

Bulletin 766

Phenothiazine-Salt Mixture, Free Choice,
for the Control of the
Large Stomach Worm in Range Sheep

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An 8-year Study Conducted Under the Natural
Range Conditions of the Edwards Plateau

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DIGEST

An 8-year study conducted under practical range conditions typical of the Edwards Plateau of Texas indicates that the large stomach worm of sheep can be controlled satisfactorily through the continued use of a 1-to-9 phenothiazine-salt mixture supplied free choice as a method of treatment.

Two groups of sheep were used. One group had access, free choice, to the phenothiazine-salt mixture for the entire period; the control group had access, free choice, to white salt only.

No apparent toxic effects were noted in any of the animals having continued access to the medicated mixture despite the long period of treatment.

Comparison of worm-egg counts, larval development in dung samples, and actual worm counts at autopsy indicate that the 1-to-9 phenothiazine-salt mixture satisfactorily controlled the large stomach worm in range sheep.

While these findings may be applicable to similar or more arid regions, they may not lend themselves to practical application in areas of greater rainfall and different topography.

Phenothiazine-Salt Mixture, Free Choice, for the Control of the Large Stomach Worm in Range Sheep

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THE SHEEP INDUSTRY is by far the most important phase of the agricultural economy of the Edwards Plateau of Texas, and it is in this area that most of Texas' sheep population is located. This plateau lies in West-central Texas east of the Pecos River, and extends eastward nearly to Austin. Its northern extent is marked by the city of Big Spring, and the southern limit corresponds roughly to a line between the cities of Austin and Uvalde. The region contains more than 34,000 square miles.

The annual rainfall is relatively light, the average recorded at the Sonora station for a 30-year period being approximately 24 inches. Elevation at the Sonora station is approximately 2,400 feet above sea level. This combination of light rainfall and relatively high elevation is favorable for sheep raising, and the general type of range vegetation, too, is excellent for the purpose.

Generally, mixtures of bunch and turf grasses, weeds and browse occur on each ranch. When the grasses and weeds become depleted during winter and in periods of drouth, sheep can subsist almost entirely on low-growing trees and shrubs. It is generally believed that the bunch grasses common to many pastures fail to provide adequate protection for parasite eggs and larvae against the strong sunlight, but the turf grasses do provide a protective environment for them. The sparsity of the range vegetation necessitates the grazing of limited numbers of sheep in large pastures, a practice which contributes greatly to the natural control of parasites.

The large stomach worm, *Haemonchus contortus*, is the most important internal parasite of sheep on the Edwards Plateau. Before the use of phenothiazine drench became general in the early 1940's, losses due to the stomach worm had made serious inroads on the local sheep industry. During these and subsequent years, there came about the general acceptance of the routine use of phenothiazine drench and one of the major obstacles to profitable sheep raising was overcome.

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The several disadvantages associated with drenching large flocks of sheep were in part responsible for the establishment of the long-term trial described herein. The disadvantages include labor and the time required for gathering sheep, weight loss resulting from holding in pens, and occasional injuries with subsequent screwworm infestation. Although the authors believe that the regular use of phenothiazine-salt mixture is more economical than the practice of drenching, the factors mentioned are so extremely variable that an attempt to estimate the actual money saving is almost impossible. When these factors are not considered, the cost of each of the two methods is approximately the same.

Since the beginning of the experiment in 1945, many of the Edwards Plateau sheep raisers have become acquainted with the administration of phenothiazine in salt as described in this bulletin and endorse it enthusiastically. They have found that it is practicable and that it controls the stomach worm satisfactorily.

REVIEW OF LITERATURE

Since the discovery, in 1938, that phenothiazine is of value as an anthelmintic, or worm medicine, an impressive amount of literature dealing with the subject has accumulated. Phenothiazine is generally conceded to be the most effective, the least toxic and the most widely used medication for the control of round-worm parasitisms of sheep.

Some of the first work with phenothiazine-salt mixtures for control of parasite infestations was conducted late in 1939, and the ensuing years produced many experiments in which such mixtures were used in various concentrations and under many different conditions, both in this country and abroad. Most of the workers carried out short-term experiments, some for only 3 or 4 months. A few studies have extended a year or more, however, and the longest study heretofore published covered the 4-year use of the mixture in West Virginia, where a 1-to-14 mixture was reported to provide good control without supplemental drenching.

PURPOSE OF THE EXPERIMENT

The purpose of the study reported in this bulletin has been to determine whether a 1-to-9 phenothiazine-salt mixture could be used as the sole means of controlling stomach worms in sheep maintained under practical range conditions on the Edwards Plateau.

PROCEDURE

Although preliminary trials with phenothiazine-salt mixtures of varying concentrations were conducted in 1941, the work reported in this bulletin did not begin until May 1945. Unpublished tests conducted from 1941 through 1944 indicated the possibility of controlling stomach-worm infestations by such a method.

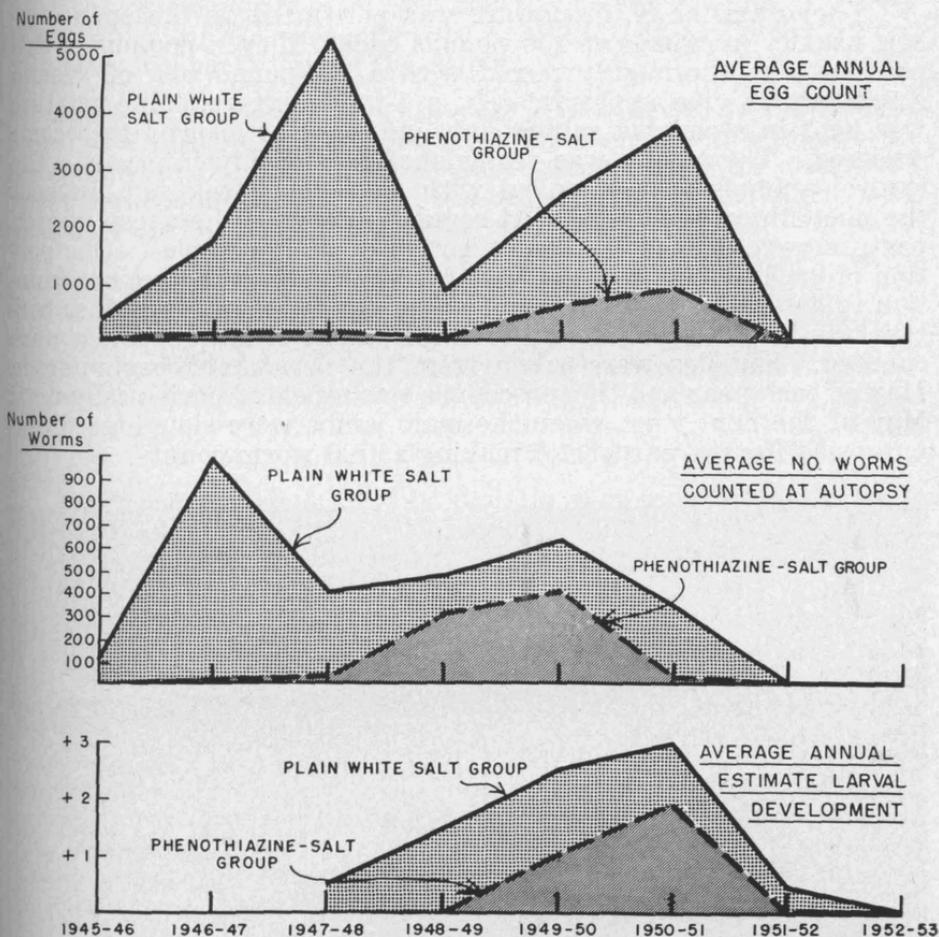


Figure 1. A comparison of the treated and control flocks of sheep based on worm-egg content of dung samples, larval development in the dung and actual worm counts at autopsy.

The sheep used in this study were purebred Rambouillet ewes which were bred to lamb in November and December of each year. They were maintained under conditions typical of the local ranches. No shelter was needed because of the mild winters. The ewes lambed in the pasture without special attention, and the lambs were thereafter kept in those same pastures for the duration of their lives, except for the brief periods when they were penned for the collection of dung samples. When the ewes became too old for breeding, they were sent to market.

Two adjoining pastures were used for the experiment. One, a 400-acre pasture, was stocked with 60 to 75 breeding ewes which had continued access, free choice, to the phenothiazine-salt mixture. Fourteen to 18 ewes in a 100-acre pasture constituted the controls. Both pastures were adjudged to be similar in their vegetative covering.

Phenothiazine N. F. powder was purchased on the open market, usually in drums of 150 pounds each. Eleven pounds of this powder were thoroughly mixed with a 100-pound bag of ground stock salt to give approximately a 1-to-9 mixture. The mixture was kept in a covered salt trough and was not allowed to become depleted. The supply was replenished at monthly intervals. The control animals were supplied with the same stock salt, without the phenothiazine powder. At regular intervals, the sheep in each pasture were penned for the collection of dung samples. One portion of each sample was subjected to routine microscopic examination to determine the number of worm eggs present. Another portion was incubated to allow the development of larvae, which were counted. Samples were taken from the new lambs beginning in May of each year and this procedure was repeated periodically until May of the next year, when the male lambs were slaughtered and autopsied for the purpose of making actual worm counts.



Figure 2. When sheep and cattle are pastured together, the phenothiazine-salt mixture can be placed in a low-style, covered salt trough for the sheep, but plain white salt should be provided for the cattle in troughs so high that the sheep cannot reach them.

RESULTS

No evidence of phenothiazine toxicity was observed. This is in accordance with the observations of others who have conducted studies on the use of phenothiazine-salt mixtures. Many of the animals in the treated flock attained the age of 6 to 8 years before being marketed and had never received any salt except that contained in the phenothiazine-salt mixture.

The rate of phenothiazine-salt consumption was slightly less than one-third pound per sheep per month. This rate varied con-

siderably from month to month and from year to year, and was probably due to the presence each year of growing lambs in the pasture and to variations in the annual rainfall.

The accompanying graphs present a comparison of the treated and control flocks of sheep, the bases for comparison being worm-egg content of dung samples, larval development in the dung and actual worm counts at autopsy. Studies on larval development were made only during the last 5 years of the study.

A reflection of the most severe drouth ever recorded in West Texas is apparent in the zero value of egg counts in 1951-53. Although a few worms were counted at autopsy at the end of that period, the method used for egg counts was not sensitive enough to reveal their presence in such small numbers.

ACKNOWLEDGMENTS

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