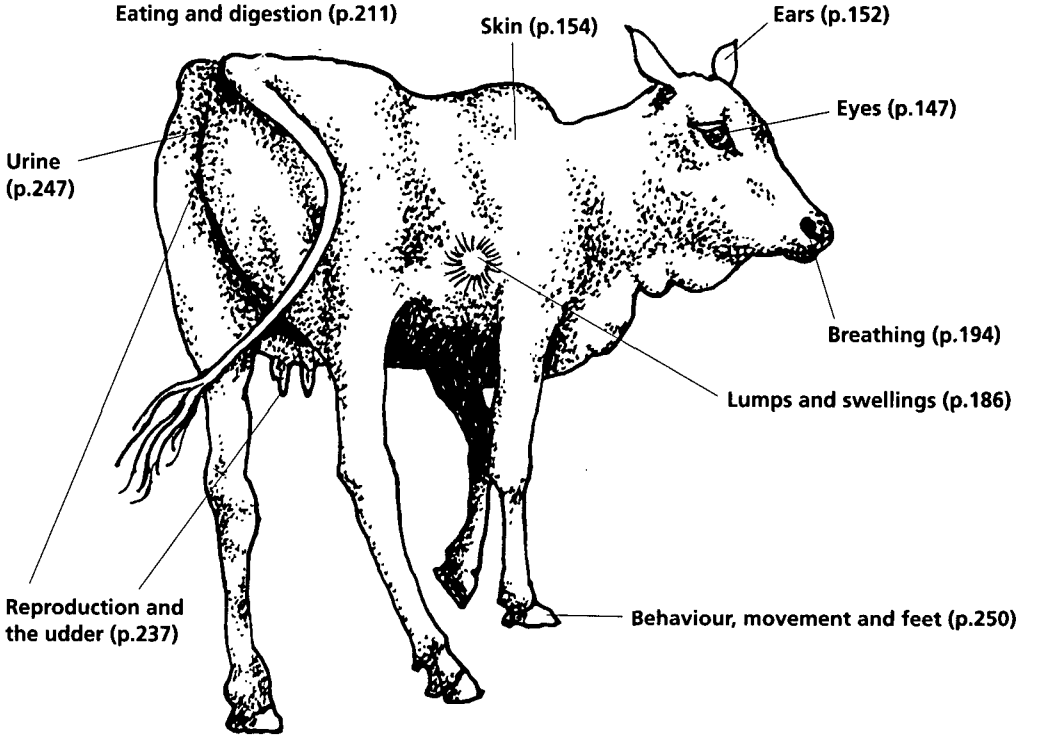
Remember that the body of a dead animal may carry a disease that people can get. Wash your hands, preferably with hot water and soap or disinfectant, after handling the body of a dead animal.

16 A quick guide to signs of disease and what they mean

The drawing below shows you which page to go to for more details about different signs of disease. (This is a cow but the chapters in this section also describe signs that other animals have.)

The signs described here are grouped together depending on which part of the body they are to do with. This guide suggests just some important diseases that may cause the signs you see when an animal is sick. Look carefully at what you see wrong with an animal (p. 113) and compare what you see with the signs described here. Turn to the pages indicated to look up more details and try to decide which disease or problem is causing the signs.

Many diseases look the same and animals do not always have the same signs, even when they have the same disease. The signs do not usually all happen at once or in the same order and some signs might not happen at all. Remember that a sign to do with one part of an animal can mean there is something wrong with another part. For example, animals often stop eating normally when they are sick but there may be nothing wrong with the stomach. Perhaps the animal does not eat because it has a bad foot and will not walk to its food.



Do not expect to find out exactly what is wrong with every sick animal. This book helps you recognise some important diseases but it is often not possible – even for skilled workers – to work out exactly which disease an animal has. If you can decide which disease an animal has you can treat it better, but if you cannot decide you can often treat it by looking carefully at the signs and treating them, such as *fever* (p. 266).

Animals that die suddenly

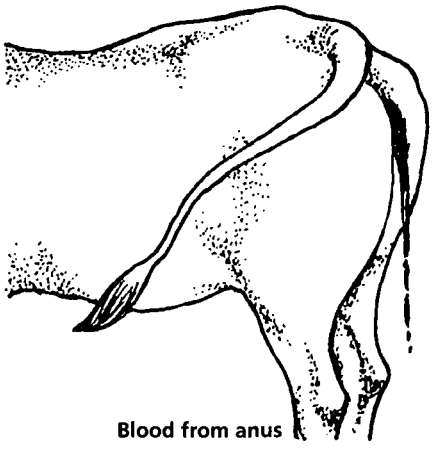
Diseases and problems mostly to do with these signs begin on page 141. Some animals die so quickly that you do not see any signs of disease and cannot treat them. But if you find out why an animal died you can often stop others dying from the same cause. Animals die suddenly for many reasons, these are just some of the important common ones to look out for. If you see any of these signs in a dead body look up the diseases or problems shown.

Always look out for anthrax when you find an animal that died with no signs of disease.

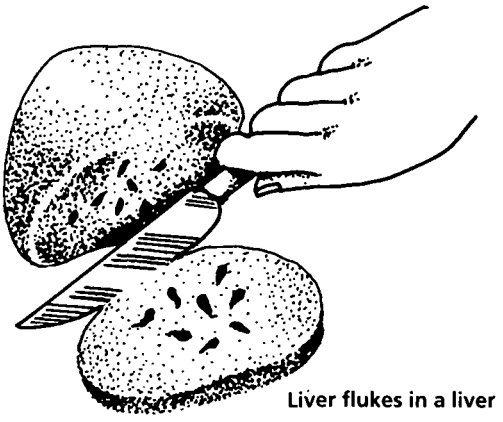
Signs for animals that die suddenly

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
One or two animals have died. Dark blood comes from the mouth, nose or *anus*. There is no sign of diarrhoea.	✓													*Anthrax* (p. 141)
Gassy swellings under the skin which crackles when touched.		✓		✓	✓	✓								*Blackquarter* (p. 144)
Diarrhoea and signs of bleeding from the *anus*. Have thrashed about on the ground.		✓												*Heartwater* (p. 257)
Diarrhoea but no bleeding from the *anus*. Swollen neck, head or tongue. *Discharge* from the nose.		✓												*Haemorrhagic septicaemia* (p. 266)
Had changed to better food. Under one year old. No other signs.					✓	✓								***Enterotox-aemia*** (p. 146)
Have many young ***liver flukes*** in the liver.					✓	✓								***Liver fluke*** (p. 285)
Other goats in the group have distressed breathing.						✓								*CCPP* (p. 197)

Also see:
Any animal *Lightning* (p. 146); *Poisoning: cyanide* (p. 304); *Rift Valley fever* (p. 289); *salmonellosis* (p. 235); *pneumonia* (very young animal) (p. 195).
Very young animals:
Cattle, sheep, goats, pigs *Foot and mouth disease* (p. 279).
Sheep *Sheep and goat pox* (p. 177).
Horses, mules, donkeys *Very severe worms* (p. 219).
Pigs *Trypanosomosis* (p. 296); *African swine fever* (p. 293).



Blood from anus



Liver flukes in a liver

Signs to do with eyes

Diseases and problems mostly to do with these signs begin on page 147.

Signs to do with eyes

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Cannot see and walks into things. It may have other signs of disease around the eye.	✓													*Blindness* (p. 147)
Blinking and avoiding bright sunlight. Cloudy or white eyes. Clear, white/grey or yellow *discharge* comes from the eye – discharge that is not washed away becomes a dry crust around the eye. Or one or both eyes are closed and the eyelids are red and swollen. The eye is red and inflamed.	✓													*Eye injury* (p. 147); *conjunctivitis* (p. 149); *kerato-conjunctivitis* (p. 150); *eyelids turned in* (p. 148); *bites: insects, snakes* (pp. 304, 307)
Clear *discharge* from the eye but no other signs.	✓													*Thelazia (Eyeworms)* (p. 150)
Discharge from the eyes and nose. *Fever*. Small lumps under the skin, sometimes over the whole body.		✓	✓											*Lumpy skin disease* (p. 176)
The skin is wet and has *ticks* on it. *Discharges* from nose and mouth. *Fever.*		✓	✓											*Sweating sickness* (p. 184)
Discharge from the eyes and a high *fever*. Females abort. Diarrhoea, often with blood in it. Collapse and die.					✓	✓								*Nairobi sheep disease* (p. 288)
Discharge from the eyes and pale *mucous membranes*. Have slowly become thin.				✓			✓	✓						*Trypanosomosis* (p. 295)

Also see:
Cattle, buffaloes *Malignant catarrhal fever* (p. 287); *rinderpest* (p. 290).
Sheep, goats *Bluetongue* (p. 273); *contagious agalactia* (p. 245); *goat plague* or *rinderpest* (p. 290).
Horses, mules, donkeys *Besnoitiosis* (p. 166).

Signs to do with ears

Diseases and problems mostly to do with these signs begin on page 152.

Signs to do with ears

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Shaking its head. Ears sensitive to being touched. The animal rubs its ears on things or scratches them and may lose hair around the ears where it has rubbed. Much dark wax in the ear. One or both ears hang down.	✓													*Ear mites* (p. 152)
Pus or *discharge* coming from the ear.	✓													*Ear infection* (p. 152)
Pus comes from the ear. The animal has recently been dipped in insecticide. In East/Central Africa.		✓												*Earworm* (p. 153)

Signs to do with skin

Diseases and problems mostly to do with these signs begin on page 154. For larger lumps and swellings under the skin see also page 126 and page 186.

Signs to do with skin

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Losing hair or wool, often around head and neck or legs. Scabs on the skin. Skin may be thickened. Animals scratch or rub. (Some kinds of *mange* do not make the animal scratch or rub.)	✓													*Mange* (p. 154)
Rubs or scratches. Black dots on skin. Often weak or sick animals that live close together.	✓													*Lice* (p. 157)

Signs to do with skin (continued)

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Rubs or scratches. Tufts of raised hairs anywhere on the body. Swellings under the skin, especially round head and neck or under the abdomen. Horses have small wet sores on mane and tail.	✓													*Allergy* (p. 162)
Grey, scaly scabs in round patches – around the head first. Usually animals in houses.	✓													*Ringworm* (p. 180)
Wound filled with fly *larvae*.					✓								✓	*Flystrike* (p. 161)
Scabs on much of the skin. Small tufts of raised hair that are easy to pull out. Wet sores under the raised hair soon become scabs on head and lower legs, sometimes over the body. Animal thin and not growing. Goats especially have scabs on nose, mouth and genitals.		✓			✓	✓	✓						✓	*Dermatophilosis* (p. 170)
Scabs and cracks on pale/white areas. Skin falling off. Sometimes yellow membranes.		✓			✓								✓	*Photo-sensitisation* (p. 163)
Skin over swellings on the legs and back is dry and crackles. No *discharge* from the nose. Very lame.		✓			✓								✓	*Blackquarter* (p. 144)
Few or many small lumps on the skin, especially near the *testicles* or eyes. Sometimes the thickened skin has wet patches on it.		✓	✓			✓	✓	✓						*Besnoitiosis* (p. 166)
Blisters around the hooves and the mouth. Much *saliva* coming from the mouth.		✓	✓		✓	✓			✓					*Foot and mouth disease* (p. 279)
Small lumps. *Discharge* or blood from the lumps. Skin thickened.		✓	✓											*Hump sore* (p. 174)
Small lumps sometimes over whole body. *Fever. Discharge* from eyes/nose.		✓												*Lumpy skin disease* (p. 176)
Skin is wet. Have *ticks* attached. *Fever. Discharges* from eyes, nose and mouth.		✓										✓		*Sweating sickness* (p. 184)
Thick scabs around mouth and nose. Lose a lot of wool. Dark blue/red membranes. Swollen tongue. *Discharges* from nose and mouth.					✓	✓								*Bluetongue* (p. 273)
Thick scabs that become bleeding sores. Young animals: on mouth and head. Old animals: on feet and udder.					✓	✓								*Contagious pustular dermatitis* (p. 167)

Signs to do with skin (continued)

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Sores and scabs on the skin, especially on the back.							✓	✓						*Rain sores* (p. 164)
Swelling of genitals. Sometimes swelling under abdomen also. Pale *mucous membranes*. Becomes thin.							✓	✓						*Dourine* (p. 297)
Lumps in rows (along *lymph* vessels in the neck). Green/yellow *discharge* comes from some lumps.							✓	✓						*Epizootic lymphangitis* (p. 190)
Lumps on legs and feet, sometimes on neck. Some lumps burst, *pus* comes out. Some become open sores.							✓	✓						*Ulcerative lymphangitis* (p. 193)
Lumps under the jaw or around the neck. The lumps burst, *pus* comes from them. Thick white/yellow *discharge* from the nose. Usually young animals.							✓	✓						*Strangles* (p. 204)
Red areas on skin. Especially legs and ears. *Fever*. Not walking normally.									✓					*African swine fever* (p. 293)

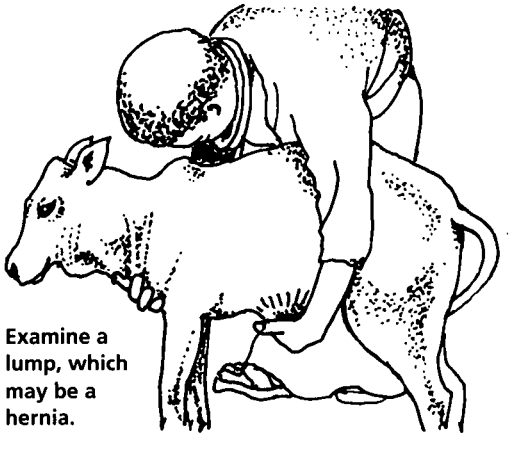
Also see:
Any animals *Saddle sores* (p. 165); *pox diseases* (p. 177).
Cattle, buffaloes *Farcy* (p. 192).
Sheep, goats *Scrapie* (p. 182).
Horses, mules, donkeys *Anhydrosis* (p. 166); *glanders* (p. 197); *summer sores* (p. 173); *worm nodules* (p. 185).
Pigs *Erysipelas* (p. 171).

Signs to do with lumps and swellings

Diseases and problems mostly to do with these signs begin on page 186. For smaller lumps see also page 124 or page 154.

Feel the lump or swelling, as well as looking at it, to work out what kind of lump or swelling it is so you can choose the right treatment for it. Find out:

- Is it hard and solid or soft and full of fluid?
- How large is it?
- Is there only one lump or swelling or are there many?



Examine a lump, which may be a hernia.

Signs to do with lumps and swellings

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Hard, hot and painful swelling that becomes softer. Sometimes it bursts and *pus* comes out. Sometimes with other signs of disease.	✓													*Abscess* (p. 186)
Soft, sometimes large, but not painful swelling. It feels full of fluid and becomes smaller and hard after a few weeks. No other signs of disease.	✓													*Haematoma* (p. 187)
Soft swelling that becomes smaller if squeezed gently. Often around the *navel*, sometimes inside the *scrotum*. No other signs of disease.	✓													*Hernia* (p. 188)
Soft swelling over a large area, often on the lower parts of the body; under the abdomen, chest or jaw. Other signs of disease.	✓													*Oedema* (p. 190)
Swelling on the legs and back. Skin over the swelling crackles. Do not have a *discharge* from the nose. Very lame.		✓			✓								✓	*Blackquarter* (p. 144)
Swellings around the joints or the *navel*.												✓		*Joint ill* (p. 251)
Swelling under the jaw or neck.		✓	✓		✓	✓							✓	*Liver fluke* (p. 285)
Lumps under the skin below the ears, at the bottom of the neck or in front of the shoulders. High *fever*. Pale *mucous membranes*. Cloudy eyes. Die with bloody froth from nose and mouth.		✓												*East Coast fever* (p. 276)
Swelling around head and neck. *Saliva* comes from the mouth. No *discharge* from nose.							✓	✓						*Anthrax* (p. 141)
Swellings around eyes, head or neck. *Saliva* comes from the mouth. Dark red/blue *mucous membranes*.							✓	✓						*African horse sickness* (p. 270)
Swellings around head and neck. *Discharge* from nose becomes thick white/grey/yellow. Cough. *Abscesses* under jaw that burst and *pus* comes out.							✓	✓						*Strangles* (p. 204)
Swelling under abdomen and around legs. *Fever* that comes and goes.							✓	✓						*Dourine* (p. 297)
Swelling under jaw and neck. Has been near the bodies of dead animals.										✓				*Anthrax* (p. 141)

- Is it hot to touch?
- If you squeeze the lump gently can you make it smaller?
- Is the animal sick or healthy otherwise?

Also see:
Horses, mules, donkeys *Epizootic lymphangitis* (p. 190); *ulcerative lymphangitis* (p. 193).

Signs to do with breathing

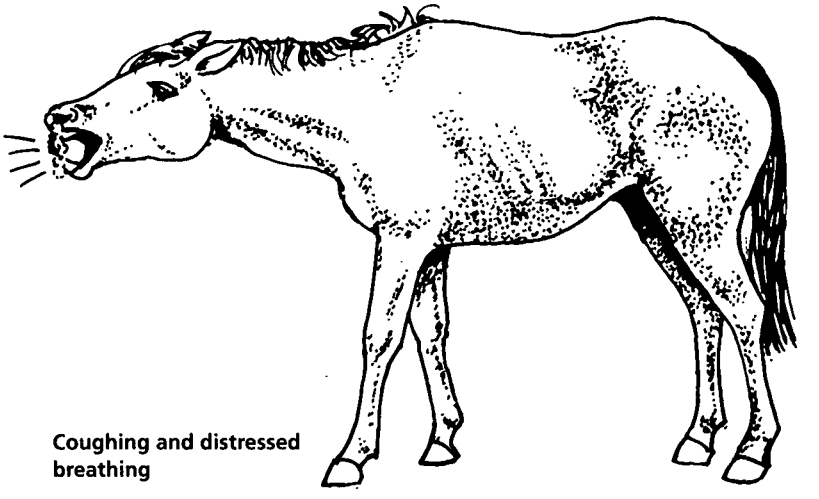
Diseases and problems mostly to do with these signs begin on page 194.

Coughing

Even healthy animals cough occasionally but animals that cough often usually have a disease (p. 194).

Double breathing

Sometimes after a **horse, mule** or **donkey** has finished breathing out, it contracts its abdomen to push out more air. This is called 'broken winded' or 'double breathing'. The animal often also coughs and has a *discharge* from its nose. This is a sign that the animal is very sick with, for example, *pneumonia* (p. 195).



Coughing and distressed breathing

Signs to do with breathing

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Distressed breathing. Cough. *Fever.*	✓													*Pneumonia* (p. 195)
Distressed breathing. Cough. No *fever.* Only in cooler wetter places. Usually young animals.	✓													*Lungworm* (p. 200)
Noisy distressed breathing that usually soon recovers.	✓													*Allergy* (p. 162)
Coughing for a long time. Thin older animals.	✓													*Tuberculosis* (p. 205)

Signs to do with breathing (continued)

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Very distressed breathing. Brilliant red *mucous membranes*. Have eaten young sorghum plants.	✓													*Poisoning: cyanide* (p. 304)
Usually cattle that have been crowded together, transported or *stressed*. Usually young sheep or goats. Distressed breathing. Cough. High *fever*. *Discharge* from nose. Many animals die.		✓	✓	✓	✓	✓								*Pasteurellosis* (p. 202)
Distressed breathing. Very swollen abdomen on the left side.		✓	✓		✓	✓								*Bloat* (p. 215)
Distressed breathing. Cough a little. *Fever*. Watery clear/yellow *discharge* from nose. Swollen tongue. Swelling around the head. Dark red/blue *mucous membranes*. Diarrhoea with blood in it. No sores in the mouth.		✓	✓	✓										*Haemorrhagic septicaemia* (p. 283)
Distressed breathing. Cough. *Fever*. Small clear *discharge* from nose that becomes thick yellow/white.		✓	✓											*CBPP* (p. 195)
Distressed breathing. No cough. Red sores in the mouth that become grey/white/yellow. Clear *discharge* becomes white/grey from nose and eyes. Severe diarrhoea with blood and pieces of *intestine* that look like cloth in the faeces.		✓	✓											*Rinderpest* (p. 290)
Distressed breathing. No cough. Thick *discharge* from nose and eyes. High *fever*. Sores in mouth later. Some have diarrhoea.		✓	✓											*Malignant catarrhal fever* (p. 287)
Distressed breathing and *discharge* from nose. Thick scabs around nose and mouth. Red ring around top of feet. Swollen mouth. Some have blue tongue.					✓	✓								*Bluetongue* (p. 273)
Distressed breathing. Cough. High *fever*. *Discharge* from nose. Goats especially.					✓	✓								*CCPP* (p. 197)
Distressed breathing and *discharge* from nose. High *fever*. Abortions. Diarrhoea, often with blood in it. Collapse and die.														*Nairobi sheep disease* (p. 288)
Very distressed breathing. Some have severe cough. Swelling over eyes, around head and neck. White/yellow frothy *discharge* from nose. Die in a few days.														*African horse sickness* (p. 270)
White/grey *discharge* from nose. Large swellings under jaw and around neck. Swellings burst releasing *pus*. Cough. Very noisy breathing.														*Strangles* (p. 204)

Signs to do with breathing (continued)

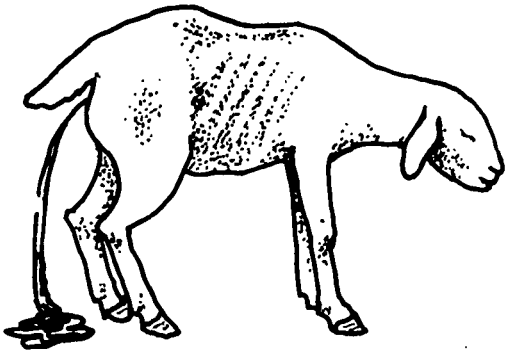
Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Clear *discharge* from nose and eyes. Some cough. Behave nervously. Some vomit. Rarely, the pads of the feet are thickened.										✓				*Distemper* (p. 275)
White/yellow *discharge* from nose. *Fever* that comes and goes. Do not eat. Vomit. Bleeding points on *mucous membranes* and skin. Some have blood coming from nose. Imported dogs.										✓				*Canine ehrlichiosis* (p. 274)
Distressed breathing. Green diarrhoea. Go round in circles and have convulsions. Many die.											✓			*Newcastle disease* (p. 208)

Also see:
Cattle, buffaloes *Anaplasmosis* (p. 271); *besnoitiosis* (p. 166); *East Coast fever* (p. 276); *heartwater* (p. 257); *lumpy skin disease* (p. 176); *mucosal disease* (p. 234); *Rift Valley fever* (p. 289); *sweating sickness* (p. 184).
Sheep, goats *Besnoitiosis* (p. 166); *goat plague* (p. 282); *rinderpest* (p. 290); *heartwater* (p. 252); *nasal bots* (and **other animals**) (p. 202); *Rift Valley fever* (p. 289); *schistosomosis* (p. 222); *sheep and goat pox* (p. 177).
Horses, mules, donkeys *Anthrax* (p. 141); *besnoitiosis* (p. 166); *epizootic lymphangitis* (p. 190); *glanders* (p. 197); *schistosomosis* (p. 222); *tuberculosis* (p. 205).
Birds *Avian coryza* (p. 207).

Signs to do with eating and digestion

Diseases and problems mostly to do with these signs begin on page 211.

Signs to do with eating and *digestion* often include *diarrhoea* (p. 211). Animals have diarrhoea so often and for so many reasons that on its own this is not a useful guide to which disease an animal has. The more watery, unusually coloured or foul smelling the diarrhoea is, the more likely it is to be a sign of a serious disease.



Signs to do with eating and digestion

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Eating much less than normal and becoming thin.	✓													*Loss of appetite* (p. 214)
Passing few hard dry faeces or none at all.	✓													*Constipation* (p. 212)
Behaving unusually because of severe pain in the abdomen. Especially horses, mules or donkeys.	✓													*Colic* (p. 217)
Much *saliva* coming from the mouth, but no other signs of disease.	✓													*Something stuck in the mouth* (p. 228) or the *oesophagus* (p. 228), *broken teeth* (p. 226), *abscess* inside the mouth (p. 186)
Much *saliva* from the mouth. No diarrhoea. Behave unusually, may become aggressive, stagger about and shake. Eat unusual things or much more than usual. Become *paralysed* – back legs first.	✓													*Rabies* (p. 260)
Much *saliva* from the mouth. Lame on all feet. Blisters in mouth and around feet.		✓	✓											*Foot and mouth disease* (p. 279)
Much *saliva* from the mouth. Swollen legs. Large sores with *pus* on the skin.		✓	✓											*Lumpy skin disease* (p. 176)
Much *saliva* from the mouth. Difficulty breathing. Swelling around the eyes and head. High *fever*							✓	✓						*African horse sickness* (p. 270)
Much *saliva* from the mouth. Behave nervously. Easily frightened by noise or light. Third eyelid comes across the eye. Closed jaws with very tense muscles. Cannot eat.							✓	✓						*Tetanus* (p. 263)
Much *saliva* from the mouth. Dark red/blue *mucous membranes*. Thick scabs around nose and mouth. May have red rings around the top of the feet. Swollen mouth and may have a blue tongue.					✓	✓								*Bluetongue* (p. 273)
Diarrhoea. Animals thin and not growing normally. Eating less than normal but may have a swollen abdomen. Do **not** usually have a *fever*. Pale *mucous membranes*. Animals on pasture that has had many animals on it before.	✓													*Worms* (p. 218)
Very watery diarrhoea. Blood in faeces. Faeces smell bad. Usually young animals living crowded together.	✓													*Coccidiosis* (p. 224)

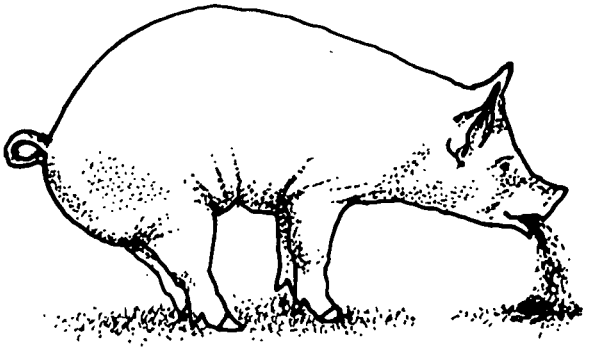
Signs to do with eating and digestion (continued)

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Diarrhoea is mild and has gone on for a long time. Animals have been near water with snails in it, are thin and not growing. May have swelling under jaw. Some may die.		✓	✓		✓	✓								*Liver fluke* (p. 285)
Diarrhoea. Blood in faeces. *Saliva* comes from the mouth. Clear/yellow watery *discharge* from nose. Swollen tongue. Swelling around head. *Fever*. Dark red/blue *mucous membranes*. Do not cough much. No ulcers in the mouth.		✓	✓											*Haemorrhagic septicaemia* (p. 283)
Diarrhoea is sudden and severe. Blood in faeces.		✓	✓											*Heartwater* (p. 257)
Diarrhoea is sudden and severe. Blood in faeces. Usually young animals.		✓	✓											*Mucosal disease* (p. 234)
Diarrohea is sudden and severe. Blood and pieces of *intestine* like cloth in faeces. *Discharge* from nose, mouth and eyes.		✓	✓											*Rinderpeest* (p. 290)
Diarrhoea. Much *saliva* from the mouth. Stagger about. Red urine.		✓	✓											*Babesiosis* (p. 248)
Diarrhoea has gone on for a long time. Thin. Yellow *mucous membranes*. Have eaten plants with yellow flowers.							✓	✓						*Poisoning: Senecio* (p. 307)
Yellow faeces with blood in them. Die quickly. Under 2 weeks old.					✓	✓								*Lamb dysentery* (p. 233)
Green watery diarrhoea. Blood in faeces. *Fever* comes and goes. Females abort. Happens quickly, many animals collapse and die.					✓	✓								*Nairobi sheep disease* (p. 288)
Very watery faeces. Faeces smell bad, have blood and mucus in them. *Discharges* from eyes, nose and mouth. Happens quickly and many die.					✓	✓								*Goat plague* (p. 282), *rinderpest* (p. 290)
Diarrhoea, may be very watery, white or green or have blood in it. May be *worms* in the faeces.											✓			*Coccidiosis* (p. 224), *worms* (p. 218), *salmonellosis* (p. 235)
Watery green diarrhoea. Faeces smell bad. Distressed breathing. Birds behave unusually or collapse. Happens quickly, often to many birds.											✓			*Newcastle disease* (p. 208)

Signs to do with eating and digestion (continued)

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Vomiting and diarrhoea happen quickly. Yellow *mucous membranes*. Drinking much water. Pale faeces may become black and watery.										✓				*Leptospirosis* (p. 284)
Diarrhoea. Vomiting. Not eating normally. Drinking a lot of water. Weak and tired. Clear/grey/white *discharge* from eyes and nose. *Fever.* Skin of nose and under feet sometimes thick and hard.										✓				*Distemper* (p. 275)
Severe diarrhoea and vomiting. *Uncoordinated* and walk in circles. Shake and become *paralysed.* High *fever.* Many die.									✓					*Swine fever* (p. 292), *African swine fever* (p. 293)

Sometimes these signs include *vomiting*. Usually only dogs, pigs and other animals with simple stomachs vomit like people do. But other animals sometimes have food coming back up the oesophagus and out of the mouth or nose or may even vomit if they have some very severe diseases, such as *Rift Valley fever* (p. 289). If this happens it is a sign the animal is very sick. If it happens to a horse it will probably die.



Also see:
Any animal *Overeating grain* (p. 227); *salmonellosis* (p. 235); *poisoning e.g., castor-oil plant* (p. 303); *lack of minerals* (p. 229).
Cattle, buffaloes *Johne's disease* (p. 232); *malignant catarrhal fever* (p. 287); *Rift Valley fever* (p. 289); *rinderpest* (p. 290); *schistosomosis* (p. 222); *sweating sickness* (p. 184).
Sheep, goats *Schistosomosis* (p. 222); *goat plague* (p. 282); *rinderpest* (p. 290); *Rift Valley fever* (p. 289).
Dogs *Tick paralysis* (p. 265); *canine ehrlichiosis* (p. 274).

Signs to do with reproduction and the udder

Diseases and problems mostly to do with these signs begin on page 237. **See also page 76 for emergency treatment of a prolapsed uterus.**

Signs to do with reproduction and the udder

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Large red swelling comes out of the *vulva*.	✓													*Prolapsed vagina* (p. 242), *prolapsed uterus* (pp. 76, 243)
Discharge from the *vulva*. Discharge is white, white/yellow, dark brown. It smells bad. Have given birth recently. (A clear or red/brown discharge that does not smell bad often comes from the *vagina* after a healthy animal has given birth.)	✓													*Metritis* (p. 241)
The *placenta* does not come out soon after birth. May smell bad.	✓													*Retained placenta* (p. 241)
Females abort (cattle 5–6 months after mating). Some males have swollen *testicles*. May have swollen joints. New-born animals are weak and may die.	✓													*Brucellosis* (p. 239)
Females abort. Stagger about. Have a high *fever*.		✓	✓											*Rift Valley fever* (p. 289)
Females abort. Baby animals cannot see, behave unusually.		✓	✓											*Mucosal disease* (p. 234)
Females abort. Infertility. Yellow *mucous membranes*. Red urine sometimes. Constipation. Pain in the abdomen.		✓	✓											*Leptospirosis* (p. 284)
Females abort. Infertility. Have weak babies that die. Have swellings on the udder or *scrotum*. Especially goats.					✓	✓								*Besnoitiosis* (p. 166)
Females abort. *Fever*. Diarrhoea with blood in the faeces. *Discharge* from eyes or nose. Some die.					✓	✓								*Nairobi sheep disease* (p. 288)
Females abort. *Fever*.					✓	✓								*Rift Valley fever* (p. 289)
Females abort. *Fever*. Weak new-born animals shake and die.									✓					*Swine fever* (p. 292), *African swine fever* (p. 293)
Red or swollen teats. Teats have cracked skin or sores. Hot or swollen udder. Unusual milk. Animal resents being milked.	✓													*Mastitis* (p. 244), *sore teats* (p. 243)
Swollen genitals. *Discharge* from *penis* or *vagina*. *Fever*. Have slowly become thin.							✓	✓						*Dourine* (p. 297)

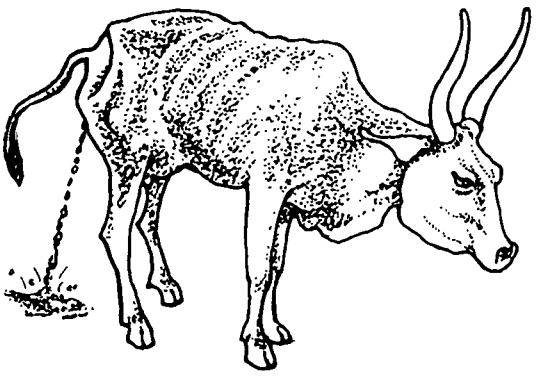
Also see:
Any animal *Breeding problems* (p. 237)

Signs to do with urine

Diseases and problems mostly to do with these signs begin on page 247.

The colour and amount of urine varies a lot, even when animals are healthy. Normal urine can be clear, dark yellow or cloudy, for example, healthy rabbits or horses often have cloudy urine. In dry times healthy camels pass little urine – often less than one litre a day.

If an animal does not pass urine for a day or is in pain when it passes urine it is a sign of disease. Urine is red/brown when there is blood in it and this is also a sign of disease.



Red/brown urine

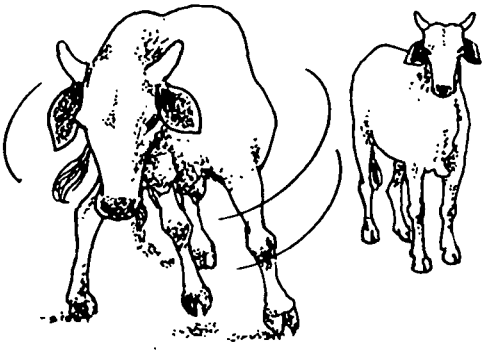
Signs to do with urine

Signs													
Not passing urine or passing very little dark coloured urine.	✓												*Dehydration* (p. 267)
An animal strains to pass urine but passes very little or none. The animal will not lie down and rest. It may have a high *fever*. After a few days the animal's breath smells bad.	✓												*Blocked urethra* (p. 247)
Red/brown urine. (Animals other than cattle do not always have red urine.) Pale/yellow *mucous membranes*. *Fever*.		✓										✓	*Babesiosis* (p. 248)
The urine smells unusual. (Some herders say it smells sweeter than normal.) Animals are weak and tired and slowly become thin.				✓									*Trypanosomosis* (p. 298)

Signs to do with behaviour and movement

Diseases and problems mostly to do with these signs begin on page 250.

Animals that cannot walk normally because of pain or injury are called *lame*. Animals that cannot control their movements properly to walk normally are called *uncoordinated* – they often walk in circles and fall down. An animal that cannot move parts of its body is called *paralysed* (p. 260). Many diseases and problems make animals lame, uncoordinated or paralysed, some common ones are shown here.



A bullock with uncoordinated movement

Signs to do with behaviour and movement

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Lame or slower than others in its group. Holds one leg off the ground or only puts a little weight on one leg. Part of a leg or a foot is hot, swollen or painful. A joint makes a grinding noise when the animal moves. Animal may have obvious signs of injury, e.g. bleeding.	✓													*Lameness* (p. 250), *broken bones* (p. 73), *dislocated joints* (p. 75), *arthritis* (p. 250)
Lame on one leg. If you press under the foot the animal feels pain. The foot may smell bad. May have swelling above the hoof. May have white/yellow/brown/grey *pus* coming from a wound in the foot.	✓													*Foot abscess* (p. 252)
Uncoordinated and easily excited. Much *saliva* comes from the mouth. Animal aggressive but may become weak and tired. Has an unusual appetite. Becomes *paralysed* from the back legs forwards and dies in a few days.	✓													*Rabies* (p. 260)
Easily frightened by noise or light. Jaws tightly shut with tense muscles, cannot eat or drink. Much *saliva* comes from the mouth. May have *third eyelid* (p. 42) coming across the eyes. Animal becomes rigid with muscle spasms and convulsions. Usually dies. (*Ruminants* may have *bloat*.)	✓													*Tetanus* (p. 263)
Moving stiffly. Becomes *paralysed* – starting with the back legs. Bends the head back to one side. (Cattle especially have probably been chewing bones.)	✓													*Botulism* (p. 256)
Uncoordinated and shaking. Suddenly becomes easily excited or weak and tired. Much *saliva* comes from the mouth. May be constipated. Collapses and becomes *paralysed*. May have convulsions and die. (Dogs and pigs may vomit.)	✓													*Poisoning: insecticides (and others)* (p. 305)
New-born animal is very lame. Many joints are hot and swollen. Animal is weak and tired. Eyes may be cloudy. Navel may be swollen with *pus*.												✓		*Navel ill* (p. 251)
Lame, especially back legs. Swelling over the back legs. Dry skin that crackles with gas bubbles under it. Weak and tired.		✓	✓	✓	✓	✓							✓	*Blackquarter* (p. 144)
Uncoordinated, may go round in circles. Grind their teeth. May have diarrhoea. Convulsions. *Fever*. Die.		✓	✓	✓	✓	✓								*Heartwater* (p. 257)
Lame on four legs. Blisters around mouth and tongue. Blisters between and above hooves.		✓	✓		✓	✓			✓					*Foot and mouth disease* (p. 279)

Signs to do with behaviour and movement (continued)

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Lame. Clear *discharge* from eyes and nose. *Saliva* comes from the mouth. Distressed breathing. Weak and tired and have *fever*. Produce little milk. Recover in a few days.		✓	✓											*Ephemeral fever* (p. 278)
Stagger about. Do not have much *saliva* coming from the mouth. Have a high *fever*. Have diarrhoea. Some have abortions.		✓	✓											*Rift Valley fever* (p. 289)
Walk stiffly and stagger about. Have red urine. Have distressed breathing. Pale *mucous membranes*. Do not have much *saliva* coming from the mouth.		✓	✓											*Babesiosis* (p. 248)
Very young cattle (under 6 months old). Become *paralysed*. Have *ticks* attached to them.		✓	✓											*Tick paralysis* (p. 265)
Lame. Thick scabs around nose and mouth. Dark red/blue *mucous membranes*. Red ring around top of the foot. Swollen tongue. Lose hair or wool.					✓	✓								*Bluetongue* (p. 273)
An animal will not walk and keeps moving its weight from one foot to another. It lies down and sweats. Feet are painful and hot.							✓	✓						*Laminitis* (p. 259)
Throw themselves about. Bite or kick at their side. Lie on their back and kick into the air. Sweat a lot.							✓	✓						*Colic* (p. 217)
Cannot move their legs. The legs are stiff. The back legs slowly become thin. Have swelling under the abdomen and around the genitals.							✓	✓						*Dourine* (p. 297)
Stagger about. Sometimes sit down like a dog or collapse. Back legs suddenly become weak or *paralysed*.							✓	✓						*Azoturia* (p. 255)
Stagger about. Have a swollen head and neck. Become sick suddenly. Have convulsions and soon die.							✓	✓						*Anthrax* (p. 141)
Behave nervously. *Discharge* from the eyes and nose is clear then becomes white/grey.										✓				*Distemper* (p. 275)
Uncoordinated and walk in circles. Shake and become *paralysed*. Severe diarrhoea and vomiting. High *fever*. Many die.									✓					*Swine fever* (p. 292), *African swine fever* (p. 293)

Also see:
Cattle, buffaloes (sometimes other animals) *Footrot* (p. 254); *lack of phosphorus* (p. 229); *malignant catarrhal fever* (p. 287).
Sheep, goats *Enterotoxaemia* (p. 146); *nasal bots* (p. 202); *tapeworm – cysts* in the brain (p. 101); *scrapie* (p. 182).
Horses, mules, donkeys *Trypanosomosis* (p. 297).

Signs to do with many different parts of the body

Diseases and problems mostly to do with these signs begin on page 266.

Nearly all diseases have signs to do with more than one part of the body. Try to decide which parts of the body the signs are mostly to do with and look them up on pages 121–39. Sometimes an animal looks 'sick' (see page 109) but it is difficult to work out which parts of the body are causing the problem, especially when a disease happens slowly and goes on for a long time. Diseases and problems like these, that are difficult to work out, can be serious. They include those set out in the table below.

Signs to do with many different parts of the body

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Weak and tired. Has a higher body temperature than normal (p. 00).	✓													*Fever* (p. 266), *heatstroke* (p. 268)
Weak and tired. Pale *mucous membranes*. Have lost a lot of blood – perhaps inside where you cannot see it. May have given birth with difficulty.	✓													*Bleeding* (p. 66) *Anaemia* (p. 268)
Weak and tired. Thin and not growing – even when animal has enough food. Stand alone and do not move much. Rough, dull coat with hair that stands up. Body looks small compared with the head. Produce little milk. May have pale *mucous membranes*. May have diarrhoea. Usually do **not** have a *fever*. The skin feels dry – if you pinch a fold of skin and let go it does not fall back as quickly as normal. The eyes are sunken. Animal has a rough coat and does not move much.	✓													*Dehydration* (p. 267), *worms* (p. 218), *poor feeding* (p. 45), *lack of minerals* (p. 229), *skin problems* (pp. 124, 154)
Pale *mucous membranes* may become yellow. Live near water with snails in it. May have diarrhoea. Some have swelling under the jaw. Usually do **not** have a *fever*. Become thin and some die.	✓													*Liver flukes* (p. 285), *Schistosomosis* (p. 222)
Fever comes and goes. Pale *mucous membranes*. Become thin. Abortions and infertility.	✓													*Trypanosomosis* (p. 295)

Signs to do with many different parts of the body

Signs	Any animal	Cattle	Buffaloes	Camels	Sheep	Goats	Horses	Donkeys/mule	Pigs	Dogs	Birds	Very young animals	Sometimes other animals	
Brilliant red *mucous membranes* are unusual and are signs of an EMERGENCY. (Animals also usually have distressed breathing.)	✓													*Poisoning: cyanide* (p. 304)

Also see these diseases – most of them cause a high fever:
Any animal *Anthrax* (p. 141); *babesiosis* (especially cattle or dogs) (p. 247); *leptospirosis* (p. 284); *poisoning* (p. 301); *tuberculosis* (p. 205).
Cattle, buffaloes, camels, sheep, goats *Anaplasmosis* (p. 271); *Rift Valley fever* (p. 289).
Cattle, buffaloes, sheep, goats *Theileriosis* (p. 294).
Cattle, buffaloes, camels *Haemorrhagic septicaemia* (p. 283).
Cattle, buffaloes *Ephemeral fever* (p. 278).
Cattle *East Coast fever* (p. 276).
Sheep, goats *Bluetongue* (p. 273); *Nairobi sheep disease* (p. 288).
Horses, mules, donkeys *African horse sickness* (p. 270).
Dogs *Canine ehrlichiosis* (p. 274); *distemper* (p. 275).