Lice and keds in sheep

C R. Toop
Recognition and control of

LICE AND KEDS IN SHEEP

By C. R. TOOP, Chief Veterinary Surgeon

BODY LICE and the so called ticks or keds are the most serious of the external parasites which infest sheep in Western Australia. Unless they are controlled by systematic dipping, these pests can cause considerable financial loss to flock owners.

The sheep body louse (Damalinia ovis) thrives under a wide range of climatic conditions and occurs in both the agricultural and pastoral areas. The so-called tick or ked (Melophagus ovinus) is confined to the higher rainfall areas of the South-West.

Isolated cases of infestation with the sheep foot louse (Linognathus pedalis) also occur, but this parasite, which is found mainly in rams, shows little tendency to spread through the flock and causes little economic loss.

SYMPTOMS OF INFESTATION

Sheep infested with lice or keds show symptoms of skin irritation. This causes them to rub against fences, posts and trees and to scratch and bite at the wool.

Heavy infestations seriously reduce the value of the clip. The wool becomes matted and discoloured and presents a torn and ragged appearance and is thus depreciated in value. The constant irritation results in loss of condition and a substantial reduction in fleece weights.

Similar symptoms are produced by the sheep itch mite (Psorergates ovis) and when in the absence of lice or keds there is evidence of skin irritation and the fleece is torn and bedraggled, the itch mite may be suspected. It is not visible to the naked eye and its presence can only be confirmed by microscopic examination of skin scrapings.

The Sheep Body Louse or Red-headed Sheep Louse

(Damalinia ovis)

The body louse is the common sheep louse in Western Australia. It is generally distributed throughout the South-Western Division of the State and is prevalent in the pastoral areas.

The insect is small—1/25 in. long—but it is readily detected by its movements in the fleece when the wool is opened in a bright light.

The abdomen is a pale brownish colour with several dark transverse bands. The reddish head is more densely pigmented, giving rise to the popular name of the parasite.
Sheep infested with lice and keds. Constant rubbing has caused the fleece to become torn and ragged.

The mouth parts of this louse are of the biting type and are adapted for feeding on the scurf and other debris lying on the surface of the skin. The situations most favoured are the neck, shoulders, back and thighs, but in severe infestations the parasites are found on almost all parts of the body.

_life History_

The eggs or "nits" of the body louse are fastened on to the wool and hatch in from six to 10 days. The young lice closely resemble the parents in all but size, and after moulting or casting their skins several times reach sexual maturity in about 18 days. The whole of the life cycle is spent on the body of the host.

**The Foot Louse**

*(Linognathus pedalis)*

The foot louse is much larger than the body louse, being about 1/12 in. long. It has a short, bluntly-pointed head with mouth parts adapted for the sucking of blood. As its name infers, this species of louse is found chiefly on the hairy parts of the legs, but may spread to the scrotum and adjacent parts of the body.

The foot louse is not common in Western Australia and has a very scattered distribution. Its permanent habitat seems to be around Carnarvon and other isolated Gascoyne localities, but it is occasionally reported in the agricultural areas.

The life history of this louse differs only in minor details from that of the body louse.

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Sheep Ked or "Tick" 
(Melophagus ovinus)

This insect is not a true tick but a wingless fly. The term "tick" is quite misleading; the true sheep tick does not occur in this State. The true tick has eight legs whereas the sheep ked has the six legs typical of insects.

The sheep ked is about \( \frac{1}{4} \) in. long. It is reddish or grey-brown in colour and is readily visible. The abdomen is disproportionately large and swollen, especially when the insect is fully gorged with blood.

The mouth parts are adapted for blood sucking and protrude as a conspicuous proboscis in front of the head.

When disturbed, the keds move very rapidly through a fleece, darting sideways and backwards with a crab-like action. They are commonly found on the neck, breast, shoulders, belly and thighs of the sheep.

Life History

The eggs of the sheep ked are retained by the female until they hatch and the larvae or maggots are not deposited until fully grown. They are then attached to the wool fibres and pupate almost immediately. The entire life cycle is therefore passed on the sheep and yet no eggs or active maggots will be seen on an infested animal. The keds emerge from the brown barrel-shaped pupae in about 22 days and reach sexual maturity after a further fortnight or three weeks.

A single female ked is considered to be capable of producing about 15 pupae.

SPREAD OF INFESTATION

The parasites are spread by close contact between infested and clean sheep in yards, trucks and shearing sheds or between ewes and their lambs.

Lice and keds never voluntarily leave the body of the host animal and are incapable of breeding or surviving long periods away from their normal environment. The adult ked, however, has been reported to live as long as 18 days detached from the sheep, and pupae have been recorded to survive as long as 42 days in tags of wool.

The survival period of lice detached from the host is usually given at about five days, but this will naturally vary according to whether the insect is exposed in a paddock or protected in a shearing shed.

The possibility of infestation from tags of wool adhering to pens and races cannot be ignored but must be regarded as remote and of little practical importance.

CONTROL AND ERADICATION

Vermin infestation may be effectively controlled by systematic dipping.

Provided the recommended dipping fluid is used and the sheep are completely saturated, the eradication both of lice and keds can usually be achieved by a single thorough dipping. A second dipping after an interval of three weeks will ensure eradication and this is a wise precaution with heavily infested flocks.

Under the Stock Diseases Act Regulations dipping is compulsory in the agricultural areas, and must be carried out after every shearing. This legislation is necessary to ensure that keds and lice are controlled on individual properties, as well as to prevent their spread from infested to clean properties by the sale of affected sheep.

There are still many farmers and graziers who are indifferent to the losses caused by vermin in their own flocks as well as losses to others resulting from indiscriminate sale of infested, undipped sheep. The enforcement of the dipping regulations is therefore essential.

Annual dipping is good sheep husbandry and its importance cannot be too strongly emphasised.
Dipping Fluids

There are many reliable brands of sheep dip on the market, all of which have been approved under the regulations. While none of these can be specifically recommended by the Department, all may be expected to give satisfactory results if used in strict accordance with the manufacturer's directions.

The choice of a dip, however, will depend upon the parasite it is desired to control and it should be recognised that a dip which is effective against one parasite will not necessarily control another. Neither the eggs or "nits" of the lice nor pupae of the keds are destroyed by dipping fluids, and it is necessary to select a dip that will not only destroy the adult parasites but will also destroy the young parasites that subsequently emerge. Both the life cycle of the parasite and the residual toxicity of the dipping fluid must therefore be considered.

Young lice hatch from the eggs in six to 10 days, but 22 days are required for the emergence of young keds from the pupae. The residual toxicity of arsenic is of short duration and while it is sufficient for the destruction of young lice as they hatch it does not remain in the wool long enough to destroy young keds as they emerge from the pupae.

The organic phosphate (diazinon, delnav, malathion) and rotenone preparations, on the other hand, have a prolonged residual toxicity and are retained in the wool long enough to destroy both young lice and young keds. It will thus be seen that arsenical dips, although effective for the eradication of body lice, will not control keds, whereas the organic phosphate preparations and the so-called double acting dips which contain both arsenic and rotenone will, when correctly used, control both of these parasites.

The dips at present in use fall broadly into two categories—

- The arsenicals.
- The organic phosphate compounds.

Rotenone is used to a much lesser extent and usually in combination with arsenic for the control of keds. Magnesium fluosilicate, under the name Butimide, has more recently become available as a sheep dip. It is stated to possess all the insecticidal properties of arsenic and is much less toxic.

It has been recommended for the control of lice and when combined with rotenone for the control of keds, but in Western Australia it has yet to stand up to the test of wide field usage.

The use of chlorinated hydrocarbons preparations (dieldrin, aldrin, B.H.C.) is no longer permitted because of the accumulation of undesirable residues in the tissues of dipped sheep.

Recommendations

Based on this knowledge, the following recommendations have been made for the control and eradication of lice, keds and itch-mite.

PARASITE RECOMMENDED DIPPING FLUID

Body lice .... Arsenic.
Organic phosphate preparations (diazinon, delnav, malathion).
Butimide (magnesium fluosilicate).

Keds and body lice ..... Organic phosphate preparations.
Arsenic and rotenone.
Butimide and rotenone.

Foot lice .... Organic phosphate preparations at double strength, and repeated after 14 days.

Itch mite .... Where itch mite is a problem arsenical dipping is recommended and while it does not eradicate the mites it suppresses the infestation to a level where it causes no ill effects.

Stripping

The organic phosphate dipping fluids tend to "strip" or become reduced in strength during use and this is most likely to occur when a small volume of fluid is used for the treatment of a large number of sheep, as in a shower spray or a swim dip of small capacity.

Dipping manufacturers have made allowances for stripping in calculating the amount of dip to be added when topping up or replenishing the bath so as to ensure that the dipping fluid is maintained at an effective strength; it is essential that the directions on the container should be
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strictly observed if satisfactory results are to be expected.

The problem of stripping has now been overcome by the use of "anti-strip" shower sprays which are equipped with a small (100 gal.) sump from which the dipping fluid is pumped and circulated connected with a large (500 gal.) storage tank. As spraying proceeds, clean, fresh dipping fluid flows into the sump from the storage tank, replacing the fluid taken out by the sheep and by this simple device the strength of the dipping fluid is at all times maintained at an effective level. It is strongly recommended that "anti-strip" equipment be installed with all shower sprays.

Arsenical and magnesium fluosilicate dips in which the chemical is in solution do not strip and present no problems in this respect.

**Time of Dipping**

Best results will be obtained by dipping immediately after shearing. The closer dipping is to shearing the more effective it will be, but to avoid infection through open wounds it is advisable to delay dipping until shearing cuts have healed. It may be noted however that under pastoral conditions many thousands of sheep are dipped straight off the board without apparent ill effects.

When it is realised that most of the parasites in the fleeces will be removed by shearing and that those remaining will be more vulnerable while the wool is short, the advantages of early dipping are obvious.

**Careful Dipping Essential**

Swim dipping is the most reliable method of control since it ensures that every animal is completely immersed and thoroughly saturated.

Care must be taken to ensure that the dipping fluid is of the correct strength. The capacity of the bath should be accurately estimated and the dip should be added in the proportions directed by the manufacturer and thoroughly mixed. The dip should be long enough to ensure that the sheep become thoroughly saturated as they swim through the bath, and the head of each animal should be ducked beneath the surface.

When shower sprays are used the sheep should be treated within a month to six weeks of shearing, otherwise the dipping fluid will not penetrate and saturate the fleece. The sheep should be held in the spraying enclosure long enough to ensure that all parts of the fleece are completely saturated—not less than three minutes for sheep up to a month off shears and four to five minutes for sheep four to six weeks off shears. This work should be closely supervised.

Where these precautions are observed satisfactory results will be obtained from spraying.

Tip spraying using a walk-through spray race cannot be relied upon to eradicate lice or keds and is not permitted under the regulations in the compulsory dipping area.

All sheep on the property, including rams, lambs and ration sheep, must be dipped at the one time, since animals left undipped will soon reinfest the rest of the flock.

**DIPPING PRECAUTIONS**

**DON'T** dip hot or thirsty sheep; yard them near the dipping site some time before dipping and allow them time to rest, settle down and thoroughly cool off before starting dipping.

**DON'T** drive sheep immediately before or after dipping. If the sheep are over-driven or shedded after dipping there is a risk of scalding the skin.

**DON'T** dip sheep in wet weather. If heavy rain falls on newly-dipped sheep before they are dry they will scald and some may die of arsenical poisoning.

**DON'T** dip sheep late in the day so that they are unable to dry out before sundown. Delayed drying may result in arsenical poisoning.

**DON'T** dip sheep in very hot weather. Sheep that are soaked with dipping fluid are liable to scald under a very hot sun.

**DON'T** allow newly-dipped sheep to be exposed to hot sun and wind. Always allow the sheep to dry in the shade in preference to drying in the sun.

**DON'T** dip sheep in very cold weather.
DON'T allow sheep to leave the bath or spraying enclosure until the dipping fluid has had time to soak through to the skin.

DON'T forget to plunge the sheep's head under twice with a guiding crutch if using a swim dip. Always allow breathing time between the plunges and never hold a sheep under the fluid. When plunging a sheep always push it backward and give the second plunge just before the sheep reaches the exit slope.

DON'T forget to dip all sheep on the property at the same time. This includes ration sheep, rams and lambs, any of which could be responsible for reinfection of the flock if dipping is omitted.

Observation of these precautions will ensure maximum efficiency and where arsenical preparations are used will minimize the risks of arsenical poisoning and skin scald.

REGULATIONS

Compulsory Dipping

Dipping is compulsory in the South-West Land Division of the State, in the Shires of Dundas, Esperance, Westonia and Yilgarn and in all those portions of the Shires of Merredin, Narembeen, Lake Grace and Phillips River situated east of the No. 1 Rabbit Proof Fence.

Within six weeks of every shearing all sheep in this compulsory dipping area are required to be dipped in a swim bath or saturated by a shower spray approved by the Chief Inspector of Stock and prepared from an approved insecticidal preparation known to be fatal to lice and keds.

Within 14 days after the dipping or spraying of his sheep the owner is required to furnish a statutory declaration to the Chief Inspector of Stock stating the date of last shearing, the number of sheep dipped, the date of dipping and the quantity and brand of dip used.

Sales of Sheep Off-Shears

No sheep may be removed from any land or offered for sale privately or by auction in the compulsory dipping area unless the sheep have been dipped or sprayed after shearing.

This has particular application in the case of sheep intended for sale off-shears, which, unless consigned direct to a meatworks for immediate slaughter, must be dipped before removal from the owner's property. An Inspector is empowered to order any undipped sheep found in saleyards to be withdrawn from sale until they have been dipped to his satisfaction.

Permits to Move Sheep from the Pastoral Areas

Dipping is not compulsory in the pastoral areas but the movement of sheep into the compulsory dipping area from the pastoral areas is subject to the written permission of an Inspector and to the condition that the sheep were dipped after shearing.

An application for a permit to move sheep into the compulsory dipping area must be supported by a Return by the owner or his manager stating the date of last shearing, the number of sheep dipped, the date of dipping and the quantity and brand of dip used.

A sheep consigned direct to a meatworks for slaughter or to a port for export for slaughter are exempt from this requirement.

Quarantine

When sheep infested with lice or keds are found in any yards or other place where sheep are offered for sale or exhibited for show purposes they may be required by an Inspector to be withdrawn until they have been dipped to his satisfaction but where the sheep are intended for slaughter they are permitted to be sold subject to that condition.

Affected properties are quarantined until the flock has been dipped and freed of infestation. While this quarantine remains in force no sheep may be removed from the property without the permission of an Inspector, which almost without exception is granted only for sheep destined for immediate slaughter.

Offences

It is an offence under the regulations to have sheep affected by lice or keds on any property, to offer them for sale either privately or by auction, to yard them for sale or exhibition or to refuse, neglect or fail to comply with an order to dip or spray.

It is also an offence to remove sheep which have not been dipped according to the regulations from any property in the prescribed compulsory dipping area, to offer them for sale either privately or by auction to drive or allow them to stray across or upon any land or to drive depasture or allow them to stray on any highway.

A person who commits an offence under these regulations is liable to a penalty of not less than £10 and not more than £50.
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