

A/14

Vet

# INVESTIGATION

## OF

## DISEASE

Specimens.

~~CC 05 (1)  
16.5.80~~

16.

1/16/1956.

Stanley

TO WHOM IT MAY CONCERN.

29th March 1956.

CERTIFICATE.

This is to certify that on the 28th March 1956, I carried out a Post Mortem Examination on a Skewbald Gelding, "Monty", 7 Years, the property of Mr L. Bonner of Stanley.

I found the Liver to be greatly enlarged, (roughly measuring 2 feet six inches by 18 inches by 8 inches, and weighing over 80 lbs (eighty pounds).

There was an old standing abscess on the liver, with adhesions to the wall of the ribs, and numerous secondary abscesses in the substance of the liver.

In my opinion, the condition had been caused in the first instance by a punctured wound of some kind, and in view of the advanced state of the secondary lesions, I estimate that the injury would have occurred about a year ago at least.

E. T. F.

M. R. C. V. S.

MEMORANDUM.

It is requested that, in any reference to this memorandum the above number and date should be quoted.

30th May 19 56

The Hon. Agricultural Officer

Stanley

Secretary, F.I.D.S.

Stanley, Falkland Islands.

SUBJECT :-

The following reports have been received from Base Y and I should be grateful for your advice on the matter.

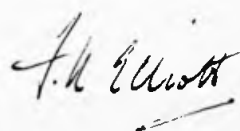
10th March, 1956

"HAVE SKIN DISEASE IN FIVE DOGS STOP IT IS VERY SLIGHT IN CAESAR DOLLY AND JOHNNIE BUT DEAN AND BABE HAVE TWO INCH HAIRLESS PATCHES ON MUZZLE STOP ALL RESPONDING WELL TO DETTOL BATH"

28th March, 1956

"THESE DOGS STILL AFFECTED AND FURTHER DOGS BECOMING INFECTED DESPITE ISOLATION NOW 12 STOP CONDITION CONSISTS 3 OR 4 SOFT PERIORAL SWELLINGS 1 TO 2 CMS ACROSS EACH WITH PARTIAL HAIR LOSS SKIN BREAKDOWN SCABBING NO LYMPHADENOPATHY NO MILES PELT HEALTH SPIRITS OTHERWISE EXCELLENT NO VENERAL SARCOMA IN PACK STOP OCCASIONAL OFF AI FEEDS PENICILLIN DETTOL GENTIAN VIOLET ACRIFLAVINE TRIED AT BEST CONDITION HELD IN CHECK STOP ADVICE MOST WELCOME ON DIAGNOSIS TREATMENT CONTINUING ISOLATION IN VIEW WIDE DISTRIBUTION AND IMMINENT START SLEDGING PROGRAMME ALSO POSSIBLE EFFECT OF RUNNING ON CONDITION"

There are a total of 32 dogs at this Base.



(F.K. Elliott)

2/1956/16.

8th June 1956.

Agricultural Officer.

To. The Secretary,

F.I.D.S.

Stanley.

Skin Disease in Dogs at Base Y.

With reference to your Memorandum No. 105/4/2Y of the 30th May 1956, I wish to inform you that from the somewhat meagre details supplied, I am unable to make any definite diagnosis regarding the skin disease in dogs at Base Y. All I can do is to suggest that it might be either of the following:-

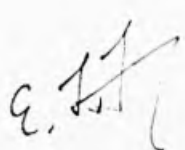
Dry Eczema;  
Mange : Demodectic or Sarcoptic;  
Ringworm;  
Avitaminosis.

2. Although it is quite possible that the condition is of a contagious nature, it is equally possible that it may not be, and that the dogs are all suffering from the same deficiency. If the disease is contagious it can be narrowed down to Mange or Ringworm.

3. For Mange : Sudermox (Burroughs Wellcome Ltd), Odylen (Bayer), and Novidol are all very good preparations. Antiseptics such as Dettol can be used in baths, while any of the Gammetox Sheep Dips can also be used in the correct strength. Subcutaneous injections of Aricyl, Omnadin and Yatren are often used.

For Ringworm : Tincture of Iodine; Salicylic Acid; Gentian Violet, and Whitfields Ointment could be used.

For Avitaminosis : Vitamin B (various groups) and Vitamins may be of use.

  
AGRICULTURAL OFFICER.

M.R.C.V.S.

No. 105/4/8Y

MEMORANDUM.

3

It is requested that, in any reference to this memorandum the above number and date should be quoted.

3rd August 19 56

The. Hon. Agricultural Officer,

Secretary, F.I.D.S.

Stanley.

Stanley, Falkland Islands.

SUBJECT :-

Skin Disease in Dogs at Base "Y"

I should be grateful if you would refer to my letter of 30th May and your reply of June 8th.

The latest information from the Base is that the condition is definitely infectious, although no mites or fungi have been observed. A course of Vitamins and the local application of Stockholm Tar did not prove successful; the administration of Iodine appears beneficial and is being continued.

If this further report will enable you to assist me once more with your advice I shall be most grateful.



(F.K.Elliott)

Ref. No. 4/1956/16.

7th August

56.

he Secretary,  
F. I. D. S.  
Stanley.

DISEASE AMONGST DOGS : BASE "Y".

I have to acknowledge the receipt of your Memorandum No. 105/4/8Y of the 3rd August 1956.

2. In view of the fact that the condition has been established as "definitely infectious", I suggest that a supply of 'Sudermox' (Burroughs, Wellcome and Co). and Whitfield's Ointment be obtained, and some of the cases treated with these two preparations, respectively. The results obtained would help to indicate the particular infection responsible.

AGRICULTURAL OFFICER.

# PHARMACEUTICAL SPECIALITIES (MAY & BAKER) LTD

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TELEPHONE ILFORD 3060  
EXTENSION 221

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DAGENHAM  
ESSEX

OUR REF XS/M/ 1462/RJ/BT

YOUR REF

DATE 26th September 1956.

Department of Agriculture,  
Port Stanley,  
Falkland Islands,  
South Atlantic.

Dear Sirs,

We have pleasure in acknowledging receipt of your letter reference 43/1956/28A dated 23rd August and are enclosing a copy of a price list dealing with the veterinary preparations we issue.

The prices appearing in this list are those ruling in the United Kingdom. Normally we supply veterinary products to the Crown Agents subject to our wholesale discounts which are 25% and 12 $\frac{1}{2}$ % delivery being f.o.b. London.

A brief indication of our veterinary products is given in the supplementary list we are sending to you, but should you require more comprehensive information at any time we would always be pleased to send this on request.

We hope that a number of our products will be found of interest to your department and we should be very pleased to receive your orders through the Crown Agents in London.

Yours faithfully,  
PHARMACEUTICAL SPECIALITIES  
(MAY & BAKER) LTD.

R. Jopling.  
Export Sales Department 'A'

AIR MAIL LETTER

# THE BRITISH DRUG HOUSES LTD.

Cablegrams "TETRADOME, LONDON"

Codes | A.B.C. 6th. & 7th. ED.  
| BENTLEY'S  
| LOMBARD

Our Reference 3/DGE/ML  
Your Reference 43/1956/23A

6

EXPORT DEPT.

GRAHAM STREET,  
CITY ROAD,  
LONDON, ENGLAND.

26th September, 1956

Agricultural Officer,  
Department of Agriculture,  
Port Stanley,  
Falkland Islands,  
South Atlantic.

Dear Sir,

Thank you for your letter dated the 23rd August from which we note that you wish to receive copies of our price lists.

We do not normally issue preparations for veterinary use, but we have sent to you, under separate cover, copies of our latest lists giving details of pharmaceutical drugs, chemicals, specialities, tablets, etc., we are usually in a position to supply.

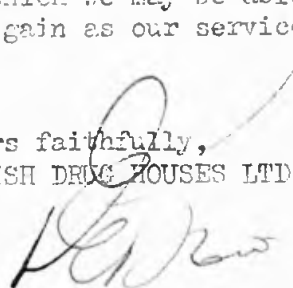
You will appreciate that since these were printed values in many instances have fluctuated, but we hope the lists will prove useful, and, of course, minimum current prices would be quoted against enquiries received through the Crown Agents.

Your address has been added to our mailing chain and you will receive copies of new lists as published.

Should there be any other way in which we may be able to help, please do not hesitate to approach us again as our services are always at your disposal.

We are,

Yours faithfully,  
for THE BRITISH DRUG HOUSES LTD.



Regional Sales Manager





Agricultural Officer,.....

Department of Agriculture,.....

PORT STANLEY,.....

FALKLAND ISLANDS,.....

South Atlantic,.....

← First fold here →

← Second fold here →

Sender's name and address: **THE BRITISH DRUG HOUSES LTD.**

**16 to 34, Graham Street,**

**LONDON, N.1 ENGLAND.**

AN AIR LETTER SHOULD NOT CONTAIN ANY  
ENCLOSURE; IF IT DOES IT WILL BE SURCHARGED  
OR SENT BY ORDINARY MAIL.

← To open cut here →

①  
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STATION STREET · NOTTINGHAM · ENGLAND

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NOTTINGHAM 45501

Cablegrams:  
DRUG NOTTINGHAM TELEX

International  
Division

RW/MBH

24th September, 1956

The Department of Agriculture,  
Port Stanley,  
FALKLAND ISLANDS,  
South Atlantic.

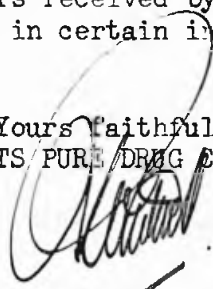
Dear Sirs,

Thank you for your letter reference No. 43/1956/28A, requesting our price lists of Veterinary preparations.

We are enclosing our current export price list of Veterinary products and also several copies of literature dealing with what are perhaps the most important preparations. We regret to say that we are out of print of literature covering other preparations and our export catalogue is at present being revised. We have, however, noted your address and will despatch a copy of the latter when it becomes available.

As mentioned in our price list, our prices are F.O.B. U.K. Port, and we should also like to mention that orders received by way of the Crown Agents in London, receive special care, and, in certain instances, enjoy certain concessions in price.

Yours faithfully,  
BOOTS PURE DRUG CO. LTD.



R. Whitwell.

BY AIR MAIL

IMPERIAL CHEMICAL (PHARMACEUTICALS) LIMITED

Director:  
Imperial Chemical Industries Limited  
Telephone: Wilmslow 4071  
Telegrams: Avlontex, Wilmslow



FULSHAW HALL,  
WILMSLOW,  
CHESHIRE.

Our ref. Sales Department,  
Your ref. JEM/EB-

ENGLAND.

25th September, 1956.

BY AIR MAIL.

The Agricultural Officer,  
Department of Agriculture,  
Port Stanley  
Falkland Islands.  
South Atlantic.

Dear Sir,

PRICE LISTS.

We thank you for your letter reference 43/  
1956/28A of the 25th August which we have just received  
and we have pleasure in attaching a copy of our price  
list relating to our veterinary products. These prices  
are of course for purchases through the Crown Agents  
for Oversea Administrations in London and are subject  
to alteration at any time.

We have taken due note of your comments  
and we have made arrangements for amendments to our prices  
to be sent to you regularly.

If we can let you have any information on our  
products please do not hesitate to let us know.

Yours faithfully,  
IMPERIAL CHEMICAL (PHARMACEUTICALS) LIMITED.  
*J. B. Madders*  
J. B. MADDERS.  
AMERICAN SECTION.

# DOUBLE INTRADERMAL TUBERCULIN TEST.

TECHNIQUE. Clip the hair off a small patch on the side of the neck.

1<sup>st</sup> DAY. Measure the thickness of a fold of skin, in millimetres. Calipers are used for this.

Inject  $\frac{1}{10}$ <sup>th</sup> cc. of concentrated Tuberculin into the thickness of skin - into the ~~skin~~ <sup>skin</sup> - not under the skin.

A small pea-like nodule should be formed

3<sup>rd</sup> DAY. 48 hours Later

Re-measure the thickness of the fold - note the character of any swelling at the site, and then give the SECOND injection ( $\frac{1}{10}$ <sup>th</sup> cc.) of Tuberculin into precisely the same spot.

4<sup>th</sup> DAY.

24 hours after the second injection (that is, 72 hours after the 1<sup>st</sup> injection) take a final reading of the thickness of the skin fold., and again note the state of the tissues at the site.

## INTERPRETATION

Sometimes the re-action at the 48<sup>th</sup> hours (3<sup>rd</sup> Day) is so pronounced that there may be no need to make a second injection.

A NEGATIVE re-action has either no swelling at all, or there may be a ~~very small~~ round, definitely defined swelling with any pain or inflammation, causing an increase in skin-fold thickness of not more than 3 millimetres.

A POSITIVE reaction shows an increase in skinfold thickness of 4 millimetres

or more; <sup>and/or</sup> ~~it~~ a swelling at the site  
 which is spread out, moved less unevenly,  
<sup>(oedema)</sup> soft to the touch, hot & painful.

Even if such a painful swelling does not  
 reach 4 millimetres it should be regarded  
 as a Positive reaction.

An increase of anything from 3 to 4 millimetres  
 without any pain & inflammation should be  
 regarded as DOUBTFUL.

Doubtful reactions should be isolated from  
 other animals if possible, and re-tested after  
 an interval of 60 days, on the other side of the neck.

### Some examples of Reactions.

Before Injection (1 <sup>st</sup> Day)	2 <sup>nd</sup> Day 48 <sup>th</sup> hours	4 <sup>th</sup> Day 72 <sup>nd</sup> hours	Result.
8.0 mm.	10.0 mm.	11.0 mm.	Negative.
8.5 ..	9.0	9.5	Negative.
7.0 ..	9.0	12.5.	Positive. O.H.P.
5.0	7.0.	11.0	Positive O.H.P.
5.5.	7.5.	9.5.	Doubtful
5.0	11.0		Positive O.H.P.
6.0.	9.5.	21 m.m.	Positive E.O.H.P.
6.0.	8.5.	9	negative.
7.5.	8.5.	9. H.P.	Positive.
7.5.	12.5.	14.0.	Positive. O.H.P.
8.0.	10.0	9.0.	Negative.
7.5.	8.5.	9.0 H.P.	Positive.

O = Oedema that is soft, watery, dropical.

H = Hot

P = Painful

E O = Extensive oedema.

## EGG EATING.

This is a vice and is caused by:-

1. Accidental breaking of an egg on the floor , or in the nest;
2. Soft shelled eggs (prevalent in the spring at peak of production);
3. Lack of proper nesting facilities;
4. Accumulation of a number of eggs in a nest;
5. Failure to gather eggs at proper intervals;
6. Mineral and protein deficiencies in the diet;
7. One bird addicted to the habit, causing others to follow suit;
8. Fowls not being kept occupied. They should have access to dry mash, green food, shell, grit, ashes, and scratching places.

## Control and Prevention.

1. Provide suitable and adequate nesting facilities,
2. Well balanced rations;
3. Remove habitual offenders from the flock;
4. Remove any floor eggs promptly (if possible), and from nests too;
5. See there is sufficient lime in ration to prevent any calcium deficiency, by providing good pounded shell or lime;
6. Make nests shaded; i.e. close nests partially so that they are a bit in the dark;
7. Keep some china eggs in the nests;
8. Place a booby egg on the floor of the hen house i.e. an egg shell filled with a mixture of flour and water, and plenty of pepper;
9. Pare back the upper beak, by cutting back to the quick with a sharp knife, but not to draw blood;
10. If everything else fails, make a nest with a false floor, (after the battery brooder pattern-, so that the eggs roll down a slope after being laid, and the fowls cannot get at them.

From "Historia Natural Ediar (Mamíferos Sud-Americanos)" por Angel Carera and Jose Yepes. Publishers: Cia. Argentina de Editores, Tucuman 826, Buenos Aires.

-----

### The Tapetis or S. American Rabbits (Familia Leporidae)

This family which includes the duplicidentata rodents, the hares and rabbits so numerous in the Old World is only represented in South America by species equal in size or less than a medium sized rabbit, with shorter ears and pasterns than in the species of other genres. The colouring of the coat is quite dappled with the belly sometimes greyish white and sometimes white.

#### Classification and Geographical Distribution

The species at present recognized are very numerous but all come within one genus which is exclusively American - *Sylvilagus* - and they are spread over very varied zones of South and Central America.

The Azara tapetí (*Sylvilagus brasiliensis*) at first sight resembles in colour a young European hare but apart from its different proportions it is somewhat more cinnamon in colour, with the back inclined to be grey and it has a light brown patch on the back of the neck. Its underneath is white with a white pectoral collar varying in width with its geographic distribution. The typical variety of the species is found in Eastern and Southern Brazil; in Paraguay and North East Argentina it is found in another form (*Sylvilagus Brasiliensis paraguensis*) which is again different to a variety properly found further west in North-Western Argentina (*S. brasiliensis gibsoni*).

Other varieties of the species are found in the interior of Brazil (*S. bras. chapadae*) and in Peru (*S. bras. inca*).

The Little Tapetí of Eastern Brazil (*S. tapetillus*) is much smaller and darker in colour with a strong contrast in its markings. The patch on the back of the neck is a dark rufous colour. The feet are a slightly greyish white.

The Tapetí of the Andes (*S. andinus*) is larger than the Azara tapetí with distinctly black streaks on the shoulder. Its colour is quite dark.

The typical variety is found on the western slopes of the Andes in Ecuador at about 4,000 metres. Below this altitude is found a subspecies (*S. andinus canarius*).

The Snow Rabbit (*S. nivicola*). The size and type of coat of this tapetí resemble the previous species; but it has a generally grey shade and the back of the neck is ash grey, never reddish or black like other tapetis. It is only found in the high altitudes in Ecuador at 4,300 metres on the permanent snow line.

The Venezuelan Tapetí (*S. meridensis*) is a species related to *S. nivicola* with the colour on the back quite dark with a brown shade. The front is coloured like the back. The ears are short. It is found in the Sierra de Merida.

The Black-necked Tapetí (*S. nigro nuchalis*) is common to the North West of Venezuela; it is thought that the typical variety lives in the islands while in the Maracibo district there is a subspecies with a reddish shade and with black tipped ears (*S. nigro nuchalis continetis*).



EMBASSY  
AUSTRALIAN LEGATION  
RIO DE JANEIRO

3rd November, 1959.

Dear Sir,

The Commonwealth Scientific and Industrial Research Organization (C.S.I.R.O.) continues to carry out work on the myxoma virus which some years ago drastically reduced the Australian rabbit population. It is endeavouring to forecast the eventual behaviour of this virus and in consequence the history in South America may be of importance: it has of course been endemic here for many years. In fact the virus introduced into Australia had its origin, we believe, in a laboratory in Montevideo.

There is some doubt as to whether there are populations of the European wild rabbit in South America although in view of the widespread breeding of the European domestic rabbit for many years it seems improbable that there are not populations originating from escapes which have gone wild.

In Argentina the virus is said to appear at intervals of three or four years in the domestic European rabbit and has such devastating effects that it is doubtful if those rabbits can act as a reservoir for the virus. The domestic rabbit is also periodically attacked in Brazil.

As you will know there has been a severe outbreak of myxomatosis in Tierra del Fuego but in this case myxoma was apparently introduced from Germany into a population of European wild rabbits which evidently had no immunity so that for our purpose this outbreak does not provide evidence of much value.

We have been informed that these rabbits in Tierra del Fuego were introduced from Central Chile in which case it would be rather surprising that they have not got immunity in view of the long term existence of the myxoma virus on the Continent. Is it possible that they were introduced from the Falkland Islands and not from Chile?

I attach a translation from a note in "Historia Natural Ediar" published in Buenos Aires, which refers to the European rabbit (*Ortolagus cuniculus*) in the Falkland Islands. It is thought possible that the reservoir in South America may be one of the varieties of the American rabbit (*Silvylagus brasiliensis*) which may carry the virus in a very mild form which becomes virulent when it reaches the European rabbit.

Would it therefore be possible for you to supply some details of the present position of rabbits in the Falklands and advise us if there is anything known as to the possible introduction from the Falklands to Tierra del Fuego. I presume that there are no American rabbit populations in the Islands.

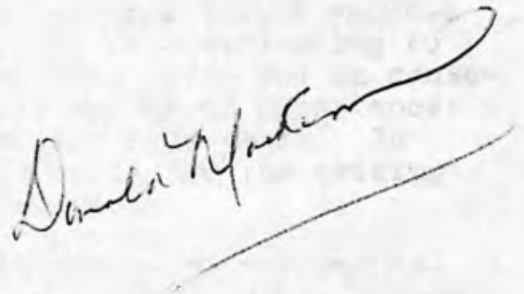


If the myxoma virus has appeared in the Falklands we would endeavour to make arrangements for a specimen of the strain to be sent to the British Embassy in Montevideo or Buenos Aires for sending by airmail to Canberra.

We apologize for a long letter but as you will appreciate the matter is of considerable importance to Australia.

With my best regards,

Yours sincerely,

A handwritten signature in dark ink, appearing to read "D. Mackinnon", written in a cursive style. The signature is positioned above a horizontal line.

D. Mackinnon,  
Ambassador.

The Agricultural Officer,  
Stanley,  
Falkland Islands



BY APPOINTMENT  
TO HER MAJESTY THE QUEEN  
SUPPLIERS OF SHEEP & CATTLE  
DIPS & VETERINARY PREPARATIONS

REGISTERED & HEAD OFFICE  
CHEMICAL WORKS, BERKHAMSTED

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COOPER'S, BERKHAMSTED

Our Ref. BGP/10

Your Ref. \_\_\_\_\_

11th August, 1960.

The Government Veterinary Officer,  
Falkland Islands.

Dear Sir,

We have recently had the pleasure of meeting Mr. W.W. Blake of Holmsted Blake and Company, Hill Cove. Mr. Blake is currently using one of our concentrated DHC dips and has expressed interest in changing to a dieldrin dip.

The product we wish to offer Mr. Blake is a powder dip containing the following active ingredients :-

20% dieldrin.  
2% arsenic.  
21.4% copper sulphate.

As we understand them the statutory dipping regulations for the Falkland Islands stipulate that the dip employed must be approved by a Government inspector.

We should now be most grateful if you could let us know whether a dip powder containing the above mentioned active ingredients would be approved by yourself, as being suitable for use by flock owners to comply with the statutory dipping regulations.

Yours faithfully,  
COOPER, McDOUGALL & ROBERTSON LTD.,

Export Department.

To open cut here

First fold here

Sender's name and address :-  
Cooper, McDougall & Robertson Ltd.  
Berkhamsted,  
Herts, England.

Second fold here

The Government Veterinary Officer,  
TILLYARD ISLANDS

BY AIR MAIL  
AIR LETTER  
RESERVE ANYTHING IS EN  
CLOSED THIS LETTER BE SENT BY  
ORDINARY MAIL.



THE 'APSLEY' AIR LETTER

Form approved by Postmaster General No.—71995/IM

To open cut here

# The Falkland Islands Company, Limited.

°(INCORPORATED BY ROYAL CHARTER 1851.)°

REGISTERED 1902.

AGENTS FOR LLOYD'S

TELEGRAMS "FLEETWING PORTSTANLEY" VIA RADIO.

*Darwin.*

10th. April. 1961.

The Agricultural Officer.  
Agricultural Department.  
STANLEY.

Dear Sir,

In the course of the past ten days, I have learned that Mr. Lee of Sea Lion Islands suspects that his stock have become infected with Lice.

I did, in fact, speak to Mr. Lee on the R/T one day, but except for saying that something seemed to be wrong and that he might have to dip all his sheep again, he did not disclose what the trouble was.

It would seem to me extremely unlikely that the stock on this outlying Island have become Lice infected, but, I suppose, nothing is impossible. As far as I know, the last sheep to be brought to Sea Lion Islands were some Rams from Roy Cove ( I admit that I stand to be corrected on this point ) but, if this is correct, we have never heard of any Lice outbreak on the West Falkland.

During my 30 odd years experience in these Islands, there has been one or two outbreaks of Lice - one at Green Patch about 1931, and another at ( I think Teal Inlet ) about two years later.

But that is a long time ago.

Only recently our London Office have sent me sundry articles dealing with an entirely new thing to me - something called the ITCH MITE - and oddly enough, this seems to have cropped up in several parts of the World. Whether carried by migrating birds - is just a guess - perhaps. Still - ?

For your information, I enclose such information as I have on this subject. You may retain these papers - but I suggest that you do not destroy them - for who knows, we might be obliged to refer to it all one day.

I understand that Mr. Lee will bring to Stanley samples of what he has found on his sheep - you may therefore check with the true Louse - and now, with this Itch Mite !

In conclusion, should Mr. Lee require any Dip, I shall be only too willing to meet his requirements, or, assist in any other way that is possible.

Yours faithfully,

*A. G. Gillett*

THE FALKLAND ISLANDS SHEEPOWNERS ASSOCIATION.

Stanley,  
9th June 1961.

The Agricultural Officer,  
Stanley.

Dear Sir,

I have been requested by the Sheepowners Association to enquire if lice have in fact been found among the sheep on Sea Lion Island, and if so to ask whether steps will be taken to eradicate them.

Yours faithfully,

*J. C. Harding*

Chairman.

JAMES LOVEGROVE WALDRON  
LIMITED.

Telegraphic Address:  
HOWARD, FOXBAY, FALKLANDS.  
BENTLEY'S CODE USED.

C O P Y .

*Port Howard,  
West Falkland Islands.*

December 22nd. 1961.

The Colonial Secretary,  
Stanley.

Dear Sir,

Itch-mite.

From recent correspondence with our London office and a report by Mr. T. A. Davis, General Manager of Waldron & Co., on his extensive 6 months tour of the most important sheep stations of Australia, Tasmania and New Zealand, we are very concerned about the possible introduction of Itch-mite on imported sheep to the Falkland Islands.

Itch-mite is only controllable by Lime and Sulphur or Arsenic Dips. Mr. Davis says that Messrs. Cooper & Nephew research station at Concord, N. S. Wales report that Gamatox, Dieldrin, Diazinon and Aldrine Dips have no effect on Itch-mite.

Furthermore since the introduction of spray dipping in Australia, New Zealand and South America, Itch-mite is reported to be spreading rapidly.

My firm have asked me to emphasize to you that they are most concerned that quarantine regulations should in no way be laxed for imported sheep and to point out to you again that Itch-mite is not controllable with gamatox dip.

Yours faithfully,

D. M. Pole-Evans, Falkland Manager.

c. c. London office.  
Agricultural Officer, Stanley. ✓  
P/H.

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SHEARING  
VETERINARY  
MERCHANDISE  
MACHINERY

BY AIR MAIL.

VGC/MEM

18th January, 1961.

..... In a recent report prepared by a technical committee of the Australian Veterinary Association. I have summarised this below and hope it supplies you with the information you requested.

### THE ITCH MITE OF SHEEP

In the absence of lice and keds, itch mite must be suspected in any sheep showing evidence of irritation by biting or rubbing the fleece. Sheep infested with itch mite bite the fleece more often than they rub. Biting produces a characteristic type of fleece damage confined to areas that the sheep can reach, mainly along the sides and down the thighs. Small tufts of wool are pulled up from the general surface of the fleece. Yolk and dirt is removed by the biting, giving the tufts a bleached or scoured appearance. The tufts also tend to become twisted at the tip, described by Carter (1941) as spiral-pointed. Sheep with extensive wool damage develop a ragged, tasselled appearance. The fleece may become severely cotted. Some months usually elapse after shearing before infested sheep again show fleece damage. Often there is an excess of dry scurf in the wool and on the skin surface, and this may be the only sign of infestation.

The skin is usually slightly thickened and may show areas of a leaden hue alternating with areas of normal skin colour, but such discolouration is not diagnostic.

The ragged appearance of the fleece is not on its own a reliable diagnostic feature. Irritation due to lice,

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keds or grass seeds may result in similar fleece damage, and these may occur alone or concurrently with itch mite. Also it is considered by some that there is an itch condition of sheep that is not associated with external parasites nor with grass seeds or similar foreign body irritation. On the other hand, the fleeces of some breeds, e.g. British breeds and crossbreeds, will not show effects of itch mite infestation to the extent seen in blocky fine-wooled merino fleeces. Excess dry scurf is the most constant visible sign of itch mite infestation, but is not diagnostic. Positive diagnosis depends on demonstration of the mite in skin scrapings or skin sections. The isolated mite is just visible but cannot be identified by the naked eye, hence diagnosis depends on microscopical examination.

For skin scrapings areas measuring 2 by 2 in. are recommended. The wool is first removed by fine clippers or scissors cutting as close as possible to the skin. The clipped area is then smeared lightly with a few drops of technical white oil, paraffin oil or glycerine to facilitate collection of material from the skin surface. The area smeared is then scraped with a scalpel and all wool, debris, epithelial tissue and oil removed is taken for microscopical examination.

In the presence of typical wool damage and skin lesions negative results of skin scrapings should be viewed with suspicion as sheep showing obvious and extensive fleece damage have often required repeated scrapings over some months before mites could be demonstrated.

The life cycle described by Murray (1959) involves six stages, namely the egg, the larva, three nymphal stages and the adult. The life cycle is completed in about five weeks, on the surface and beneath the stratum corneum of the skin. Newly laid eggs develop the first nymphal stages in two weeks, and nymphal stages develop to adults in a further three weeks.

All stages of the mites are found directly on the skin surface or under the superficial layers of the epithelium.

Only the adult is freely mobile, and it is probable that transmission is by the adult stage alone. Transmission is from sheep to sheep by contact and occurs most readily from freshly shorn to other shorn or woolled sheep. Transmission from a woolled sheep to shorn or other woolled sheep is not frequent and may take several months of



contact (Graham 1943, Sinclair 1958). As the mite will live off the sheep in oil for two to three days mechanical transmission is a possibility, but such has not been shown to occur. The rate of reproduction generally appears to be slow and is probably related to low rates of egg production. On lightly infested sheep mites tend to be unevenly distributed and mites may be found in one scraping whereas all adjacent scrapings may be negative. On heavily infested sheep mites may be found on any area of the body, including the hairy areas of the face and legs, but are usually most numerous on the upper part of the body towards the shoulders. Mite populations are heaviest during winter and spring months and decline in summer (Moule 1957, Sinclair 1958).

There is no correlation between mite population and extent of wool damage. Heavy populations are often found on sheep showing little fleece damage and vice versa.

Development of clinical signs on an infested sheep is usually slow. Seriously affected sheep are usually in the older age groups. However, heavy infestations with extensive fleece damage have been seen in yearlings and lambs. Heavy infestations in young sheep may be due to shearing of infested ewes before their lambs are weaned, facilitating transmission to the lambs.

Spread through a flock is also usually slow. Carter (1941) quotes a flock in which the clinical incidence rose from 1% to 15% over 8 years. In another instance 6-8 years elapsed before clinical signs were seen in an infested flock following careful treatment.

Thus itch mite is an obligatory parasite that completes its life cycle on the surface and beneath the superficial layers of the skin. Transmission occurs chiefly after shearing. Infestation develops slowly on individual sheep and spread through a flock is also slow. These features have important implications when considering application of control measures.

Breed distribution. Itch mite was first found on Merino sheep and some time elapsed before diagnosis was made on other breeds. It has since been found on Polwarths, Corriedales, Comebacks, Crossbreds and Border Leicesters. It is probable that itch mite also occurs on other British breeds but has not been detected due to lack of obvious effects on the fleece and lack of attention paid to their fleeces.

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Geographical. Itch mite has been reported in Australia, South Africa, New Zealand and North America and South America.

In Australia confirmed reports of itch mite come mainly from areas where fine merino wool is produced, i.e. from areas where itch mite causes obvious wool damage and such damage is regarded seriously.

Accurate information on the economic importance of itch mite is not available because controlled investigations planned to provide factual data have not been undertaken.

On two occasions when new insecticides that subsequently proved ineffective for itch mite control were introduced, there was an upsurge of infestations, particularly in flocks in the Southern States. Experience on these occasions indicated that itch mite, unless effectively controlled, could become a problem of considerable economic importance.

The opinion of Government officials is that, under present conditions, when the majority of graziers are using reasonable control measures, itch mite is not a serious problem in the sheep industry.

However, when no control measures are applied or when ineffective insecticides are used, itch mite can cause serious economic loss in individual flocks. Under these circumstances fleeces may become badly ragged and cotted. Reductions to the extent of 25-35% in wool value and 30% in wool production have been reported in some clinically affected flocks.

The effect of sub-clinical infestations on the productivity of sheep has not been investigated.

Methods of Treatment. Irrespective of the chemical that is used, the efficiency of any treatment will depend on the thoroughness with which it is applied. Because of the habits of *P. ovis* thorough wetting of the skin is essential. This can be achieved with plunge or shower dips, but surface application methods are not adequate. Sheep should be dipped with the wool as short as possible because the difficulty of achieving adequate wetting increases greatly with wool length.

Careful attention to dip management is essential. Sheep dipped in plunge dips should be checked in their progress

through the dip to ensure "opening" of the fleece and heads should be immersed at least twice. It is recommended the sheep should be held in the dip for at least 30 seconds. In shower dipping manufacturers directions for operation should be strictly observed particularly in regard to exposure times, pressures and the speed of moving sprays.

Sheep should be closely inspected after dipping just before leaving the draining pen to ensure that adequate wetting is achieved. It is sound practice to return the first batch dipped to the flock and dip them again, because the first sheep dipped tend to be poorly wetted (Hill, 1946).

Insecticides. Lime sulphur dips containing 0.4% w/v or more of polysulphide sulphur have been shown to give a complete kill of itch mite. For field use 1.0% is recommended to allow for exhaustion of insecticide from the dip. Sheep so treated remain free of itch mite for at least 9 months (Graham 1943, Keast 1943, Sinclair 1958). Thus, if effectively applied, lime sulphur can eradicate itch mite at a single treatment. Lime sulphur will not eradicate itch mite at concentrations below 0.4%, and the polysulphide sulphur content of some dips including "sulphur additives" is insufficient to be of value. Commercial lime sulphur concentrates with a guaranteed polysulphide content are preferable to home made lime sulphur in which the polysulphide content varies with the quality of the ingredients and the method of preparation.

No other insecticide has yet been shown to be as effective as lime sulphur. It can be used in either plunge or shower dips, either alone or in combination with other suitably formulated insecticides (Sinclair 1958).

Apart from its high efficiency, lime sulphur has little to recommend its use. It has poor wettability and an effective wetting agent must be used in conjunction. It is unpleasant to use, it is toxic if ingested or inhaled, and the cost is high. Furthermore, it is ineffective against lice and keds.

Arsenical dips containing sodium arsenite equivalent to 0.2%  $As_2O_3$  reduce mite populations very effectively but are not sufficiently active to eradicate itch mite at a single treatment. When used in patch tests at concentrations below 0.2%  $As_2O_3$  efficiency was reduced. Although 0.2%  $As_2O_3$

is the generally accepted standard for arsenical dips, some of the commercial brands available contain lower concentrations when mixed according to instructions given on the labels. Such dips usually contain other insecticides or additives that may enhance efficiency against lice and keds, but, notwithstanding these, efficiency against itch mite may be lowered if the level in the wash is below 0.2%  $As_2O_3$ .

In general careful dipping in arsenic at 0.2%  $As_2O_3$  will reduce itch mite infestation to an extent that fleece damage is not evident in the following year. There have been some reports of the failure of arsenic to give satisfactory control, but it is not known whether this was due to the arsenic or to faulty methods of application. More observations are required to determine how long a single arsenical dipping will adequately control infestations. It may be that use of arsenic once in two or three years may be sufficient.

Arsenic can be used in either plunge or shower dips. It has the advantage of low cost. It does not exhaust from the dip. It will eradicate lice and reduce ked populations. Its main disadvantage is toxicity. Under some circumstances deaths may result from ingestion, inhalation or absorption through the skin.

Other Insecticides. No other insecticides have proved as efficient as lime sulphur or arsenic under Australian conditions. Those tested include B.H.C., Aldrin, Dieldrin, Diazinon, Malathion and Rotenone.

#### Recommendations.

1. That greater attention be paid to diagnosis. This cannot be confirmed without demonstration of the mite. Fleece damage should not be ascribed to itch mite purely on the basis of freedom from other parasites, nor should itch mite be disregarded on the basis of only a few skin scrapings taken on only one occasion.
2. That only plunge or shower dips be used for treatment directed against itch mite.
3. That more careful attention be paid to dipping procedure to ensure thorough wetting to the skin.
4. That infested sheep be dipped as soon as possible after shearing, preferably not longer than 2 weeks.

5. That on present knowledge for best efficiency, the dips used should be:
- (a) Lime Sulphur dips containing not less than 1.0% polysulphide sulphur together with an effective wetting agent.

or

(b) Arsenical dips containing sodium arsenite equivalent to not less than 0.2%  $As_2O_3$ . Choice between lime sulphur and arsenic will depend on the degree of infestation in the flock, the presence or absence of other parasites, the degree of control required by the owner, and the cost of treatment.

If eradication is desired, lime sulphur is recommended.

If it is desired merely to reduce itch mite to a level causing only minimal fleece damage, arsenical dipping is recommended. However, irrespective of these recommendations for the control of itch mite, owners must comply with sheep dipping regulations currently in force in their own State. Such regulations may specify the insecticides to be used.

6. That, whereas circumstances may justify attempts to eradicate itch mite from a flock, attempted eradication on a district or State basis is not at present justified.
7. That properly planned and controlled investigations should be undertaken to determine the economic loss caused by itch mite, taking account of the effects on the amount, quality and value of wool produced.
8. That manufacturers be encouraged to adopt the criteria for testing of insecticides against itch mite as set out in this statement as the minimum required to provide data for registration of new insecticides.
9. That when sheep dips containing new insecticides are

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marketed, their standard of efficiency against itch mite should be clearly stated as eradication of the parasite, or as reduction of mites to a level causing no appreciable wool damage.

10. That owners of flocks in which there is a problem related to itch or to external parasites should consult their veterinary surgeons for accurate diagnosis and advice on treatment.

Yours faithfully,  
GRAZCOG CO-OPERATIVE LIMITED

V.G.Cole, B.V.Sc.,  
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Commonwealth of Australia  
 COMMONWEALTH SCIENTIFIC & INDUSTRIAL RESEARCH ORGANIZATION  
 Reprinted from "The Australian Veterinary Journal"  
 Vol. 35 No. 7 - Page 352 - July, 1959

### LIFE CYCLE OF PSOREROGATES OVIS (ITCH MITE)

The Editor,  
 THE AUSTRALIAN VETERINARY JOURNAL,  
 Dear Sir,

Experiments have now revealed further details of the life cycle of the itch mite (*Psorergates ovis*) of sheep.

three nymphal stages and the ~~adult~~ <sup>larva</sup>. The life cycle is completed in about five weeks on the surface and beneath the stratum corneum of the skin. The first two weeks are required for the newly-laid egg to develop to a nymph and the remaining three weeks for development through the nymphal stages to the adult. In the three nymphal stages there is considerable variation in size and most of the smaller nymphs of this stage develop into males.

Mites have been transferred successfully to weaners and to a one week old lamb. In 15 transmissions the only visible skin lesion was a white scurf. In the field, the writer has repeatedly noted an association between a white scurf on the skin and heavy infestations.

Full details of this study will be published.

Yours, etc.,  
 M. D. MURRAY,  
 Senior Research Officer.

McMaster Animal Health Laboratory,  
 Parramatta Road,  
 Glebe, N.S.W.,  
 25th June, 1959.

Commonwealth of Australia  
COMMONWEALTH SCIENTIFIC & INDUSTRIAL RESEARCH ORGANIZATION  
Reprinted from "The Australian Veterinary Journal"  
Vol. 35, No. 4 - Pages 153-155 - April, 1959

## THE CONTROL OF ITCH MITE (*PSOREREGATES OVIS*) IN SHEEP

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### Introduction

The economic loss caused by a parasite must be taken into account when considering the most desirable measures for its control. Although the sheep itch mite, *Psorergates ovis*, was first described by Carter (1941) eighteen years ago there is still very little information available on the economic importance or the prevalence of this parasite in sheep flocks in Australia. Piedler and Du Toit (1955) claimed that in parts of South Africa up to 40 per cent. of all flocks are infested and that in some flocks 90 per cent. of the sheep are infested. It is doubtful if the incidence of itch mite in

Australia is as high as this. In Australia it is usual to find only a small proportion of the sheep in a definitely infested flock showing clinical symptoms of the disease and even among these clinically infested sheep the lesions are usually mild.

The amount of damage done to the fleece is not always related to the size of the mite population as often few mites are found on sheep showing extensive signs of biting and rubbing and heavily infested sheep may show little disturbance of the fleece. The chief clinical symptom, biting and rubbing of the fleece, is only indicative of irritation of the skin and this



symptom may have its genesis in many conditions other than itch mite infestation.

A definite diagnosis of itch mite infestation can only be made if the mites are demonstrated in skin scrapings. With heavily infested sheep demonstration of the mites is comparatively easy, but workers who have been looking for heavily infested sheep for insecticidal tests have found them to be rare in most flocks. It is often necessary to scrape several areas on lightly infested sheep before mites can be found, so that a definite diagnosis is both time consuming and not very reliable. The difficulty in detecting the parasite particularly on lightly infested sheep limits the scope of accurate assessment of the efficiency of the parasite and the assessment of the efficiency of insecticides.

#### Control Measures

Control measures may be aimed at eradicating the parasite or at suppressing the population to a level where the damage it causes results in a negligible economic loss. The complete eradication of any pest is always difficult and generally costly. In the case of this parasitic mite the difficulties are aggravated by the fact that it often is impossible to say whether sheep are infested or not. When itch mite was first discovered, and its potential dangers were unknown, regulations were promulgated to enable the Departments of Agriculture to control infested sheep and to prescribe the treatment they were to receive. Later when the true significance of the parasite became known these regulations were repealed. During the period when the regulations were in force the only acceptable treatment was one which was capable of eradicating the parasite, but now that the regulations no longer apply it is possible to consider treatments which reduce the mite population to a level where it causes no economic loss or what is often called 'economic control'. *Psocoptes* *ovis* lends itself particularly to exercising economic control with chemical treatments which are incapable of eradicating the parasite.

The slow rate of spread of the parasite from sheep to sheep has been observed by many workers. (Graham (1943), Fiedler and Du Toit (1954), Davis (1954), Sinclair (1958)). The rate of increase of the population on a sheep is often slow. Scott (personal communication) has observed that the population shows very little increase on sheep kept under observation for long periods and that there is only a slow increase in the number of clinically affected

sheep in a flock. Because of its low biotic potential once the itch mite population in a flock is reduced, it takes a long time to build up again to a level where it causes an economic loss, probably about two years.

The usual method of applying insecticides or acaricides is by dipping and graziers expect to control all species of obligatory ectoparasites with a single treatment. In Australia the three common obligatory ectoparasites of sheep are body lice (*Damillina ovis*), keds (*Melophagus ovinus*) and itch mite. Of these the body louse is by far the most important economically and has a wide distribution. Keds do not cause such severe damage and are more restricted in their distribution. However because lice and ked infestations are proclaimed diseases which are satisfactorily treated by many insecticides, infestations with these parasites are found only in a small minority of flocks. Graziers, therefore, are generally concerned with the control of itch mite only, occasionally with the control of lice and itch mite and less frequently with the problem of controlling keds and itch mites. For keds and lice the only acceptable treatment is one which will eradicate them but for itch mite it is sufficient to achieve economic control.

#### Testing of Insecticides

When testing an insecticide or acaricide for the control of itch mite it has been customary to carry out preliminary *in vitro* or *in vivo* tests. A wide range of chemicals have been tested by this means and the efficiency of some of them have been reported by (Graham (1943), Fiedler and Du Toit (1955), Murray (1957) and the 2nd Annual Report of C.S.I.R.O. (1950)). These by no means exhaust the list of materials tested as many unreported tests have been carried out by private organisations. The interpretation of these tests is not always easy. When eradication of itch mite is the objective a clear cut line of demarcation can be made and only chemicals which give a complete kill of mites are acceptable. When economic control of itch mite is the objective no such clear cut line of demarcation exists and it is only possible to compare the results with those obtained by some widely used material such as Lime Sulphur or Arsenic.

Irrespective of the results achieved by these preliminary tests it is necessary to test insecticides in the field as field tests also give information on a number of more general requirements for a dip-formulation such as ease

of use, stability, cost, etc. There have been very few published reports on field tests for the control of itch mite.

#### Lime Sulphur

Graham (1943), Keast (1943) and Sinclair (1958) showed that thoroughly dipping sheep in a lime sulphur solution containing 1 per cent. polyphosphide sulphur was capable of eradicating itch mite in a single treatment. Graziers however rarely achieve eradication with a single application due to insufficient attention to the details of dipping procedures. Lime sulphur, however, has a number of disadvantages. It is objectionable to use, it will not control concurrent infestations of keds and lice and it is comparatively expensive. Assuming that on an average three-quarters of a gallon of wash per sheep is required, the cost of materials for dipping 1,000 sheep in lime sulphur solutions is about £100. High on lime sulphur. If a concurrent infestation of lice or keds is present, some supplementary treatment will be necessary. The simplest supplementary treatment is the addition of an aldrin or dieldrin wettable powder to the wash. This will, however, increase the cost of materials by approximately £6 per 1,000 sheep.

#### Arsenical Dips

There is very little direct evidence on the efficiency of arsenical dips for the control of itch mite. Murray (personal communication) obtained satisfactory economic control in one field trial. In general, however, graziers experience little trouble from itch mite while they use arsenical dips. There has been a general increase in clinical cases of itch mite infestation on two occasions when there has been a general trend to use the less efficient dips based on chlorinated hydrocarbon insecticides, i.e., when BHC dips became popular 10 years ago and more recently when there was a change to dieldrin and aldrin dips. The simplest and cheapest arsenical dip is a solution of sodium arsenite used at a wash concentration of 0.2 per cent. arsenic as As<sub>2</sub>O<sub>3</sub>. These liquid arsenical dips cost about £2 10s for enough material to dip 1,000 sheep. The arsenical powder dips cost about three times as much, are more difficult to mix, and there has been no information published to show they are more efficient. Arsenical dips also give a satisfactory control of lice and of keds if rotenone is incorporated in the formulation. On occasions it has been suggested that the efficiency of these arsenical dips against itch mite can be increased by dipping twice at an interval of some weeks. Experience with double dipping for grub control in England shows that the second dipping greatly increases the toxic hazard as well as the expense.

#### Other Preparations

A number of other formulations have been used under field conditions but very little information is available on their performance.

A rotenone-BHC emulsion has been used for some years and is said to give effective control of itch mite. The rotenone content of the wash is about four times as high as that used for the control of keds. The cost of this preparation is high being about £30 per 1,000 sheep on the basis used for calculating the cost of the other materials. The formulation exhausts and a strict dipping

regimen must be followed. The BHC content is high enough to control keds and lice.

The delta isomer of BHC was claimed to give good results against itch mite by Fiedler and Du Toit (1955) when used at a wash concentration of 0.1 per cent. They also stated that the gamma isomer of BHC was antagonistic to the delta isomer and this may explain the failure of commercial BHC to control itch mite even when used at concentrations containing more than 0.1 per cent. delta isomer of BHC Scott (1949), Murray (1957) and Scott (personal communication) both failed to get a satisfactory kill of mites when they used 0.1 per cent. delta isomer in patch tests. Following the work of Fiedler and Du Toit, a mixture of BHC isomers other than the gamma isomer was marketed in South Africa for itch mite control. Scott (personal communication) failed to kill all mites in a patch test using this South African formulation at three times the recommended concentration. A similar type of formulation is being marketed in Australia but no detailed information has been published which would indicate its efficiency against lice, keds or itch mite. The cost of material, on the basis previously mentioned, for dipping 1,000 sheep would be approximately £12. Being an emulsion formulation which exhausts, a strict regimen of usage would have to be followed.

Malathion at a wash concentration of 0.2 per cent. also gave satisfactory results in the tests of Fiedler and Du Toit (loc citi). Murray (1957) also found it to be satisfactory at this concentration. It is estimated that the cost of material for dipping 1,000 sheep in Malathion at 0.2 per cent. would be more than £20. Very little information is available on the general efficiency of this material under field conditions.

#### Discussion

At the present time arsenical liquid dips provide the cheapest material to maintain an economic control of itch mite. Lime sulphur is the most reliable and efficient material tested so far and it may be desirable to use it when clinical cases of itch mite infestation are an acute problem. Some of the newer dipping materials have a lower toxicological hazard than arsenic but it is doubtful if this justifies the use of these materials in view of their higher cost. Itch mite appears to cause little damage where reasonable control measures are used and its importance is frequently magnified mainly to justify the sale of a new type of dip rather than because of the loss it causes the wool industry.

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Itch mite causes little trouble in flocks dipped annually in arsenical liquids. Lime-sulphur is more efficient, but costs about four times as much. Other dips have not yet been fully tested against this parasite.

## controlling itch-mite

IN DECEMBER 1940, several puzzling samples of abnormal fleeces were sent to Mr. H. B. Carter, of the Division of Animal Health and Production. He had never seen anything quite like them before, and to diagnose the trouble he visited the fine-wool Merino property concerned. At first sight some of the sheep seemed to be lousy, but no lice could be seen.

He therefore took some of the animals to the McMaster Laboratory and began a microscopic examination of affected skin and wool. He soon discovered the culprit—a minute mite, no bigger than a speck of dust. It was later identified as a new species, and named *Psorergates ovis*.

Since then the incidence of the sheep itch mite has fluctuated. There was an upsurge about ten years ago, when wool began to replace arsenic in dips. And more recently, after the introduction of aldrin and dieldrin, mite-infested sheep with torn ragged fleeces and a thin wispy staple again became more frequent.

### Few Field Trials

Not many field tests of chemicals for controlling itch mite have been carried out since Mr. N. P. H. Graham, also of the McMaster Laboratory, conducted the first experiments in 1941-43. In preliminary patch tests, he found that a large proportion of mites was killed either by a solution containing 0.2 per cent. of arsenic trioxide, or by a suspension containing 0.005 per cent. of rotenone. Dilute solutions of lime-sulphur, however, eliminated all mites.

A sheep prepared for patch tests at the McMaster Laboratory. This technique of comparing different insecticides on the one animal provides useful preliminary information, but must be followed by field tests under practical conditions.



Field trials by both CSIRO and the New South Wales Department of Agriculture then confirmed that a single dipping with a lime-sulphur solution, containing 1 per cent. poly-sulphide, eradicated itch mite. Nevertheless, due to insufficient attention to dipping procedures, graziers rarely achieve these results in a single treatment and usually have to re-dip once, or even twice, in succeeding years.

Mr. Graham has recently reviewed the whole position of itch mite control in Australia (see *Further Reading*). When the parasite was first discovered, and its potential danger was unknown, State Departments of Agriculture were given the power to order infested flocks to be dipped in lime-sulphur. Later, when it became evident that itch mites were not as serious as was first feared, these regulations were repealed.

### Economic Control

Because of this relaxation we can now consider other treatments as well as lime-sulphur, treatments that cannot eradicate itch mites but which will reduce them to a level where they do not cause appreciable economic loss. Fortunately, *Psorergates ovis* is particularly susceptible to this so-called "economic control". Once itch mites in a flock are reduced, it takes a long time for them to build up again, probably about two years.

In spite of its effectiveness in killing mites, lime-sulphur has a number of disadvantages. It is unpleasant to use, does not control lice and keds, and is comparatively expensive. Assuming that three-quarters of a gallon of wash per sheep is required, the cost of materials for dipping 1000 sheep is about £10-£11, to this must be

added freight charges, which are high on lime-sulphur. If lice and keds are also present, some supplementary treatment will be needed. The simplest is to add aldrin or dieldrin to the wash, but this will increase the cost of materials by about £6 per 1000 sheep.

### Arsenical Dips Cheapest

Mr. M. D. Murray of the McMaster Laboratory observed that arsenical dips gave adequate control in a field trial. Apart from this experiment, there is very little direct evidence on the efficiency of arsenical dips for controlling itch mite. But graziers generally experience little trouble with itch mite while they use arsenical dips for controlling lice. And, as stated above, the parasites have twice increased during periods when arsenical dips were less favoured than newer insecticides.

The simplest and cheapest dip is a solution of sodium arsenite used at a wash concentration of 0.2 per cent. arsenic trioxide. Liquid arsenical dip for 1000 sheep costs only about £2-10s. Incidentally, the arsenical powder dips cost about three times as much, are more difficult to mix, and have not been shown to be more effective.

Arsenical dips also control lice, and keds can be catered for by using a dip containing both arsenic and rotenone. This would increase the cost of materials per 1000 sheep by about £1.

It has been suggested that two dippings at an interval of some weeks would increase the efficiency of arsenic against itch mite. But experience in England has shown that the second dipping greatly increases the toxic hazard as well as the expense.

### DIPS FOR ITCH-MITE CONTROL

compared on a basis of one annual treatment

	Controls	Controls	Ineffective	£2-10s
Arsenical liquid	Controls	Controls	Ineffective	£2-10s
Arsenical powder with rotenone	Controls	Controls	Controls	£8-10s
Lime-sulphur	Eradicates	Ineffective	Ineffective	£10-£11
DIPS FOR ITCH-MITE CONTROL				
	ERADICATES	LICE	KEDS	COST per
Lime-sulphur	Eradicates	Controls	Controls	£16-£17
Aldrin or dieldrin	Probably ineffective	Controls	Controls	£12
BHC isomers (not gamma)	Probably ineffective	Controls	Controls	£12
Rotenone-BHC	Not yet known	Controls	Controls	£30

*DDT, aldrin and dieldrin are ineffective. Little information available on malathion, diazinon and Neguvon as to their effectiveness and relative costs.*

A number of other preparations are on the market, but very little information is available on their performance under field conditions. A rotenone-BHC emulsion has been used for some years and it is claimed that this controls itch mite effectively. The rotenone content is about four times as high as that normally used for controlling keds, while the BHC content is sufficient to control keds and lice. It costs about £30 per 1000 sheep.

South African workers have claimed that 0.1 per cent. of the delta isomer of BHC controls itch mite, but both Mr. Murray and Miss M. I. Scott failed to obtain satisfactory kills with the delta isomer in patch tests at the McMaster Laboratory. Complex formulations based on the delta isomer of BHC are being sold in South Africa and Australia for controlling itch mite, but very little information is available on their efficiency under field conditions. Neither Mr. Murray nor Miss Scott (now with ICI ANZ Ltd.) achieved satisfactory kills with them in patch tests.

Malathion at a wash concentration of 0.02 per cent., diazinon at 0.01 per cent., and Neguvon at 0.01 per cent. all gave satisfactory kills of mites in patch tests carried out by Mr. Murray. However, these successful results were not repeated in field tests with diazinon by Mr. A. N. Sinclair of Sunbeam Corporation Ltd.

To sum up, itch mite appears to cause little damage in flocks where reasonable control measures are used. Its importance is frequently magnified, mainly to justify the sale of a new dip rather than because of the loss it causes to the wool industry. Mr. Graham concludes that the present position is as follows:

- Arsenical liquids are by far the cheapest dips for economically controlling itch mite.
- Lime-sulphur, however, is the most efficient material, and may be preferred when mites are an urgent problem.
- Little information is available on the newer insecticides, but the lower toxicity to sheep of some of them probably does not make up for their higher costs.
- Surface or tip spraying will not adequately control itch mite, no matter what insecticide is used.

### Further Reading

*The Control of Itch Mite (Psorergates ovis) in Sheep.* N. P. H. Graham. *Aust. Vet. J.* 35: 153-5 (1959).  
*Life Cycle of Psorergates ovis (Itch Mite).* M. D. Murray. *Aust. Vet. J.* 35: 152 (1959).

To diagnose itch mite, the skin must be scraped and the debris examined under a microscope.



0301

13 th January, 1962.

Sir,

I am directed to refer to your letter of 22nd December 1961, regarding the control of itch-mite and to give you my assurance that quarantine regulations will in no way be laxed for imported sheep. The Officer-in-Charge Agricultural has in fact been issued with instructions to exercise particular caution when examining incoming sheep for this infection.

I am,  
Sir,  
Your obedient servant,

(Sgd.) H. L. Bound.

for COLONIAL SECRETARY.

The Manager,  
PORT HOWARD.

COPY TO : Officer in Charge Agric. Dept. ✓

HLB/TB

F. I. ref: 1093/II

C. O. ref:

SAVING TELEGRAM.

✓ Copy to Oi/c Ag. Dept.

*From:* The Officer Administering the Government of the Falkland Islands.

*To:* The Secretary of State for the Colonies.

*Date:* 16th February, 1962.

No. 27 SAVING. COLONY

Livestock Insecticides.

Information has been obtained from the October 1961 issue of the New Zealand Journal of Agriculture that the use on livestock of preparations containing aldrin, dieldrin, benzene hexachloride (BHC), lindane, DDT and methoxychlor is prohibited because extensive investigations and testing of livestock products have shown that active ingredients in some insecticides tend to leave residues in the products from treated livestock and that alternative chemicals now available are much safer to use and do not leave residues.

Aldrin and dieldrin are used here for spray dipping of sheep.

I should be glad of advice as to whether the use of these chemicals should be discouraged or prohibited and if so what would be the alternative safer chemicals.

21st January,

63.

T. A. Gilruth Esq.,  
Camp Manager,  
Darwin.

Dear Sir,

With reference to your letter of 16th January, Mr. G. Stewart informs that the Department holds sufficient stock of Gammaxene to dip any sheep which are likely to be imported.

It is, of course, by no means certain that Gammaxene would be 100% effective against Itch Mite in the event of this scourge arriving in the Colony, and in any case Gammaxene appears to have been withdrawn from Cooper's range of Dipping products.

The Falkland Islands Company's letter from London Office dated 29th January, 1962 refers to the new dip which Messrs. Cooper, McDougall & Robertson have produced for controlling Itch Mite but does not give it a name nor have the Company in Stanley any details of it.

Assuming that the new dip contains all the ingredients necessary for the control of parasites other than Itch Mite it is obvious that the Department should, as soon as possible, import sufficient for all probable requirements and obtain from the Ministry of Agriculture the most up-to-date information on the method of controlling the pest.

In the meantime I should point out that according to Section 15 (3) of the Live Stock Regulations sheep imported from South America have to be dipped four times during the 3-month period of quarantine, and if the Department telegraphs for a small quantity of Itch Mite preparation to come by March sailing of "A.E.S" it could be used for the fourth dip of the 12 Corriedale rams which Dean Brothers Ltd. propose to import from Punta Arenas February 1963.

The duplicate copy of your letter dated 16th January is attached to the Officer in Charge, Agricultural Department's copy of this letter.

Yours faithfully,



Chairman.

17 Gilwin.

16th. January. 1963

The Chairman.  
Sheep Owners Association.  
Stanley.

ITCH MITE.

Dear Sir,

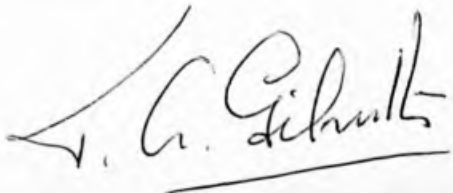
At the S.O.A. Meeting held in July 1962 it was decided to call the attention of the Agricultural Department to the question of ITCH MITE and to enquire if in the event of ITCH MITE arriving in the Colony (on imported sheep) had the Government an effective Dip to control it as Coopers now produce one. (See the Minutes.)

I now learn from Mr. M.C.Waldron that this dreaded ITCH MITE has spread as far south in Argentina as Gallegos ! It could be that by this date that it has spread into Chile which is but a days march south of Gallegos.

It would therefore seem to me that any sheep coming into this Colony from Chile should be Dipped at least once, in Coopers Dip preperation to control ITCH MITE. THIS IS OF THE VERY FIRST IMPORTANCE.

We, in these Islands are very fortunate in being free from the many sheep diseases that hamper and baffle farmers in other parts of the world. I trust that this state of affairs may long continue - but the one way to ensure that we keep clear is to enforce very strich Quarantine Rules and in the case of ITCH MITE an effective Dip is called for.

Yours faithfully,



Camp Manager.

The Falkland Islands Sheepowners Association,

(LOCAL COMMITTEE)

STANLEY, FALKLAND ISLANDS.

21st January, 1963.

The Officer in Charge,  
Agricultural Department,  
STANLEY.

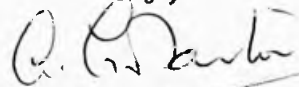
Dear Sir,

ITCH MITE.

I enclose a copy of Mr. Gilruth's letter of 16th January with reply attached.

You will note that in the fifth paragraph I have suggested that the forthcoming shipment of sheep for Dean Brothers Ltd. from South America should be dipped with Messrs. Cooper's new preparation and I assume that in the general interests of sheep-farming you will arrange for a supply of the dip to be available for the purpose.

Yours faithfully,



CHAIRMAN.



DECODE.

TELEGRAM SENT.

From GOVERNOR to SECRETARY OF STATE

Despatched: 23.1.63 Time: 1100 Received: Time:

No. 10. Am concerned about danger of itchmite spreading to sheep in Falklands. Consignment of 12 sheep arriving from Punta Arenas about 19th February. Am advised Coopers have made new preparation for dipping sheep to eliminate itchmite. Grateful for advice as to whether this is affective or whether anything else is better. Please request Crown to send enough for at least 30 sheep of this or other preparation recommended. Should be shipped A.E.S. leaving England February or March.

Governor

P/L : RHDM/LH

Copy to OIC ~~Agie~~

DECODE.

No. 19.

TELEGRAM.

From Crown Agents, London.

To Colonial Secretary, Stanley.

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Despatched :            5th February,        1963.        Time : 1145  
Received :              6th February,        1963.        Time : 1000

for Governor.

Your telegram No. 10 dated 23rd January. Coopers Veterinary Surgeon in Chile investigating suspected itchmite. Believe may be resistant scab for which itchmite preparation useless Cooper suggest you await results of veterinary tests in about two weeks.

Crown

P/L : LH  
(Intld.) DM

Copy to OIC Agric.

B

No. 2287

MEMORANDUM

It is requested that, in any reference to this memorandum the above number and date should be quoted.

August, 1963.

To: Officer-in-Charge,  
Agricultural Department,

From: Acting Colonial Secretary,  
Stanley, Falkland Islands.

STANLEY.

SUBJECT :-

DOG ILLNESS AT BLUFF COVE

I am directed to refer to the recent outbreak of an illness among the dogs at Bluff Cove and to request that you submit a brief report on the case showing the methods used to combat it and the results obtained.

*L. Stansell*

ACTING COLONIAL SECRETARY

HLB/FH

15th August, 63.

Sir,

I am directed to refer to previous correspondence relating to the importation of live stock to the Falkland Islands from Uruguay and to say that due to the risk of introducing live stock diseases (particularly foot and mouth) it has been decided to suspend the importation of cattle from any part of South America and to limit sheep from that area lying south of Rio Gallegos. This arrangement is a provisional one and has been applied pending receipt of further information on the subject.

2. Meanwhile I have received an application to import a donkey from Montevideo and wonder if you would be good enough to seek advice on this point from your Agricultural Attache in Buenos Aires and advise me accordingly. At the moment we have no restriction governing the import of horses, mules or donkeys from South America except the general requirement that all live stock imported from a foreign country must be accompanied by a written declaration from the exporter made before a British Consular Officer to the effect that the animal was free, on embarkation, from any infectious or contagious disease and had not been within 30 days preceding shipment in contact with infected stock.

I am,  
Sir,  
Your obedient servant,

(Sgd) W. Gleadell

ACTING COLONIAL SECRETARY.

H.B.M. Ambassador,  
British Embassy,  
Montevideo,  
URUGUAY.

Copy to Agric. Officer. ✓

HLB/IW.

## Leucocytozoon caulleryi Infection

### A Note on Recent Outbreaks in the Far East

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By R.B. Griffiths  
FAO Regional Veterinarian for the Far East

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#### Introduction

Within recent years several serious outbreaks of acute leucocytozoonosis in fowls have been reported from Japan, Taiwan and Burma. It is probable that the disease reported from Thailand as Bangkok Haemorrhagic Disease is leucocytozoonosis.

In Japan and in Burma, the species which has been identified in outbreaks is Leucocytozoon caulleryi.

#### Symptomatology

The disease, which generally affects birds at 3-5 months of age, is acute. Before death, an infected bird may show symptoms which comprise the expectoration of blood-stained ropy mucus from the respiratory tract, or the passage of blood per the cloaca, but very frequently birds die without showing symptoms at all. The mortality rate is frequently about 20 percent in affected flocks, but this figure may be exceeded.

#### Pathology

At autopsy, extensive haemorrhages are found in the lungs and kidneys. There may be gross haemorrhage from the kidneys into the peritoneal cavity. In addition to haemorrhages, megaloschizonts, which are greyish-white structures, are seen scattered throughout the lungs and kidneys as well as in the liver, spleen, pancreas, ovaries, testes, on the mucous membranes of the alimentary and respiratory tracts, on all the serous membranes, the meninges, and in the subcutaneous fascia.

In the visceral organs, the megaloschizonts frequently occur as scattered individual bodies measuring up to 300 microns in diameter; each is therefore just visible to the naked eye. They also occur in groups in these organs, but the tendency to the formation of collections of megaloschizonts is more pronounced on the mucous and serous membranes. A group of megaloschizonts, which may consist of several of these structures, is frequently oval in shape and may reach 1.5 mm. x 2 mm. or more in size. A group of megaloschizonts frequently has a variegated greyish-white and red appearance which results from the entry of blood into the interior of megaloschizonts that have discharged their merozoites.

Depending upon the stage of the infection when examination is made, blood smears stained with a Romanowsky stain, e.g. Giemsa, show one or more of the following:-

- (a) merozoites in the plasma
- (b) merozoites in the erythrocytes
- (c) developing gametocytes in immature erythrocytes
- (d) extra-cellular mature gametocytes.

It should perhaps be noted that the gametocytes of L. caulleryi are round or oval in shape, and when they are developing in the host cell they cause a round distortion of the cell in contrast to the spindle-shaped distortion which occurs with other species of Leucocytozoon.

#### Diagnosis

Diagnosis depends upon finding the stages listed above. It is unnecessary to section tissues to discover megaloschizonts in the tissues. Crush preparations, prepared by crushing small portions of lung, kidney or other tissues between two glass slides, serve adequately for the demonstration of megaloschizonts by naked eye examination or observation under low power magnification.

#### Differential diagnosis

The field worker should be careful not to confuse leucocytozoonosis with fowl cholera. The small greyish-white foci in the liver resemble superficially the hepatic lesions in fowl cholera, but a crush preparation will show megaloschizonts in cases of leucocytozoonosis and blood smears will reveal the absence of Pasteurella multocida. When groups of megaloschizonts are found under the serosa of the intestine, and especially when haemorrhage has occurred into ruptured megaloschizonts, the intestinal lesions may resemble those caused by Eimeria necatrix. Examination of the lesions with a hand lens will, however, reveal the presence of megaloschizonts.

#### Transmission

It has been shown in Japan that L. caulleryi is transmitted by the ceratopogonid fly Culicoides arakawae. This species of fly occurs also as an important pest of poultry in lower Burma; here transmission by the fly has not been proved although epizootiological evidence suggests that it may be a vector.

Control

At present it is not possible to make any recommendations for control. No drug has yet been found which has any action on stages of the parasite in the avian host. The control of C. arakawae whose breeding stages are to found extensively on paddy fields and marsh land is not yet feasible.

Since there is evidence that L. caulleryi infection is becoming very important as a cause of loss in fowls in Southeast Asia, the Food and Agriculture Organization would appreciate it if veterinary authorities in countries where the infection is enzootic would supply FAO with information on outbreaks as they occur.



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OCT. 10 1963 - 45

...

Attached herewith is a note on recent outbreaks of  
Leucocytozoon caulleryi infection in the Far East.

This disease, which has been known for a considerable number of years, appears to be on the increase in South East Asia. It is capable of causing very heavy losses in poultry, and potentially could become a disease of considerable economic importance everywhere.

Its importance as an "emerging disease" especially in the Far East region, is obvious and it is considered that all veterinary services should maintain a careful watch for the appearance of this condition in their areas.

K.V.L. Kesteven  
Director  
Animal Production and Health Division



No. \_\_\_\_\_

MEMORANDUM

It is requested that, in any reference to this memorandum the above number and date should be quoted.

5th August 19 65

To: The Honourable, \_\_\_\_\_

The Colonial Secretary, \_\_\_\_\_

Stanley. \_\_\_\_\_

From: The Officer-In-Charge, \_\_\_\_\_

Agric. Dept.

Stanley, Falkland Islands.

SUBJECT :-

Inspection of Dogs.

I refer to paragraph 3 of your letter of the 23rd July, 1965 and to inform you that 87 dogs are licensed in Stanley plus 13 unlicensed, therefore the Agricultural Department will require the necessary drugs to cover 100 dogs.

*L. J. G. G. G.*  
Officer - In - Charge,  
Agricultural Department.

29<sup>th</sup> Jun. 1972.

Dear Leo,

At last I have got round to putting pen to paper! How are things in Stanley? I trust you are languishing in a warm summer, whilst we are fighting our way through the misty darkness of sprawling Manchester!

Regarding the reets, these have been identified by Dr. Henderson at Edinburgh, and he has asked if some dried specimens, other than the preserved ones could be procured. So I wonder if you could arrange this?

If some neat-erected leaves of tussach, sea cabbage, and any other plants neat-is allan, could be pressed flat in blotting or newspaper, dried for a day or so, and then posted to Dr. Henderson,

Royal Botanic Gardens, Edinburgh, EH3, 5LR. If a note of date and location of collection could be included this would also help.

The best place for the sea cabbage is probably New Island or Port Stephens (near Cape O'Connell) & the neat-can come from anywhere, but West Point / New Island may be the best again.

Apparently the problem is deciding which species the reets are, and this is best done on the colour of spores, which is lost in the pressed specimens.

I must admit, though, the prospect of control seems a very bleak one indeed, but we'll come to that in the report.

Had better get this in the post. All the best Leo, regards to Peggy.

C Dees,

/im

10th April,

75.

Dear Tim,

Many thanks for your letter - good to hear from you.

I tried to get the tussock and sea cabbage from West Point Island but so far have only been able to get the tussock. In fact Margaret Davidson write and told me she had never seen rust on sea cabbage! I will now try New Island and Port Stephens. I have forwarded the tussock to Dr. Henderson.

Our summer has not been very good - rather too much rain, but this back end has been good - so good in fact some of the Farms are worried about the lack of water.

Peggy joins me in sending all good wishes and regards

P.S. I am enclosing a letter from Margaret Davidson .