SLIP PLOWING

in non-stratified clay

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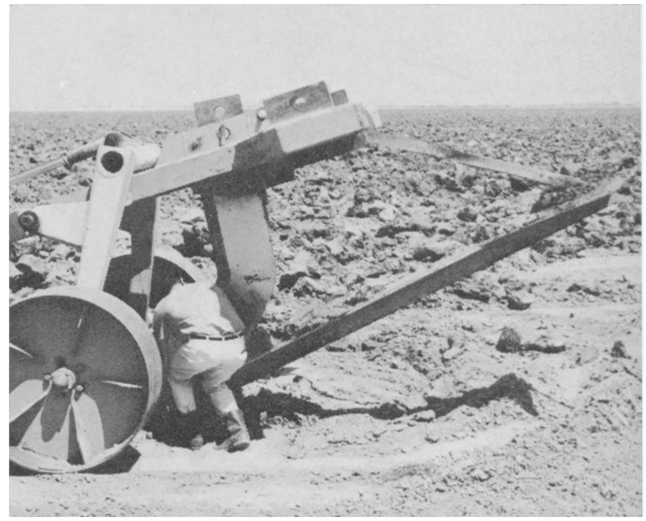
Top photo to left of slip plow shows blade and "V" at top to spread out soil. Because slip plow does not invert the soil, the saltier layers remain in the subsurface horizons, as shown in photo to left. Soil slit is opened with the chisel and widened by the slip plow blade (right photo). Slight uplift but no inversion of soil layers results from slip plow operation (photo below).



Since 1962 the slip plow has been used extensively to improve drainage of perched water tables in Imperial Valley. This implement is a modified soil chisel with a flat plate 8 to 12 inches wide attached to its back from the chisel point to the aboveground portion. The upper section has a V-shaped flare to push loose soil away from the slit opened by the plow. Slits from a depth of 4 to 6 feet are common.

The slit opened by the plow is believed to allow the subsoil to dry and crack, thereby permitting greater lateral water movement and, hence, greater leaching of salts. The use of this equipment in stratified soils allows the less permeable layers to be opened into the more permeable ones. This facilitates water movement and increases the rate at which the water table drops. This study was conducted to determine the effect of slip plowing on the drainage characteristics of a non-stratified clay soil. (Of 300 mechanical analyses run in this soil to a 5 feet depth, only 5 per cent did not fall in the clay designation.)

The 40-acre field used for this investigation was tiled at a 6 feet depth on 120-foot intervals. The field was divided into

TABLE 1. EFFECT OF SOIL TREATMENT ON SOIL LEACHING EXPRESSED AS A REDUCTION IN CONDUCTIVITY OF A SATURATED SOIL EXTRACT OBTAINED 15 FT AND 60 FT FROM TILE TRENCH. PLUS SIGN INDICATES GAIN IN CONDUCTIVITY

Depth feet	Chiseled to 22 inches				Depth feet	Slip plowed to 48 inches				Depth feet	Untreated			
	15 feet		60 feet			15 feet		60 feet			15 feet		60 feet	
	Prior*	After†	Prior*	After†		Prior*	After†	Prior*	After†		Prior*	After†	Prior*	After†
	mmho/cm					mmho/cm					mmho/cm			
0–1	0.65	0.61	0.90	+0.23	0–1	0.76	1.46	0.21	1.60	0–1	0.38	4.79	2.50	1.46
1–2	0.16	0.01	+0.21	1.00	1–2	1.74	0.30	+0.20	1.79	1–2	0.08	2.30	1.67	+0.69
2–3	+0.11	+0.56	0.18	1.17	2–3	1.33	0.74	+0.05	1.75	2–3	+0.06	1.81	0.41	0.63
3–4	+0.63	0.54	0.65	0.99	3–4	+0.52	1.08	+0.58	1.72	3–4	+0.32	1.37	0.58	0.65
4–5	+1.54	0.99	+1.03	1.88	4–5	+0.16	0.97	+1.07	1.52	4–5	0.53	1.22	0.78	0.12

* Reduction in conductivity due to leaching untreated soil.
† Reduction in conductivity due to leaching treated soil.

TABLE 2. SALINITY OF SATURATED SOIL EXTRACT TO 5 FT DEPTH AFTER SOIL TREATMENTS AND AFTER LEACHING (MEAN OF FIVE SAMPLES)

Depth	Soil treatment								
	Chisel 22 inches (Leached for 30 days)			Slip plow 48 inches (Leached for 30 days)			Untreated (Leached for 60 days)		
	Feet from tile trench			Feet from tile trench			Feet from tile trench		
	0	15	60	0	15	60	0	15	60
	mmho/cm			mmho/cm			mmho/cm		
1	3.87	6.45	8.45	5.05	5.93	6.74	2.47	5.10	6.56
2	5.65	7.84	7.88	6.37	6.69	6.97	3.47	6.58	9.33
3	7.70	10.22	9.64	9.22	8.79	9.23	4.94	8.88	10.09
4	9.42	10.78	10.10	10.91	10.13	10.52	6.27	10.29	10.58
5	9.47	10.67	9.73	11.21	10.36	10.72	7.16	10.01	11.16

TABLE 3. SOIL INTAKE RATES OF 2 ACRE PONDS BEFORE AND AFTER SOIL TREATMENT

Soil treatment					
Chisel 22 in.		Slip plow 48 in.		Untreated	
Prior	After	Prior	After	Prior	After
mm/day		mm/day		mm/day	
11.2	12.0	10.6	14.8	9.6	11.6

Analysis of Variance (level of significance of F test)

Treatment	Chiseled	Slip plow	Untreated
	%	%	%
Replications	1	1	5
Depth	1	1	1
Distance from tile trench	1	NS	1
Depth × distance	NS	NS	NS

three longitudinal strips by soil levees. The strips were further subdivided into five ponds with connecting spillways. Soil salinity samples to 5 feet of depth were taken 15 feet and 60 feet from the tile trench, in each of the pond areas of each strip. Each strip was flooded individually for a 1-month period. After the water had receded, soil samples of the areas were again taken. The levees were flattened, and the following year on February 16, 1967, the southern strip was chiseled to 22 inches, the center strip was slip plowed to 48 inches, and the north strip was left untreated. The field was left fallow for three months to allow the soil to dry out. The levees were again constructed and the strips flooded indivdually for 1-month periods with the exception of the untreated check, which was flooded for 2 months. After the water had receded in the ponds, soil samples were again taken at sites 15 and 60 feet from the tile trench. Soil samples were also taken directly over the tile. The infiltration rate was obtained by measuring the rate of fall of the impounded water.

The reduction in soil salinity from leaching the area prior to the soil manipulation was compared with the reduction from leaching after the soil manipulation (table 1). Conductivities of the saturated soil extract after leaching each soil treatment are shown in table 2. The rate of fall of the ponds after the cessation of water flow is shown in table 3.

The data indicate that the ponds which had been slip plowed showed the greatest reduction in salinity at the midpoint between the tile trenches. It is believed that the slip trench served to channel water flow to the tiles, allowing a faster movement of water at the midpoint between the tile. The result was a better leaching of salts from the midpoint.

Table 2 shows that both the chiseled area and the untreated area had significantly lower soil salinity in the tile trench. The slip-plowed area did not show this effect. It appears that the slip plow opened up the soil profile sufficiently to allow leaching from all points at the same depth to proceed at nearly equal rates.

Table 3 shows that the greatest increase in soil intake rates was in the slip plowed area.

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GASTROINTESTINAL PARASITISM OF LAMBS . . . *a survey of Imperial Valley feeder lambs*

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Animal husbandry practices in the production of fat lambs in the Imperial Valley of California are quite different from those in the remainder of the state. Shipment of feeder lambs into the Imperial Valley begins early in September and is usually completed by the end of October. The lambs are grazed inside temporary fencing on alfalfa and barley stubble pastures. Pastures of 80 acres are usually used, and a band of 1,500 to 2,000 lambs is grazed for 1 to 2 weeks, after which the lambs are driven or trucked to another pasture. Dry hay is occasionally fed as supplemental feed. Most shearing is done by the middle of December, and most of the lambs are marketed directly from pasture by the first of March. In view of these husbandry practices, different patterns in the host-parasite relationship might be expected between sheep and their gastrointestinal nematode (roundworm) parasites in the Imperial Valley than in other regions of the state.

To obtain information on the status of parasitism in Imperial Valley lambs, a cooperative project between the Agricultural Extension Service (El Centro) and the School of Veterinary Medicine, Davis, was initiated. This program was conducted for two years—1963 and 1964. The objects of the program were, first, to assess the level of parasitism in lambs arriving from different geographic areas; second, to determine whether or not the degree of parasitism increased or decreased during the feeding period; and third, to attempt to assess whether or not the parasites were detrimental to the growth of the lambs.

Procedure

In 1963, eight bands of sheep differing in origin or condition were selected for study, while in 1964, five bands were studied. These bands were characterized as follows: The eight bands in the 1963 tests included: (1) a "tail end" band of mixed blackface crosses sorted from a larger band and originating in the Fort Bridger area of southwestern Wyoming; (2) medium weights from the same original flock as band 1; (3) heavy lambs from the same original band from which bands 1 and 2 were selected; (4) whiteface crosses (Columbian rams × Western whiteface ewes) originating on the continental divide in southwestern Wyoming; (5) mainly crossbred blackface lambs shipped from San Angelo, Texas; (6) mainly whiteface lambs shipped from Artesia, New Mexico; (7) whiteface lambs shipped from the Fort Stockton area in west Texas; and (8) a band similar to band 7.

The five bands studied in 1964 included: (9) lightweight crossbred lambs from the Fort Bridger area of Wyoming (similar to band 1); (10) predominantly western whiteface lambs from the continental divide northeast of Fort Bridger, Wyoming (similar to band 4); (11) crossbred lambs from Ely, Nevada; (12) largely whiteface lambs from Pecos, Texas (band made up at Fort Stockton, Texas); and (13) a band similar to band 12.

To study the host-parasite relationships in these lambs, 40 individual fecal samples were collected at random from each band monthly for quantitative determinations of the number of parasite eggs per gram of feces (epg).

Results

In 1963, early egg counts in the feces of all bands originating in Texas (bands 5, 7, and 8) were considerably higher (see graphs 1 and 2) than in those of the bands from Wyoming (bands 1, 2, 3, and 4) and New Mexico (band 6). The reason for the higher egg count in the feces of the Texas bands is that these particular eggs were produced by *Haemonchus con-*