

Researches into Dips and Dipping.

A. Lime-Sulphur Dips.

Paper V. The minimum effective concentration of Lime-Sulphur Dips for Sheep scab eradication.

By

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THE official strength of lime sulphur dips, viz., 1·5 per cent. sulphide sulphur—recommended by the Union Department of Agriculture seems to have been adopted as a result of the specifications of the American Bureau of Animal Industry. In the American B.A.I. Order No. 263 of 1st July, 1919, it is specified that lime-sulphur baths shall be maintained at a strength of not less than $1\frac{1}{2}$ per cent. of "sulphid sulphur". Regarding the lowest effective strength it is interesting to note thereanent the precise wording of the Order (pp. 19-20): "No dip other than the lime-sulphur or the nicotine dip will hereafter be given Department permission for use in official dipping for scabies, unless it has been shown to the satisfaction of the Bureau (1) that the strength of the bath prepared therefrom may be satisfactorily determined in the field by a practical portable testing outfit; (2) that under actual field conditions the dipping of cattle in a bath of definite strength will effectually eradicate scabies infection without injury to the animals dipped". From this one is led to conclude that the Bureau considered any appreciable deviation from this specified strength of 1·5 per cent. as a rather serious matter. Whether this attitude on the part of American authorities has subsequently been changed in any way, we have not been able to determine.

However, certain experiments carried out at Onderstepoort in 1915 by Bedford and Green with soda-sulphur (sodium polysulphide) solutions showed that the minimum effective concentration against sheep scab must be somewhere between 0·31 and 0·64 per cent. polysulphide sulphur. In a Bulletin issued by the Union Minister of Mines and Industries, Green (1919) suggested that the American standard of 1·5 per cent. sulphide sulphur for sheep scab was empirical and in all probability unnecessarily high. A strength of 1 per cent. was suggested as adequate.

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In the following experiment, conducted at Onderstepoort, an attempt was made to determine the actual minimum effective concentration. The sheep were dipped individually, each animal being kept immersed for a full two minutes and its head ducked twice during this operation. A second dipping was given nine days after the first. In every case the ears were thoroughly hand-treated with a mixture consisting of two parts linseed oil to one part paraffin. The different groups were isolated in different pens, care being taken not to put a dipped group back into a still infected pen.

EXPERIMENT No. 4589.

Test No. 1.

- 10.2.1932. The following six sheep badly infected with scab dipped in Capex Lime-sulphur (strength 0·92 per cent. polysulphide sulphur): Nos. 31158, 31589, 31831, 31951, 31999 and 32100.
- 19.2.1932. Second dipping. Strength 0·85 per cent. polysulphide sulphur.
- 20.2.1932. Sheep No. 32100 died of general debility due to scab infection.

Result.—No scab parasites were found on the sheep either after the first dipping or up to six months after the second dipping.

Test No. 2.

- 10.2.1932. The following six sheep badly infected with scab dipped in Capex Lime-sulphur (strength 0·72 per cent. polysulphide sulphur): Nos. 31690, 31695, 32083, 32144, 32276 and 32354.
- 13.2.1932. Sheep No. 32354 died.
- 20.2.1932. Second dipping. Strength 0·77 per cent. polysulphide sulphur.

Result.—No scab parasites were found on the sheep either after the first dipping or up to six months after the second dipping.

Test No. 3.

- 16.2.1932. The following six sheep badly infected with scab dipped in Capex Lime-sulphur (strength 0·47 per cent. polysulphide sulphur): Nos. 31141, 31143, 31665, 31781, 32166 and 32314.
- 25.2.1932. Second dipping. Strength 0·47 per cent. polysulphide sulphur.
- 1.3.1932. Sheep No. 31143 died as a result of scab infection and myiasis.

Result.—No scab parasites were found on the sheep either after the first dipping or up to six months after the second dipping.

Test No. 4.

- 5.4.1932. The following six sheep badly infected with scab dipped in Capex Lime-sulphur (strength 0·29 per cent. polysulphide sulphur): Nos. 31488, 31645, 31715, 31922, 32028 and 32200.
- 14.4.1932. Second dipping. Strength 0·31 per cent. polysulphide sulphur.

Result.—No scab parasites were found on the sheep either after the first dipping or up to six months after the second dipping.

Test No. 5.

- 1.6.1932. The following six sheep badly infected with scab dipped in Capex Lime-sulphur (strength 0·2 per cent. polysulphide sulphur): Nos. 27589, 28700, 31166, 31540, 31967 and 32133.
- 6.6.1932. A few live acari found on each of the sheep.
- 10.6.1932. Second dipping. Strength 0·2 per cent. polysulphide sulphur.
- 12.7.1932. All sheep found to be infected.

Result.—The dip did not cure the sheep of scab.

Test No. 6.

- 13.7.1932. The following 16 sheep, badly infected with scab, dipped in Capex Lime-sulphur (strength 0·25 per cent. polysulphide sulphur): Nos. 31269, 31436, 31463, 31500, 31514, 31516, 31519, 31536, 31581, 31616, 31650, 31766, 31793, 31909, 32091 and 32323.
- Sheep No. 31269 died after dipping.
- 22.7.1932: Second dipping. Strength 0·3 per cent. polysulphide sulphur.

Result.—The dip failed to cure the sheep of scab. Acari were found on the sheep at various periods after they had been dipped. On a few of the animals only fresh lesions were found, indicating that they had become reinfected through coming in contact with the infected sheep.

SUMMARY AND CONCLUSIONS.

The above tests demonstrate that lime-sulphur dips used at a strength varying between 0·9 and 0·3 per cent. polysulphide sulphur may be effective in curing sheep of scab when badly infected. When used at a lower concentration it was found to be ineffective. In one test, however, in which the strength of the first dip was 0·25 per cent. and the second dip 0·3 per cent. polysulphide sulphur, some of the sheep were apparently cured of the disease as only fresh lesions could be found on them, indicating that they had become reinfected through contact with others which were not cured. It is obvious, therefore, that the dip, when used at a strength of 0·3 per cent., cannot always be relied upon to cure animals of scab, and should, in the interests of safety, be avoided at all stages in the process of dipping.

REFERENCES.

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