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J.W. Wilson

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AGRICULTURAL EXPERIMENT STATION

SOUTH DAKOTA
STATE COLLEGE OF AGRICULTURE
AND MECHANIC ARTS.

Animal Husbandry Department

RAPE PASTURE FOR PIGS IN
CORN FIELD
KAOLIANG FOR PIGS

BROOKINGS, SOUTH DAKOTA

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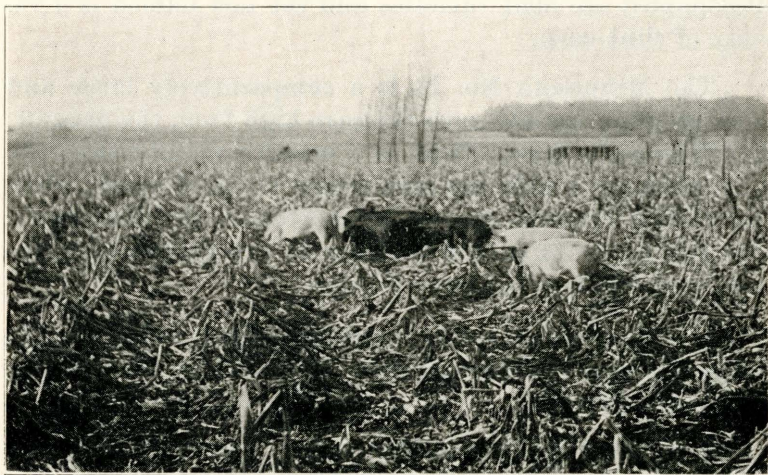
RAPE PASTURE FOR PIGS IN CORNFIELD.

By James W. Wilson.

INTRODUCTION.

Some pork producers in South Dakota practice the turning of their pigs in the cornfield during the late summer and early fall to pick their own feed instead of gathering the corn and hauling it to them. The practice is a good one because it saves much labor.

Pigs do well under these conditions, probably because they secure more of a variety of forage with their corn than they would receive in a dry lot or even on a good pasture. By this practice they are required to take exercise which is also a benefit to the growing pig. In this connection we believe there would be less disease and ailments of different kinds if more exercise were required of the pig. We further believe that if the pig were required to take more exercise the body would be better developed and we would hear less complaint of breeds of hogs "running out."



A Clean Job of Picking Corn.

The above picture shows that the pigs did a thorough

piece of work. Even the kernels of corn were picked up, probably a cleaner job of picking than when the corn is picked by hand or with machinery.

Before turning in the field we believe it a good practice to feed new corn cut from the field so that they may be brought to their new ration gradually.

The number of pigs to put on an acre will depend on the condition of the corn. Because of the uncertainty of the weather in the late fall it is better to put on too many than not enough as a few will knock down the corn and eat part of the ears and make it difficult to husk. Then again the waste will be great under these conditions as there will be much shelled corn on the ground uneaten.

THE OBJECT

The object of this experiment was to determine the relative feeding value of the three following well known varieties of corn for hogging off purposes: Minnesota No. 13, Wisconsin White Dent, and Yellow Triumph. The two first named are dent varieties and the last named is a variety of flint corn.

The Minnesota No. 13 is a comparatively large and rank growing variety with the ears high from the ground; the Wisconsin White Dent is a smaller variety than the first mentioned with the ears closer to the ground; while the Yellow Triumph flint is the shortest of the three varieties and bears its ears still closer to the ground than the dent varieties but has more foliage.

It was also desired to determine the relative feeding value of these varieties of corn when fed in conjunction with rape pasture.

Ten years ago at this Station an experiment was conducted by the writer, the object of which among other things was to determine the value of rape pasture for pigs. The results of this experiment were published in Bulletin No. 90 (edition exhausted) and summarized as follows:

At the close of this experiment these hogs were worth four cents per pound in the local market. From the above tables it may be seen that the lot fed barley and rape gained forty-four pounds more than the lot fed barley without rape. The two lots consumed practically the same quantity of grain, and it required five and seventy-seven hundredths pounds of barley to produce a pound of gain in lot one, and for forty-four additional pounds of gain it should have required two-hundred and fifty-three and eighty-eight hundredths pounds more of barley at thirty-four cents per fifty pounds which is the value of the quarter acre of rape.

In calculating the cost of producing one hundred pounds of gain, the rape pasture is valued at \$7.04 per acre as this was found to be its actual value according to the difference in gains made by Lot I and Lot II at four cents a pound.

The results of these two experiments show that pigs make better gains when they have rape pasture with their grain. For the past 12 years we have made it a practice of sowing rape for pig pasture to be used after other grasses have dried up in the fall of the year.

When the pigs in the lots that did not have rape were driven to the scales to weigh it was noticed that they ate the grass in the lane with unusual greed.

THE EXPERIMENT

In the spring of 1914 a small field was divided into three equal areas. On the first one-third was planted the Minnesota No. 13 corn, a dent variety. On the second area was planted the Wisconsin White Dent, and on the third area was planted the Yellow Triumph flint.

After the last cultivation each of these areas was divided again, and on the second, fourth and sixth areas Dwarf Essex rape was drilled in between the rows with a one horse drill at the rate of four pounds of seed to the acre. In 1913 the same experiment was attempted when

we sowed the rape broadcast before the last cultivation. Whether the system of planting the rape or the seed was poor was the cause of not securing a stand we are unable to state. Thirty-six pigs, ranging in age from four to six months were sorted into six different lots with the weights and sizes as near equal as possible, and were weighed up for the experiment. They had the run of the fields for 42

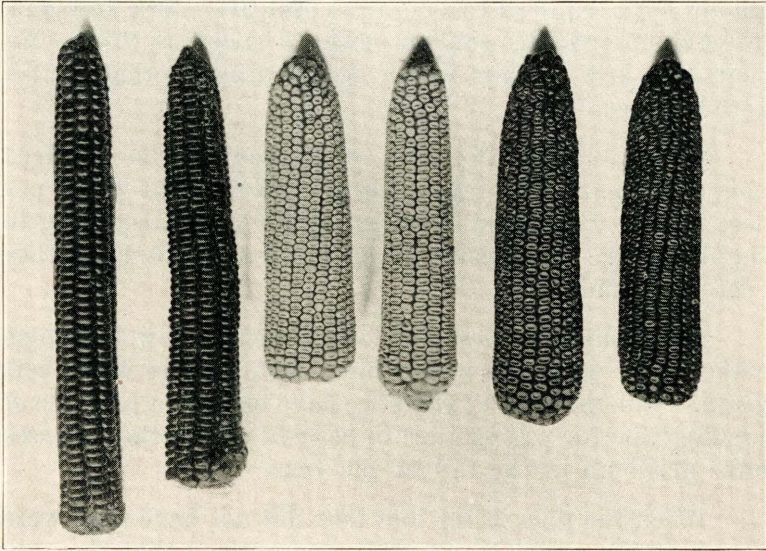


Fig. II. Showing Kinds of Ears of Each Variety

days. Wood ashes and salt were put in each lot and no other feed was given them in addition to what they could pick in the lots.

RESULTS

In this experiment we found that there was a marked difference in the growth of rape in the different kinds of corn.

The best growth of rape was in the lot that was planted to the Wisconsin White dent corn. The next best was in the lot planted to the Yellow Triumph flint and the

poorest growth was in lot planted to the Minnesota No. 13 variety of dent corn.

The eighteen pigs in the three lots receiving corn without rape made an average daily gain per head of 1.06 pounds. The eighteen pigs in the three lots that were receiving rape pasture in addition to their corn ration



Lot IV. Showing Good Stand of Rape in Wisconsin White Dent Lot

made an average daily gain per head of 1.28 pounds. From these two statements it will be seen that the rape pasture caused an increase of over one-fifth in the daily gain of the pig.

The twelve pigs in the two lots planted to Wisconsin White dent and Yellow Triumph flint corn made an average gain per head of 51 pounds as compared to an average of 45 pounds made by the twelve pigs in lots planted to Minnesota No. 13 corn. From a study of the table of

weights and gains it is apparent that the rape pasture is the cause of this difference in gain per head.

At the beginning of the experiment the growth of rape in Lot II was about one-third as large as the growth of



Lot II. Showing the Stand of Rape in Minnesota No. 13 Lot. Compare This With Lot IV above and Note the Difference.

rape in Lots IV and VI. This stunted growth was caused by the rank growth of the Minnesota No. 13 variety of corn. This variety completely shaded the ground.



Lot VI. Showing Stand of Rape in Flint Corn. Compare This With Lot II Above and Note the Difference.

WEIGHTS AND GAINS

Lot I. Minnesota No. 13 Corn

No. of pig	Weight Aug. 22	Weight Sept. 21	Weight Oct. 3	Gain per head	Gain per head daily
1	67	86	93	26	.61
2	113	151	161	48	1.14
3	95	123	137	42	1.00
4	77	113	126	49	1.16
5	122	161	179	57	1.36
6	89	119	134	45	1.07
Total	563	753	830	267	
Average	93	125	138	44	1.04

Lot II. Minnesota No. 13 Corn and Rape

7	127	163	188	61	1.45
8	87	113	126	39	.92
9	75	94	105	30	.71
10	106	135	156	50	1.19
11	70	94	106	36	.85
12	111	152	177	66	1.57
Total	576	751	858	282	
Average	96	125	143	47	1.11

Lot III. Wisconsin White Dent

13	67	87	94	27	.64
14	91	120	137	46	1.09
15	102	134	150	48	1.14
16	92	114	125	33	.78
17	132	186	209	77	1.83
18	81	113	124	43	1.02
Total	565	754	839	271	
Average	94	125	139	45	1.08

Lot IV. Wisconsin White Dent and Rape

19	128	172	192	61	1.52
20	85	127	149	64	1.52
21	136	174	199	63	1.50
22	96	127	137	41	.97
23	89	116	138	49	1.16
24	83	127	147	64	1.52
Total	617	843	962	345	
Average	102	140	160	57	1.36

Lot V. Flint Corn

25	70	95	108	38	1.02
26	113	138	159	46	1.09
27	121	154	171	50	1.19
28	101	131	147	46	1.09
29	65	79	89	24	.57
30	132	172	193	61	1.45
Total	602	769	867	265	
Average	100	128	144	44	1.05

Lot VI. Flint Corn and Rape

31	58	86	101	43	1.02
32	64	99	116	52	1.23
33	140	187	206	66	1.57
34	125	184	207	82	1.95
35	76	106	119	43	1.02
36	83	123	145	62	1.47
Total	546	785	894	348	
Average	91	130	149	58	1.38

KAOLIANG AND ALFALFA HAY FOR PIGS

By James W. Wilson

Both alfalfa and kaoliang do well in the semi-arid section of South Dakota. This is the reason why they were fed together in this experiment. Again, swine should have other feed than corn during the long winter and we know of no other crop to grow, that can be grown so successfully in all sections of the state, to furnish the proteinaceous part of the ration better than alfalfa. When given a chance pigs do not eat much hay but it is evident what little they do eat tends to larger gains.

During the fall of 1913 a quantity of this comparatively new grain was purchased in the vicinity of Highmore, South Dakota, and shipped to the Station at Brookings, for a feeding test with pigs. The object of this experiment was to determine the relative feeding value of kaoliang and corn when fed with and without alfalfa hay.

CHEMICAL ANALYSIS OF FEED

By Guy E. Youngberg, Assistant in Chemistry

	Per cent moisture	Per cent ether extract	Per cent crude protein	Per cent ash	Per cent crude fiber	Per cent N. free extract.
Corn meal	13.00	3.87	10.15	1.19	2.17	69.62
Kaoliang meal	9.88	4.35	14.93	2.56	2.45	65.83

The analysis shows that kaoliang contains a large per cent of protein, an element necessary for best development of all kinds of live stock.

The United States Department of Agriculture reports that kaoliang has a nutritive ratio of one to eight. This we might rank between oats and corn, better for the growing animal than corn but not as good as corn for the fattening animal.

The ground kaoliang was highly palatable for pigs. From the nature of the seed we believe it should always be ground before feeding.

As to its value as a drought-resistant plant I quote from a report made by Mr. O. Hull of Alma, Harlan County, Nebraska, as follows:

"I was furnished four pounds of kaoliang seed from the Highmore Station. It was planted on our farm in Harlan county, Nebraska, May 10th, 1913, on an acre of ground. It was planted with a lister the same as corn and cultivated the same. On one side of the kaoliang was a strip of kafir corn and on the other side was common corn, all being planted at the same time and in the same way. The ground was doubled disked and then listed and cultivated four times.

"Owing to the extreme dry hot weather the kafir corn grew only about two feet, six inches tall, and only now and then a head showed up, and then died. The common corn nearly came in tassel, had no ears, and was fit only for the silo, while the kaoliang, between the two, all headed out and matured seed at the rate of twenty bushels per acre.

"When we consider the light rainfall during the growing months and the extreme heat, I think this yield quite remarkable. In May the rainfall was only 2.52 inches, in June 4.19 inches, in July .33 of an inch and in August .06 of an inch.

"During the last part of July and the month of August we had 36 days when the thermometer showed a degree of heat ranging from 100 to 110 F. in the shade."

The sixteen pigs used for this experiment were a strong vigorous lot and were in poor condition to expect any large gains. Then too the time of the year, during midwinter, was not the best for large gains. However, they were divided into four lots of four head each, making the lots as uniform as to size and breed as possible.

In two of the lots were placed small racks to hold the

alfalfa hay. At this time of the year pigs relish a green forage of any kind and it is evident from the table of weights and gains that the lots that received the alfalfa hay returned a larger gain than those that did not receive the hay. The pigs did not eat the entire hay fed but sought after the leaves and the more delicate parts.

RESULTS

Lot I.

Kaoliang Meal and Alfalfa Hay

	Pounds
Total grain fed	1262
Total alfalfa hay fed	217
Total gain for lot.....	217
Average pounds of kaoliang for pound of gain....	5.81
Average pounds of hay for pound of gain	1.00

Lot II.

Kaoliang Meal

Total grain fed	1277
Total gain for lot	193
Average pounds of kaoliang for pound of gain....	6.61

Lot III.

Corn Meal and Alfalfa Hay

Total grain fed	1348
Total alfalfa hay fed	217
Total gain for lot	291
Average pounds of corn meal for pound of gain..	4.63
Average pounds of alfalfa hay for a pound of gain	.74

Lot IV.

Corn Meal

Total grain fed	1375
Total gain for lot	263
Average pounds of corn meal for a pound of gain	5.22

These results show that by feeding alfalfa hay less

grain was required in each case for the production of a pound of gain than when no alfalfa was fed.

Valuing the grains at one cent a pound and the hay at \$15.00 a ton, a pound of pork was produced for \$6.61 a hundred with kaoliang alone. When alfalfa hay was fed with the ground kaoliang 100 pounds of gain were made for \$6.56. With the lot that received corn meal it cost \$5.22 to produce 100 pounds of pork, and when alfalfa hay was fed with the corn meal 100 pounds of gain were made for \$5.19.

There is a large area in the Northwest where the season is not suitable for the production of corn as a grain crop. These results show that kaoliang is one of the best if not the best crop to grow in the semi-arid section for grain.

TABLE OF WEIGHTS AND GAINS

No. of pig.	Weight at beginning Feb. 1	Weight Mar. 2	Weight at close Mar. 28	Gain	Days fed	Average gain per head daily
Lot I. Kaoliang and Alfalfa Hay.						
1	240	264	304	64	55	1.16
2	171	188	206	35		.63
3	181	198	222	41		.74
4	234	268	311	77		1.40
Total	826	918	1043	217		
Average gain		23	31	54		.98
Lot II. Kaoliang.						
5	253	252	306	53		.94
6	201	229	258	57		1.03
7	171	182	195	24		.43
8	204	236	263	59		1.07
Total	829	929	1022	193		
Average gain		25	23	48		.87
Lot III. Corn and Alfalfa Hay						
9	201	232	327	126		2.30
10	242	284	330	88		1.60
11	149	152	168	19		.35
12	198	223	256	58		1.05
Total	790	891	1081	291		
Average gain		25	47	73		1.32
Lot IV. Corn						
13	180	218	274	94		1.71
14	241	252	294	53		.96
15	171	197	228	57		1.03
16	190	216	249	59		1.07
Total	782	883	1045	263		
Average gain		25	40	66		1.19

SUMMARY

1. Results show that flint corn is about equal to dent corn for pigs. The 12 head receiving dent corn made an average gain per head of 45 pounds during the 42 days, as compared to an average of 44 pounds per head for lot receiving flint corn.

2. In each case the pigs receiving rape pasture with their ration of corn made larger gains than those that were getting corn alone.

3. Because the supply of flint corn was exhausted we were compelled to close the experiment. As the areas were equal and there were the same number of pigs on each, an acre of flint corn is not equal to an acre of dent corn for hogging off purposes. However, the flint variety might be of more value in localities where the dent varieties will not mature.

4. The low growing varieties of dent corn are to be preferred, to the tall growing varieties, to secure a suitable growth of rape, as the rape plant does not flourish when shaded.

5. Much labor may be saved by allowing the pig to pick his own living in the cornfield; and a cleaner job of husking is the result, providing the pig does not have too large an area.

6. The table of weights and gains shows that the gains made by the heaviest pigs compare favorably with the gains made in experiments where the ration was much more expensive.

7. Kaoliang grain is not as good as corn for fattening pigs. But when we consider its great drought resistant qualities it is a better feed to grow in some sections of the state than corn. See South Dakota Bulletin No. 156.

8. Both lots of pigs receiving the alfalfa hay with their grains made larger gains than pigs in lots not receiving alfalfa hay.

AVAILABLE BULLETINS

99. Macaroni and Durum Wheats. A continuation of Bulletin 92.
105. Stock Foods for Pigs.
106. Sugar Beets in South Dakota.
107. Sheep Scabs.
108. New Hybrid Fruits.
109. Rusts of Cereals and Other Plants.
111. A Study of South Dakota Butter with Suggestions for Improvement.
112. The Killing of Mustard and other Noxious Weeds in Grain Fields by the Use of Iron Sulphate.
113. Progress in Variety Tests of Barley.
114. Digestion Coefficients of Grain and Fodders for South Dakota.
115. Report of Work for 1907 and 1908 at Highmore Sub-Station.
116. Acidity of Creamery Butter and its Relation to Quality.
117. Sugar Beets in South Dakota.
123. Milk Powder Starters in Creameries.
125. Fattening Steers of Different Ages.
126. Alkali Soils.
127. Breeding and Feeding Sheep.
129. Growing Pedigreed Sugar Beet Seed in South Dakota.
130. Some New Fruits.
131. Scabies (Mange) in Cattle.
132. Effects of Alkali Water on Dairy Products.
134. More Winter Dairying in South Dakota.
135. Trials with Millets and Sorghums for Grain and Hay in South Dakota.
136. Fattening Pigs.
137. Wintering Steers.
138. Hog Cholera.
139. Soil and Crop and Their Relation to State Building.
141. Co-operative Tests of Alfalfa from Siberia and European Russia.
142. Sugar Beets In South Dakota—Results to Date.
143. Roughage for Fattening Lambs.
144. Preliminary Report on the Milking Machine.
145. A Report of Progress in Soil Fertility Investigations.
146. Some Varieties and Strains of Wheat and their Yields in South Dakota.
147. The Effect of Alkali Water on Dairy Cows.
148. Corn Silage and Mill Products for Steers.
149. Some Varieties and Strains of Oats and their Yields in South Dakota.
150. Weeds.
151. Trials with Sweet Clover as a Field Crop in South Dakota.
152. Testing and Handling Dairy Products.
153. Selecting and Breeding Corn for Protein and Oil in South Dakota.
154. The Pit Silo.
155. Selection and Preparation of Seed Potatoes, Size of Seed Pieces, and Bug-Variation.
156. Kaoling, A New Dry Land Crop.