Swine Feeding Tests

supplemented cooked garbage tested in feeding trials in Los Angeles County

Hubert Heitman, Jr., and Chester A. Perry

Disposal of garbage as swine feed is of special importance in California—the leading state in numbers of garbage-fed swine—particularly in regions adjacent to densely populated areas, such as Los Angeles and San Francisco.

Prior to the national spread of vesicular exanthema in 1952, garbage fed to swine in the United States was—almost exclusively—raw. Since 1952 most states, including California, have enacted legislation requiring garbage to be cooked by heating to the temperature of boiling water and held there for 30 minutes. Available evidence indicated that cooked garbage was not as suitable a feed for swine as that fed raw. Because hog feeders in the state were not familiar with cooked garbage as a feed, studies were undertaken to demonstrate its usefulness and value.

Three feeding trials have been conducted on a large garbage feeding ranch in Los Angeles County. In each experiment there were 12 pens of four pigs each available. The hogs were Hampshires and typical of the area. The garbage was typical residential garbage and was well segregated, even though some paper and cans were present. It was hauled to the ranch in large trucks and semi-trailers with a capacity of approximately 20 tons. Steam pipes fastened on the beds of the trailers can be connected by flexible hoses to a steam generator to cook the garbage by steam injection.

Garbage was fed in wooden troughs to allow weighbacks, and dry feeds were fed in metal troughs. When antibiotic supplement was fed alone with garbage, the weighed quantity was mixed with a small quantity of garbage which was completely consumed before the remainder of the garbage was fed. Garbage was free-fed, and the level set was so that the weighback ran from one third to one half of the feed fed.

In the first two trials the supplemental value of barley was studied. Ground barley was fed at a rate estimated to be 10% of the dry matter requirement, or from 0.40–0.53 pound per pig per day.

The addition of barley increased weight gain about 20% in both trials, while in Trial *2* the daily garbage consumption was reduced, resulting in a greater weighback. Garbage fed and consumed per pound of gain was reduced. One pound of barley replaced 9–10 pounds of cooked residential garbage in Trials *1* and *2*. When a mixture of equal parts ground barley and alfalfa meal was fed as 10% of the estimated dry matter requirement—Trial *1*—results indicated that the beneficial effects were due to the amount of barley the supplement contained. One pound of mixture replaced approximately five pounds of garbage.

In Trials *2* and *3*, the addition of the antibiotic aureomycin at a level of 0.1 gram daily per pig was studied. This level approximates 35–50 grams per ton of dry feed. In Trial *2* the addition of aureomycin supplement increased weight gain about 28% and decreased the amount of garbage fed and consumed per unit of gain by about 22%. The results of antibiotic supplementation in Trial *3* were negative and failed to substantiate those of Trial *2*.

Level of garbage feeding was shown in Trial *3* to affect weight increase even though at the lowest level of garbage feeding there was over 20% weighback. As the average daily feed was increased from 16.5 pounds to 25.0 pounds daily per pig, weight gain was increased 15% and when increased to 36.1 pounds daily per pig, the weight gain was 18% greater. The increase in rate of feeding caused an actual increase in garbage consumption of 26% and 11% that was reflected in increased gain. But the increase in feed increased the weighback and the amount fed per unit of gain.

At the level of garbage feeding established—weighback one third to one half—each ton of cooked garbage fed produced 48–80 pounds of pork. In Trial *3* the increased level of feeding decreased the amount of pork produced per ton of garbage fed from 63 pounds to 39 pounds. These figures are undoubtedly higher than growers obtain in practice because of the smaller groups used in these trials and resultant less crowded conditions. They also emphasize the large problem feeders have in disposal of weighback where feeding level of garbage is high with resultant higher gains.

The equivocal results obtained with antibiotic are not unexpected because they are representative of results obtained under typical grain feeding conditions. The use of grain supplement and level of garbage feeding will be deter-

Trial 1
83 days, 4 pens of 4 pigs each—16 pigs—per treatment

Lot	1	2	3
Ration	Garbage	Garbage plus barley	Garbage + barley + alfalfa
Initial wt., lbs.	63.9	63.7	66.9
Average total gain, lbs.	72.3	87.3	80.6
Average daily gain, lbs./pig	.87	1.05	.97
Feed fed/lb. gain, garbage, lbs.	25.1	20.8	22.6
dry feed, lbs.		.43	.47
Feed consumed /pound gain, garbage, lbs.	14.0	11.0	12.5
dry feed, lbs.		.43	.47

Trial 2
83 days, 3 pens of 4 pigs each—12 pigs—per treatment

Lot	1	2	3	4
Ration	Garbage	Garb. + aureomycin	Garb. + barley	Garb. + barley + aureo
Initial wt., lbs.	51.5	52.7	49.9	51.6
Av. total gain, lbs.	57.7	72.6	67.0	86.8
Av. daily gain, lbs./pig	.70	.87	.81	1.05
Av. daily feed consumption, lbs./pig garbage	13.1	14.3	12.8	12.8
dry feed			.44	.44
Weighback, %	44.5	39.4	45.8	45.8
Feed fed /lb. gain garbage, lbs.	34.1	27.0	29.3	22.4
dry feed, lbs.			.55	.46
Feed consumed/lb. gain garbage lbs.	18.9	16.4	15.9	12.2
dry feed, lbs.			.55	.46

Trial 3
84 days, 2 pens of 4 pigs each—8 pigs—per treatment

Lot	1	2	3	4	5	6
Ration	Garbage Level 1[1]	Garbage Level 1 + aureomycin	Garbage Level 2[2]	Garbage Level 2 + aureomycin	Garbage Level 3[3]	Garbage Level 3 + aureomycin
Initial wt., lbs.	28.2	27.2	27.5	28.6	30.2	24.0
Av. total gain, lbs.	43.9	48.1	51.0	54.5	63.7	60.9
Av. daily gain, lbs./pig	.52	.57	.61	.65	.76	.72
Av. daily feed consumption lbs./pig	12.3	12.7	15.7	15.9	17.8	17.2
Garbage fed/lb. gain, lbs.	32.9	30.4	43.1	40.4	49.7	52.0

[1] Level 1 fed to estimated weighback of 1/3.
[2] Level 2 fed to estimated weighback of 1/2.
[3] Level 3 fed to estimated weighback of 1/2.

mined by local economic conditions reflecting the relationship between price of hogs and price of feeds including garbage. The results in all trials indicate the palatability and suitability of cooked residential garbage as a swine feed.

Hubert Heitman, Jr., is Associate Professor of Animal Husbandry, University of California, Davis.

Chester A. Perry is Farm Advisor, Los Angeles County, University of California.

This study was financed in part by the California Swine Growers through the California Farm Bureau Federation, Inc.

Rancher C. J. Lyons of Saugus cooperated in the swine feeding trials

LETTUCE APHID

Continued from page 8

deeply and allowed to dry thoroughly before being replanted to lettuce. Often lettuce can produce a satisfactory crop—even with a heavy infestation of aphids—if it can be made to grow rapidly. Even, adequate irrigation and the elimination of cracks through which winged aphids can enter the soil often assist in averting damage.

Some varietal differences in susceptibility to the lettuce root aphid have been observed. Imperial strain E-4—currently not an acceptable commercial variety—is the most resistant variety found to date, and attempts are being made to incorporate that resistance in the commercial variety Great Lakes.

Based on the results of the investigations in 1956, it is possible to control the European lettuce root aphid by a preplanting soil treatment with parathion at five pounds of actual chemical per acre. However, parathion is a highly toxic organic phosphate insecticide and all precautions and rules on the label should be followed and permits from the County Agricultural Commissioner are required before it can be purchased or used. Parathion should only be used for summer and fall harvested acreages and ordinarily only where there is a history of aphid attacks. Protection will probably last for only a single crop.

W. H. Lange is Associate Professor of Entomology, University of California, Davis.

L. C. Benson is Assistant Extension Specialist, University of California, Berkeley.

D. C. Force was Research Assistant, Department of Entomology, University of California, Davis, when these studies were made.

A. A. Grigarick is Senior Laboratory Technician, Department of Entomology, University of California, Davis.

N. F. McCalley is Assistant Specialist in Entomology, University of California, Davis, stationed at Salinas.

The analyses for the presence of parathion were made by Professor W. M. Hoskins and the Insect Toxicology Laboratory, University of California, Berkeley.

CUTTINGS

Continued from page 11

alcohol can be used satisfactorily. This solution will keep indefinitely without losing its effectiveness, but should be tightly sealed and stored in the dark.

Curtis Lynn was Graduate Student and Laboratory Assistant in Pomology, University of California, Davis, when this study was made.

H. T. Hartmann is Associate Professor of Pomology, University of California, Davis.

California Agriculture, *May 1956, page 7, published a description of mist equipment.*

STRAWBERRY

Continued from page 4

rooting habit of the strawberry, because most of its feeder roots are rather shallow. When the strawberry beds were formed the top soil—which had a good potassium content—was piled together. Therefore, most of the strawberry roots were in soil with an adequate potassium supplying potential. This contrasts with the apricot trees, which had no roots in the cultivated surface and were unable to obtain adequate supplies from the deeper layers of soil. The fact that the apricot requires large amounts of potassium as shown by leaf analyses may also be pertinent.

The reason for the failure of the strawberry plants to absorb potassium from the added fertilizer is not so clear. The large amount applied to the beds should have encouraged luxury consumption.

This trial does not provide any basis for considering the use of a complete fertilizer for strawberries under similar conditions. Further trials are in progress in other districts to determine what may be expected on other soil types and under different climatic conditions.

E. L. Proebsting is Professor of Pomology, University of California, Davis.

Lee C. Benson is Extension Specialist, University of California, Berkeley.

WALNUT

Continued from page 10

maturity. Thorough application is most essential, and special care must be exercised when trees are in full leaf.

Although OMPA is the most effective aphicide for the control of the walnut aphid, it can not be used commercially because it has not been nationally registered by the United States Department of Agriculture for use on walnuts, nor has a tolerance been established by the Food and Drug Administration as authorized by the Miller Amendment.

However, satisfactory control can be expected where Systox is applied twice at a dosage of 0.25–0.37 pound—1–1½ pints of two pounds per gallon emulsion—per acre for each treatment if applications are made with an air carrier sprayer. The first application should be made in the spring and the second in July or August, when the aphid population begins to increase. To avoid injury from Systox it should not be applied until after the leaves are fully expanded. Further, applications should not exceed a total of 0.75 pound—three pints—in a single treatment or during a season, and no treatment should be made closer than three weeks before harvest.

An effective treatment is to use BHC or nicotine in the first treatment, followed by a 0.25–0.37 pound application of Systox when needed in June or July.

Walnut Aphid Control Treatments

Where air carrier sprayers are used, the aphicides listed below have given adequate aphid control when incorporated with the codling moth spray. If used alone, the aphicide should be applied in from 50–150 gallons of water per acre, depending on the air capacity of the sprayer.

Aphicide	Amount per acre
Parathion, 25% wettable powder	1.0–1.5 lbs.
or	
Malathion, 25% wettable powder	3–4 lbs.
or	
TEPP, 40%	¾–1 pt.
or	
Nicotine, 25% dry concentrate	5–6 lbs.
or	
BHC—12% gamma isomer	3.75–4.00 lbs.
or	
Systox	0.25–0.37 lb.

Where conventional sprayers were used, the aphicides gave good control when applied as full coverage sprays. The amounts used per 100 gallons of spray were:

Aphicide	Amounts per 100 gallons
Parathion, 25% wettable powder	3 oz.
or	
Malathion, 25% wettable powder	8 oz.
or	
Nicotine, 25% dry concentrate	10 oz.
or	
BHC—12% gamma isomer	8 oz.
or	
Systox—two pounds per gallon concentrate	¼ pt.

Because of the danger of BHC imparting an off-flavor to the harvested nuts, it should not be used more than once in a season, or later than May, and never at a concentration greater than that recommended by the manufacturer.

In areas where the walnut aphid is resistant to phosphate aphicides, other treatments than parathion, malathion or TEPP should be utilized.

Control of the walnut aphid can be obtained with dusts, where they are thoroughly applied. A 4% malathion dust or a 1% TEPP dust or a 2% nicotine dust applied at the rate of 40–60 pounds per acre have resulted in satisfactory control.

A. E. Michelbacher is Professor of Entomology, University of California, Berkeley.

Stephen W. Hitchcock is Research Assistant, University of California, Berkeley.