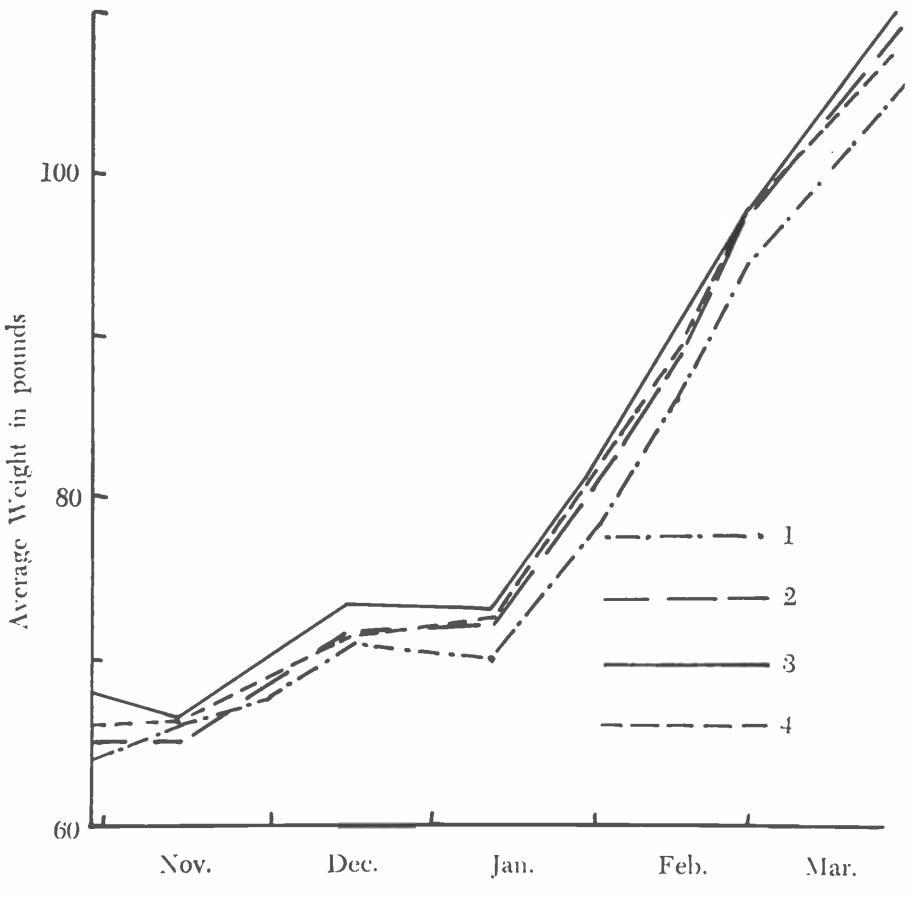
Sheep Bot Fly in Arizona

*by George W. Ware, Leonard W. Dewhirst & Roy Echeverria**

This is a success story of perhaps the widest range and variety of cooperation of any project in the history of the College of Agriculture. It concerns Roger S. Buchanan, a graduate student from New Zealand, who came to the University of Arizona to work on his doctoral degree in entomology.

Roger's research and support were financed by the Dow Chemical Co., and the Chemagro Corp., manufacturers of the chemicals he tested against the sheep bot fly. This financial support was a critical point, because at the time he began his studies (1966) the University had a ruling preventing the employment of alien students.

His research concerned the value of systemic insecticides in controlling the sheep bot fly (*Oestrus ovis* L.), sometimes referred to as the sheep nose bot. The maggot of this fly lives and grows to full development in the nasal and sinus cavities of sheep, goats and sometimes their wild relatives.



The graph above shows average group weights of lambs receiving different treatments for bot fly larval control. Weights were corrected for shrinkage during weighing.

The problem began in the Department of Entomology, but rapidly became involved in the Department of Animal Pathology and later the Department of Animal Science.

The study was planned to test a number of systemic insecticides against the sheep bot fly and determine whether such a program was economical in lamb feeding operations in Arizona. The research began in Tucson, moved to Chambers and Window Rock on the Navajo Indian Reservation, returned to a large Casa Grande feedlot and was completed in the Swift & Co. packing plant in Los Angeles.

Several tests were conducted with the bot fly control in sheep from 1966-68. The overall effort was to eventually test the most successful insecticide formulation on a large herd of feeder lambs to determine if treatment and the resulting increased production would be profitable.

The first tests on Navajo sheep and goats brought to the University Experiment Station in Tucson indicated Ruelene wormer drench was superior in sheep bot fly larvae control (See Table 1). Based on this information a large scale test was begun on 400 Navajo lambs brought to the Echeverria Feeding Co., under supervision and contract with its owner Dr. Roy Echeverria, D.V.M. (also a U of A alumnus).

In October 1967, the 400 lambs were divided into four groups of 100 and given the following treatments at the indicated times:

Group	*Ruelene Drench*	*Thiabendazole*
1	**Oct. 21**	**None**
2	**Oct. 28**	**Oct. 28**
3	**Jan. 5**	**Oct. 21**
4	**None**	**Oct. 21**

Group 1 was intended to compare Ruelene as an an-

* *Head, Dept. of Entomology; Professor, Department of Animal Pathology; and Practicing Veterinarian, Casa Grande Animal Hospital, respectively.*

Table 1. Treatments given groups of five lambs and goats and bot fly numbers recovered after slaughter.

Treatment[a]	larvae recovered
Lambs	
Control	91
Co-Ral dip	19
Co-Ral feed additive	102
Ruelene feed additive	15
Ruelene wormer drench	0
Ruelene 8R pour-on	17
Maretin feed additive	53
Tiguvon water additive	76
Tiguvon oral drench	8
Goats	
Control	4
Maretin oral drench	7
Maretin oral drench	16
Co-Ral feed additive	4

[a]*Lambs and goats treated November 14 and December 13, 1966, respectively.*

thelmintic (wormer) with thiabendazole (Group 4). Group 2 would show the lamb production as weight gains in worm- and bot-free lambs. Group 3 would show the effect of drenching late in season, while Group 4 served as the control and would show the effect of all stages of bot fly larvae infections in worm-free lambs.

After 5 months of hay-cube feeding, alfalfa grazing and finally spring desert grazing, all of the lambs were trucked to Los Angeles and slaughtered in the Swift & Co. packing plant. There in the plant 20-25 heads of each group were thoroughly examined by Buchanan, Ware and Echeverria for bot fly larvae and each carcass was weighed and evaluated on 9 different classifications. The grading of carcasses was done by Dr. John Marchello and a graduate student, Forrest Dryden, both from the Department of Animal Science.

Statistical analyses were conducted on all data gleaned from these weights and gradings, to determine whether there was any difference in the means of the grades between treatment groups.

The results of lamb growth are shown in Figure 1, and the sheep bot larvae counts for each group in Table 2. The head examinations showed very good control of larvae in treated groups. There was no significant difference between treatment groups with regard to performance characteristics such as growth rate and carcass evaluation.

Several other smaller tests were conducted over the two-year period involving the control of gastrointestinal nematodes and the sheep ked. The first tests, illustrated in Table 1, were also studied for activity against gastrointestinal nematodes. Nematode counts from the abomasa and small and large intestines showed that Ruelene, Co-Ral dip and Maretin feed additive gave the best control.

Fifty ewes belonging to the herd of Richard Lynch on the Navajo Indian Reservation, received Maretin drench at 50 mg/kg. Egg counts in fecal samples for one month after treatment indicated good control of gastrointestinal parasites.

In another test, part of Richard Lynch's herd was sprayed with Dursban and compared with those sprayed with Ronnel. Wettable powder and emulsion sprays of Dursban were applied at 0.0125 and 0.05% to groups of 50 to 50 ewes. Ked counts for one month following treatment were compared with a group sprayed with a 0.25% emulsion of Ronnel, and a control group. All Dursban formulations except the 0.0125% emulsion equaled or surpassed the Ronnel standard.

Table 2. Bot fly infestation summary from lamb head examination at slaughter.

	Treatment[a] 1	2	3	4
No. heads/sample	20	20	20	25
Avg. No. larvae/head	0.05	0.15	0.15	3.12
% heads infested	5	10	10	64
Larvae/head (range)	0-1	0-2	0-2	0-16
% reduction	98.4	95.2	95.2	0.00
Total No. larvae	1	3	3	78

[a]*Groups received the following drenches at the indicated times: (1) Ruelene Oct. 21; (2) thiabendazole Oct. 21, Ruelene Oct. 28; (3) thiabendazole Oct. 21, Ruelene Jan. 5; and (4) thiabendazole Oct. 21.*

SUMMARY — These results confirm those of other workers showing that systemic insecticides are active against a wide range of parasites. Since, however, it was not economical to treat for bot fly infestation in the feedlot and there are cheaper wormers than Ruelene, it is suggested that, under conditions similar to those of these trials, systemics should not be recommended for control of bot fly or nematode alone. Where the bot, gastrointestinal nematodes and sheep ked occur together in a flock, a different set of economic parameters exists and a systemic treatment, effective against all parasites, may be administered alone, or once in a wormer regimen.

Sampling methods used on sheep to determine sheep tick infestation. Arrows mark characteristic location of sheep tick on ram shoulders.